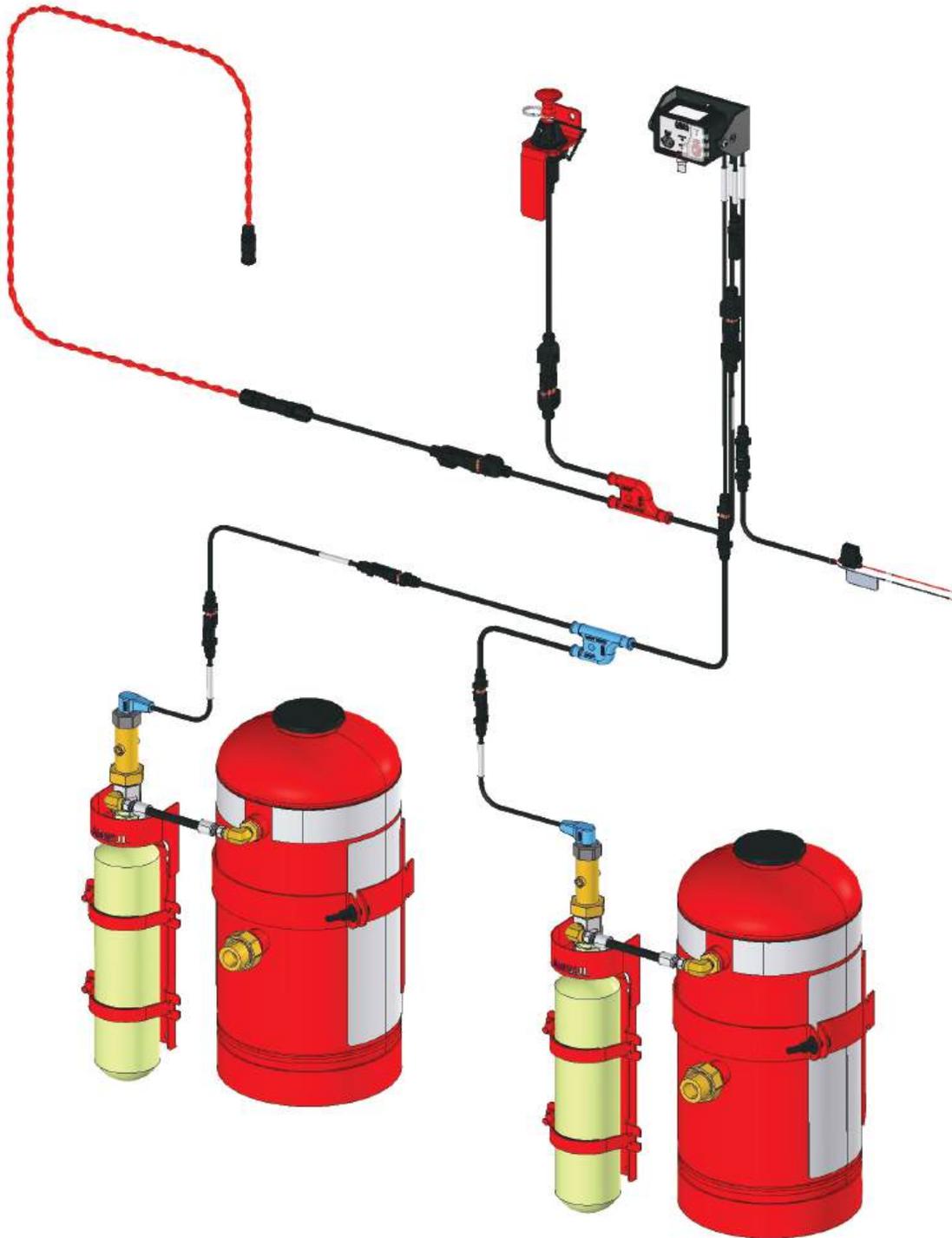


# CHECKFIRE 110-D DETECTION AND ACTUATION SYSTEM



## PLANNING, INSTALLATION, OPERATION, AND MAINTENANCE MANUAL



009149a



This manual is intended for use with the ANSUL® CHECKFIRE 110-D Detection and Actuation System. This system is specifically engineered for monitoring and release of vehicle fire suppression systems. Planning, installation, recharge, and maintenance of the system must conform to the limitations detailed in this manual. Installation and maintenance shall be performed by an individual holding current ANSUL® Certification from an ANSUL® CHECKFIRE 110-D Training Program with training to plan, install, recharge, and maintain the CHECKFIRE 110-D Systems. Individuals must also hold current ANSUL® Certification for applicable vehicle suppression systems being installed.

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

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

The application and use of the CHECKFIRE 110-D System is limited to the applications and uses described in this manual. For other applications, contact your Authorized ANSUL® Distributor, Territory Manager, or Johnson Controls – Technical Services Department, Marinette, Wisconsin 54143-2542, USA.

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

#### **DISCLAIMER:**

Johnson Controls does not make any representations, warranties or guarantees, expressed or implied, as to the accuracy or completeness of the manual. Users must be aware that updates and amendments will be made from time to time to the manual. It is the user's responsibility to determine whether there have been any such updates or amendments. Neither Johnson Controls nor any of its directors, officers, employees, or agents shall be liable in contract, tort, or in any other manner to any person for any loss, damage, injury, liability, cost, or expense of any nature, including without limitation incidental, special, direct, or consequential damages arising out of or in connection with the use of the manual.

All instructions contained herein relate to a typical installation.

Part Number: A16381NWJ8

Date: 2023-MAR-24

ANSUL®, CHECKFIRE, and the product names listed in this material are marks and/or registered marks. Unauthorized use is strictly prohibited.

 **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.

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**NOTES:**

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**NOTES:**

## SYSTEM DESCRIPTION

The CHECKFIRE 110-D Detection and Actuation System is typically used with an ANSUL® A-101 or LVS Vehicle Fire Suppression System for 24-hour protection of equipment. The system is designed for vehicles in extreme environmental and physical conditions.

Industries where vehicles use CHECKFIRE 110-D Systems:

- Forestry
- Agriculture
- Construction
- Public transportation
- Public utilities
- Land fills
- Waste disposal
- Mining

The automatic detection and actuation system provides monitored input/output circuits to activate an ANSUL® fire suppression system. On detecting a fire condition, the control module activates the release circuit resulting in the discharge of an expellant gas cartridge initiating fire suppression system operation. Optional pneumatic actuation is available.

## CHECKFIRE 110-D Features

- Supervised power, detection, and release circuits
- External primary power with an internal reserve power source
- Selectable release time delay
- Electric “DELAY/Reset/Silence” button
- “PUSH To Activate / Alarm When Lit” electric manual activation button
- Color-coded “Plug and Play” connections
- Minimum 75 dB Internal Sounder
- System isolate feature
- Dust and water tight (IP68 rated)

## CHECKFIRE 110-D Specifications

### CONTROL MODULE POWER (24 HOUR OPERATION)

12/24 VDC vehicle Primary power source

Internal 72 hour reserve power source

### SYSTEM CURRENT DRAW

Nominal: 4 mA @ 10.2 – 28 VDC

- Maximum: 50 mA @ 10.2 – 28 VDC

### OPERATING TEMPERATURE LIMITS

– 40 °F to 140 °F (– 40 °C to 60 °C)

### APPROVALS

CE Marked

## CHECKFIRE 110-D Connectivity

The modular cable harness system includes four leads for Detection, Release, External Power, and Alarm Output. See Figure 1-1.

### DETECTION INITIATING / MANUAL ACTIVATION CIRCUIT

Connects to:

- Detection Circuit Cable and Detection Circuit “h” Cable
  - Electric Manual Actuator
  - Linear Detector

### RELEASE CIRCUIT

Connects to:

- Release Circuit Cable
  - Release Circuit “h” Cable
  - Release Circuit Drop Cable
  - Protracting Actuation Device

### PRIMARY POWER CIRCUIT

Connects to:

- Power Circuit Cable
  - Fused Power Circuit Cable
  - Over-Voltage Protection

### ALARM OUTPUT CIRCUIT (Optional)

Connects to:

- Vehicle electronics (digital 3.3 VDC output)



NOTE: CABLES SHOWN SHORTER THAN ACTUAL LENGTH

FIGURE 1-1  
CHECKFIRE 110-D CONTROL MODULE LEADS  
011959

TYPICAL SYSTEM CONNECTIONS

Four leads provide easy CHECKFIRE 110-D System installation, see Figure 1-2.

**Detection Circuit Lead:** Permits multiple-detection options using Detection Circuit Cables, and Detection Circuit “h” Cables, for the main detection trunk and branch lines.

Options:

- Electric Manual Actuators (EMA)
- Linear Detectors

**Release Circuit Lead:** Connects to a maximum of 2 Electric-Pneumatic Actuators installed on the agent tank expellant gas cartridges; components include: Release Circuit Cables, Release Circuit “h” Cable and Release Circuit Drop Cables.

**Primary Power Circuit Lead:** Provides a direct connection to the vehicle power source using Power Circuit Cables and a single Fused Power Circuit Cable.

**Alarm Output Lead:** Connects to vehicle electronics (by others) as needed (connection line not shown).

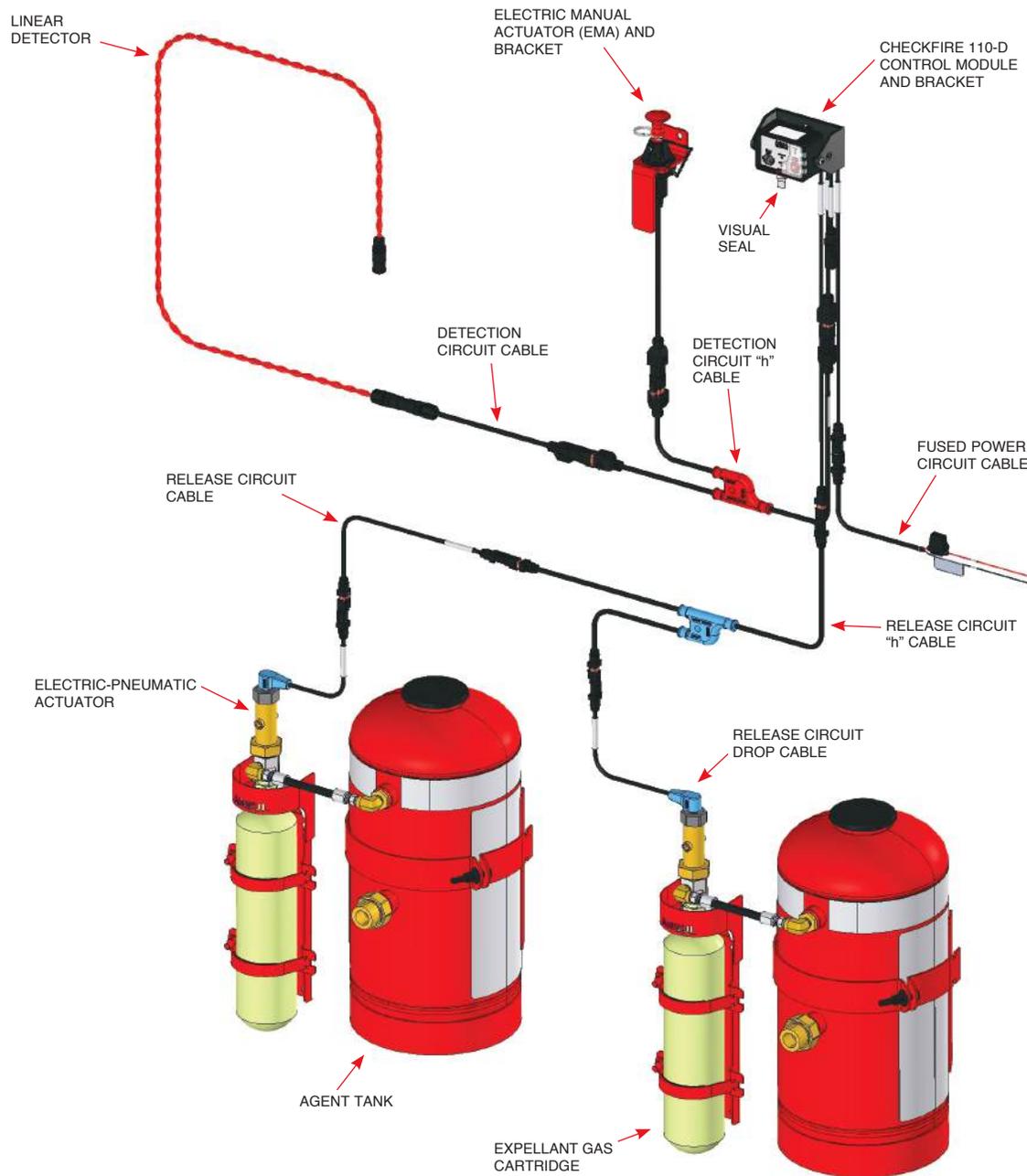


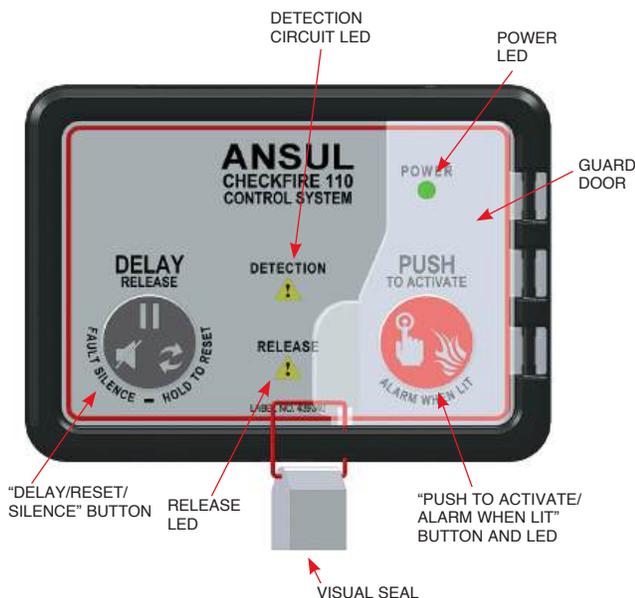
FIGURE 1-2  
SYSTEM CONNECTIONS  
009149a

**CHECKFIRE 110-D CONTROL MODULE**

**Part No. A16381C9PH**

Provides communication and control of input/output components. See Figure 2-1.

- Durable high-strength glass-filled nylon material
- UL94 Flame rating
- Surface or bracket mounted
- Two index pins on back for secure mounting
- Ambient temperature range -40 °F to 140 °F (-40 °C to 60 °C)
- LED indicators provide notification of system status (Internal Sounder matches LED pulse rate)
- “PUSH To Activate / Alarm When Lit” manual-activation Button and LED
  - Provide manual operation (immediate release)
  - Indicates alarm condition
- Guard door with visual seal to protect manual-activation button
- “DELAY/RESET/SILENCE” Button
  - Restarts Time DELAY sequence when initiated before release function activities
  - Resets control module
  - Silences audible notifications during fault conditions
  - Activates/Deactivates system ISOLATE feature



**FIGURE 2-1**  
**CHECKFIRE 110-D CONTROL MODULE**  
009151

**NOTICE**

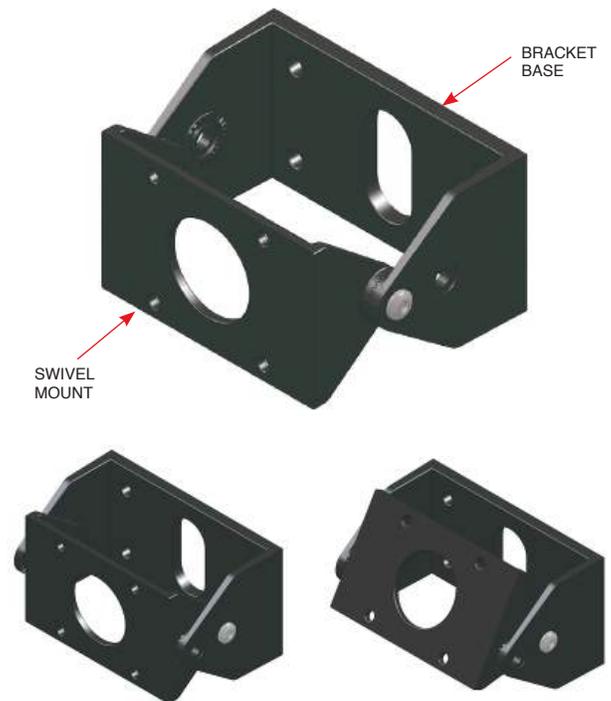
The Control Module should never be mounted in an area subject to pressure washing or steam cleaning.

**CHECKFIRE Mounting Bracket**

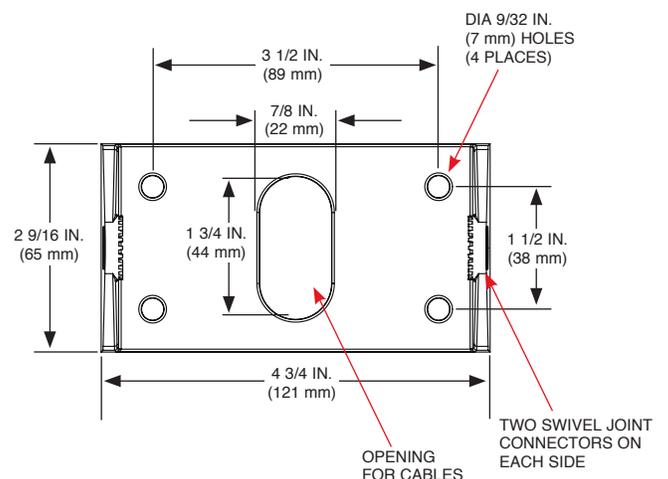
**Part No. 439564**

Provides flexible bracket mounting for the Control Module at various viewing angles. See Figure 2-2.

- Constructed with high-strength glass-filled nylon material
- Multi-position bracket for securing module in a variety of configurations
- Dimensions for bracket base, see Figure 2-3.



**FIGURE 2-2**  
**FLEXIBLE MOUNTING BRACKET**  
009152/ 009181



**FIGURE 2-3**  
**BRACKET BASE FRONT VIEW**  
009113

**CIRCUIT CABLES**

Provide the pathways for communication between system detectors, PADs and EMAs. The cables include the following:

- Temperature rating: 221 °F (105 °C)
- Multiple lengths for versatility
- Jacketed cable minimum bend radius: 2 1/2 in. (64 mm)

**DETECTION CIRCUIT**

Connects the CHECKFIRE 110-D Control Module to the detection circuit input components. See Figures 2-4 and 2-5.

- Maximum total length of detection circuit cable plus Linear Detector is 50 ft (15.24 m).
- Detection Circuit Single Conductors are 18 gauge wire.

**Detection/Relay Circuit Bulk Cable**

Part No.	Description
A16381EW49	100 ft (30.5 m) Bulk Detection/Relay Circuit Cable
A16381EW45	500 ft (152.4 m) Bulk Detection/Relay Circuit Cable Spool
A16381TK1Y	6-Pin Connector Kit*

\* Connector kit includes equipment to make one complete connection. Both plug and receptacle items as needed.



**FIGURE 2-4**  
**PLUG AND RECEPTACLE FROM CONNECTOR KIT**  
 011832

**Detection/Relay Circuit Cable with Connectors**

Part No.	Length:	ft	(m)
A16381C9PN		2	(0.61)
A16381CBOF		3	(0.91)
A16381CBOG		5	(1.53)
A16381CB62		10	(3.05)
A16381CB63		20	(6.10)
A16381CB64		30	(9.15)
A16381CB65		50	(15.24)



**FIGURE 2-5**  
**DETECTION/RELAY CIRCUIT CABLE WITH CONNECTORS**  
 011777

**Detection Circuit “h” Cable**

**Part No. A16381CD32**

Provides a connection for a branch detection circuit. See Figure 2-6.

- 15 in. (0.38 m) leads with connectors
- 3/8 in. (10 mm) Crush Sleeve for mounting.
- Overall length: 33 3/4 in. (0.86 m)



**FIGURE 2-6**  
**DETECTION CIRCUIT “h” CABLE**  
 011778

**Linear Detector**

**Part No. See table**

Provides fire detection in the protected area with a choice of two temperature ratings.

- Two twisted spring steel conductors separated by a heat-sensitive insulator

Activation temperature ratings		Maximum installed continuous operating temperature
Red	356 °F (180 °C)	250 °F (121 °C)
White	220 °F (105 °C)	175 °F (79 °C)

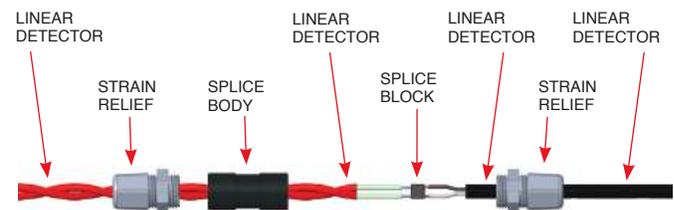
**Bulk Linear Detector**

Part No.	Description
071230	100 ft (30.5 m) Red Bulk Linear Detection Wire, 356 °F (180 °C)
A16381ULBP	100 ft (30.5 m) White Bulk Linear Detection Wire, 220 °F (105 °C)

**In-Line Splice Kit**

**Part No. 428375**

Provides the connection between the Detection Circuit Cable and the Linear Detector or between separate sections of the Linear Detector. The kit includes enough components to create 10 assemblies. See Figure 2-7.



**FIGURE 2-7**  
**IN-LINE SPLICE KIT ASSEMBLY**  
 007045a

**DETECTION CIRCUIT (Continued)**

**Electric Manual Actuator (EMA)  
Part No. A16381C9PM**

Provides manual electrical activation of the fire suppression system; typically accessible from ground level and/or in a path of egress. See Figure 2-8.

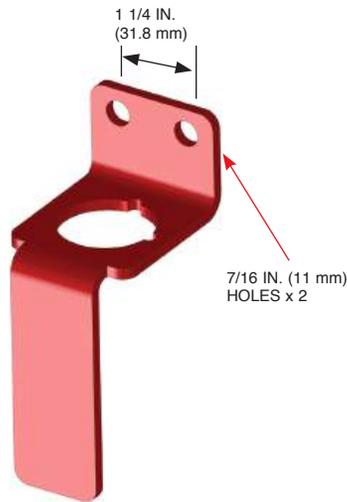
- Electronic signal sent to Control Module that activates the fire suppression system
- Temperature range: -40 °F to 185 °F (-40 °C to 85 °C)
- Flexible 24 in. (610 mm) Detection Cable



**FIGURE 2-8  
ELECTRIC MANUAL ACTUATOR (EMA)**  
011781

**Electric Manual Actuator Bracket  
Part No. 440537**

Constructed of 3/16 in. (4.8 mm) painted steel. Weld or bolt with appropriate fasteners. See Figure 2-9.



**FIGURE 2-9  
ELECTRIC MANUAL ACTUATOR BRACKET**  
009154

**Detection Circuit EOL (End-of-Line) Device (DT Style)  
Part No. A16381CB66**

Provides circuit supervision and termination point for main detection circuit trunk. See Figure 2-10.

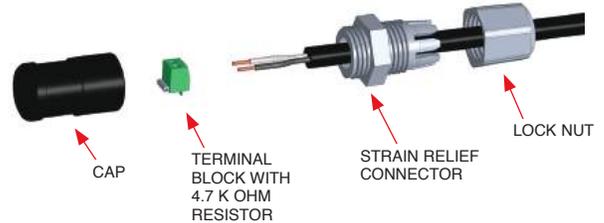


**FIGURE 2-10  
DETECTION CIRCUIT EOL**  
011807

**End-of-Line Resistor (EOL) (Field Wireable Option)  
Part No. 426520**

Provides field wireable circuit supervision and termination point for main detection circuit trunk.

- Each package consists of the required components to assemble the resistor assemblies. See Figure 2-11.



