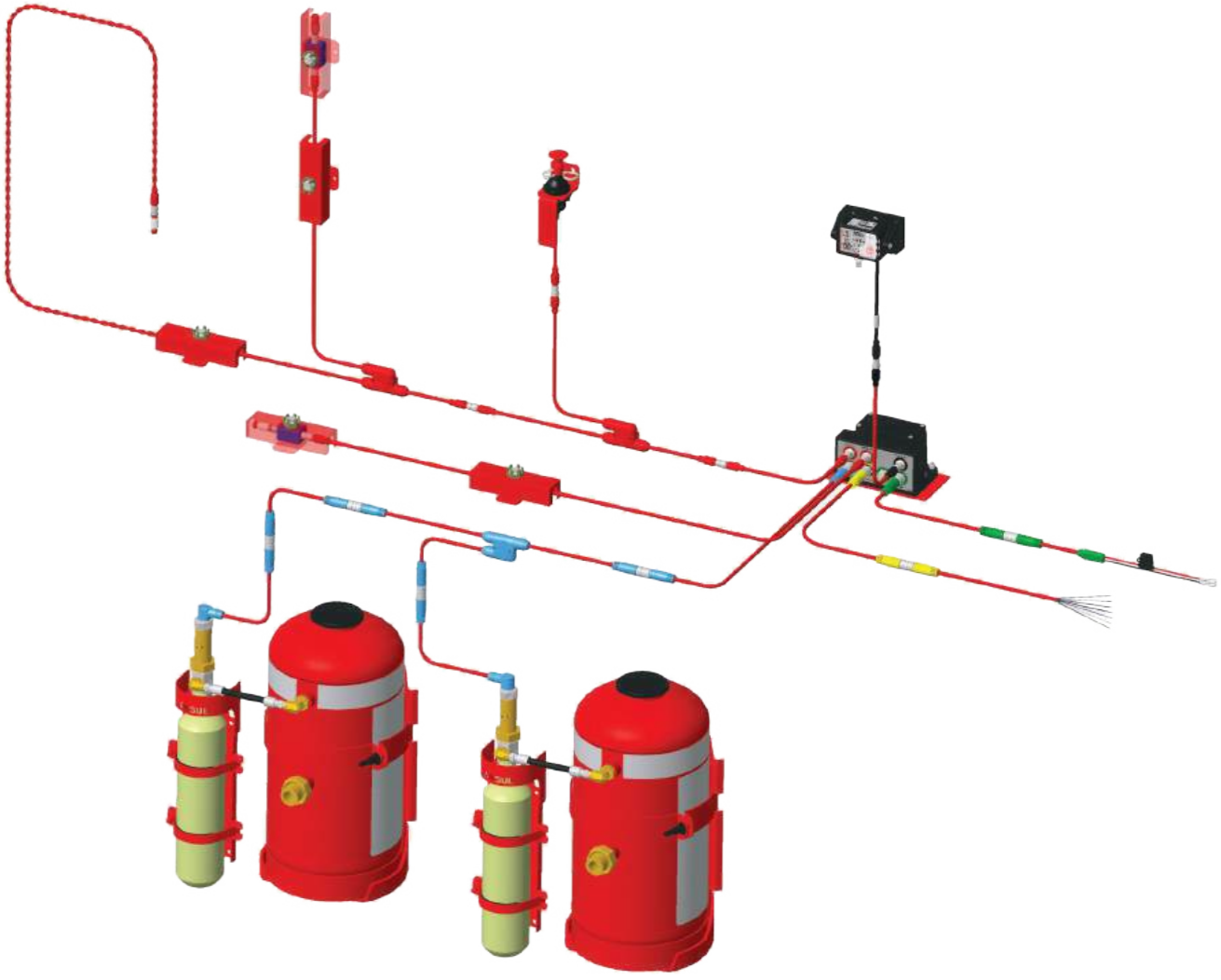
CHECKFIRE 210 DETECTION AND ACTUATION SYSTEM

PLANNING, INSTALLATION, PROGRAMMING, OPERATION, AND MAINTENANCE MANUAL



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 | Part No. 440392-02

This manual is intended for use with the ANSUL® CHECKFIRE 210 Detection and Actuation System. This system is specifically engineered for monitoring and release of vehicle/equipment fire suppression systems. Planning, installation, programming, operation, 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 210 Training Program with training to plan, install, recharge, and maintain the CHECKFIRE 210 Systems. Individuals must also hold current ANSUL® Certification for applicable vehicle suppression systems being installed.