**FIGURE 2-11  
END-OF-LINE RESISTOR**  
002774a

**Detection Circuit Branch Terminator  
Part No. A16381CB6Y**

Terminates detection circuit branch line. See Figure 2-12.



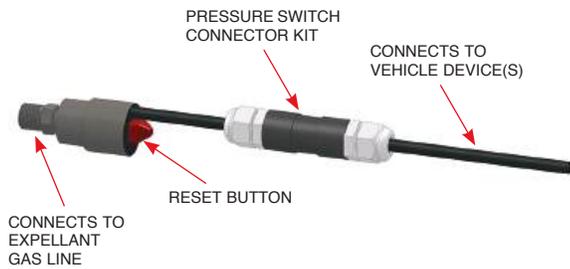
**FIGURE 2-12  
BRANCH TERMINATOR**  
011783a

**DETECTION CIRCUIT (Continued)**

**VEHICLE SYSTEM PRESSURE SWITCH  
 Part No. 440090**

Provides auxiliary functions (i.e. equipment shutdown, turning on notification appliances, or providing “Pressure Switch Feedback” to a vehicle control panel). See Figure 2-14.

- One integral cable, sealed to switch housing
- Manually resettable 3-conductor (NO/C/NC) SPDT switch
- Rated for 6A with 12/36 VDC nominal
- Includes Pressure Switch Connector Kit to ensure adequate weatherproofing of all electrical connections.
- Includes 1/4 in. brass tee and nipple



**FIGURE 2-14  
 PRESSURE SWITCH CONNECTIONS**  
 009178

**RELEASE CIRCUIT**

Connects the CHECKFIRE 110-D Control Module to Release Circuit Cables, Release Circuit “h” Cables, and Release Circuit Drop Cables. See Figures 2-15 and 2-16.

- Maximum circuit length: 50 ft (15.24 m)
- Release Circuit Single Conductors are 16 gauge wire

**Release/Power Circuit Bulk Cable**

Part No.	Description
A16381EW4B	100 ft (30.5 m) Bulk Release/Power Circuit Cable
A16381EW47	500 ft (152.4 m) Bulk Release/Power Circuit Cable, Spool
A16381TK21	2-Pin Connector Kit*

\* Connector kit includes equipment to make one complete connection. Both plug and receptacle items as needed.



**FIGURE 2-15  
 PLUG AND RECEPTACLE FROM CONNECTOR KIT**  
 011834

**Release Circuit Cable with Connectors**

Part No.	Length:	ft	(m)
A16381CB70		2	(0.61)
A16381CB71		3	(0.91)
A16381CB72		5	(1.53)
A16381CB73		10	(3.05)
A16381CB74		20	(6.10)
A16381CB7D		30	(9.15)
A16381CB7E		50	(15.24)



**FIGURE 2-16  
 RELEASE CIRCUIT CABLE**  
 011788

**Release Circuit “h” Cable  
 Part No. A16381CD33**

Provides connections for multiple Release Circuit Drop Cables. See Figure 2-17.

- 19 3/4 in. (0.5 m) leads with connectors
- 3/8 in. (10 mm) Crush Sleeve for mounting
- Overall length: 43 1/8 in. (1.09 m)



**FIGURE 2-17  
 RELEASE CIRCUIT “H” CABLE**  
 011785

**RELEASE CIRCUIT (Continued)**

**Release Circuit Drop Cable**  
Part No. A16381CB7H

Provides connectivity between Release Circuit Cable and Electric-Pneumatic Actuator. See Figure 2-18.

- Overall length: 38 in. (0.96 m)



**FIGURE 2-18**  
**RELEASE CIRCUIT DROP CABLE**  
011786

**Release Circuit Terminator**  
Part No. A16381CB7J

Identifies termination point in the release circuit. See Figure 2-20.



**FIGURE 2-20**  
**RELEASE CIRCUIT TERMINATOR**  
011787

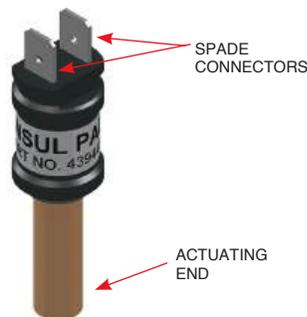
**Protracting Actuation Device (PAD)**  
Part No. 439448

Provides electrical activation of the fire suppression system. See Figure 2-19.

**CAUTION**

When handling the PAD, always point actuating end away from yourself and others. On electrical initiation, PAD operates very quickly and a small brass disk forcefully separates from actuating end. Physical injury may occur from contact with the actuating pin and/or the detaching disk.

- Generates force to drive the Electric-Pneumatic Actuator puncture pin through an expellant gas cartridge seal, allowing the expellant gas to flow into agent tank.
- Integral spade connectors easily field install into the Release Circuit Drop Cable. See Figure 2-19.



**FIGURE 2-19**  
**PAD**  
009169

**Electric-Pneumatic Actuator**  
Part No. 439569

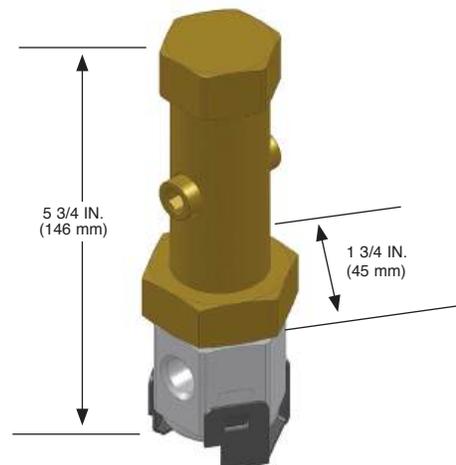
Installs on expellant gas cartridge and provides release of gas into agent tank. See Figure 2-21.

- Brass and stainless steel construction
- Includes preventor to reduce possibility of installing actuator with puncture pin not completely retracted

**NOTICE**

Do not bend or remove the preventor; it is required for correct operation of the actuator.

- Activate with electric and/or pneumatic connections
- Punctures seal in cartridge allowing expellant gas to flow into agent tank



**FIGURE 2-21**  
**ELECTRIC-PNEUMATIC ACTUATOR**  
009168

**POWER CIRCUITS**

Connects the CHECKFIRE 110-D Control Module to Power Circuit Cables and Fused Power Circuit Cable. See Figure 2-22.

- Bulk part numbers are in the table for Release/Power Circuit Bulk Cable on page 2-5. See Figure 2-15.
- Maximum circuit length: 50 ft (15.24 m): Excludes 3 ft (10.9 m) Fused Power Circuit Cable
- Power Circuit Single Conductors are 16 gauge wire.

**Power Circuit Cable with Connectors**

Part No.	Length:	ft	(m)
A16381CB7K		2	(0.61)
A16381CB7L		3	(0.91)
A16381CB7M		5	(1.53)
A16381CB7P		10	(3.05)
A16381CB7T		20	(6.10)
A16381CB8K		30	(9.15)
A16381CB8M		50	(15.24)



**FIGURE 2-22  
POWER CIRCUIT CABLE**  
011788

**Fused Power Circuit Cable  
Part No. A16381CB9P**

Connects Power Circuit Cable to the 12/24 VDC external power source. See Figure 2-23.

- 3 amp in-line ATO/ATC blade style automotive fuse



3 FT (0.9 m)

**FIGURE 2-23  
FUSED POWER CIRCUIT CABLE**  
011789

**REQUIRED LABELS**

**CHECKFIRE Label Package  
Part No. 440798**

Provides instructions for vehicle/equipment operators and service personnel on system operation and protection.

Attach appropriate labels as needed in the specified locations. See Figures 2-24 through 2-27.

If automatic vehicle/equipment shutdown is part of the CHECKFIRE System, install the Engine Shutdown Label near the operator’s line of vision. Cut out the correct time delay value from the Time Delay Label, remove backing to expose adhesive, and attach to the Engine Shutdown Label in the space provided. See Figure 2-24.



**FIGURE 2-24  
LABEL FOR ENGINE SHUTDOWN AND TIME DELAY**  
009174

If automatic vehicle/equipment shutdown is **NOT** part of the CHECKFIRE System, install the Stop Vehicle and Exit Label near the operator’s line of vision. See Figure 2-25.



**FIGURE 2-25  
LABEL TO STOP VEHICLE AND EXIT**  
009175

As a reminder to service and maintenance personnel, install this CAUTION in the area protected by the Linear Detector. See Figure 2-26.



**FIGURE 2-26  
LABEL FOR PROTECTING LINEAR DETECTOR**  
011941

Install the In Case of Fire Label next to every Electric Manual Actuator (EMA). See Figure 2-27.



**FIGURE 2-27  
INSTRUCTION LABEL FOR EMA**  
009324a

**TESTING EQUIPMENT**

**Detection Circuit Tester**  
Part No. A16381TK27

Simulates normal, fault, and alarm conditions for testing the CHECKFIRE 210-D System performance. See Figure 2-28.

Switch settings:

- Normal
- Fault
- Alarm



**FIGURE 2-28**  
**DETECTION CIRCUIT TESTER**  
011826

**Release Circuit Tester**  
Part No. 441021

Indicates a successful release energy pulse to fire the PAD (pass or fail). See Figure 2-29.



**FIGURE 2-29**  
**RELEASE CIRCUIT TESTER**  
009288

**Release Circuit Test Plug**  
Part No. 440912

Replaces a PAD for testing the CHECKFIRE 210-D System. See Figure 2-30.



**FIGURE 2-30**  
**RELEASE CIRCUIT TEST PLUG**  
009289

## USER INTERFACE

This section provides the user with overall information on features and operation of the CHECKFIRE 110-D Control Module.

### FIELD CONNECTIVITY – CABLES AND DEVICES

The CHECKFIRE 110-D Control Module communicates to devices through cable assemblies.

### CONTROL MODULE FRONT PANEL BUTTONS

#### “DELAY/Reset/Silence” Button

Manage fault and/or detection conditions by pressing the “DELAY/Reset/Silence” button (See Figure 3-1) for the following results:

- Audible Fault Silence
  - Silence an audible notification during a fault condition for two hours. Fault LED indicators continue pulsing until the fault has been cleared. If a subsequent fault condition occurs, the audible notification will resume until the “DELAY/Reset/Silence” button is pressed again or the fault has cleared.
  - During a post-discharge condition the button will silence the sounder.
  - Any new detection or fault conditions will reactivate the audible notification.
  - The audible notification for either a post-discharge or fault condition will resume after being silenced for two hours.
- **Restart Time Delay Sequence**  
Restart the time delay cycle during a Detection condition (must be initiated before release circuit activation occurs).
- **Control Module Reset**  
Reset the control module after initiating devices have been restored and/or reset.
- Activate/Deactivate ISOLATE feature.
- **Select Time Delay Period**  
Two options available: 5 seconds or 15 seconds.

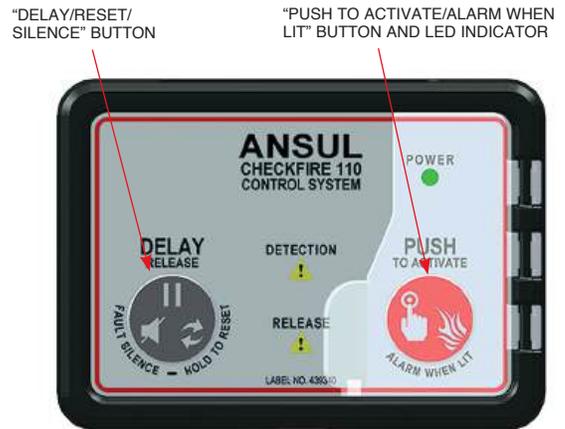


FIGURE 3-1  
CONTROL MODULE FRONT PANEL  
009180

**CONTROL MODULE FRONT PANEL BUTTONS (Continued)**

**Red “PUSH To Activate / Alarm When Lit” Button and LED Indicator (See Figure 3-1)**

- Combination button and LED indicator
- MANUAL ACTIVATION - Pressing the red “PUSH To Activate / Alarm When Lit” button immediately triggers the release circuit and illuminates the red LED for 10 seconds.

**Note:** No time delay occurs when red “PUSH To Activate / Alarm When Lit” button is pressed.

After 10 seconds, the control module enters post-discharge mode, and the red “PUSH To Activate / Alarm When Lit” LED will pulse at a rate of 1 x 10 seconds.

- DETECTOR ACTIVATION - When a detection device sends a detection signal, the “PUSH To Activate / Alarm When Lit” LED indicator displays the following sequence (see Table 3-1):

1. Pulses RED, 2 x 1 second until the time delay period has 5 seconds remaining (sounder matches pulse rate).

2. Pulses RED, 4 x 1 second in the final 5 seconds until time delay has expired (sounder matches pulse rate).
3. Illuminates RED and remains steady-on for 10 seconds (release circuit active) (sounder remains steady-on).
4. Pulses 1 x 10 seconds indicating post-discharge mode (sounder matches pulse rate).

**Internal Sounder (Audible Notification)**

- Audible notification for all detection and fault conditions
- Pulses at same rate as a corresponding LED indicator (see Table 3-1)

**TABLE 3-1: SUMMARY DETECTION CONDITION INDICATORS**

	“PUSH To Activate / Alarm When Lit” LED and Sounder Indications			
	2 x 1 sec. for 10 sec.	4 x 1 sec. for 5 sec.	Steady-on for 10 sec.	1 x 10 sec. until reset*
<b>Manual Action (Release circuit activation)</b>				
Push the “PUSH to Activate / Alarm When Lit” button <b>Or:</b> Pull ring pin and push an EMA (Immediate release for either action)				
Post discharge				
<b>Detection Circuit Input</b>				
15-Second Time Delay (1st 10 seconds)				
5-Second Time Delay <b>And</b> 5 Seconds to release for 15 Second Time Delay				
<b>Release Circuit Activation (Time Delay Expired)</b>				
Post discharge				

\* Release Fault Indicator also pulses at this rate during post discharge. When release circuit test device is installed, Release Fault Indicator does not pulse.

## CONTROL MODULE FRONT PANEL INDICATORS

### Power Status (Dual-Color Power LED – GREEN / AMBER) (See Figure 3-2)

- Normal status - Power LED is GREEN and remains steady-on indicating power is normal from the primary power source
- Fault status - Power LED pulses AMBER 1 x 30 seconds indicating power from primary source dropped below acceptable level causing a fault condition.
- Fault condition will continue pulsing (AMBER) for as long as fault exists or until control module powers down
- Once primary power source is restored, the (AMBER) power fault LED returns to normal status (steady-on GREEN) and sounder will cease (may take up to 30 seconds)

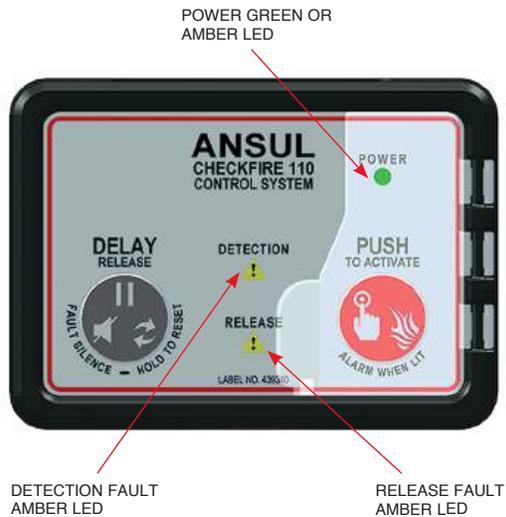


FIGURE 3-2  
CONTROL MODULE FRONT PANEL  
009180

### Detection Circuit Fault (AMBER) (See Figure 3-2)

- Pulses (AMBER) 1 x 10 seconds (sounder matches pulse rate) during a fault condition
- Returns to normal (no indication) when fault is cleared

### Release Circuit Fault (AMBER) (See Figure 3-2)

- Pulses (AMBER) 1 x 10 seconds (sounder matches pulse rate) during a fault condition
- Returns to normal (no indication) when fault is cleared

## POWER

### Primary Power

The CHECKFIRE 110-D Control Module utilizes vehicle power for the primary external power source. The input power circuit requires 12 to 24 VDC nominal and is supervised for low power conditions such as open circuits, and/or ground faults.

### Secondary Reserve Power

In the event primary power source is low or disconnected the CHECKFIRE 110-D Control Module has an internal secondary power source providing up to 72 hours of reserve power. A low or lost power condition causes the AMBER Power Fault LED and sounder to pulse 1 x 30 seconds. The sounder will auto-silence after a period of 10 minutes. Restoring the primary power source will clear the fault and automatically regenerate the internal secondary power source.

**NOTES:**

## HAZARD IDENTIFICATION BASIC PLANNING

Individuals responsible for planning (or designing) a CHECKFIRE 110-D Detection and Actuation System must hold current ANSUL® Certification from an ANSUL® A-101 and/or LVS training program. In addition to the certification, planners must research:

- Known fire hazards in equipment to be protected
- Federal and local fire protection codes/standards

For easier planning obtain a general model drawing of the vehicle with accurate dimensions.

Identify hazard areas needing protection. Agent nozzles in existing fire suppression systems may point out hazard areas. For existing or new fire suppression/detection systems review and apply the following vital information to determine proper placement of discharge nozzles and detection devices.

### Fire Hazard Locations

A fire hazard is any area where an ignition source (heat, high temperature or sparks) and fuel (flammable materials) may be found in close proximity. A solid or liquid combustible or flammable material can cause fire when in contact with an ignition (heat) source. Fire hazard areas may also exist in locations where fire can propagate due to dripping or running flammable liquids.

Examples of ignition (heat) sources:

- Engines
- Exhaust manifolds and piping
- Turbochargers

Examples of fuel or flammable materials (may cause rapid buildup or spreading of fire):

### CLASS B MATERIALS

- Leaking fuel (gasoline, diesel, engine oil, hydraulic oil, glycol, steering fluid, etc.)
- Broken fuel lines/fittings
- Slow leaks – fuel or hydraulic fluid
- Broken hydraulic lines or pumps
- High pressure hoses
- Belly pan (fuel and debris accumulation)
- Greases

### CLASS A MATERIALS

- Electric wiring insulation
- Plastic parts
- Rubber
- Debris (wood chips, coal dust, landfill material, etc.)

Identify every foreseeable hazard. Include the occasional danger of malfunctioning components.

### Other Considerations

The propagation of fire from one area to another may cause a hazard to be larger than originally determined. Liquid fuel may flow, spray, or splash causing the fire to spread further than anticipated. Radiation, sparks, or conduction through metal can carry heat to an area where the danger of fire would not normally exist. Hand portable fire extinguishers should be accessible to suppress residual fires or to help with providing an escape route.

Research the fire history of the equipment or of similar equipment. This information may be available through company records or vehicle operators who may have first-hand experience enabling them to identify locations of previous fires as well as specific hazards such as frequent component wear, fuel leak points, or ruptures of certain hydraulic fittings or hoses.

Normal operating temperatures in excess of the detector ratings will cause the detection system to activate.

Each identified hazard must include both fire suppression system fixed nozzles and linear detectors or spot thermal detectors for automatic detection and system activation.

### Equipment Shutdown

Plan for the shutdown of components that could add to the intensity of the fire, re-ignite the fire, or negatively impact the discharge of fire suppression agent such as:

- Fuel pumps
- Hydraulic pumps
- Engine
- Power source
- Electrical system
- Fans

Automatic pressure bleed-down and/or fuel and hydraulic tank shutoff valves should also be considered to mitigate fire propagation and/or re-flash.

Electrical interface to shutdown functions requires the pneumatic Pressure Switch (the CHECKFIRE 110-D Control Module does not include a shutdown function). The switch connects to shutdown devices to initiate properly sequenced engine shutdown simultaneously with fire suppression system operation. Consult the vehicle manufacturer for details. See Section 2 – Components, page 2-4, for electrical rating of switch contacts.

## HAZARD IDENTIFICATION BASIC PLANNING (Continued)

### Alarm Application – Operator Safety

Most vehicles are very noisy, and parts of the vehicle are not visible; often the operator is not aware a fire exists. A high decibel alarm and flashing strobe may help warn the operator the CHECKFIRE 110-D Control Module is actuating the fire suppression system. Use the Pressure Switch for connections to remote alarming devices (provided by others). For safety, evacuate the vehicle at the earliest possible moment.

The control module pulsing LEDs and sounder are intended to alert the operator when the unit receives a fault signal or detection input from a detection device (before actuating the fire suppression system).

The Alarm Circuit 3.3 VDC digital output from the control module connects to compatible vehicle electronics (i.e. computer) for notification of an Alarm or Fire condition.

### SPECIFIC PLANNING INFORMATION

Review the following information to plan the CHECKFIRE 110-D System layout. Create a drawing of the proposed plan showing locations of components and cable on the vehicle. This will help avoid unforeseen installation problems. Once an acceptable layout is complete; record and keep it for future reference.

### Control Module Location

1. Mount control module in full view, easily accessible, and within reach of the operator. Select a flat surface that will properly support the control module during all vehicle operating and environmental conditions (e.g., shock and vibration). **Note:** The control module should never be mounted in an area subject to pressure washing or steam cleaning.
2. Confirm the operator has access to the “PUSH To Activate / Alarm When Lit” and the “DELAY/Reset/ Silence” buttons.
3. Select a location suitable for surface mounting (3/16 in. (4.7 mm) maximum thickness), or bracket mounting. For bracket mounting, use the optional CHECKFIRE 110/210 Mounting Bracket and secure with screws or bolts. The mounting surface must be flat to avoid strain on the mounting bracket.
4. Confirm access for proper wiring connections, periodic inspection, and maintenance. If surface mounted, access to the underside or rear of the mounting surface is necessary. Review the surrounding area to confirm the location will not interfere with normal vehicle equipment maintenance or operation.

**Note:** If plans include an optional pneumatic manual actuator in the operator’s compartment, confirm the operator has access to the red strike button on the actuator. For detailed planning/installation guidelines, refer to the appropriate system manual (latest edition):

### CHECKFIRE 110-D Circuit Cable Leads and Cable Assemblies

Plan on routing circuit cables in accessible locations, protected from undue wear, damage, and heat. Cables should not be installed in areas where temperatures exceed 221 °F (105 °C).

Keep cables as far away as possible from equipment electric cables, particularly power cables to and from generators and electric motors; also avoid;

- Antennas and associated cables
- Fire hazard areas
- Areas exposed to mechanical damage
- Proximity to moving parts
- Areas subject to debris accumulation
- Areas exposed to high temperatures (turbo chargers, exhaust equipment, or other equipment
- Areas requiring access by equipment service and maintenance personnel

Cables must never be routed through or near sharp edges without being properly protected. The Bulkhead Cord Grip fits all cables and provides a cable pass through at a bulkhead.

### NOTICE

The ambient temperature for the control module location must not fall below –40 °F nor exceed 140 °F (–40 °C to 60 °C).

### SPECIFIC PLANNING INFORMATION (Continued)

#### Detection Circuit Cable:

Review specific requirements for each at the end of this section.

1. Plan route for the cable from the control module to the detection component end points (note end points for cable lengths) using the following rules:
  - No Double Branching
  - No EOL Devices on end of branch
  - Branch must end with Detection Circuit Branch Terminator or EMA
  - If used, EMAs must be first component(s) on circuit
  - Each EMA must be on a single use branch
  - Linear Detector may be used anywhere in the main trunk after the EMA (if installed)
  - Main detection circuit trunk must be terminated with EOL Device
2. Select appropriate cable lengths for area of installation. Total main detection trunk length must not exceed 50 ft (15.24 m). Maximum length for individual branch lines is 25 ft (7.6 m) (length not included with main trunk limit)

#### ELECTRIC MANUAL ACTUATOR (EMA)

If used, connect the EMA to the main detection circuit using a Detection Circuit "h" Cable and appropriate length of Detection Circuit Cable to the EMA. Surface mount or bracket mount on a flat surface that will properly support the EMA for vehicle use and conditions.