Those who plan, install, program, operate, reset, 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 210 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: 440392

Date: 2023-JAN-30

⚠ 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.

DATE	PAGE	REV. NO.
2023-JAN-30	Manual includes multiple technical revisions with new components, new and updated images, and changes to the order of the information. All pages are marked as Rev. 02 regardless of previous revision number. Revised technical information is marked with a revision indicator (▸).	02

DATE	PAGE	REV. NO.

LEGEND FOR PAGES WITH REVISION INDICATORS:	▸ Indicates revised technical information.

NOTES:

SYSTEM DESCRIPTION

The CHECKFIRE 210 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/equipment in extreme environmental and physical conditions.

Typical types of equipment for the ANSUL® CHECKFIRE 210 Systems:

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

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

CHECKFIRE 210 System Features

- Supervised power, detection, release, and communication circuits
- System can be independently powered by utilizing either the primary power input or secondary power input.
  Note: Both primary and secondary power supplies must be utilized to maintain FM 5970 approval.
- Two time delays programmable to 0, 5, 10 or 15 seconds
- “DELAY/Reset/Silence” button
- “PUSH To Activate / Alarm When Lit” electric manual activation button and LED
- Color-coded “Plug and Play” connections
- Minimum 75 dB internal sounder
- Dust and water tight (IP67 rated)
- Manual programming button
- Computer programmable via mini USB port
- Two analog detection circuits, detection circuit #2 may be programmed for pressure switch feedback
- Detection circuits are programmable for independent detection and release, cross-zone detection and release or detection only
- Auxiliary Power output available when external power is connected
- Two internal programmable SPDT Form “C” relays (6A @ 30 VDC resistive, 3A @ 30 VDC Inductive)
- Isolate function
- Downloadable 4000+ Event History Log

CHECKFIRE 210 System Specifications

SYSTEM POWER (24 HOUR OPERATION)

- Connection for 12/24 VDC primary power source
- Supervised internal 3.6 VDC secondary power source

SYSTEM CURRENT DRAW*

- Nominal 8 mA @ 10.2 VDC
  - Maximum Alarm/Fault 120 mA @ 10.2 VDC

  Nominal 5 mA @ 28.0 VDC
  - Maximum Alarm/Fault 50 mA @ 28.0 VDC

* **Note:** Does not include AUX OUTPUT load of up to 1.5 A

OPERATING TEMPERATURE LIMITS

– 40 °F to 185 °F (– 40 °C to 85 °C)

APPROVALS

FM Approved and CE Marked

CHECKFIRE 210 System Connectivity

The CHECKFIRE 210 Display Module (see Figure 1-1) communicates with the CHECKFIRE 210 Interface Control Module (ICM) through the Display Circuit Cable. The black color-coded connector securely attaches to the ICM receptacle using threaded circular connectors.

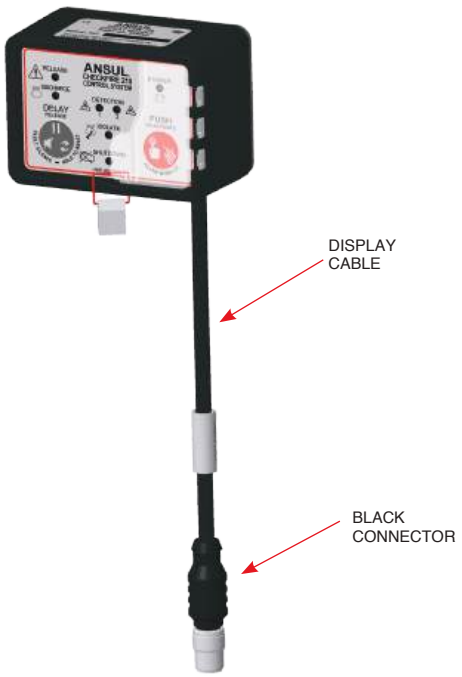


FIGURE 1-1
CHECKFIRE 210 DISPLAY MODULE
009272a

SYSTEM DESCRIPTION (Continued)

CHECKFIRE 210 System Connectivity (Continued)

The CHECKFIRE 210 ICM provides receptacles for the following circuits, see Figure 1-2.