1. When planning the detection circuit layout, the EMA(s), if used, MUST be installed before any other device on the detection circuit.
2. Locate EMA where accessible; preferably in path of egress accessible from ground level. If intended for vehicle operator manual actuation, locate in operator's compartment easily accessible to operator.
3. Each EMA must be branched off the main detection trunk utilizing a detection circuit "h" cable and is the only component allowed on the branch.

#### LINEAR DETECTOR

- Only install in main detection trunk
  - If used, must install after the EMA
  - Cannot be branched from main detection trunk
  - If last device, must include EOL Device for circuit supervision
1. Where possible, install Linear Detector above the hazard area or around the perimeter of a hazard compartment, preferably within normal airflow, for quick response.

Do not allow struts, frame members, or other obstacles to act as heat shields between the hazard area and the detection cable.

#### NOTICE

Maximum installed ambient temperature at the Linear Detector location is:

Red: 250 °F (121 °C)

White: 175 °F (79 °C)

2. The minimum bend radius for Linear Detector must not be less than 2 1/2 in. (64 mm). See Figure 4-1.
3. After reviewing the above instructions, select the appropriate length Linear Detector to cover the hazard area(s).
4. Whenever possible make end point connections outside the hazard area(s).
5. Keep the detector as far away as possible from vehicle electric cables, particularly power cables to and from generators and electric motors.

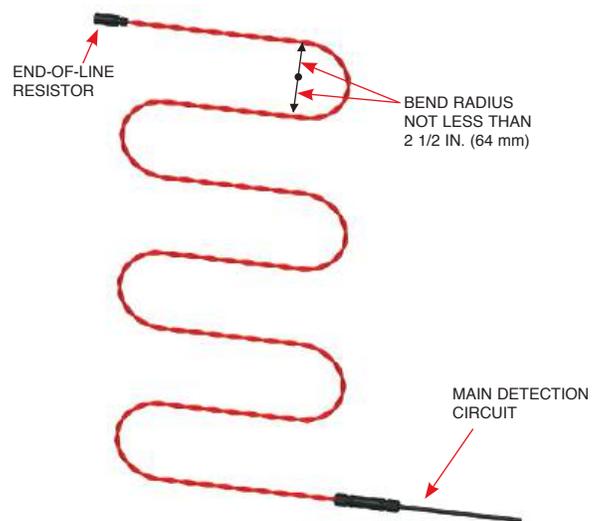


FIGURE 4-1  
LINEAR DETECTOR INSTALLATION

## SPECIFIC PLANNING INFORMATION (Continued)

### Release Circuit Cable

Connects Electric-Pneumatic Actuator(s) (for agent tank expellant gas cartridges(s)) to CHECKFIRE 110-D Control Module.

- System activates a maximum of 2 Electric-Pneumatic Actuators (one per tank).
- For electrical actuation include a Release Circuit Drop Cable and a Protracting Actuation Device (PAD) for each actuator. Release Circuit "h" Cable required for two actuators.
  1. Determine location of agent tank(s), expellant gas cartridge assembly(s), and actuator(s) for specific cable end points.
  2. Plan route for the release circuit cable from the control module to the agent tank expellant gas cartridge end points (note end points for cable lengths).
  3. Select appropriate cable lengths for area of installation. See Section 2 - Components, page 2-5, for available sizes. Maximum 50 ft (15.2 m) allowed.
  4. If more than one Electric-Pneumatic Actuator is required, add a Release Circuit "h" Cable and appropriate length Release Circuit Cable to interconnect release circuits.

### Power Circuit Cables

Connects CHECKFIRE 110-D Control Module to 12/24 VDC nominal vehicle power source using the Power Circuit Cable and the Fused Power Circuit Cable (connects to vehicle power supply).

1. Determine location of power source that will provide the following current load capabilities:
2. Plan route for the Power Circuit Cable from the control module to the end point of the Fused Power Circuit Cable (note end points for both cables).
3. Select appropriate cable lengths for area of installation. See Section 2 – Components, page 2-6, for available sizes.

### Alarm Output Circuit Lead – Digital 3.3 VDC

The Digital 3.3 VDC Alarm Output Circuit Lead (DT04-2P Connector) on the CHECKFIRE 110-D Control Module is an 18 AWG, two conductor polarity sensitive cable assembly. The DT04-2P housing mates with a Deutsch DT06-2S two-position plug with pin 1 being the positive conductor and pin 2 being the negative conductor.

This circuit is initiated by an alarm condition. The output is not intended to directly operate analog devices such as audible horns, strobes and relays. However, the installer or OEM can use the circuit as a logic input to a vehicle operating system or Programmable Logic Controller to manage engine shutdown, cooling fans, hydraulic pumps, notification devices, relays, etc.

The vehicle operating system, control configuration, and field wiring must be provided and installed by others.

**Note:** If not utilizing the Alarm Output, leave the factory plug installed to maintain the IP68 rating of the device.

### Vehicle System Pressure Switch

The Vehicle System Pressure Switch is a manually resettable 3-conductor SPDT switch, rated for 6A when used with voltages between 12 VDC and 36 VDC nominal. The switch can be used to perform several different tasks on system actuation, including equipment shutdown, turning on notification appliances, or providing "Pressure Switch Feedback" to a vehicle control panel. The switch has one integral cable, sealed to the end of the switch housing with 3-conductors (NO/NO/C/NC) for field connections.

Install switch in expellant gas actuation line using a 1/4 in. tee at the inlet port on the agent tank. Make certain to protect switch and connections from potential damage.

Planner/Installer must verify contact ratings of devices intended for pressure switch connection. Connections to vehicle devices to be made by others, or with vehicle manufacturer's direct instruction and approval.

**Note:** Pressure switch activates on expellant gas release. CHECKFIRE 110-D Control Module is unable to monitor or verify pressure switch operation.

### Label Package

Include a Label Package to identify specific procedures of the system to vehicle operators.

### System Layout

Once components are selected and locations are determined, complete a final drawing of the system layout. This drawing should at a minimum include the following:

- Hazard area locations
- Component locations (include vehicle power source)
- Routes for all connecting circuits with cable lengths identified.

Indicate areas where cable must pass-through bulkheads. Use circuit bulkhead connectors to support and protect cables. (Confirm acceptable pass-through locations with vehicle manufacturer.) The drawing should be as precise as possible to avoid installation problems later.

Compile a list of components to confirm system includes all required parts (review Components Planning Checklist, page 4-8). The CHECKFIRE System is complete when all necessary components combine to provide automatic fire detection and activation of the fire suppression system for protected areas.

## NOTICE

Do not remove the yellow plug unless circuit is intended for use.

### COMPONENTS PLANNING CHECKLIST

**(Copy before use)**

- CHECKFIRE 110-D Control Module
- Mounting Bracket
- Detection Circuit Cables, Detection Circuit "h" Cable, EOL Device, and Branch Terminator(s)
- Electric Manual Actuator(s) (EMA) and Bracket(s)
- Linear Detector(s)
- Release Circuit Cable(s) and Release Circuit "h" Cable
- Release Circuit Drop Cable(s)
- PAD(s)
- Electric-Pneumatic Actuator(s) (may be supplied with agent tanks)
- Pneumatic Manual Actuator(s) (optional)
- Power Circuit Cable(s) and Fused Power Circuit Cable
- Pressure Switch(es), if applicable
- Connector Clamps
- Cable Grommets (3-hole, 2-hole, Linear Detector)
- Double-Loop Cable Ties
- Bulkhead Cord Grips
- Alarms or Strobes
- Label Package

**Note:** For part numbers, see Section 10 – Appendix, Component Index, page 10-1.

**NOTES:**

## CABLE CONNECTIVITY

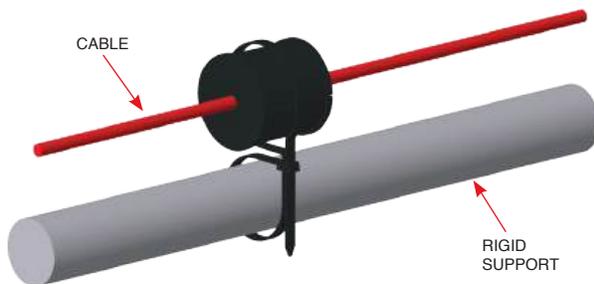
### General Instructions for Routing

1. Follow planned route in the layout drawing and install each circuit starting at the Control Module connection and work outward.
2. Completely install one circuit at a time, finishing with the power circuit.
3. All connections shall be supported using Cable Grommets, Rubber Coated P-Clamps, Double Loop Cable Ties, or an industry acceptable method of attachment. See Figure 5-1.
4. All cable assemblies and connectors must be supported appropriately. See Figure 5-2.
5. Use additional supports to ensure cable is not subject to snagging, crushing, and abrasion.

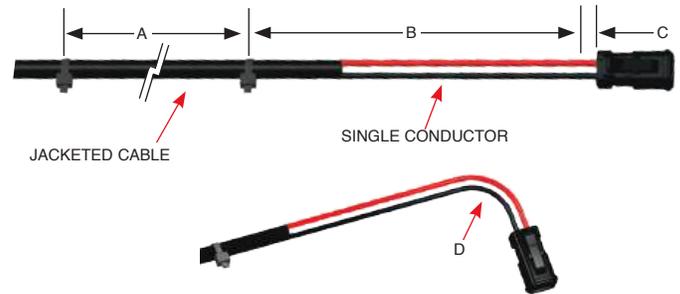
### NOTICE

Cables should not be supported by hydraulic hoses.

6. Allow appropriate slack through areas that are intended to move under normal vehicle/equipment operation.
7. Avoid routing cables in areas where they may be used as handhold or footrests when equipment service is performed or during operation.
8. Cable must never be routed through a hole or near sharp edges without being properly protected.
9. When cables pass through a partition, it is recommended to use a Bulkhead Cord Grip.
10. Double-loop cable ties may also be used to secure cable grommets if necessary.



**FIGURE 5-1**  
**DOUBLE-LOOP CABLE TIE**  
009211



ITEM	DESCRIPTION	IN.	(mm)
A	DISTANCE BETWEEN CABLE SUPPORTS	10 TO 18	(254 TO 457)
B	FIRST CABLE SUPPORT	5 TO 7	(127 TO 178)
C	STRAIGHT CONDUCTOR FROM BACK OF CONNECTOR	1/2	(13)
D	SINGLE CONDUCTOR BEND RADIUS	3/4	(19)

**FIGURE 5-2**  
**GENERAL FIELD-WIREABLE INSTALLATION**

011891/ 011891a

### General Requirements for Cable Assembly

Review Figures 5-2 and 5-3 for general guidance for all CHECKFIRE 110-D Field Wireable System Cables.

- All unused single conductor wires shall be cut off flush with the jacketed cable and be covered within the shrink tube.
- Use the required Deutsch HDT-48-00 Crimping Tool or equivalent to assemble the solid pins and sockets for the field wireable cables.
- Crimp sockets or pins according to crimping tool instruction
- Insert wire with socket or pin into rear of the connector
  - Push until click is heard or felt.
  - Pull back slightly on wire to confirm proper installation
- Receptacles
  - Once all pins are inserted, use a needle nose pliers to insert wedgelock, pressing firmly until the wedgelock clicks in place.
- Plugs
  - Once all contacts are in place, the wedgelock may be inserted by hand. Press until the wedgelock clicks in place.
- Back shells are required to maintain IP rating.
- Sealing plugs are required on all unused connector positions to maintain the connector IP rating

Note: Per compatibility issues, connector wedgelocks are NOT interchangeable and shall not be mixed.



**FIGURE 5-3**  
**CONNECTOR PARTS FOR INSTALLATION**

011894

**CHECKFIRE 110-D CONTROL MODULE**

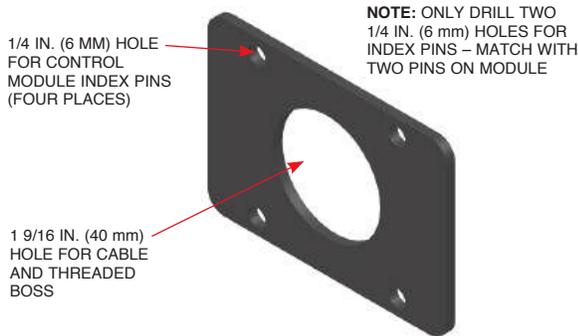
The CHECKFIRE 110-D Control Module may be surface mounted (3/16 in. (4.7 mm) maximum thickness) or bracket mounted. For bracket mounting, use the CHECKFIRE 110/210 Mounting Bracket. Index pins on the display module prevent rotation.

**Note:** The control module should never be mounted in an area subject to pressure washing or steam cleaning.

**Surface Mounting Instructions**

Although recommended, the CHECKFIRE 110-D Control Module does not require a bracket when surface mounting in a flat location. The location must properly support the Control Module during all vehicle/equipment environmental and operating conditions (e.g., shock and vibration).

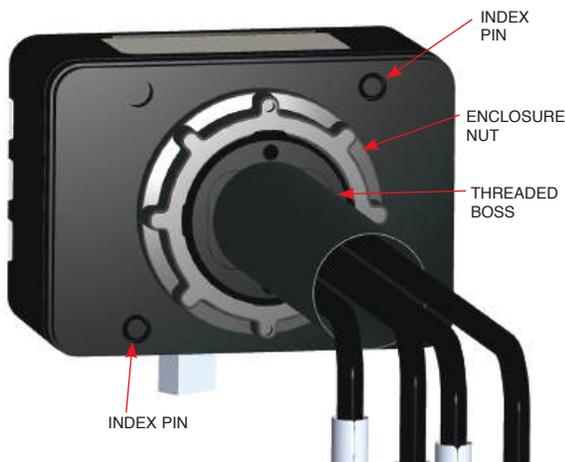
1. Refer to layout drawing for planned location and determine a position within operator's reach with the best viewing angle for Control Module LEDs and easy access to Control Module buttons.
2. Drill three holes matching the correct diameter and index pin layout for surface mounting, see Figure 5-4.
  - a. Use the foam gasket as a template to carefully mark hole locations. See Figure 5-5.
  - b. After drilling holes, remove burrs and sharp edges.
3. Remove protective backing exposing gasket adhesive then install foam gasket on Control Module.



**FIGURE 5-4**

**SURFACE MOUNTING TEMPLATE (FOAM GASKET)**

009203



**FIGURE 5-5**

**INDEX PINS AND THREADED BOSS**

011960

4. Carefully feed cables through drilled hole, rubber washer, and enclosure nut.
5. Fit index pins and threaded boss into the drilled holes.
6. Hand-tighten enclosure nut on threaded boss, see Figure 5-6.

**NOTICE**

Only hand-tighten enclosure nut, do not use mechanical force such as a wrench.



**TOP VIEW**



**FIGURE 5-6**

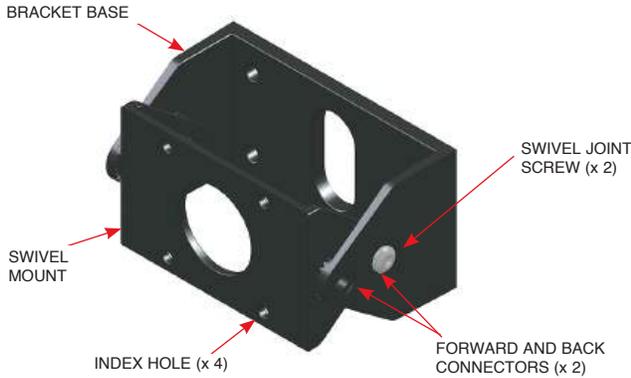
**SURFACE MOUNT 110-D CONTROL MODULE**

011943a/ 011943b/ 011943c

**CHECKFIRE 110-D CONTROL MODULE (Continued)**

**Bracket Mounting Instructions**

Bracket mounting requires the CHECKFIRE 110/210 Mounting Bracket, see Figure 5-7. The bracket is a two piece, multi-position bracket for securing the Control Module in a variety of configurations. Mount on a flat surface that will properly support the Control Module during all vehicle/equipment operating and environmental conditions (e.g. shock and vibration).



**FIGURE 5-7**  
**CHECKFIRE 110/210 MOUNTING BRACKET**  
009181

1. Refer to layout drawing for planned location and determine a position within the operator’s reach with the best viewing angle for Control Module LEDs and easy access to Control Module buttons. Verify the location meets approval of the vehicle/equipment owner and/or vehicle/equipment service manager. See Figure 5-8 for sample mounting options. Note the positions of the swivel mount and connectors.

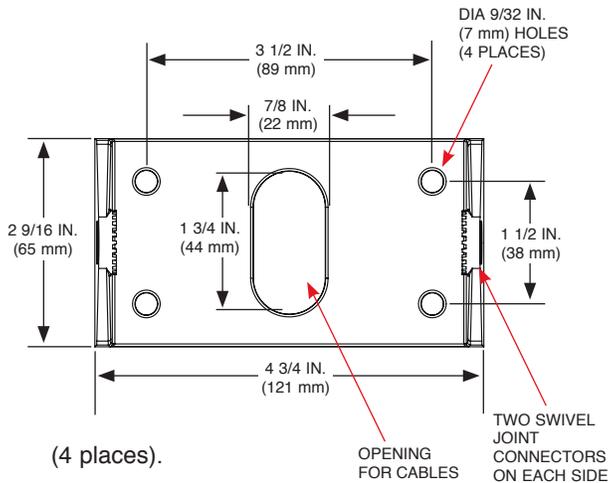


**FIGURE 5-8**  
**SAMPLE MOUNTING OPTIONS**  
011944a-b-c-d-e-f

**CHECKFIRE 110-D CONTROL MODULE (Continued)**

**Bracket Mounting Instructions (Continued)**

2. Confirm access to the Control Module for proper cable connections, periodic inspections, and maintenance. Verify module location and connections will not interfere with vehicle/equipment operation, service, and maintenance.
3. Using the bracket base as a template (see Figure 5-9), mark and drill 9/32 in. (7 mm) holes in the flat surface



**FIGURE 5-9  
 BRACKET BASE FRONT VIEW**

009113

4. If needed, mark a 1 5/8 in. (42 mm) dia. circle in the mounting surface, matching center of the 7/8 in. x 1 3/4 in. (22 mm x 44 mm) opening for cables passing through the mounting surface. See Figure 5-9. Drill the marked hole. Remove burrs and sharp edges; protect cables as needed.
5. Secure base to mounting surface using appropriate length fasteners (1/4 in. [6 mm]) screws or bolts with lock washers and nuts).
6. Attach control module to swivel mount according to the position determined in Step 1. See Figure 5-10.
  - a. Retrieve enclosure nut and rubber washer for threaded boss from separate bag in the CHECKFIRE 110-D Control Module.
  - b. Carefully feed cables through center hole in Swivel Mount, rubber washer, and enclosure nut. Back shells need to be removed to feed cables through mount.
  - c. Insert index pins into index holes and hand-tighten enclosure nut to threaded boss.

**NOTICE**

Only hand-tighten enclosure nut, do not use mechanical force such as a wrench.



**FIGURE 5-10  
 HAND-TIGHTEN ENCLOSURE NUT**

011945

7. If required, feed cables through opening in bracket base. Reinstall the Swivel Mount to the base according to the position determined in Step 1. Carefully align joint teeth and secure with the swivel joint screws to lock swivel mount in place. Do not over tighten, 20 in.-lb to 25 in.-lb (2.26 N•m to 2.82 N•m) maximum. See Figure 5-11.



**FIGURE 5-11  
 MOUNTING BRACKET WITH  
 CHECKFIRE 110-D CONTROL MODULE**

011946a/b

**DETECTION CIRCUIT**

The Detection Circuit cable is the starting point for the detection circuit. See Figures 5-12 and 5-13. Each detection circuit consists of a main trunk and branch lines may be added with a Detection Circuit “h” Cable on the main trunk. See Figure 5-14 for sample branch lines.



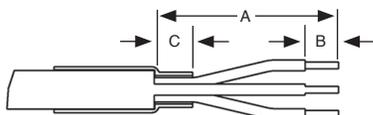
NOTE: CABLES SHOWN SHORTER THAN ACTUAL LENGTH

**FIGURE 5-12  
DETECTION CIRCUIT CONNECTIONS**

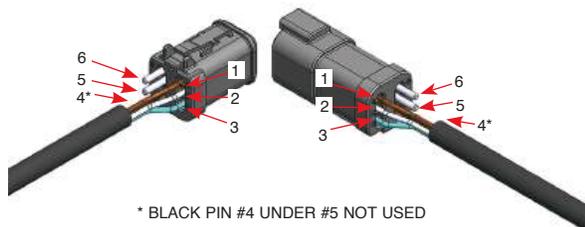
011959

**Detection Circuit Connector Assembly (Figure 5-13)**

ITEM	DESCRIPTION	IN.	(mm)
A	DISTANCE OF UNPROTECTED CONDUCTORS	2 1/4 TO 7	(57 TO 178)
B	SINGLE CONDUCTOR STRIPPING	1/4 TO 3/8	(6 TO 8)
C	1/2 IN. SHRINK TUBE - SINGLE CONDUCTOR	3/8 TO 1/2	(10 TO 13)



POSITION	COLOR	CRIMP SIZE
1	BROWN	18 AWG (0.75 mm <sup>2</sup> )
2	WHITE	18 AWG (0.75 mm <sup>2</sup> )
3	BLUE	18 AWG (0.75 mm <sup>2</sup> )
4	BLACK	18 AWG (0.75 mm <sup>2</sup> )
5	NOT USED	PLUG
6	NOT USED	PLUG



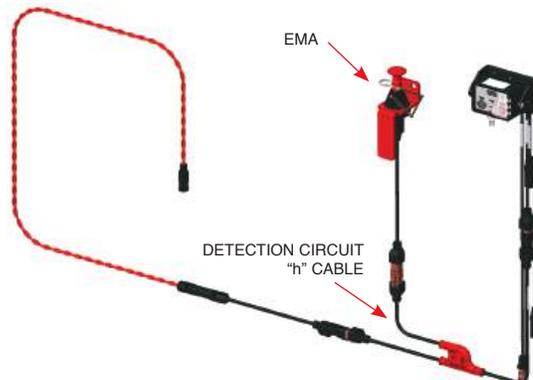
\* BLACK PIN #4 UNDER #5 NOT USED

**FIGURE 5-13  
DETECTION CIRCUIT CONNECTOR ASSEMBLY**

011887

Install Detection Circuits using the following rules:

1. An Electric Manual Actuator (EMA), if used, must be installed prior to any other detection device with a Detection Circuit “h” Cable. See Figure 5-14.



**FIGURE 5-14  
DETECTION CIRCUIT “h”CABLE SAMPLE INSTALLATION**

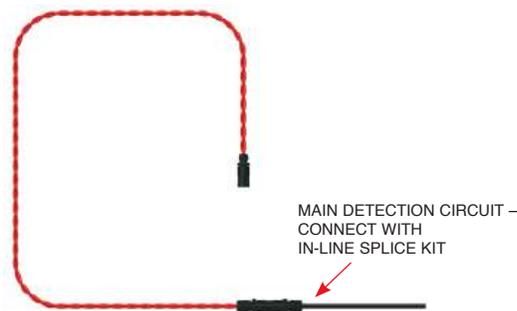
009192

2. Install each EMA on a separate branch (only one device on a branch). See Figure 5-14.

**CAUTION**

Do not terminate any branch with an EOL Device. Use Branch Terminator only.

4. The Linear Detector may be installed anywhere in the main detection circuit trunk after the EMA. If last device, the Linear Detector is terminated with an EOL Device or a Field Wireable EOL Resistor. See Figure 5-15.



**FIGURE 5-15  
DETECTION CIRCUIT – LINEAR DETECTOR**

011795

Review complete installation to verify correctness.

**Detection Circuit “h”Cable**

The Detection Circuit “h” Cable, see Figure 5-16, provides a straight cable connection to detection circuit cables, and Linear Detectors. Use the hole in the over-mold body to mount the cable or other industry acceptable methods of attachment.



**FIGURE 5-16  
DETECTION CIRCUIT “h”CABLE**

011778

**LINEAR DETECTOR**

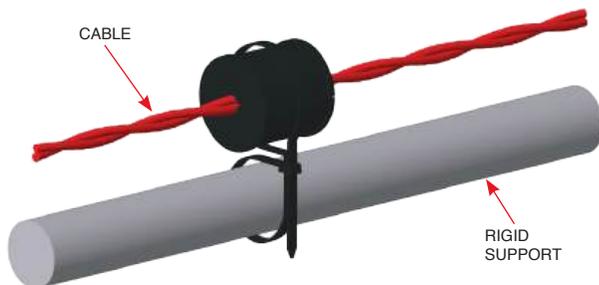
Install Linear Detector throughout the hazard area by only connecting directly to the main detection circuit trunk.

**NOTICE**

**The minimum bend radius for the Linear Detector must not be less than 2 1/2 in. (64 mm) (see Figure 5-18).**

Keep the following in mind when installing a Linear Detector:

- Make certain Linear Detector routing allows direct exposure to heat resulting from a fire
  - Choose routing locations where heat is likely to travel to or through quickly in the event of a fire
1. Make sure detection circuit cable is completely installed from CHECKFIRE 110-D Control Module to hazard area end point. Start installation of Linear Detector at end point of the detection circuit cable.
  2. Install Linear Detector above hazard area or around perimeter of a hazard compartment so it can react to escaping heat. Refer to layout drawing. Do not allow struts, frame members, or other obstacles to act as heat shields between hazard and detector cable.
  3. Do **NOT** install Linear Detector within 12 in. (305 mm) of any area that will become extremely hot during operation, such as:
    - Exhaust manifolds
    - Exhaust tubes/mufflers
    - Turbochargers
  4. Secure Linear Detector every 12 in. to 18 in. (305 mm to 454 mm) using a Linear Detector Cable Grommet or equivalent. Protect wire against abrasion and damage. Where it is not possible to use P-Clips, a double-loop cable tie and Linear Detector Cable Grommet is acceptable to provide separation between cable and securing point. Secure more often if necessary. See Figure 5-17.



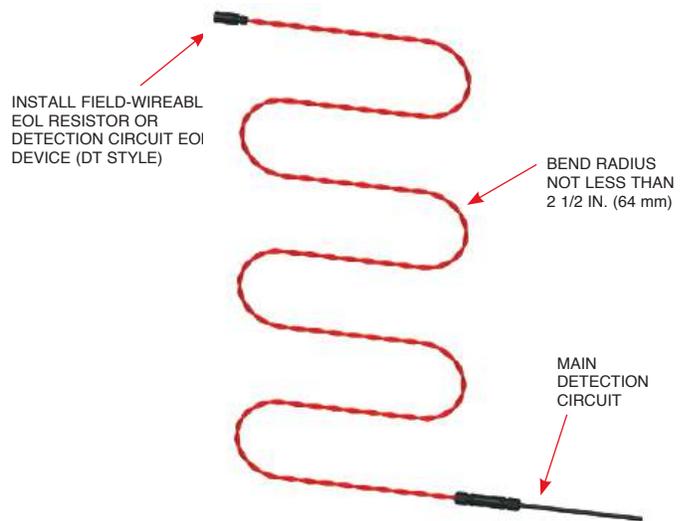
**FIGURE 5-17**  
**GROMMET AND DOUBLE-LOOP CABLE TIE**  
 009213

**5. CAUTION**

Linear Detector must never be routed through a hole or near sharp edges without being properly protected. Failure to protect the cable from being cut or abraded could cause a fault condition or false alarm condition, potentially leading to a false activation or detection failure.

When a Linear Detector must pass-through a partition it is recommended to use a Bulkhead Cord Grip designed for the appropriate cable.

6. Install an EOL Device at the end of the Linear Detector, if last device to complete the circuit. See Figure 5-18.



**FIGURE 5-18**  
**SAMPLE LINEAR DETECTOR INSTALLATION**  
 001793

**Linear Detector Connector Assembly**

When splicing Linear Detectors to Detection Circuit Cables, the white and black single conductors will be used to complete the circuit.

All unused single conductor wires shall be cut off flush with the jacketed cable and be covered within the shrink tube.

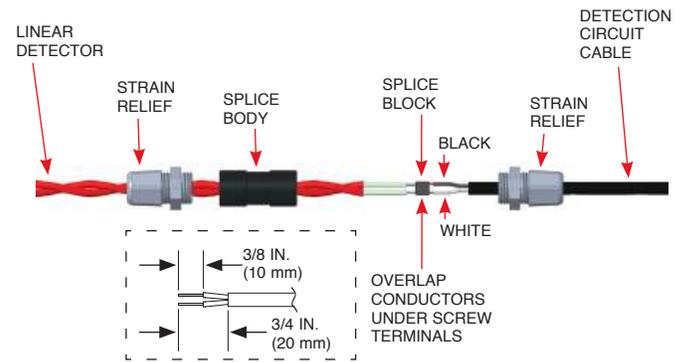
The CHECKFIRE In-Line Splice Kit is used to make in-line splices of the Linear Detection Cable. It can also be used to make the transition splice from Detection Circuit Cable to Linear Detection Cable.

## LINEAR DETECTOR (Continued)

### Linear Detector Connector Assembly (Continued)

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

1. Remove 3/4 in. (20 mm) of the wire outer jacket, exposing the internal Mylar wrap.
2. Remove 3/4 in. (20 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. When connecting the Linear Detector Cable to the Detection Circuit Cable, the white and black single conductors will be used to complete the circuit.
4. Loosen the compression nut of the strain relief assembly and slide the assembly over the end of the wire as shown in Figure 5-19. 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 or equivalent sealant 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 onto wire at this time.
11. Slide splice body assembly near splice block. Fill splice body approximately 3/4 full with Dow Corning 737 or equivalent 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 or equivalent 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 5-19**  
**IN-LINE SPLICE KIT**  
007045a

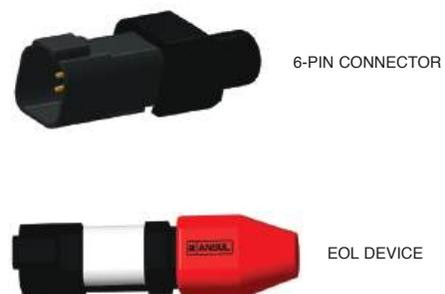
### End-of-Line (EOL) Resistor

An End-of-Line (EOL) Resistor must be installed at the end of the main trunk circuit.

Two options are available, a field wireable EOL Resistor or a Detection Circuit EOL Device (DT Style).

If using the EOL Device (DT Style), the following is required.

1. To make the EOL connection, a 1 ft (300 mm) minimum piece of Detection Circuit Cable must be installed at the end of the Linear Detector.
2. Connect the Detection Circuit Cable to the Linear Detector using the In-Line Splice Kit and follow the splice kit steps to make a connection.
3. On the opposite end of the Detection Circuit Cable, install a 6-pin plug, see Figure 5-20. See the General Requirements for Cable Assembly (Page 5-2) and Detection Circuit Connector Assembly (Figure 5-13) (Page 5-6) to complete this step,
4. Connect an EOL Resistor Device to the installed 6 pin plug as required. See Figure 5-20.



**FIGURE 5-20**  
**6-PIN PLUG FROM CONNECTOR KIT AND EOL DEVICE**  
011832/011807

**LINEAR DETECTOR (Continued)**

**End-of-Line (EOL) Resistor (Continued)**

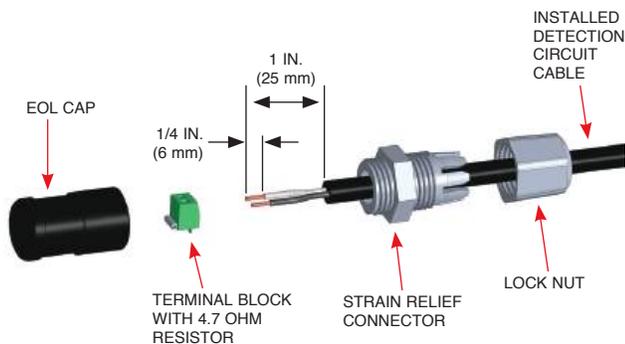
If using the Field Wireable End-of-Line Resistor the following steps are required.

An End-of-Line (EOL) Resistor must be the final connection on the Trunk Circuit. See Figure 5-21.

1. Install an EOL resistor assembly to the far end of the detection wire.

To properly attach the EOL Resistor assembly, complete the following steps (see Figure 5-21).

- a. Strip 1 in. of outer jacket off the linear detection wire.
- b. Strip 1/4 in. 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 or equivalent sealant on male threads of strain relief connector.
- f. Screw EOL cap to strain relief connector.
- g. Tighten lock nut onto detection wire.
- h. Secure EOL cap to support device.



**FIGURE 5-21**  
**END-OF-LINE RESISTOR ASSEMBLY**  
 002774a

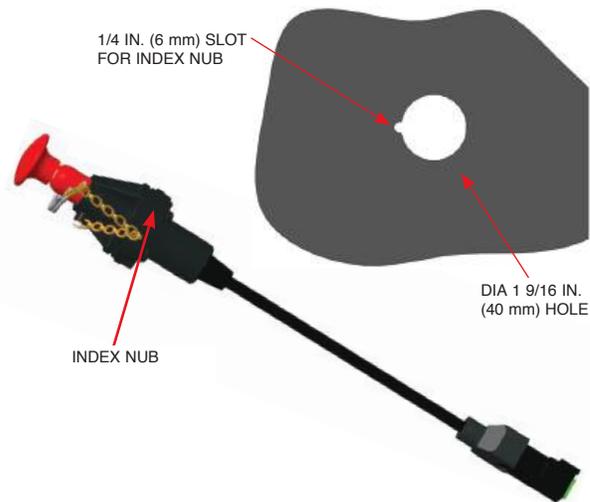
**ELECTRIC MANUAL ACTUATOR (EMA)**

Refer to layout drawing and install Electric Manual Actuator at locations in a path of operator egress and accessible from ground level, when possible. Confirm Detection Circuit branch for the EMA is prior to any detection device in the main detection circuit trunk.

EMA may be surface (1/4 in. (6 mm) maximum thickness) or bracket mounted. For bracket mounting use the EMA Bracket.

**Surface Mounting Instructions**

1. Determine the location of the EMA.
2. Mark the center of the EMA Mounting hole, and the center of the keyway hole.
3. Drill the 1/4 in. (6 mm) keyway hole first followed by the 1 9/16 in. (40 mm) hole second.
4. Deburr and smooth and smooth edges of the holes. See Figure 5-22.



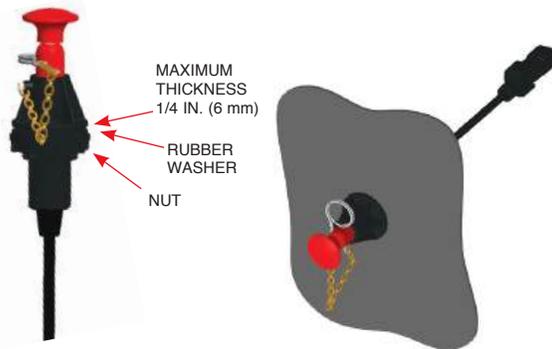
**FIGURE 5-22**  
**EMA SURFACE MOUNT DIMENSIONS**  
 011781/ 009216a

5. Remove nut and rubber washer from threaded boss and insert boss through drilled hole fitting index nub into slot. Install rubber washer between EMA and EMA bracket. Place plastic nut below EMA and hand tighten. Do not apply mechanical force. See Figure 5-23.

**NOTICE**

Only hand-tighten nut, do not use mechanical force such as a wrench.

**ELECTRIC MANUAL ACTUATOR (EMA) (Continued)**  
**Bracket Mounting Instructions (Continued)**



**FIGURE 5-23**  
**EMA SURFACE MOUNT INSTALLED**  
011781/011925

**Bracket Mounting Instructions**

1. Install the EMA Bracket by bolting or welding.
  - a. **Bolting:** Using bracket base as a template (see Figure 5-24), mark and drill 7/16 in. (11 mm) holes in flat surface (2 places). Secure bracket with 3/8 in. (9 mm) corrosion resistant bolts of the appropriate length with lock washers and nuts.
  - b. **Welding:** Confirm intended surface is approved for welding. To avoid corrosion, paint welded surfaces after welding is complete and surface temperature is normal.



**FIGURE 5-24**  
**EMA BRACKET MOUNT**  
011797

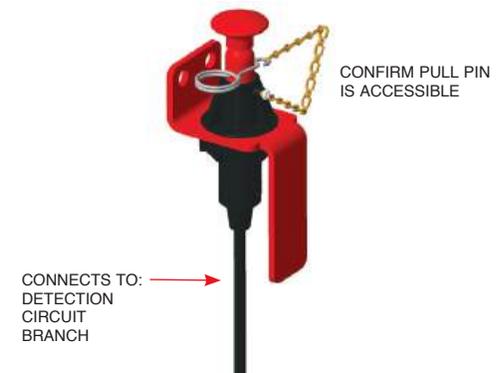
2. Once the EMA bracket is securely mounted, remove nut from threaded boss on EMA. Position EMA in bracket with RED strike button (and pull pin) facing in desired direction (fit index nub into desired slot). Install rubber washer and hand-tighten nut on threaded boss.

**Note:** Pull pin may need to be removed and inserted in the opposite direction for proper fit. See Figure 5-25.

**NOTICE**

Only hand-tighten nut, do not use mechanical force such as a wrench.

**Note:** Install visual seal (supplied by others) when instructed in Section 6 – Operational Test and Place in Service.

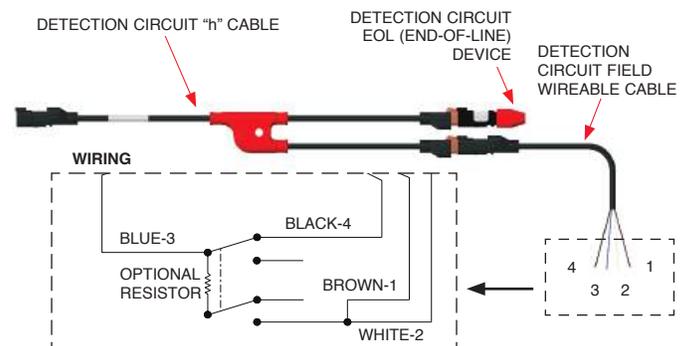


**FIGURE 5-25**  
**EMA INSTALLED IN BRACKET**  
011926

**CHECKFIRE 110-D REMOTE ACTIVATION**

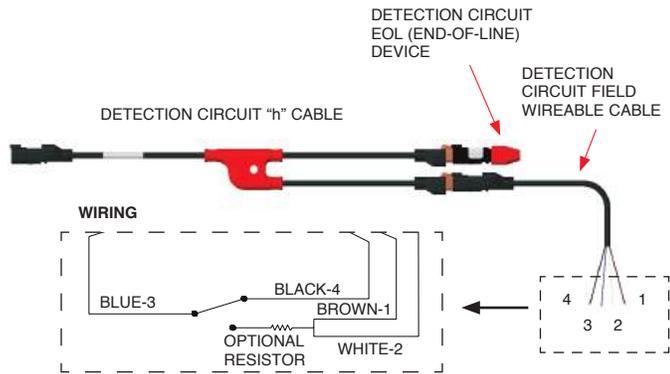
When installing the Field Wireable Remote Actuation Cable, complete the following steps:

1. Install using a Detection Circuit “h” Cable on a branch circuit. The Field Wireable Remote Actuation Cable is the only component allowed on that given branch circuit.
2. If installed on a shared detection circuit, the Field Wireable Cable must be installed prior to any Linear Detection Circuit Cable.
3. Follow the Figure connection for the type of activation required. See Figures 5-26 to 5-28.

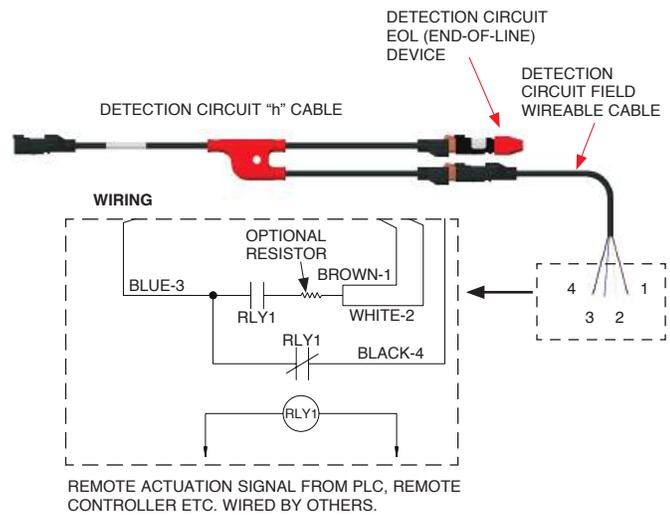


**FIGURE 5-26**  
**DPDT SWITCH ACTIVATION**  
011927 / 009610

**CHECKFIRE 210-D REMOTE ACTIVATION (Continued)**



**FIGURE 5-27**  
**DPST SWITCH ACTIVATION**  
 011927/ 009611



**FIGURE 5-28**  
**RELAY ACTIVATION**  
 011927/ 009609

**DIGITAL 3.3 VDC ALARM OUTPUT CIRCUIT LEAD**

The Digital 3.3 VDC Alarm Output Circuit Lead DT04-2P connector on the CHECKFIRE 110-D Control Module is a DT04-2P, 2-pin Deutsch connector. This circuit is polarity sensitive, with pin 1 being the positive (+3.3 VDC) conductor and pin 2 being the negative (reference) conductor.

This circuit is initiated by an alarm condition. The output is not intended to directly operate analog devices such as audible horns, strobes and relays. However, the installer or OEM can use the circuit as a logic input to a vehicle operating system or Programmable Logic Controller to manage engine shutdown, cooling fans, hydraulic pumps, notification devices, relays, etc.

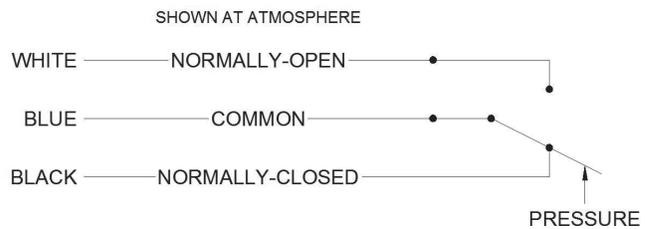
The vehicle operating system, control configuration, and field wiring must be provided and installed by others.

**VEHICLE SYSTEM PRESSURE SWITCH**

The Vehicle System Pressure Switch is a manually resettable 3-conductor SPDT switch, rated for 6A when used with voltages between 12 VDC and 36 VDC nominal. The switch can be used to perform several different tasks on system actuation, including equipment shutdown, turning on notification appliances, or providing “Pressure Switch Feedback” to a vehicle control panel. The switch has one integral cable, sealed to the end of the switch housing with 3-conductors (NO/C/NC) for field connections. See Figure 5-29.

**3-CONDUCTOR CABLE**

- Common (COM) – BLUE
- Normally Closed (N.C.) – BLACK
- Normally Open (N.O.) – WHITE



**FIGURE 5-29**  
**PRESSURE SWITCH CONDUCTORS**  
 009351

**CAUTION**

The location of the Discharge Pressure Switch must be at the expellant gas inlet port of the agent tank. Failure to comply may result in damage to the switch and cause the switch to not function properly.

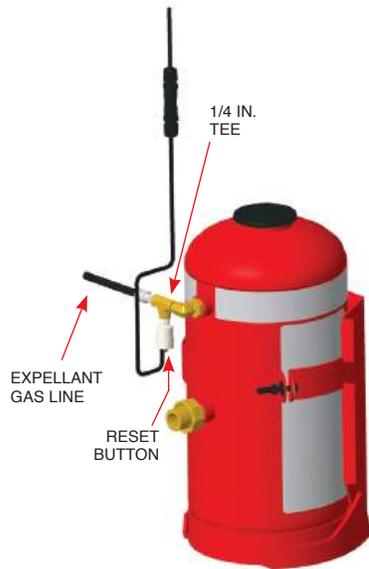
**Installation of the Vehicle System Pressure Switch**

1. The pressure switch installs in a standard 1/4 in. NPT female fitting. The pressure switch must be installed in the expellant gas line using the included 1/4 in. tee at the inlet port of the agent tank. Use Teflon tape on the male threads (see Figure 5-30).

VEHICLE SYSTEM PRESSURE SWITCH (Continued)

Installation of the Vehicle System Pressure Switch  
(Continued)

Step 1 (Continued)



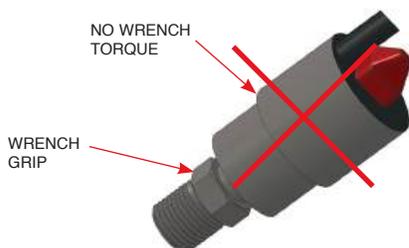
**FIGURE 5-30**  
**INSTALLED PRESSURE SWITCH**  
011950

**CAUTION**

When threading the switch into the expellant gas line tee, DO NOT apply torque directly to the metal switch body. Failure to comply may result in damage to the switch. Tighten ONLY by applying torque to the 1/4 in. NPT male pressure fitting. See Figure 5-31.

**CAUTION**

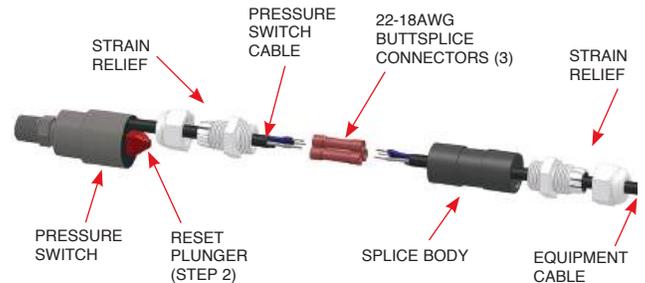
DO NOT install the pressure switch in the fire hazard area or in any area where the ambient temperature will exceed 175 °F (79 °C). Failure to comply may prevent the pressure switch from functioning properly.



**FIGURE 5-31**  
**WRENCH GRIP AREA**  
009231

Pressure Switch Reset

- To reset the pressure switch, press the red plunger located on the back of the switch. An audible click should be heard. See Figure 5-32.



**FIGURE 5-32**  
**WIRE SPLICING**  
009255

Connection of 3-Conductor Cable

- A Pressure Switch Connector Kit is provided with each switch to ensure adequate weatherproofing of electrical connections associated with the pressure switch. The following components from that kit will be required to complete the installation of the 3-conductor cable (see Figure 5-32):

- Two Strain Reliefs
- One Splice Body
- Three 22-18 AWG Butt Splice Terminals

**Note:** The 3-conductor cable and the field cable wiring may also be wired and enclosed within a weather-proof electrical box (not supplied) using weather-proof fittings appropriate for the cable size. The allowable cable outside diameter is 0.08 in. (2 mm) minimum and 0.24 in. (6 mm) maximum.

- Begin by trimming 3 conductors on the pressure switch to a length of 3/4 in. (19 mm) from the end of the outer jacket. Trim the outer jacket on the equipment cable to the same length. **Note:** Brown conductor is not used in this application.
- Strip 1/4 - 3/8 in. (6 - 10 mm) of insulation from each conductor in both cables.
- Loosen the lock nut on the strain relief connectors and slide both the lock nuts and connectors over the ends of both wires.
- Slide the enclosed splice body over the end of one of the cables.

**NOTICE**

Before performing the next step, double check the equipment and pressure switch wiring to ensure the proper connections are being made for your intended application. Refer to the pressure switch wire color-coding for proper terminal designation.