DETECTION INITIATING / MANUAL ACTIVATION CIRCUITS

Two **Red** Color-coded detection receptacles:

Detection Circuit #1 receptacle connects to:

- Detection Circuit Cables
- ▸ Detection Circuit "h" Cables
- ▸ Detection Circuit 3-Branch Cables
- Electric Manual Actuators
- Linear Detectors
- Spot Thermal Detectors

Detection Circuit #2 receptacle connects to:

- Detection Circuit Cables
- ▸ Detection Circuit "h" Cables
- ▸ Detection Circuit 3-Branch Cables
- Electric Manual Actuators
- Linear Detectors
- Spot Thermal Detectors
- Discharge Pressure Switch (if programmed for pressure switch feedback)

DISPLAY MODULE CIRCUIT

Black color-coded receptacle connects to:

- Display Circuit Cables
- ▸ CHECKFIRE 210 Display Module

RELEASE CIRCUIT

Blue color-coded receptacle connects to:

- Release Circuit Cables
- ▸ Release Circuit "h" Cables
- Release Circuit 4-Tank Cables
- Release Circuit Drop Cables
- ▸ Protracting Actuation Devices

RELAY #1 AND #2 CIRCUIT (Optional)

Yellow color-coded receptacle connects to:

- Relay Circuit Cables

AUXILIARY OUTPUT CIRCUIT (Optional)

- ▸ **Green** color-coded receptacle (only available with primary power) connects to:
  - Power Circuit Cables

- ▸ POWER CIRCUIT (12/24 VDC, primary power)

Green color-coded receptacle connects to:

- Power Circuit Cables
- ▸ Power Circuit Cables w/Over-Voltage Protection

FIGURE 1-2
CHECKFIRE 210 ICM RECEPTACLES
009273a

SYSTEM DESCRIPTION (Continued)

CHECKFIRE 210 System Connectivity (Continued)

TYPICAL SYSTEM CONNECTIONS

The Display Module continually exhibits system status. Color-coded receptacles on the Interface Control Module (ICM) provide ease of CHECKFIRE 210 System installation. See Figure 1-3.

Display Module Circuit: Permits connection between the Display Module and the ICM.

Detection Circuit (#1 and #2): Permits multiple-detection options using detection circuit cables, Detection Circuit "h"Cables and/or Detection Circuit 3-Branch Cable.

- Electric Manual Actuators (EMA)
- Linear Detectors
- Spot Thermal Detectors
- Pressure Switch

Release Circuit: Connects up to a maximum of 8 Electric-Pneumatic Actuators installed on agent tank expellant gas cartridges using Release Circuit Cables, Release Circuit "h" Cables, Release Circuit 4-Tank Cable, and Release Circuit Drop Cables.

Power Circuit: Provides a direct connection to the primary power source using Power Circuit Cables and a single Fused Power Circuit Cable.

Auxiliary Output Circuit: Provides auxiliary power output to additional devices from the primary power source.

Relay #1 and #2 Circuit: Provides connection for two internal Relays with SPDT Form "C" (6 A @ 30 VDC resistive, 3 A @ 30 VDC Inductive) automotive contacts.