## VEHICLE SYSTEM PRESSURE SWITCH (Continued)

### Connection of 3-Conductor Cable (Continued)

#### Step 3 (Continued)

- e. Using the supplied 22-18AWG Butt Splice Terminals, crimp the splices onto each pressure switch wire being used. Once complete, crimp the splices to the corresponding equipment wiring.
- f. Once crimps are complete, apply Dow Corning 737 sealant (or equivalent) to strain relief threads going into splice body.
- g. Securely tighten the one strain relief into the splice body. **Note: Do not tighten the compression nut onto the wire at this time.**
- h. Slide the splice body assembly near the recently crimped butt splice terminals. Fill the splice body approximately half full with Dow Corning 737 sealant (or equivalent) and pull the splice body assembly over the terminals so the terminals are located approximately halfway inside the splice body. This should result in the terminals being enclosed in the sealant.

- i. If needed, fill the remainder of the cavity with sealant.
- j. Apply Dow Corning 737 sealant (or equivalent) to the thread on the unattached strain relief lock nut and thread this strain relief assembly into the splice body.
- k. With a wrench on both strain relief locks, simultaneously tighten both ends.
- l. Complete the assembly operation by securely tightening the strain relief to both the pressure switch and equipment cables. See Figure 5-33.



**FIGURE 5-33**  
**CONNECTOR KIT INSTALLED**  
009178

4. For **PRESSURE SWITCH FEEDBACK**: Make connections to a field-wireable on the vehicle.

**RELEASE CIRCUIT**

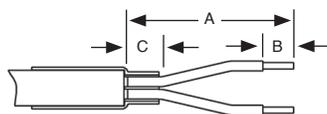
The Release Circuit Cable at the CHECKFIRE 110-D Control Module is the starting point for the release circuit. See Figure 5-34. The release circuit consists of a main trunk with Release Circuit “h” Cables, and Release Circuit Drop Cables.



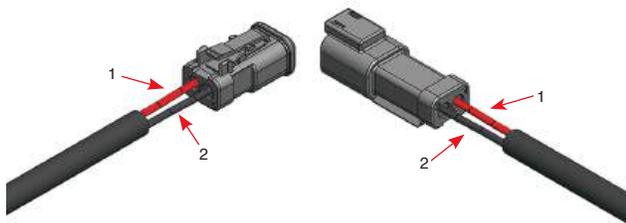
**FIGURE 5-34**  
**RELEASE CIRCUIT CONNECTION**  
011959

**Release/Power Circuit Connector Assembly (Figure 5-35)**

ITEM	DESCRIPTION	IN.	(mm)
A	DISTANCE OF UNPROTECTED CONDUCTORS	1 1/2 TO 7	(32 TO 178)
B	SINGLE CONDUCTOR STRIPPING	1/4 TO 3/8	(6 TO 8)
C	3/8 IN. SHRINK TUBE - SINGLE CONDUCTOR	3/8 TO 1/2	(10 TO 13)



POSITION	COLOR	CRIMP SIZE
1	RED	16 AWG (1.0 mm <sup>2</sup> )
2	BLACK	16 AWG (1.0 mm <sup>2</sup> )



**FIGURE 5-35**  
**RELEASE/POWER CIRCUIT CONNECTOR ASSEMBLY**  
011890

**NOTICE**

If not completed, install the Electric-Pneumatic Actuator, by following instructions in the applicable ANSUL® vehicle fire suppression system manual.

Install the release circuit using the following rules (see Figures 5-36, and 5-37):

1. Use a Release Circuit “h” Cable for each additional actuator. Additional release circuit cable may be used after the Release Circuit “h” Cable if required.
2. Use Release Circuit Drop Cable at end of circuit for connection to the Electric-Pneumatic Actuator.
3. Route and secure Release Circuit Cable following installation instructions under Cable Connectivity, page 5-1.
4. Do not attach Release Circuit Drop Cable to Electric-Pneumatic Actuator at this time. If Release Circuit Drop Cable is connected, the system could be accidentally actuated during installation.

**CAUTION**

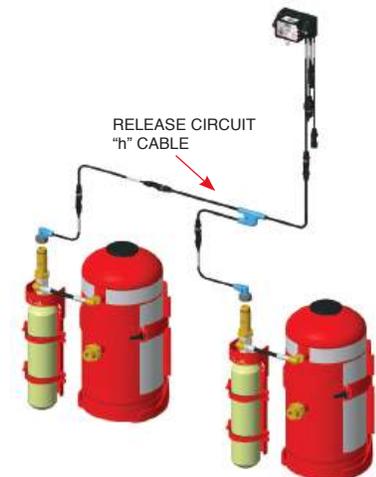
**Do not attach any Release Circuit Drop Cable to any Electric-Pneumatic Actuator until testing is complete.**

**Release Circuit Cable**



**FIGURE 5-36**  
**RELEASE CIRCUIT – SINGLE TANK**  
011948

**Release Circuit “h” Cable**



**FIGURE 5-37**  
**RELEASE CIRCUIT – TWO TANKS**  
011947

### POWER CIRCUIT CABLE

The Power Circuit Cable at the CHECKFIRE 110-D Control Module is the starting point of the external power circuit. See Figures 5-38.

**Note:** See Release/Power Circuit Connector Assembly in Release Circuit Section, previous page.

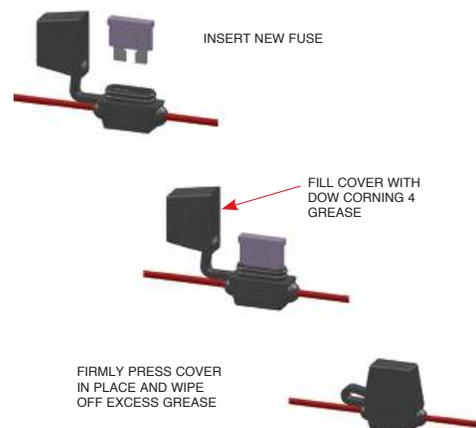


**FIGURE 5-38**  
**POWER CIRCUIT CONNECTION**  
011959

Before installation remove fuse and place in a safe place. Install power circuit using the following rules:

1. It is recommended to install power circuit directly to the 12/24 VDC nominal vehicle batteries, if possible. This will provide continuous power for 24 hour system protection.
2. Install black jacketed conductor, labeled “- VEH BATT” to the negative post on battery or 12/24 VDC nominal power source.
3. Install red jacketed, 3A fused conductor, labeled “+ VEH BATT” to the positive post on the battery or 12/24 VDC nominal power source. **Do not install fuse at this time.**
4. Route and secure the Power Circuit Cable following the installation instructions under Cable Connectivity, page 5-1.
5. Do not install fuse until entire system is ready for testing (see Section 6 – Operational Test and Place in Service). When ready, install fuse following required steps (a to e) to help ensure an IP67 connection. See Figure 5-39.

- a. Insert new fuse.
- b. Apply entire contents of supplied Dow Corning 4 (dielectric grease) inside in-line fuse holder cover.
- c. Snap cover in place and press firmly together around outer edges to properly seal.
- d. Wipe off excess grease on outside of in-line fuse holder.
- e. May take up to a minute before green Power LED displays on the Control Module.



**FIGURE 5-39**  
**FUSE INSTALLATION**  
009228

### NOTICE

Anytime fuse cover is opened or fuse is removed, review steps (a to e) to confirm fuse and cover are correctly replaced.

Cover must be completely refilled with Dow Corning #4 or equal (dielectric) grease before closing to maintain IP67 rating. Press cover firmly in place and wipe off excess grease.

**LABEL PACKAGE**

Attach appropriate labels as needed in the specified locations. See Figures 5-40 to 5-43.

If automatic vehicle/equipment shutdown is part of the CHECKFIRE System, install the Engine Shutdown Label near the operator’s line of vision. Cut out the correct time delay value from the Time Delay Label, remove backing to expose adhesive, and attach to the Engine Shutdown Label in the space provided. See Figure 5-40.



**FIGURE 5-40**  
**LABEL FOR ENGINE SHUTDOWN AND TIME DELAY**  
009174

If automatic vehicle/equipment shutdown is **NOT** part of the CHECKFIRE System, install the Stop Vehicle and Exit Label near the operator’s line of vision. See Figure 5-41.



**FIGURE 5-41**  
**LABEL TO STOP VEHICLE AND EXIT**  
009175

As a reminder to service and maintenance personnel, install this CAUTION Label in the area protected by the Linear Detector. See Figure 5-42.



**FIGURE 5-42**  
**LABEL FOR PROTECTING LINEAR DETECTOR**  
011941-

Install Label No. 440802 next to every Electric Manual Actuator (EMA). See Figure 5-43.



**FIGURE 5-43**  
**INSTRUCTION LABEL FOR EMA**  
009324

**FINAL COMPONENT CONNECTIONS**

**Electric activation:** See Section 6 – Operational Test and Place in Service for final electric activation connections.

**Combined electric and pneumatic actuation:** Connect both pneumatic actuator hoses and Release Circuit Drop Cables with installed PADs (see electric actuation instructions in Section 6 – Operational Test and Place in Service).

**PNEUMATIC MANUAL ACTUATION (OPTIONAL)**

If layout drawing includes an optional pneumatic manual actuator in the operator’s compartment, confirm the operator has access to the red strike button on the actuator. For detailed installation guidelines, refer to the appropriate system manual (latest revision).

**NOTES:**

**CAUTION**

Before performing any operational tests, protect the fire suppression system from unintentional actuation. Verify Release Circuit Drop Cables are not connected to Electric-Pneumatic Actuators and any pneumatic manual actuators are ring-pinned for safety and/or actuation cartridges removed.

The following tables are step-by-step instructions to complete testing and place the system in service. If unexpected results occur refer to Section 9 – Troubleshooting.

**TABLE 6-1: PREPARATION – OPERATIONAL TEST**

**Release Circuit**

**CAUTION**

When handling the PAD, always point actuating end away from yourself and others. On electrical initiation, PAD operates very quickly and a small brass disk forcefully separates from actuating end. Physical injury may occur from contact with the actuating pin and/or the detaching disk.

Before conducting the OPERATIONAL TEST (see Table 6-4), confirm all installed Release Circuit Drop Cables have a Release Circuit Tester (RCT) and if needed, a Release Circuit Test Plug installed.

1. Insert Release Circuit Test Plug in socket of Release Circuit Drop Cable. (If installed remove PAD.)
2. On last Release Circuit Drop Cable in main trunk insert RCT. (If installed, remove PAD.)

Switch on top of RCT must be turned on for testing. LEDs on front indicate status: Ready, Pass, Fail, and replace RCT battery.

After RCT indicates pass or fail, press switch on top to reset the tester.

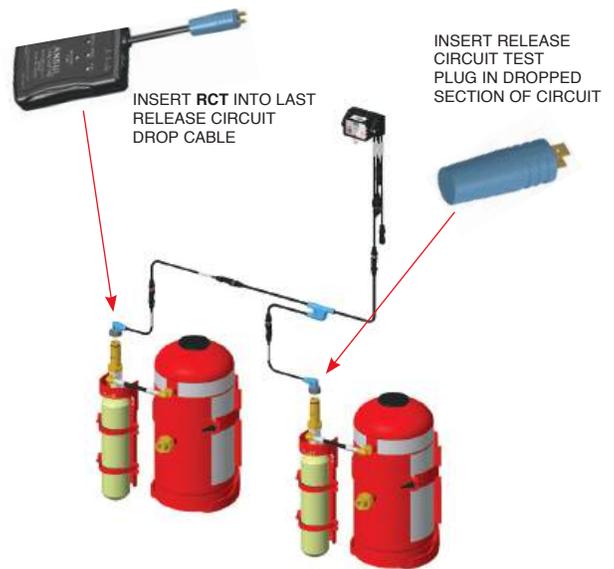
**Note:** If there is a single Electric-Pneumatic Actuator, connect RCT to Release Circuit Drop Cable. Release Circuit Test Plug is not installed.

**CAUTION**

When performing any operational tests, make certain RCT and Release Circuit Test Plugs, as required, are attached to the release circuit.



IF USING TWO DROP CABLES, INSTALL RELEASE CIRCUIT TEST PLUG IN DROPPED SECTION OF CABLE



009288/ 009289/ 011947

**Detection Circuit**

Before conducting the OPERATIONAL TEST, install the Detection Circuit Tester (DCT).

1. Remove the Detection Circuit EOL Device from the detection circuit.
2. Set DCT to “Normal” condition, then install DCT.

**NOTICE**

In applications that do not use the detection circuit End Of Line (EOL) Device (DT Style) the Detection Circuit Tester can be connected directly to the Detection Circuit Cable at the CHECKFIRE 110-D Control Module for functional testing.



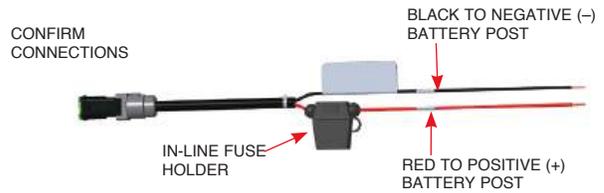
011826

**TABLE 6-1: PREPARATION – OPERATIONAL TEST (Continued)**

**Power Up**

Before conducting the OPERATIONAL TEST, make certain primary power is properly connected to CHECKFIRE 110-D Control Module (see Section 5 - Installation, page 5-14).

- If fuse is not installed, follow instructions in Section 5 – Installation, page 5-14 (step 5).
- May take up to a minute before green Power LED displays



**FOLLOW SECTION 5 – INSTALLATION INSTRUCTIONS TO INSTALL FUSE**

011789

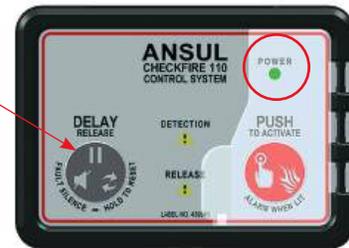
**Reset to Normal:** Press and hold the “DELAY/Reset/Silence” button for 3 seconds; Power LED and Sounder quickly pulse 3 or 5 times, then Power LED remains GREEN steady-on.

**Note:** On reset the electronics perform a Self Diagnostic Routine (SDR) and LED test. The LED and Sounder indicate the end of the test and pulse according to the Release Time Delay setting. (3 = factory default, 5 = optional setting).

**RESET TO NORMAL**

PRESS AND HOLD 3 SECONDS

POWER LED IS GREEN STEADY-ON



009180

**TABLE 6-2: ISOLATION FEATURE**

The CHECKFIRE 110-D Control Module includes an Isolation Feature for vehicle/equipment service personnel to help minimize the possibility of a false fire suppression system discharge when service or maintenance takes place on the protected vehicle/equipment (not intended for CHECKFIRE 110-D System maintenance).

The control module must be in Isolate Mode to change the Release Time Delay setting. Refer to Table 3 - Programming the Release Time Delay.

**CAUTION**

When placed in Isolate Mode, the Release Circuit cannot be initiated by an automatic detection circuit input.

In the event of fire, manual actuation bypasses Isolate Mode. To operate manually:

- Press “PUSH to Activate/ Alarm When Lit” button

**Or**

- Pull ring pin and operate RED Strike button on an EMA or a pneumatic manual actuator

TABLE 6-2: ISOLATION FEATURE (Continued)

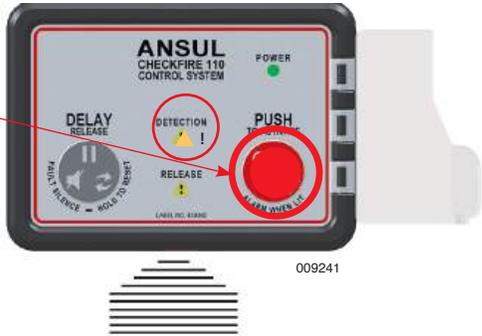
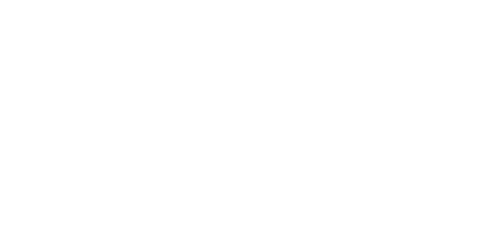
<p>Place the CHECKFIRE 110-D Control Module in Isolate Mode then confirm: system will not auto release and will manually actuate while in Isolate Mode.</p> <p><b>Note:</b> While in Isolate Mode service personnel can perform service and maintenance on the vehicle as needed.</p>	<p>PLACE IN ISOLATE MODE</p> <p>PRESS AND HOLD 8 SECONDS</p>	 <p>009180b</p>
<p>1. Press and hold the “DELAY/Reset/Silence” button for approximately 8 seconds causing two consecutive resets; control module cycles through two SDR and LED tests.</p>	<p>ISOLATE MODE</p> <p>LED AND SOUNDER QUICKLY PULSE 2 X 30 SECONDS</p>	 <p>009180b</p>
<p>2. Amber Detection Fault LED and sounder quickly pulse 2 x 30 seconds indicating Isolate Mode.</p> <p>3. If desired, push the “DELAY/Reset/Silence” button to silence sounder.</p>	<p>ALARM CONDITION DCT = ALARM</p> <p>RED LED AND SOUNDER PULSE 1 X 1 SECOND, AMBER LED PULSES 2 X 30 SECONDS</p> <p>VERIFY TIME DELAY DOES NOT START</p>	 <p>009180b</p>
<p>4. Set DCT switch to “Alarm” position. Red “Push to Activate / Alarm When Lit” LED and sounder pulse 1 x 1 second; Amber Detection Fault LED and sounder pulse 2 x 30 seconds.</p> <p><b>Verify time delay does not start.</b></p>	<p>OPEN DOOR</p> <p>PUSH BUTTON</p>	 <p>009241</p>
<p>5. After 30 seconds of indication, open the protective guard door and push the “PUSH to Activate / Alarm When Lit” button. Release Activated starts immediately.</p> <p><b>Note:</b> There is no time delay upon manual activation.</p>	<p>RELEASE ACTIVATED</p> <p>RED LED AND SOUNDER STEADY-ON FOR 10 SECONDS; AMBER LED PULSES 2 X 30 SECONDS</p>	
<p>6. <b>Release Activated</b> – The Red “PUSH to Activate / Alarm When Lit” LED, and sounder are steady-on for 10 seconds; Amber Detection Fault LED pulses 2 x 30 seconds.</p>		

TABLE 6-2: ISOLATION FEATURE (Continued)

7. **Post Release Activated** – The Red “PUSH to Activate / Alarm When Lit” LED and sounder pulse 1 x 10 seconds; and Amber Detection Fault LED pulses 2 x 30 seconds.

8. Push the “DELAY/Reset/Silence” button to test sounder silence. Sounder silences and LEDs continue.

9. Confirm successful release signal (Pass) on RCT.

10. Reset DCT to “Normal” position.

11. Reset RCT.

**POST RELEASE ACTIVATED**

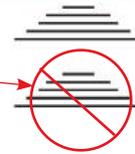
RED/AMBER LEDs AND SOUNDER PULSE 1 X 10 SECONDS, AMBER RELEASE LED PULSES 2 X 30 SECONDS



009180c

**PUSH BUTTON**

SOUNDER STOPS



12. Cancel Isolate Mode. Reset control module to Normal: Press and hold the “DELAY/Reset/Silence” button for approximately 8 seconds; Power LED and Sounder quickly pulse 3 or 5 times, then Power LED remains GREEN steady-on.

**RESET TO NORMAL**

PRESS AND HOLD 3 SECONDS

POWER LED IS GREEN STEADY-ON



009180

**TABLE 6-3: PROGRAMMING THE RELEASE TIME DELAY**

At the start of an alarm condition the red “PUSH To Activate / Alarm When Lit” LED and Sounder notify operator of pending release. The CHECKFIRE System activates the release circuit at end of time delay, unless the “DELAY/Reset/Silence” button is pushed to restart time delay cycle **before the time delay expires**. The time delay can be re-started multiple times if more time is needed for safety.

**Note:** The release time delay only applies to a detection device input. The time delay is bypassed when the CHECKFIRE 110-D Control Module or an EMA is manually actuated.

Options for the release time delay are either 5 seconds or 15 seconds. The CHECKFIRE 110-D Control Module is factory set for a 5-second time delay.

1. Verify time delay setting: press and hold the “DELAY/Reset/Silence” button for 3 seconds (reset to normal). At the end of reset, the GREEN Power LED and Sounder quickly pulse 3 times indicating a 5-second time delay or 5 times for a 15-second time delay.

Power LED and Sounder Quickly Pulse	Indicates Seconds of Time Delay
3	5
5	15

**VERIFY TIME DELAY SETTING**

PRESS AND HOLD 3 SECONDS

**TIME DELAY SETTING INDICATION:**

LED AND SOUNDER PULSE	TIME DELAY SECONDS
3	5
5	15



2. To change the time delay place in Isolate Mode. Refer to Table 2 - Isolation Feature, Steps 1-3, then continue.
3. The time delay toggles between 5 to 15 seconds by rapidly pushing the “DELAY/Reset/Silence” button 3 x 1 second. The GREEN Power LED and Sounder quickly pulse 3 times for a 5-second time delay or 5 times for a 15-second time delay.

**SEE TABLE 2, TO PLACE MODULE IN ISOLATE MODE**

THEN PUSH 3 X 1 SECOND

POWER LED AND SOUNDER PULSE 3 OR 5 TIMES



4. Reset control module to Normal: Press and hold the “DELAY/Reset/Silence” button for 3 seconds; Power LED and Sounder quickly pulse 3 or 5 times, then Power LED remains GREEN steady-on.
5. To change time delay again, repeat above procedure.

**RESET TO NORMAL**

PRESS AND HOLD 3 SECONDS

POWER LED IS GREEN STEADY-ON



TABLE 6-4: OPERATIONAL TEST

The following tests verify system operation for:

1. Circuit Supervision: Confirm supervisory function of each circuit.
2. Detection Input: Receive electrical signal from a detection device (simulated fire condition).
3. Time Delay: Verify accuracy of time delay setting.
4. Electric Manual Activation: Receive electrical signal from an EMA.

If noted results are not attained, refer to Section 9 - Troubleshooting for corrective action.

**NOTICE**

If the system is connected to a vehicle shutdown device through the pressure switch, verification needs to be made at the pressure switch.

**NOTICE**

During testing, verify any devices connected to the Alarm Circuit Lead function as intended.

**CAUTION**

Before performing any operational tests, protect the fire suppression system from unintentional actuation. Verify Electric-Pneumatic Actuators are not connected to Release Circuit Drop Cables and any pneumatic manual actuators are ring-pinned for safety and/or actuation cartridges removed.

**CAUTION**

When performing any operational testing, make certain the RCT and Release Circuit Test Plugs are attached to the release circuit.

**Detection Circuit - Supervision Test**

Set DCT switch to “Fault” position. The CHECKFIRE 110-D Control Module indicates the following:

1. Detection Fault LED pulses AMBER 1 x 10 seconds.
2. Sounder pulses 1 x 10 seconds.

DETECTION FAULT INDICATION (DCT SWITCH = FAULT)

AMBER LED AND SOUNDER PULSE 1 X 10 SECONDS



Test silence function: push the “DELAY/Reset/Silence” button.

3. Sounder silences and Detection Fault LED continues to pulse AMBER 1 x 10 seconds.

SILENCE FUNCTION DETECTION FAULT INDICATION

PUSH TO SILENCE SOUNDER (LED CONTINUES)

AMBER LED PULSES 1 X 10 SECONDS



Reset the DCT to the “Normal” position.