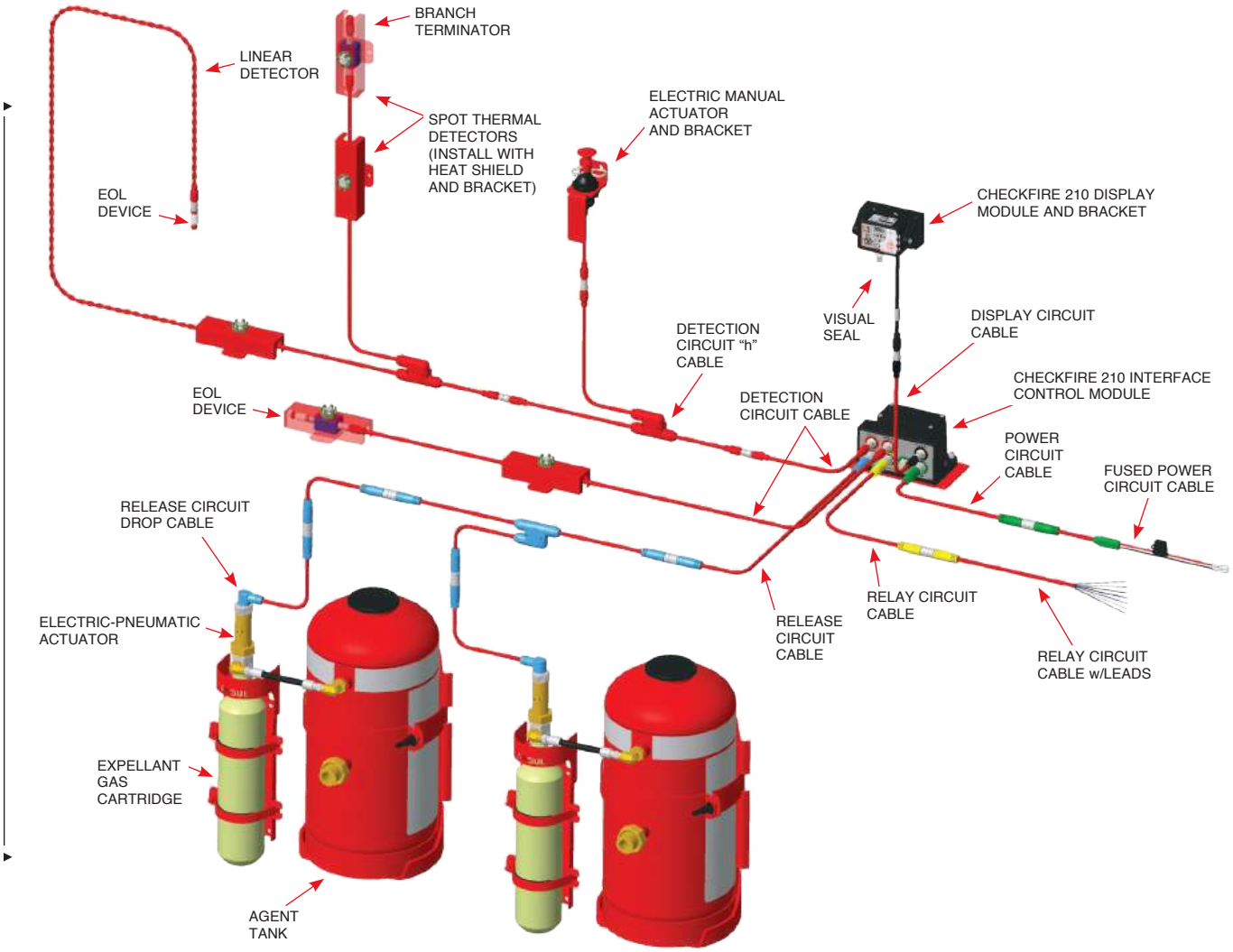


FIGURE 1-3
SYSTEM CONNECTIONS
009274a

NOTES:

CHECKFIRE 210 INTERFACE CONTROL MODULE Part No. 439561

The CHECKFIRE 210 Interface Control Module (ICM) communicates with the CHECKFIRE 210 Display Module and is the central connection point for input/output circuits. An isolate switch is easily accessible on the side of the module. See Figure 2-1.

- The accessible battery compartment contains the secondary power supply, a USB Mini B connection port, and the programming interface. See Figure 2-2.
- Dimensions for ICM base, see Figure 2-3