4. CHECKFIRE 110-D Control Module returns to Normal status; Power LED is GREEN steady-on.

RESET DCT TO NORMAL

MODULE RETURNS TO NORMAL STATUS

POWER LED IS GREEN STEADY-ON



**TABLE 6-4: OPERATIONAL TEST (Continued)**

<p><b>Release Circuit - Supervision Test</b></p> <p>Remove RCT from the Release Circuit. The CHECKFIRE 110-D Control Module indicates the following.</p> <ol style="list-style-type: none"> <li>1. Release Fault LED pulses AMBER 1 x 10 seconds.</li> <li>2. Sounder pulses 1 x 10 seconds.</li> </ol>	<p><b>RELEASE FAULT INDICATION (RCT REMOVED)</b></p> <p>AMBER LED AND SOUNDER PULSE 1 X 10 SECONDS</p>	 <p>009180b</p>
<p>Test silence function; push the “DELAY/Reset/Silence” button.</p> <ol style="list-style-type: none"> <li>3. Sounder silences and Release Fault LED continues to pulse AMBER 1 x 10 seconds.</li> </ol>	<p><b>SILENCE FUNCTION RELEASE FAULT INDICATION</b></p> <p>PUSH TO SILENCE SOUNDER (LED CONTINUES)</p> <p>AMBER LED PULSES 1 X 10 SECONDS</p>	 <p>009180b</p>
<p>Reconnect RCT to release circuit.</p> <ol style="list-style-type: none"> <li>4. CHECKFIRE 110-D Control Module returns to Normal status; Power LED is GREEN steady-on.</li> </ol>	<p><b>RECONNECT RCT</b></p> <p>MODULE RETURNS TO NORMAL STATUS</p> <p>POWER LED IS GREEN STEADY-ON</p>	 <p>009180</p>

TABLE 6-4: OPERATIONAL TEST (Continued)

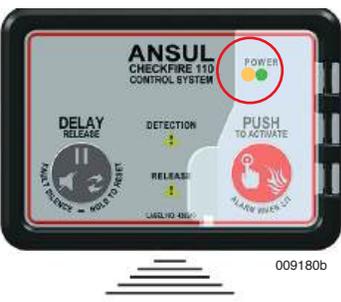
<p><b>Secondary Power Circuit – Supervision Test</b></p> <p>Disconnect the primary power circuit connection at the CHECKFIRE 110-D Power Circuit Lead.</p> <ol style="list-style-type: none"> <li>1. Power LED pulses AMBER 1 x 30 seconds.</li> <li>2. Sounder pulses 1 x 30 seconds.</li> </ol>	<p><b>POWER SUPERVISION (REMOVE POWER CABLE)</b></p> <p>AMBER LED AND SOUNDER PULSE 1 X 30 SECONDS</p>	 <p>009180b</p>						
<ol style="list-style-type: none"> <li>3. Repeat supervision tests on Secondary power:             <ul style="list-style-type: none"> <li>• Detection Circuit – Supervision Test (page 6-6)</li> <li>• Release Circuit – Supervision Test (page 6-7)</li> </ul> </li> <li>4. Reconnect primary power circuit connection at the Power Circuit Lead. The CHECKFIRE 110-D Control Module returns to Normal status; Power LED is GREEN steady-on. (may take up to 10 seconds)</li> </ol>	<p>REPEAT ABOVE TESTS ON SECONDARY POWER</p> <p>RECONNECT EXTERNAL POWER AND MODULE RETURNS TO NORMAL STATUS</p> <p>POWER LED IS GREEN STEADY-ON</p>	 <p>009180</p>						
<p><b>Verify Time Delay</b></p> <p>Reset control module to Normal: Press and hold the “DELAY/Reset/Silence” button for 3 seconds; Power LED and Sounder quickly pulse 3 or 5 times, then Power LED remains GREEN steady-on.</p> <p>The number of pulses at end of reset indicates length of time delay.</p> <p>3 Pulses – 5 Second Time Delay              5 Pulses – 15 Second Time Delay</p>	<p><b>VERIFY TIME DELAY SETTING</b></p> <p>PRESS AND HOLD 3 SECONDS</p> <p>POWER LED IS GREEN STEADY-ON</p> <p>TIME DELAY SETTING INDICATION:</p> <table border="1"> <thead> <tr> <th>LED AND SOUNDER PULSE</th> <th>TIME DELAY SECONDS</th> </tr> </thead> <tbody> <tr> <td>3</td> <td>5</td> </tr> <tr> <td>5</td> <td>15</td> </tr> </tbody> </table>	LED AND SOUNDER PULSE	TIME DELAY SECONDS	3	5	5	15	 <p>009180b</p>
LED AND SOUNDER PULSE	TIME DELAY SECONDS							
3	5							
5	15							

TABLE 6-4: OPERATIONAL TEST (Continued)

Detection Circuit: Alarm Condition Test	
<b>CAUTION</b>	
<p>Before beginning this test, verify:</p> <ul style="list-style-type: none"> <li>Release Circuit Test Plugs and RCT are connected in the Release Circuit.</li> <li>DCT replaces the EOL Device in the Detection Circuit.</li> </ul>	
<ol style="list-style-type: none"> <li>1. Simulate alarm condition by turning switch on DCT to ALARM position.</li> <li>2. Verify accuracy of time delay:               <ol style="list-style-type: none"> <li>a. <b>15-Second Time Delay:</b> The “PUSH to Activate / Alarm When Lit” RED LED and Sounder pulse 2 x 1 second until last 5 seconds of time delay period. 5 seconds before end of 15-second time delay period, pulse rate increases to 4 x 1 second.</li> <li>b. <b>5-Second Time Delay:</b> The “PUSH to Activate / Alarm When Lit” RED LED and Sounder pulse 4 x 1 second.</li> </ol> </li> <li>3. Release Circuit Activation: Upon expiration of the time delay, the Release Circuit activates.</li> </ol>	<div style="background-color: yellow; padding: 5px;"><b>CAUTION</b></div> <p>VERIFY RCT AND DCT INSTALLED!</p> <p><b>START OF DETECTION CIRCUIT ALARM CONDITION (DCT = ALARM)</b></p> <p>RED LED AND SOUNDER PULSE 2 X 1 SEC. FOR 10 SECONDS (15 SECOND TIME DELAY ONLY)</p> <p>5 SECONDS BEFORE END, RED LED AND SOUNDER PULSE 4 X 1 SEC. FOR 5 SECONDS (NOTE: 5 SECOND TIME DELAY STARTS AT THIS LEVEL)</p> 
<ol style="list-style-type: none"> <li>4. <b>Release Activated:</b> The “PUSH to Activate / Alarm When Lit” RED LED and Sounder remain steady-on for 10 seconds.</li> </ol>	<p><b>RELEASE ACTIVATED</b></p> <p>RED LED AND SOUNDER REMAIN STEADY-ON FOR 10 SECONDS</p> 
<ol style="list-style-type: none"> <li>5. <b>Post Release Activated:</b> The RED “PUSH to Activate / Alarm When Lit” LED and Sounder pulse 1 x 10 seconds.</li> <li>6. Push “DELAY/Reset/Silence” button to test Sounder silence.</li> <li>7. RED LED continues to pulse 1 x 10 seconds.</li> <li>8. Confirm RCT displays “PASS.”</li> </ol>	<p><b>POST RELEASE ACTIVATED</b></p> <p>RED LED AND SOUNDER PULSE 1 X 10 SECONDS</p> <p>PUSH TO SILENCE SOUNDER (LEDs CONTINUE)</p> 

TABLE 6-4: OPERATIONAL TEST (Continued)

**Detection Circuit: Test Time Delay Restart**

1. Reset DCT to normal position.
2. Reset RCT - press reset button.
3. Reset control module to Normal: Press and hold the “DELAY/Reset/Silence” button for 3 seconds; Power LED and Sounder quickly pulse 3 or 5 times, then Power LED remains GREEN steady-on.

**RETURN TO NORMAL STATUS**

RESET DCT, RCT, AND CONTROL MODULE

POWER LED IS GREEN STEADY-ON



009180

4. Initiate alarm condition by turning DCT switch to ALARM.
5. Before time delay period expires (5 or 15 seconds), push “DELAY/Reset/Silence” button to restart time delay (3 or 5 pulses indicate time is reset). Time delay resets to full delay period. (Time delay reset may be repeated multiple times. Press and release.)

**Note:** Holding button down does **not** pause time delay.

**SET DCT TO ALARM TO TEST TIME DELAY**

BEFORE END OF TIME DELAY, PUSH BUTTON TO RESTART TIME DELAY



009180br

6. Allow Control Module to complete time delay cycle then during Release Activated (“PUSH to Activate / Alarm When Lit” RED LED and Sounder remain steady-on for 10 seconds) push the “DELAY/Reset/Silence” button. Verify:

- a. Time delay will not restart.
- b. Sounder will not silence.

7. Confirm successful release signal on RCT.

**CONTROL MODULE COMPLETES TIME DELAY**

PUSH BUTTON DURING RELEASE ACTIVATED (RED LED AND SOUNDER ARE STEADY-ON)

• VERIFY NO RESPONSE TO PUSHING BUTTON



009180d

8. Return to normal:

- a. Reset DCT to normal position.
- b. Reset RCT - press reset button.
- c. Reset control module to Normal: Press and hold the “DELAY/Reset/Silence” button for 3 seconds; Power LED and Sounder quickly pulse 3 or 5 times, then Power LED remains GREEN steady-on.

**RETURN TO NORMAL STATUS**

RESET DCT, RCT, AND CONTROL MODULE

POWER LED IS GREEN STEADY-ON



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TABLE 6-4: OPERATIONAL TEST (Continued)

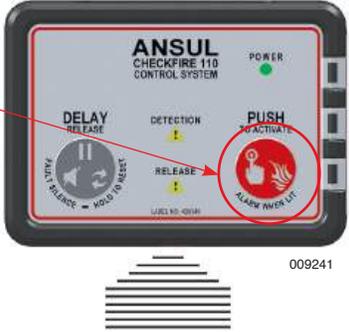
<p><b>Manual Activation Release Circuit Test</b></p> <ol style="list-style-type: none"> <li>1. Open the protective guard door and push the “PUSH to Activate / Alarm When Lit” button. Release Activated starts immediately.</li> </ol> <p><b>Note:</b> There is no time delay upon manual activation.</p> <ol style="list-style-type: none"> <li>2. <b>Release Activated</b> – The “PUSH to Activate / Alarm When Lit” RED LED and Sounder are steady-on for 10 seconds.</li> </ol>	<p><b>MANUAL ACTIVATION</b></p> <p>OPEN GUARD DOOR AND PUSH RED BUTTON</p> <p>10 SECOND RELEASE STARTS IMMEDIATELY</p> <p>RED LED AND SOUNDER REMAIN STEADY-ON FOR 10 SECONDS</p>	 <p>009241</p>
<ol style="list-style-type: none"> <li>3. <b>Post Release Activated</b> – The “PUSH to Activate / Alarm When Lit” LED and Sounder pulse 1 x 10 seconds.</li> <li>4. Push the “DELAY/Reset/Silence” button to test Sounder silence.</li> <li>5. The LED continues to pulse 1 x 10 seconds.</li> <li>6. Confirm successful release signal on RCT.</li> </ol>	<p><b>POST RELEASE ACTIVATED</b></p> <p>CONTINUES UNTIL MODULE IS RESET</p> <p>RED LED AND SOUNDER PULSE 1 X 10 SECONDS</p> <p>PUSH TO SILENCE SOUNDER (LEDs CONTINUE)</p>	 <p>009180br</p>
<ol style="list-style-type: none"> <li>7. Reset RCT.</li> <li>8. Reset control module to Normal: Press and hold the “DELAY/Reset/Silence” button for 3 seconds; Power LED and Sounder quickly pulse 3 or 5 times, then Power LED remains GREEN steady-on.</li> </ol>	<p><b>RETURN TO NORMAL STATUS</b></p> <p>RESET RCT, AND CONTROL MODULE</p> <p>POWER LED IS GREEN STEADY-ON</p>	 <p>009180</p>

TABLE 6-4: OPERATIONAL TEST (Continued)

**Electric Manual Actuator (EMA) Test**

**CAUTION**

If the system includes Pneumatic Manual Actuators, **DO NOT TEST** these components. The actuators also have ring pins and red strike buttons. Actuation can cause fire suppression system release.

1. Pull ring pin and strike red button to manually operate EMA.

**Note:** There is no time delay upon manual activation.

2. **Release Activated** – The “PUSH to Activate / Alarm When Lit” RED LED and Sounder are steady-on for 10 seconds.

PULL RING PIN AND STRIKE RED BUTTON

10 SECOND RELEASE STARTS IMMEDIATELY

RED LED AND SOUNDER REMAIN STEADY-ON FOR 10 SECONDS

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009180d

3. **Post Release Activated** – The “PUSH to Activate / Alarm When Lit” LED and Sounder pulse 1 x 10 seconds.

RED LED AND SOUNDER PULSE 1 X 10 SECONDS

POST RELEASE ACTIVATED CONTINUES UNTIL MODULE IS RESET



009180br

4. Reset EMA by pulling red strike button up to set position, re-install ring pin. Do not reseal at this time.
5. Reset RCT.
6. Reset control module to Normal: Press and hold the “DELAY/Reset/Silence” button for 3 seconds; Power LED and Sounder quickly pulse 3 or 5 times, then Power LED remains GREEN steady-on.
7. Repeat Test for each remaining EMA following above steps.

RESET EMA: PULL RED BUTTON UP, INSERT RING PIN



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**CAUTION**

If the system includes Pneumatic Manual Actuators, **DO NOT TEST** these components. The actuators also have ring pins and red strike buttons. Actuation can cause fire suppression system release.

RETURN TO NORMAL STATUS

RESET RCT, AND MODULE

POWER LED IS GREEN STEADY-ON



009180

**TABLE 6-5: SUMMARY ALARM CONDITION INDICATORS**

	“PUSH To Activate / Alarm When Lit” LED and Sounder Indications			
Manual Action (Release Circuit Activation)	2 x 1 sec. for 10 sec.	4 x 1 sec. for 5 sec.	Steady-on for 10 sec.	1 x 10 sec. until reset*
Push the “PUSH to Activate / Alarm When Lit” button <b>Or:</b> Pull ring pin and push an EMA (Immediate release for either action)				
Post discharge				
Detection Circuit Input				
15-Second Time Delay (1st 10 seconds)				
5-Second Time Delay <b>And</b> 5 Seconds to release for 15 Second Time Delay				
<b>Release Circuit Activation</b> (Time Delay Expired)				
Post discharge				

\*Release Fault Indicator also pulses at this rate during post discharge. When release circuit test device is installed, Release Fault Indicator does not pulse.

**TABLE 6-6: SECONDARY POWER CIRCUIT – OPERATIONAL TEST**

<p>Disconnect primary power circuit connection at the CHECKFIRE 110-D Power Circuit Lead.</p> <ol style="list-style-type: none"> <li>Power LED pulses AMBER 1 x 30 seconds.</li> <li>Sounder pulses 1 x 30 seconds.</li> <li>Push the “DELAY/Reset/Silence” button to test Sounder silence. The LED continues to pulse 1 x 30 seconds.</li> <li>Repeat the following tests (pages 6-9 thru 6-13) with control module on secondary power: <ul style="list-style-type: none"> <li>Detection Circuit: Alarm Condition Test</li> <li>Detection Circuit: Test Time Delay Restart</li> <li>Manual Activation Release Circuit Test</li> <li>Electric Manual Actuator (EMA) Test</li> </ul> </li> </ol> <p><b>Note:</b> For above tests the Power LED continues to pulse AMBER 1 x 30 seconds.</p>	<p><b>SECONDARY POWER TESTING (REMOVE POWER CABLE)</b></p> <p>AMBER POWER LED AND SOUNDER PULSE 1 X 30 SECONDS</p> <p>PUSH TO SILENCE SOUNDER (LED CONTINUES)</p> <p>REPEAT TESTS PAGES 6-9 – 6-13 ON SECONDARY POWER</p>	
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TABLE 6-7: PLACING CHECKFIRE 110-D CONTROL MODULE IN SERVICE

1. Reconnect primary power circuit. The Power LED returns to GREEN steady-on. (At completion of testing return all devices to normal status.)

RECONNECT EXTERNAL POWER, LED IS GREEN STEADY-ON



2. Confirm all EMAs are in the up / ring-pinned positions and properly re-sealed with a visual seal.

ALL EMAs IN UP/PINNED POSITION AND SEALED



3. Close guard door for "PUSH To Activate / Alarm When Lit" button and install visual seal.

SEAL GUARD DOOR PROTECTING RED BUTTON



4. Replace DCT with Detection EOL Device in the detection circuit or reconnect Detection Circuit Cables. Detection fault indication starts and then clears.

REPLACE DCT WITH EOL DEVICE IN DETECTION CIRCUIT



5. Remove RCT and/or Release Circuit Test Plug from Release Circuit Drop Cable. **Note:** Release fault indication starts and remains in fault until installation of PADs.

REMOVE RCT AND RELEASE CIRCUIT TEST PLUG



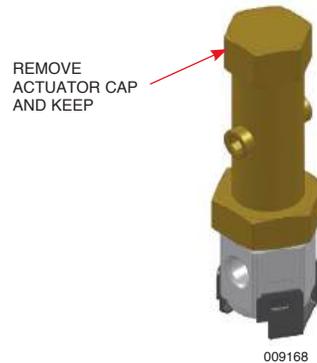
TABLE 6-7: PLACING CHECKFIRE 110-D CONTROL MODULE IN SERVICE (Continued)

6. Remove actuator cap on top of Electric-Pneumatic Actuator and retain for future use.

**Before installing PADs place control module in Isolate Mode, see Table 2 – Isolate Mode.**

**CAUTION**

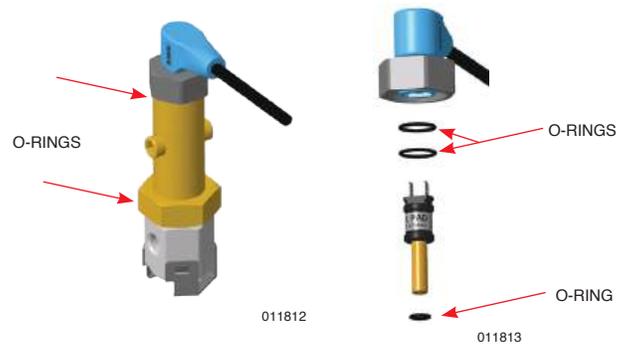
When handling the PAD, always point actuating end away from yourself and others. On electrical initiation, PAD operates very quickly and a small brass disk forcefully separates from actuating end. Physical injury may occur from contact with the actuating pin and/or the detaching disk.



7. Lubricate PAD, Electric-Pneumatic Actuator and Release Circuit Drop Cables o-rings with Dow Corning #4 grease. Attach Release Circuit Drop Cable with PAD to Electric-Pneumatic Actuator and hand-tighten the connector. Once the Drop Cable is fully seated, torque to 20 ft-lb to 25 ft-lb (27 N·m to 34 N·m) which may be applied with an appropriate tool. (Keep actuator cap for recharge and maintenance procedures.)

**NOTICE**

Be sure the Control Module does not have any faults or alarms before installing Release Circuit Drop Cable to Electric-Pneumatic Actuator.



8. Write installation date on PAD, DO NOT cover manufacturing date on label. Install PAD into Release Circuit Drop Cable. Verify o-ring is in place on PAD.

**NOTICE**

The PAD (Protracting Actuation Device) must be replaced after being in-service for five years.

- a. The in-service date should be recorded in installation and maintenance records and written on the PAD label with permanent marker at the time of installation.
- b. The PAD has a 10 year shelf life when stored in an environmentally stable location. The 5 year in-service life may not extend beyond the 10 year shelf life. (The month and year of manufacture is printed on the label located on the PAD body).

WRITE INSTALL DATE ON PAD LABEL  
MAKE SURE MANUFACTURING DATE IS READABLE



Install all PADs in the Release Circuit Drop Cables then confirm all faults are cleared prior to installing Release Circuit Drop Cables to actuators.

PAD FIELD INSTALLED IN CABLE

011806

TABLE 6-7: PLACING CHECKFIRE 110-D CONTROL MODULE IN SERVICE (Continued)

- 9. To complete re-installation of the Electric-Pneumatic Actuator, follow the instructions in the applicable ANSUL® vehicle fire suppression system manual.
- 10. Re-install pneumatic manual actuator cartridges if previously removed.

ELECTRONIC ACTUATION INSTALLATION COMPLETE

IF REMOVED, RE-INSTALL MANUAL ACTUATOR CARTRIDGES

**CAUTION**

FOR ELECTRIC ACTUATION ONLY 1/4 IN. BRASS PLUGS MUST REMAIN IN PLACE OR FIRE SUPPRESSION SYSTEM WILL NOT OPERATE.



011812

- 11. Reset control module to Normal: Press and hold the “DELAY/Reset/Silence” button for 3 seconds; Power LED and Sounder quickly pulse 3 or 5 times, then Power LED remains GREEN steady-on.
- 12. Record results of testing.

**RESET TO NORMAL**

PRESS AND HOLD 3 SECONDS

POWER LED IS GREEN STEADY-ON



009151

### IN CASE OF FIRE

Read these instructions and precautions carefully until they are clearly understood. All equipment operators or anyone who has any responsibility for the equipment should understand how the CHECKFIRE 110-D Electric Detection and Actuation System operates. Every operator should be completely trained in these procedures.

- When the detection circuit alarm sounds, bring the equipment to a safe controlled stop, shut off the engine, and exit.

**Note:** Equipment left running may add fuel to the fire or reignite the fire with heat or sparks.

- If possible, safely exit and move a safe distance from vehicle, and stand by with hand portable extinguisher.

### WARNING

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

### Automatic Detection and System Actuation

The CHECKFIRE 110-D Electric Detection and Actuation System includes a thermal detection device(s) located in each protected area. On detecting a fire alarm condition, the CHECKFIRE Control Module starts the time delay cycle; at the end of the cycle an electrical release signal initiates the fire suppression system.

### Manual System Operation

Bring equipment to a safe stop, shut off engine, and manually actuate system.

Perform one of the following to manually operate the system:

- Open guard door on CHECKFIRE 110-D Control Module (break visual seal), and push the “PUSH To Activate / Alarm When Lit” button, see Figure 7-1.
- Pull ring pin and strike red button on an Electric Manual Actuator (EMA), see Figure 7-1.
- If an optional pneumatic actuation system is installed, pull ring pin and strike red button on the pneumatic manual actuator.

Safely exit and move a safe distance from vehicle, and stand by with hand portable extinguisher.

### CAUTION

Manual system operation will result in immediate system discharge which may obscure vision. Make certain vehicle is stopped safely before manually operating system.

### Automatic Equipment Shutdown

The fire suppression system may be equipped with a pressure switch. This switch operates when the fire suppression system expellant gas cartridge is released. If a shutdown device is connected to the pressure switch, make certain all responsible personnel understand shutdown device operation, and when it will operate with reference to a release/discharge condition.

If the “DELAY/Reset/Silence” button (on the control module) is pushed and released **before the end of time delay cycle** (5 or 15 seconds), the time delay repeats the delay cycle, delaying eventual system discharge and pressure switch operation. This delay can be repeated (using the “DELAY/Reset/Silence” button) as many times as necessary to safely stop the vehicle before the system discharges and automatically shuts down the vehicle.

**Note:** Press and hold will not pause the time delay.

### WARNING

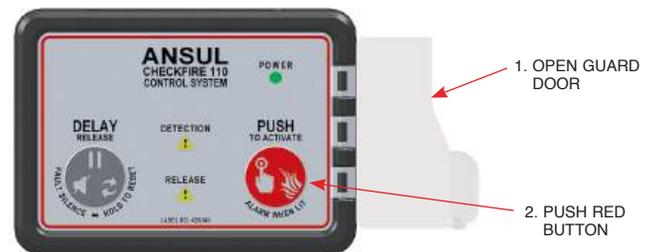
Delay of system operation may allow the fire to intensify, which could result in a more difficult fire to suppress.

### Exit Vehicle and Move Safely Away

Bring equipment to a safe controlled stop as soon as possible.

If fire suppression system has not yet operated, manually operate system (refer to Manual System Operation in this section).

Exit the vehicle (with hand portable fire extinguisher), and move away from the equipment. Stand by with hand portable fire extinguisher to guard against any fire that may reignite after fire suppression system has been discharged. Remain alert until equipment cools and possibility of re-ignition is no longer a threat.



OR

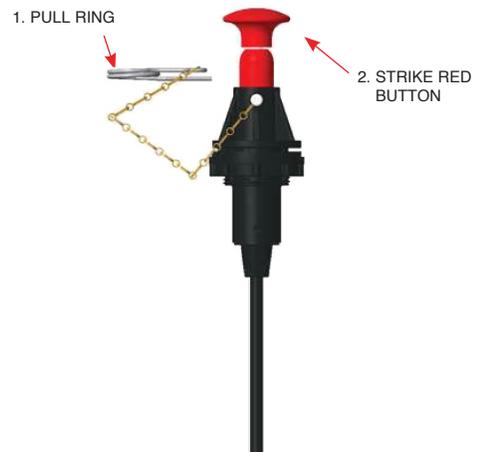
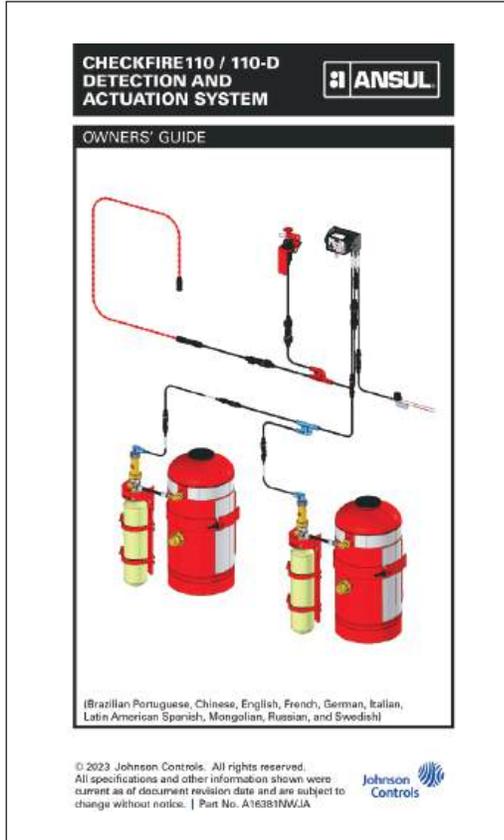


FIGURE 7-1  
IMMEDIATE RELEASE OPTIONS

009241/011810

**CHECKFIRE 110-D OWNERS' GUIDE**

The CHECKFIRE 110-D Owners' Guide (see Figure 7-2) is available for download using the QR Code (see Figure 7-3). The code is also on the QR Code Pack Sheet shipped with the 110-D Control Module.



**FIGURE 7-2**  
**CHECKFIRE 110-D OWNERS' GUIDE HANDBOOK**  
 012007



[docs.jci.com/ANSUL/CHECKFIRE110-D\\_OwnersGuide](https://docs.jci.com/ANSUL/CHECKFIRE110-D_OwnersGuide)

**FIGURE 7-3**  
**QR CODE – CHECKFIRE 110-D OWNERS' GUIDE**  
 110-D QR Code

Download the complete guide with the QR Code, print, and place in an easy to reach location for the operator. The guide provides instructions for manual actuation and a review of the automatic system operation.

Complete pages 1 and 2 in the Owners' Guide with the system information as installed (see Figure 7-4). This will help the operator become familiar with the actions required for the specific vehicle if an alarm is activated. The operator should review this system guide regularly before operating the vehicle/equipment.

**Fill-In System Information (as installed)**

External Power Supply (vehicle battery, power panel, etc.):  
 \_\_\_\_\_

**Note:** Internal backup power provides approximately 72 hours of power during normal operating conditions.

Selected Time Delay Period (seconds):     5     15

Pressure Switch Auxiliary Operation: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

PAGE 1

**Fill-In System Information (as installed)**

Electric or Pneumatic Manual Actuator Location(s):  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

PAGE 2

**FIGURE 7-4**  
**COMPLETE THE SYSTEM INFORMATION**  
 011961/ 011962

## RECHARGE

Individuals responsible for recharging, inspecting, and maintaining a CHECKFIRE 110-D System, must hold current ANSUL® Certification from an ANSUL® A-101 or LVS training program.

For continued protection, the CHECKFIRE 110-D System and fire suppression system must be recharged immediately after activation.

Before performing the recharge steps, inspect the CHECKFIRE 110-D Detection and Actuation System to determine cause of system release.

1. Disconnect the CHECKFIRE 110-D Control Module Release Circuit Lead from release circuit.
2. Check all Electric Manual Actuators (EMAs) for evidence of operation and determine if visual seal is intact. For EMAs needing reset and/or re-sealing complete the following:
  - a. Reset switch to normal position (pull button out).
  - b. Insert ring pin.
  - c. Wait to seal until after system test.
3. If optional pneumatic actuation is part of the system follow recharge instructions in the appropriate A-101 or LVS Design, Installation, Recharge, and Maintenance manual (latest revision).
4. Closely examine all detection circuit cables and Linear Detectors for loose connectors and damage (cut, abraded, burnt, blackened, melted, deformed, etc.) The Detection Circuit Fault LED on the CHECKFIRE 110-D Control Module will indicate a fault condition if there is an open or grounded circuit in the detection circuit.
  - a. Inspect all detection circuit cable for damage and replace if there are visible and mechanical signs of damage (brittleness, deformation, discoloration, etc.).

### CAUTION

Failure to replace damaged cable can result in unintended discharge.

- b. If a fire event was the cause of discharge, all Linear Detectors in the hazard area must be replaced; otherwise, inspect for damage and replace if damaged.  
**Note:** Splicing of any Linear Detector is **not allowed**.
- c. The Detection Circuit Fault clears once all faulty components have been replaced.

5. Closely examine all release circuit cables for loose connectors and damage (cut, abraded, burnt, blackened, melted, deformed, etc.). Replace cables as needed.
6. Check and perform maintenance on each Electric-Pneumatic Actuator (installed on each agent tank expellant gas cartridge): **Note:** If system was electrically operated all of the PADs should be actuated.
  - a. If attached, remove the Release Circuit Drop Cable from the Electric-Pneumatic Actuator.

### CAUTION

When handling the PAD, always point actuating end away from yourself and others. On electrical initiation, PAD operates very quickly and a small brass disk forcefully separates from actuating end. Physical injury may occur from contact with the actuating pin and/or the detaching disk.

### CAUTION

The Release Circuit Drop Cable with PAD must be removed from the Electric-Pneumatic Actuator to retract the actuator puncture pin. An actuated PAD can lock the Electric-Pneumatic Actuator puncture pin in the actuated position until removed from actuator.

- b. Confirm PAD o-ring is in place; if absent, check inside actuator and remove. (New PAD comes with new o-ring.) See Figure 8-1.

### CAUTION

Failure to remove loose o-ring from inside actuator body can result in improper positioning of the PAD and incorrect system operation.

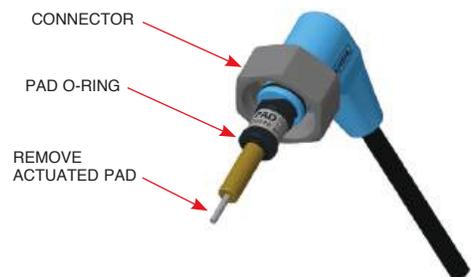
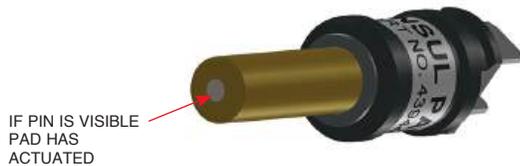


FIGURE 8-1  
ACTUATED PAD  
0011815

RECHARGE (Continued)

Step 6 (Continued)

- c. Examine actuating end of PAD to determine if PAD has actuated. **Note:** Occasionally the actuating pin will pull back into the PAD. Look directly at actuating end where pin extends. If pin is visible PAD has actuated. See Figure 8-2.
- d. If PAD actuated, remove PAD from the connector and discard. See Figure 8-1. **Do not install new PAD until testing is complete, see Step 10.** Find and discard small brass disk ejected from actuating end of PAD during release.
- e. If PAD has not actuated (system actuated with optional pneumatic manual actuator), refer to Five-Year PAD Replacement instructions, page 8-6, and replace if needed.



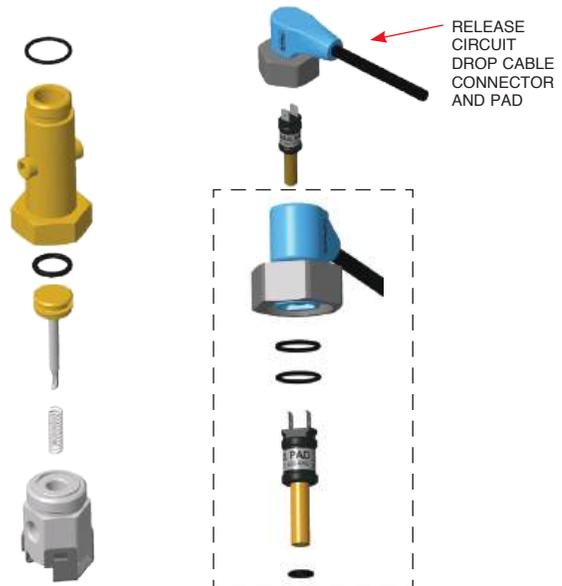
**FIGURE 8-2**  
**CHECK END OF PAD**  
009243

- f. If needed, remove 1/4 in. gas actuation hose(s). Loosen and slide base of Electric-Pneumatic Actuator sideways to remove from each expellant gas cartridge.

**CAUTION**

If the Electric-Pneumatic Actuator is difficult to remove puncture pin is not fully retracted. Do not force.

- g. Disassemble actuator and inspect for damage. Gently remove the puncture pin and spring from body being careful to keep the puncture pin straight (do not bend). Retain all parts for re-assembly. See Figure 8-3.



**FIGURE 8-3**  
**ELECTRIC-PNEUMATIC ACTUATOR**  
011814/ 011813

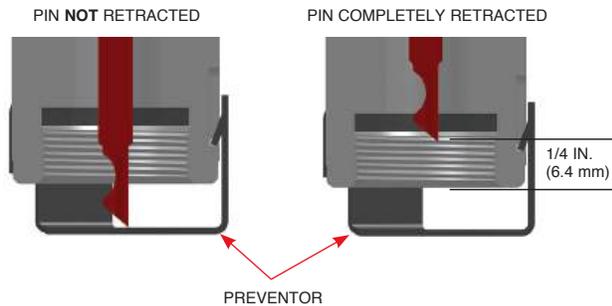
- h. Inspect and replace all damaged components (o-rings, flat gaskets, etc.).
  - i. Lubricate all o-rings (Connector o-rings, PAD o-ring, EPA o-ring and puncture pin o-ring) and gaskets with Dow Corning #4 (or equal) and reinstall. Include o-ring on PAD.
  - j. Replace flat gasket semi-annually.
  - k. Install spring on puncture pin and insert into body. Push down several times to confirm ease of movement.
  - l. Reassemble actuator.
  - m. Install actuator cap and pressure test using dry air or nitrogen.
- 7. Recharge the fire suppression system in accordance with the appropriate Fire Suppression Design, Installation, Recharge and Maintenance manual (latest revision).
  - 8. After fire suppression system recharge is complete:
    - a. Confirm puncture pin is completely retracted on the Electric-Pneumatic Actuator. See Figure 8-4.

**WARNING**

Before attaching the Electric-Pneumatic Actuator to the expellant gas cartridge, **verify the cartridge is correctly secured and confirm actuator puncture pin is in the completely retracted position.** If puncture pin is not completely retracted the cartridge seal can become damaged or pierced which can result in system actuation or serious personal injury or death.

## RECHARGE (Continued)

Step 8. a. (Continued)



**FIGURE 8-4**  
**RETRACT ACTUATOR PISTON**  
009220

b. To complete re-installation of the Electric-Pneumatic Actuator, follow the instructions in the applicable ANSUL® vehicle fire suppression system manual.

9. Reconnect the CHECKFIRE 110-D Control Module Release Circuit Lead to release circuit. Release Circuit Fault clears once all faulty components have been replaced.

**Note:** If Release Circuit Fault LED indicates an un-intentional fault condition, there may be an open or grounded circuit. See Section 9 – Troubleshooting to determine cause of fault. Replace cables as needed.

10. Test system and place into service by completing all steps in Section 6 – Test and Place in Service.
11. Complete steps 1 through 3 in the Maintenance Section.
12. Confirm all system equipment has been correctly serviced and recharged, and visual seals are in place on all EMAs and CHECKFIRE 110-D Control Module.
13. Record date of recharge on tag and in permanent record file. Notify operating personnel system is back in service.

## INSPECTION AND MAINTENANCE

To help ensure the CHECKFIRE 110-D Detection and Actuation System will operate as intended, proper inspection and maintenance procedures must be performed at the specified intervals.

### DAILY INSPECTIONS

The vehicle operator must check the system daily by visually verifying:

- Power LED is GREEN and steady-on, see Figure 8-5
- All other LEDs are off (not steady-on or pulsing)
- Sounder is silent
- No apparent damage to any components
- Visual seals in place

If any other conditions exist, contact the local Authorized ANSUL® Distributor or a person who has been trained and authorized by Johnson Controls to perform inspection and maintenance service on the CHECKFIRE 110-D System.



**FIGURE 8-5**  
**NORMAL CONDITION**  
009151

## MAINTENANCE

To help ensure the system will operate as intended, maintenance shall be performed semi-annually or sooner, depending on the operating and/or environmental conditions. Maintenance should be performed by an Authorized ANSUL® Distributor or a person who has been trained and authorized by Johnson Controls to perform maintenance checks.

Visually inspect system to confirm it is adequate for the vehicle hazard areas.

1. Check condition of the CHECKFIRE 110-D Control Module.
  - a. Confirm securely mounted, either in the CHECKFIRE 110/210 Mounting Bracket or surface mounted. Verify all fasteners are tight and control module enclosure nut is correctly torqued.
  - b. If secured in bracket, check bracket for damage or wear to ratchet teeth.
  - c. Check control module for damage or undue wear.
2. Check cable connectivity and integrity.
  - a. Confirm cable connections are correctly torqued.
  - b. Inspect all cables and connections for wear, abrasion or other physical damage.
  - c. Confirm all cables are correctly secured.

### MAINTENANCE (Continued)

3. Check integrity of each component.
  - a. Confirm Electric Manual Actuator (EMA) is:
    - Securely mounted
    - No damage, wear, or abrasions
    - Red strike button intact
    - Ring pin intact and in place
    - Rubber boot intact
    - Connector secure
    - Visual seal intact
    - Bracket secure
  - b. Confirm Electric-Pneumatic Actuator is:
    - Securely mounted
    - All actuator components appropriately tightened
    - Release Circuit Drop Cable connection tight
    - 1/4 in. brass plugs securely tightened in pneumatic ports OR - if optional pneumatic actuation, 1/4 in. actuation hose fittings securely in place
4. If optional Pneumatic Manual Actuator is part of system refer to appropriate system manual for inspection and maintenance instructions (latest revision):
5. If system includes optional Pneumatic Manual Actuators, carefully remove the LT-10-R cartridges from the pneumatic manual actuators, install shipping caps, and set aside in a safe location.
6. Check and perform maintenance on each Electric-Pneumatic Actuator (installed on each agent tank expellant gas cartridge):
  - a. If attached, remove Release Circuit Drop Cable from Electric-Pneumatic Actuator.

### CAUTION

When handling the PAD, always point actuating end away from yourself and others. On electrical initiation, PAD operates very quickly and a small brass disk forcefully separates from actuating end. Physical injury may occur from contact with the actuating pin and/or the detaching disk.

- b. Check PAD and maintenance records for installation date of PAD to determine if PAD needs replacement. Refer to Five-Year PAD Replacement instructions, page 8-7.
- c. Confirm PAD o-ring is in place; if absent, check inside actuator and remove. (New PAD comes with new o-ring.) See Figure 8-7.

### CAUTION

Failure to remove loose o-ring from inside actuator body can result in improper positioning of the PAD and incorrect system operation.

- d. Examine actuating end of PAD to determine if PAD has actuated. See Figure 8-8. **Note:** Occasionally the actuating pin will pull back into the PAD. Look directly at actuating end where the pin extended. If pin is visible PAD has actuated.
- e. If PAD actuated, remove PAD from the connector and discard. If possible, determine why PAD was actuated. **Do not install new PAD until testing is complete, see Step 9.** Find and discard small brass disk ejected from actuating end of PAD during release.

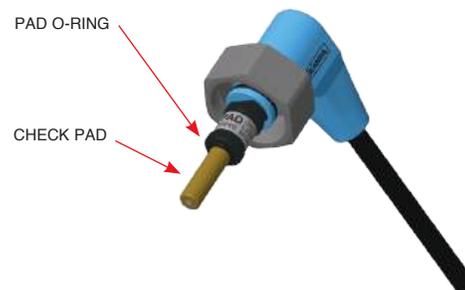


FIGURE 8-7  
CHECK PAD  
011813

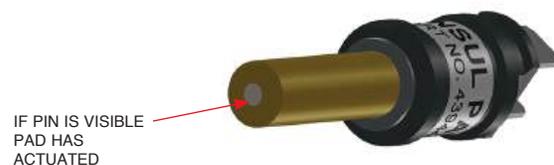


FIGURE 8-8  
CHECK END OF PAD  
009243

- f. If needed, remove 1/4 in. gas actuation hose(s). Loosen and slide base of Electric-Pneumatic Actuator sideways to remove from each expellant gas cartridge.

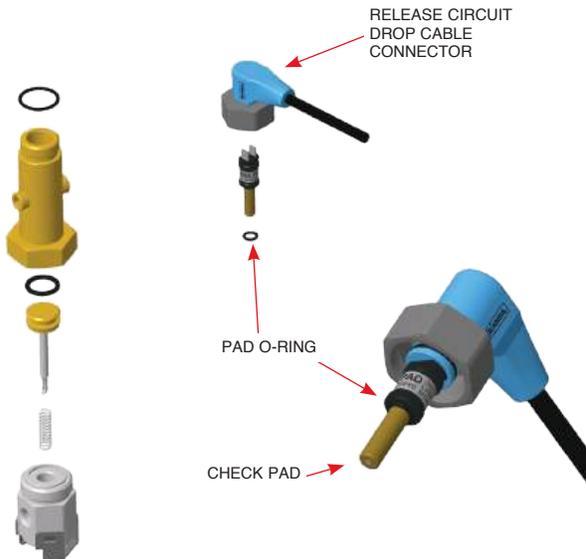
### CAUTION

If the Electric-Pneumatic Actuator is difficult to remove puncture pin is not fully retracted. Do not force.

## MAINTENANCE (Continued)

### Step 6 (Continued)

- g. Disassemble actuator and inspect for damage. Gently remove the puncture pin and spring from body being careful to keep the puncture pin straight (do not bend). Retain all parts for re-assembly. See Figure 8-9.



**FIGURE 8-9**  
**ELECTRIC-PNEUMATIC ACTUATOR**  
**RETAIN ALL PARTS FOR RE-ASSEMBLY**  
011814/ 011813

- h. Inspect and replace all damaged components (o-rings, flat gaskets, etc.).
- i. Lubricate all o-rings (Connector o-rings, PAD o-ring, EPA o-ring, and puncture pin o-ring) and gaskets with Dow Corning #4 (or equal) and reinstall, as described on page 8-2 (Recharge). Include o-ring on PAD.
- j. Replace flat gasket semi-annually.
- k. Install spring on puncture pin and insert into body. Push down several times to confirm ease of movement.
- l. Reassemble actuator.
- m. Install actuator cap (if needed) and pressure test using dry air or nitrogen.

7. To complete re-installation of the Electric-Pneumatic Actuator, follow the instructions in the applicable ANSUL® vehicle fire suppression system manual.
8. Test system and place into service by completing all steps in Section 6 – Test and Place in Service.  
**Note:** If Release Circuit Fault LED indicates an un-intentional fault condition, there may be an open or grounded circuit. (See Section – 9 Troubleshooting to determine cause of fault.) Replace cables as needed.
9. For fire suppression system maintenance refer to appropriate system manual (latest revision).
10. Test all accessories including discharge pressure switch, engine shutdown devices, and notification appliances.
11. Confirm all system equipment has been correctly serviced and recharged, and visual seals are in place on all EMAs and CHECKFIRE 110-D Control Module.
12. Record date of maintenance on tag and in permanent record file. Notify operating personnel system is back in service.

MAINTENANCE (Continued)

Five-Year PAD Replacement

**CAUTION**

When handling the PAD, always point actuating end away from yourself and others. On electrical initiation, PAD operates very quickly and a small brass disk forcefully separates from actuating end. Physical injury may occur from contact with the actuating pin and/or the detaching disk.



**FIGURE 8-11**  
**PAD MANUFACTURING DATE**  
009247

1. The PAD (Protracting Actuation Device) must be replaced after being in-service for five years.
  - a. The in-service date must be recorded in installation and maintenance records and written on the PAD label with permanent marker at the time of installation. See Figure 8-10.



**FIGURE 8-10**  
**WRITE DATE ON PAD**  
009169

- b. The PAD has a 10-year shelf life when stored in an environmentally stable location. The 5-year in-service life may not extend beyond the 10-year shelf life. The month and year of manufacture is printed on the label, see Figure 8-11.

- c. For proper disposal, the PAD must be actuated before discarding. Actuate the PAD in a safe manner consistent with site safety policies.
  2. Write installation date on new PAD(s). DO NOT cover manufacturing date on label. See Figure 8-10. Do not install PAD(s) until testing is complete.
  3. Follow instructions in Section 5 – Installation, to complete re-installation of the Electric-Pneumatic Actuator.
  4. Place in service by completing Table 6-7: Placing CHECKFIRE 110-D Control Module in Service, (see Section 6 – Test and Place in Service).
  5. Record date of PAD replacement in a permanent record file. Notify operating personnel the system is back in service.

**TROUBLESHOOTING**

The following tables provide information on normal operating and fault condition indications for the CHECKFIRE 110-D Detection and Actuation System. Refer to Table 9-5 for detailed circuit testing procedures. When all faults are cleared, confirm proper operation of the entire CHECKFIRE 110-D System by completing Section 6 – Test and Place in Service.

**TABLE 9-1: POWER LED INDICATIONS**

<p><b>NORMAL OPERATING CONDITION</b></p>	<p>Power LED is <b>green</b> steady-on indicating a normal condition.</p> <p>System is monitoring all the circuits and is ready to respond to a fault/fire condition.</p>	<p><b>NORMAL CONDITION</b></p> <p>LED GREEN STEADY-ON</p>		<p>009180</p>
<p><b>Primary Power Fault</b></p>	<p>Power LED pulsing <b>amber</b> with sounder 1 x 30 seconds indicating primary power circuit fault.</p>	<p><b>PRIMARY POWER FAULT</b></p> <p>PULSING 1 X 30 SECONDS</p>		<p>009180b</p>
<p>Power LED pulsing <b>amber</b> 1 x 30 seconds and sounder is <b>off</b> (after 10 minutes to conserve power) indicating primary power circuit fault.</p>	<p>The system continues to operate on secondary power to supervise the power, detection, and release circuits; remains ready to respond to a fault/fire condition.</p>	<p><b>PRIMARY POWER FAULT AND SOUNDER OFF</b></p> <p>PULSING 1 X 30 SECONDS</p>		<p>009180b</p>
<p><b>Loss of All Power</b></p>	<p>Power LED shows no indication for more than 30 seconds – the CHECKFIRE 110-D Control Module has lost all power.</p>	<p><b>LOSS OF ALL POWER</b></p>		<p>009180</p>

**CAUTION**

System is not providing protection until power is restored.

- Check the primary power connections, fuse, and cables
- Check the primary power supply for proper voltage
- If the proper voltage is verified at the module, and the Power LED remains off, replace the module

TABLE 9-2: RELEASE CIRCUIT FAULT

<b>Release Circuit Fault</b>	
<p>Release circuit fault LED and sounder pulsing 1 x 10 seconds indicating release circuit fault.</p>	<p><b>RELEASE CIRCUIT FAULT</b>  PULSING 1 X 10 SECONDS</p>
<ul style="list-style-type: none"><li>• Check the release circuit cables for an open circuit or a ground fault; replace cables as needed</li><li>• Check connections</li><li>• Check for activated or missing PAD(s); replace as needed following Section 8 – Recharge instructions</li></ul>	<p>009180b</p>
<b>Post Discharge Mode/Release Circuit Fault</b>	
<p>Release circuit fault LED, “PUSH to Activate / Alarm When Lit” LED and sounder pulsing 1 x 10 seconds indicating Post Discharge Mode, and Release circuit fault.</p>	<p><b>POST DISCHARGE MODE</b>  PULSING 1 X 10 SECONDS</p>
<ul style="list-style-type: none"><li>• Check for activated or missing PAD(s), replace as needed following Section 8 – Recharge instructions</li><li>• If a fault does not clear, check the release circuit cables for an open circuit or a ground fault; replace cables as needed</li></ul>	<p>009180br</p>

TABLE 9-3: DETECTION CIRCUIT FAULT

**Detection Circuit Fault**

Detection circuit fault LED and sounder pulsing 1 x 10 seconds indicating detection circuit fault.

- Check the connections
- Check the detection circuit cables for an open circuit or a ground fault; replace the cables as needed
- Verify the linear detector continuity or ground fault condition. Replace as needed.

DETECTION  
CIRCUIT FAULT  
PULSING  
1 X 10 SECONDS



**Isolate Mode Condition**

Detection circuit fault LED and sounder pulsing quickly 2 x 30 seconds indicate the CHECKFIRE 110-D Control Module is in Isolate Mode.

Placing the control module into isolate mode minimizes occurrence of a false discharge during service or maintenance procedures on the protected vehicle.

**CAUTION**

When the control module is in isolate mode, the release circuit cannot be initiated by an automatic detection circuit input.

In the event of fire, manual actuation will bypass the isolate mode for immediate release. To operate manually:

- Press “PUSH to Activate/ Alarm When Lit” button

**Or**

- Pull ring pin and operate the red strike button on an EMA or a pneumatic manual actuator.

**Note:** If a fault or alarm condition occurs while in isolate mode the condition will be displayed and the module will remain in isolate mode.

**CAUTION**

If an alarm condition has occurred in isolate mode resetting the control module results in an immediate start of the time delay leading to a release.

Return the control module to normal: Press and hold the “DELAY/Reset/Silence” button for 3 seconds; the power LED and sounder quickly pulse 3 or 5 times, then the power LED remains **green** steady-on.

DETECTION  
CIRCUIT FAULT –  
ISOLATE MODE  
PULSING QUICKLY  
2 X 30 SECONDS



TABLE 9-4: MULTIPLE CIRCUIT FAULTS

### Multiple Circuit Faults

Detection circuit fault, release circuit fault, “PUSH to Activate / Alarm When Lit” LEDs, and sounder pulsing 1 x 10 seconds indicate the post discharge mode, the detection circuit fault, and the release circuit fault.

When multiple fault conditions exist, check each circuit as previously described (clear circuit faults in this order: power, release, detection). Determine the fire system status.

- Check connections on all cables
- Check the release circuit cables for an open circuit or a ground fault; replace cables as needed
- Check the detection circuit cables for an open circuit or a ground fault; replace cables as needed
- Check for activated or missing PAD(s); replace as needed following Section 8 – Recharge instructions

**Note:** The power LED could also be pulsing **amber** if there is a fault in the primary power circuit.

### MULTIPLE CIRCUIT FAULTS

ALL LEDS  
PULSING  
1 X 10 SECONDS

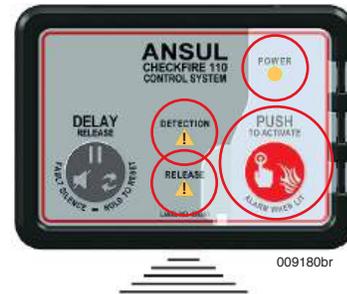


TABLE 9-5: SPECIFIC CIRCUIT TESTING PROCEDURES

### General Instructions

Test the connecting cables if faults are indicated on the CHECKFIRE 110-D Control Module, and end-of-circuit devices (EMAs, EOL Device, branch terminators, PADs, etc.) are properly connected to the system.

Before testing specific circuits, confirm completion of a thorough visual inspection. Inspect all the cables for damage and replace if there are visible and mechanical signs of damage (brittleness, deformation, discoloration, etc.). Test all the connections for loose or disassembled connectors.

**Note:** Once all the faults are cleared, confirm proper operation of the entire CHECKFIRE 110-D System by completing Section 6 - Test and Place in Service.

If the faults cannot be cleared, test each circuit and cable individually with the following procedures.

- |                   |          |
|-------------------|----------|
| Power Circuit     | page 9-5 |
| Release Circuit   | page 9-6 |
| Detection Circuit | page 9-8 |

TABLE 9-5: SPECIFIC CIRCUIT TESTING PROCEDURES (Continued)

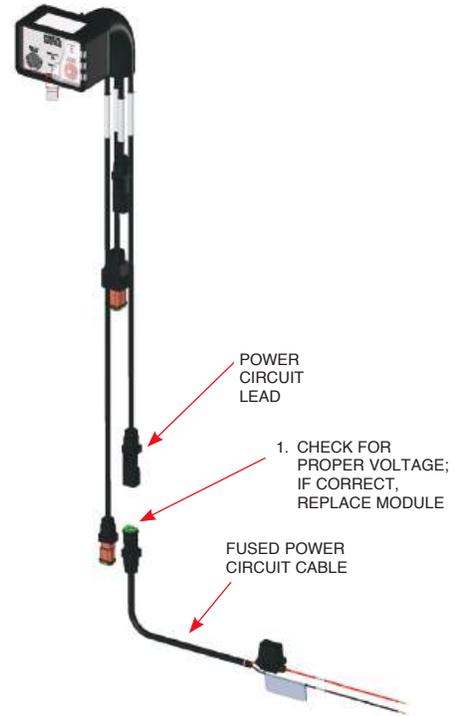
**Power Circuit**

If the power LED is pulsing **amber** or showing no indication for more than 30 seconds check primary power connections.

**Required Test Equipment**

- New fuse (3 amp inline ATO/ATC blade style automotive fuse)
- Digital multimeter

1. Disconnect the power circuit cable at the control module power circuit lead (green connector). Use the digital multimeter to confirm proper voltage is available at the end of the power circuit cable. If the voltage on the power circuit cable is correct, there is a control module internal problem and the CHECKFIRE 110-D Control Module must be replaced.



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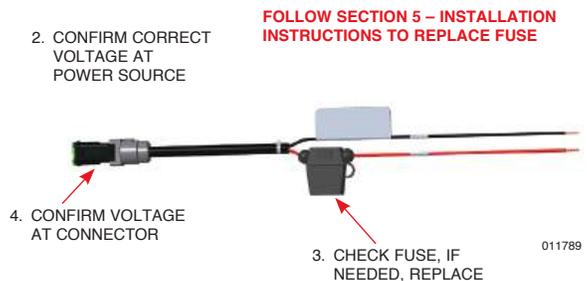
2. If the voltage on the power circuit cable is not correct, use the digital multimeter to check for proper voltage at the vehicle power source (battery).

- a. If the voltage is correct move to step 3.
- b. If the power source voltage is incorrect or indicates no power, contact vehicle service personnel to correct. When the voltage is restored reconnect the entire power circuit to see if power fault clears. If the fault does not clear, return to step one.

3. Check the fuse in the fused power circuit cable connected to the vehicle power source. If needed, replace the fuse following instructions in Section 5 – Installation, page 5-14 (step 5).

4. After confirming the correct voltage at the power source and a good fuse, disconnect the fused power circuit cable connector from the power circuit and check for proper voltage with the digital multimeter. If the voltage on the fused power circuit cable is correct, the cable is functioning properly. If the voltage is incorrect, the fused power circuit cable must be replaced.

5. After confirming the correct voltage at the end of the fused power circuit cable continue checking the remaining power circuit at each set of connectors for proper voltage from the power source. Replace the non-functioning cable with an identical new part.



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TABLE 9-5: SPECIFIC CIRCUIT TESTING PROCEDURES (Continued)

**Power Circuit (Continued)**

6. After replacing non-functioning cable and confirming correct voltage through the entire power circuit, reconnect to the control module. Power LED returns to **green** steady-on.

If all faults are clear, verify proper operation of the CHECKFIRE 110-D System by completing Section 6 – Test and Place in Service.

**Note:** Specific jurisdictions or customer procedures may require documentation of all components replaced. Keep a record of all changes to the system as required.

6. AFTER REPLACING CABLE AND CONFIRMING CORRECT VOLTAGE RE-CONNECT TO MODULE.

**Release Circuit**

If the release circuit fault LED is pulsing **amber** and cannot be cleared, check the release circuit cable.

**Required Test Equipment** (Confirm test equipment is new and functioning properly)

- 2 - Release Circuit Terminators
- 2 - Release Circuit Test Plugs

1. Disconnect the release circuit cable at the control module release circuit lead (blue connector). Install the release circuit terminator on the blue lead. If the release circuit fault LED continues pulsing **amber**, there is a control module internal problem and the CHECKFIRE 110-D Control Module must be replaced.

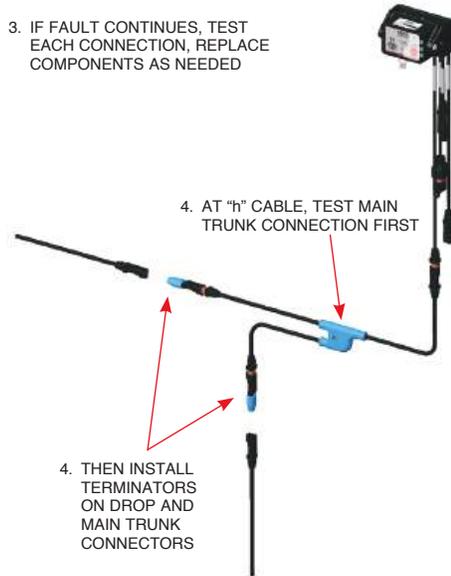


TABLE 9-5: SPECIFIC CIRCUIT TESTING PROCEDURES (Continued)

**Release Circuit (Continued)**

2. If the release circuit fault clears, the CHECKFIRE 110-D Control Module is functioning properly. Re-install the complete release circuit to the control module release circuit lead and complete an SDR (self diagnostic routine): Press and hold "DELAY/Reset/Silence" button for 3 seconds; power LED and sounder quickly pulse 3 or 5 times, then power LED remains **green** steady-on).
3. If the release circuit fault does not clear, continue testing the release circuit at each set of connectors starting at the next set from the control module. Separate connectors and install the release circuit terminator on the control module side. If the fault does not clear, replace non-functioning component with an identical new part and retest. If the fault clears, part is good; re-install and move to next set of connectors. Note: Be sure to add only one new component (cable, "h" Cable, etc.) at a time to help identify the specific part causing the fault.
4. At the Release Circuit "h" Cable remember to first check the main trunk connector leading to the "h" Cable; then re-connect to check the "h" Cable. Install a detection circuit terminator on each side of "h" Cable. If the fault clears, "h" Cable is good. If the fault does not clear, replace "h" Cable.

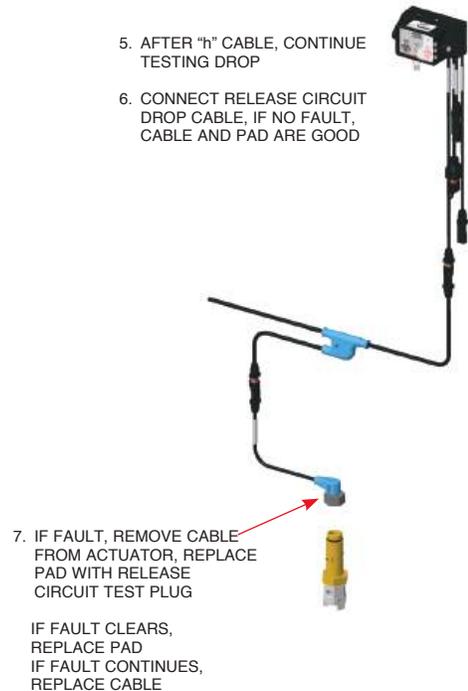
2. IF FAULT CLEARS, RECONNECT AND COMPLETE SDR
3. IF FAULT CONTINUES, TEST EACH CONNECTION, REPLACE COMPONENTS AS NEEDED



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5. After checking a Release Circuit "h" Cable, continue testing components to the end of the drop line.
6. To test the Release Circuit Drop Cable at the end of a drop or end of the main trunk, reconnect cable to the original location. If there is no fault indication, the Release Circuit Drop Cable and PAD are working properly.
7. If the Release Circuit Drop Cable causes a fault, remove cable from the electric-pneumatic actuator and replace the PAD with the release circuit test plug.  
If the fault clears, replace the PAD.  
If the fault continues, replace the Release Circuit Drop Cable.

5. AFTER "h" CABLE, CONTINUE TESTING DROP
6. CONNECT RELEASE CIRCUIT DROP CABLE, IF NO FAULT, CABLE AND PAD ARE GOOD



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TABLE 9-5: SPECIFIC CIRCUIT TESTING PROCEDURES (Continued)

**Release Circuit (Continued)**

8. After the drop is clear, return to the last connection that was good and continue testing the main trunk and any drop lines in the same manner until release circuit fault is clear.

If all the faults are clear, verify proper operation of the CHECKFIRE 110-D System by completing Section 6 – Test and Place in Service.

**Note:** Specific jurisdictions or customer procedures may require documentation of all components replaced. Keep a record of all changes to the system as required.

8. AFTER DROP IS CLEAR,  
CONTINUE TESTING IN  
SAME MANNER UNTIL  
ENTIRE CIRCUIT IS CLEAR

**Detection Circuit**

If the detection circuit fault LED is pulsing **amber** and cannot be cleared check the detection circuit cable.

**Required Test Equipment** (Confirm the test equipment is new and functioning properly)

- Detection Circuit EOL Device
- Detection Circuit Tester (DCT)
- Detection Circuit Branch Terminator)

1. Disconnect the detection circuit cable at the control module detection circuit lead (red connector). Install the EOL Device or DCT on the red lead. If the detection circuit fault LED continues pulsing **amber**, there is a control module internal problem and the CHECKFIRE 110-D Control Module must be replaced.



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2. If the detection circuit fault clears, the CHECKFIRE 110-D Control Module is functioning properly. Re-install the complete detection circuit to the control module detection circuit lead and complete an SDR (Self Diagnostic Routine: Press and hold "DELAY/Reset/Silence" button for 3 seconds; Power LED and sounder quickly pulse 3 or 5 times, then power LED remains **green** steady-on).

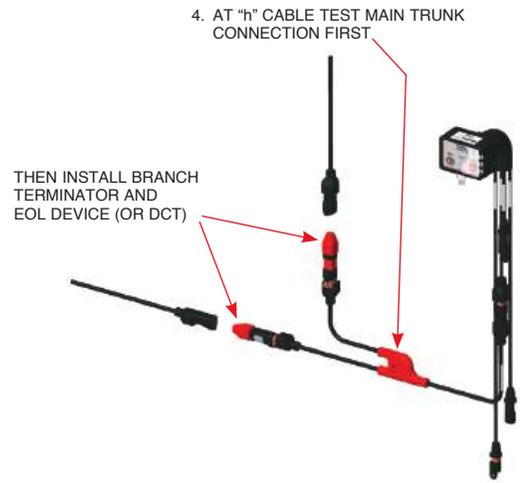
2. IF FAULT CLEARS,  
RECONNECT AND  
COMPLETE SDR

TABLE 9-5: SPECIFIC CIRCUIT TESTING PROCEDURES (Continued)

Detection Circuit (Continued)

3. If the detection circuit fault does not clear, continue testing the detection circuit at each set of connectors starting at the next set from the control module. Separate the connectors and install the EOL Device or DCT on the control module side. If fault does not clear, replace non-functioning component with an identical new part and retest. If fault clears, part is good; re-install and move to next set of connectors. **Note: Be sure to add only one new component (cable, "h" Cable, EMA, etc.) at a time to help identify the specific part causing the fault.**
4. At a detection circuit "h" Cable remember to first check the main trunk connector leading to the "h" Cable, then re-connect to check the "h" Cable. Install a detection circuit branch terminator on the branch side of "h" Cable, and the EOL Device or DCT on the main trunk side. If fault clears, "h" Cable is good; if fault does not clear, replace "h" Cable.

3. IF FAULT CONTINUES TEST EACH CONNECTION, REPLACE COMPONENTS AS NEEDED



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5. After checking a detection circuit "h" Cable, continue testing components to the end of the branch.  
  
If a non-functioning component is found and replaced on a branch and the entire branch is not causing a fault, reconnect the complete detection circuit to determine if that is the only fault in the circuit.  
  
If reconnecting the remaining detection circuit causes a fault, return to the last connection that was good and continue testing the main trunk and any branch lines in the same manner until the detection circuit fault clears.  
  
If all faults are clear, verify proper operation of the CHECKFIRE 110-D System by completing Section 6 – Test and Place in Service.

5. IF FAULT IS CORRECTED IN BRANCH LINE, RECONNECT ENTIRE CIRCUIT;  
  
IF FAULT OCCURS, CONTINUE TESTING CIRCUIT FROM LAST GOOD CONNECTION UNTIL FAULT CLEARS

**Note:** Specific jurisdictions or customer procedures may require documentation of all components replaced. Keep a record of all changes to the system as required.

**NOTES:**

**COMPONENT INDEX**

Part No.	Description
<b>System Components</b>	
A16381C9PH	Control Module, CHECKFIRE 110-D
439564	Mounting Bracket, CHECKFIRE 110/210
439569	Electric-Pneumatic Actuator (normally supplied with agent tanks)
<b>Detection Circuit Cables and Fittings</b>	
A16381EW49	100 ft (30.5 m) Bulk Detection/Relay Circuit Cable Box
A16381EW45	500 ft (152.4 m) Bulk Detection/Relay Circuit Cable Spool
A16381C9PN	2 ft (0.61 m) Cable, Detection/Relay Circuit
A16381CBOF	3 ft (0.91 m) Cable, Detection Circuit
A16381CBOG	5 ft (1.53 m) Cable, Detection Circuit
A16381CB62	10 ft (3.05 m) Cable, Detection Circuit
A16381CB63	20 ft (6.10 m) Cable, Detection Circuit
A16381CB64	30 ft (9.15 m) Cable, Detection Circuit
A16381CB65	50 ft (15.24 m) Cable, Detection Circuit
A16381CD32	“h” Cable, Detection Circuit
A16381C9PM	Electric Manual Actuator (EMA)
440537	Electric Manual Actuator Bracket
426520	End-of-Line Resistor
426461	End-of-Line Resistor (10 Pack)
A16381CB66	EOL (End-of-Line) Device, Detection Circuit
A16381CB6Y	Branch Terminator, Detection Circuit
428375	In-Line Splice Kit
A16381TK26	Discharge Pressure Switch
<b>Linear Detectors (Red)</b>	
071230	100 ft (30.5 m) Red Bulk Linear Detection Wire 356 °F (180 °C)
* Activation temperature = 356 °F (180 °C)	
<b>Linear Detectors (White**)</b>	
A16381ULBP	100 ft (30.5 m) White Bulk Linear Detection Wire 220 °F (105 °C)
** Activation temperature = 220 °F (105 °C)	

Part No.	Description
<b>Release Circuit Cables and Fittings</b>	
A16381EW4B	100 ft (30.5 m) Bulk Release/Power Circuit Cable Box
A16381EW47	500 ft (152.4 m) Bulk Release/Power Circuit Cable Spool
A16381CB70	2 ft (0.61 m) Cable, Release Circuit
A16381CB71	3 ft (0.91 m) Cable, Release Circuit
A16381CB72	5 ft (1.53 m) Cable, Release Circuit
A16381CB73	10 ft (3.05 m) Cable, Release Circuit
A16381CB74	20 ft (6.10 m) Cable, Release Circuit
A16381CB7D	30 ft (9.15 m) Cable, Release Circuit
A16381CB7E	50 ft (15.24 m) Cable, Release Circuit
A16381CB7H	38 in. (0.97 m) Cable, Release Circuit Drop
A16381CD33	“h” Cable, Release Circuit
A16381CB7J	Connector, Terminator, Release Circuit
439448	Protracting Actuation Device (PAD)
<b>Power Circuit Cables and Fittings</b>	
A16381EW4B	100 ft (30.5 m) Bulk Release/Power Circuit Cable Box
A16381EW47	500 ft (152.4 m) Bulk Release/Power Circuit Cable Spool
A16381CB7K	2 ft (0.61 m) Cable, Power Circuit
A16381CB7L	3 ft (0.91 m) Cable, Power Circuit
A16381CB7M	5 ft (1.53 m) Cable, Power Circuit
A16381CB7P	10 ft (3.05 m) Cable, Power Circuit
A16381CB7T	20 ft (6.10 m) Cable, Power Circuit
A16381CB8K	30 ft (9.15 m) Cable, Power Circuit
A16381CB8M	50 ft (15.24 m) Cable, Power Circuit
A16381CB9P	3 ft (0.91 m) Cable, Fused Power Circuit, (w/In-line Fuse Holder)
<b>Bulk Circuit Connector Kits</b>	
A16381TK21	2-Pin Connector Kit, 1 pack Release/Power Circuits
A16381TK20	2-Pin Connector Kit, 5 packs Release/Power Circuits
A16381TK1V	6-Pin Connector Kit, 1 pack Display/Detection/Relay Circuits
A16381TK1Y	6-Pin Connector Kit, 5 packs Display/Detection/Relay Circuits

**COMPONENT INDEX (Continued)**

Part No.	Description
<b>Cable Mounting Hardware</b>	
448174	Bulkhead Cord Grip (50 Pack)
440737	Double Loop Cable Tie (50 Pack)
447931	2-Hole Grommet (25 Pack)
447928	3-Hole Grommet (25 Pack)
447321	Linear Detector Grommet (25 Pack)
<b>Testing Devices</b>	
A16381TK27	Detection Circuit Tester
441021	Release Circuit Tester - Optional
A16381V3R6	Release Circuit Test Plug
440912	Release Circuit Test Plug - Optional
<b>Service Components</b>	
440798	Label Package
440802	In Case of Fire, Label
009182	Dow Corning No. 4, Extreme Temperature Silicone Grease
440082	Guard Door, Display Module
015999	Visual Seal
440083	Enclosure Nut, Display Module
016047	O-Ring #11, Protracting Actuation Device
076076	O-Ring #016, Release Circuit Drop Cable O-Ring
016470	Knob - Red
056759	Boot-EMA
032342	Ring Pin
000507	Chain
000197	Lead Wire Seal

**TORQUE SPECIFICATIONS**

Component*	Torque Specification in.-lb (N·m)	Comments
Cord Grip Lock Nut	75 to 80 (8.5 to 9.0)	- -
Cord Grip Lock Sealing Nut	80 to 85 (9.0 to 9.6)	
Electric-Pneumatic Actuator (EPA) to Cartridge	38 to 42 (51.5 to 57)	- -
Control Module Swivel Joint Screws	20 to 25 (2.26 to 2.82)	- -
CHECKFIRE 110-D Control Module Enclosure Nut	20 to 30 (2.26 to 3.39)	- -
EMA Nut	20 to 30 (2.26 to 3.39)	- -
Drop Cable	20 ft-lb to 25 ft-lb (27 to 34)	- -
Self Locking Seal	None	Break Force 12 lb to 14 lb (5.4 kg to 6.4 kg)
Lead Wire Seal	None	Break Force 12 lb to 14 lb (5.4 kg to 6.4 kg)

\*Note: Associated component part numbers available in this CHECKFIRE 110-D Manual (latest revision).

**NOTES:**