FIGURE 2-1
INTERFACE CONTROL MODULE (ICM) FRONT AND SIDE VIEWS
009273a / 009277a

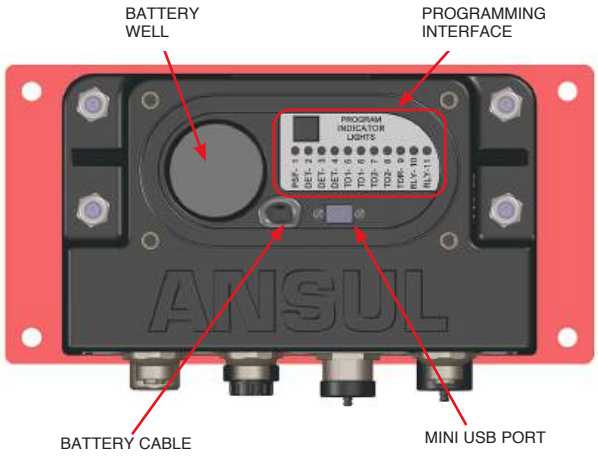


FIGURE 2-2
ICM BATTERY COMPARTMENT
009279

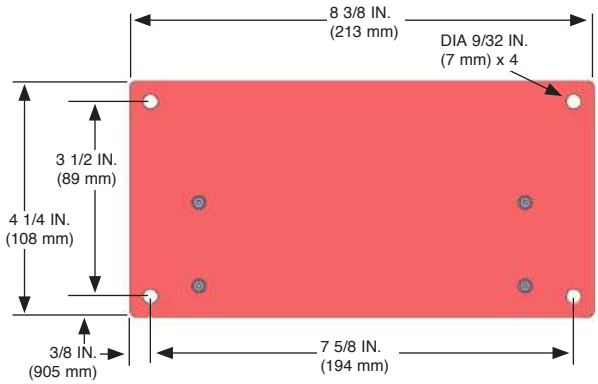


FIGURE 2-3
BASE MOUNTING
009312a

CHECKFIRE 210 ICM Battery Module Part No. 440352

- A supervised non-rechargeable 3.6 VDC lithium battery provides secondary power for the CHECKFIRE 210 System. See Figure 2-4.

Note: Battery is for the CHECKFIRE 210 System only.

FIGURE 2-4
BATTERY MODULE
009278

CHECKFIRE 210 DISPLAY MODULE
Part No. 439560

Provides communication with the Interface Control Module (ICM) and indicates system status. See Figure 2-5.

- Durable high-strength glass-filled nylon material
- Surface or bracket mounted
- Two index pins on back for secure mounting
- LED indicators provide visual notification of system status
- Internal Sounder provides audible notification of system status
- "PUSH To Activate / Alarm When Lit" manual-activation button and LED
  - Provides manual operation (immediate release)
  - Indicates alarm condition
- Guard door with visual seal to protect manual-activation button
- "DELAY/Reset/Silence" button
  - Restarts Time Delay #1 (TD1) period before TD1 expires
  - Resets CHECKFIRE 210 System (during non-alarm status)
  - Silences internal sounder during fault conditions
  - Activate/Deactivate ISOLATE mode

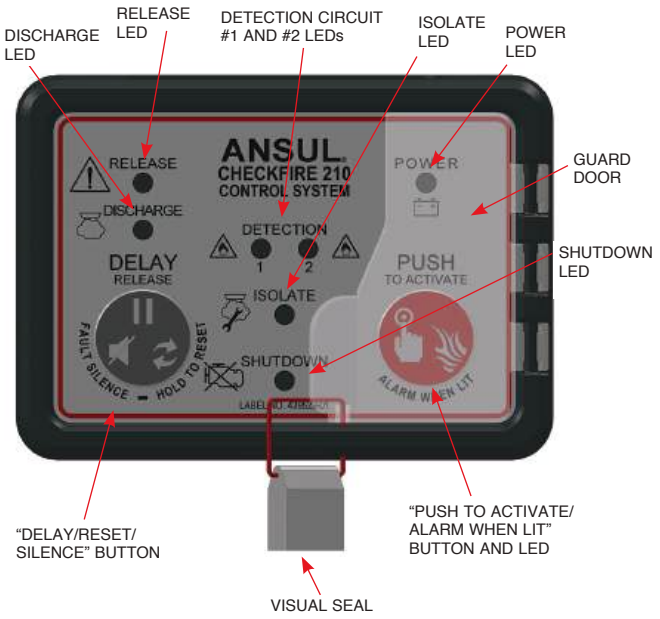


FIGURE 2-5
CHECKFIRE 210 DISPLAY MODULE
009275a

Display Cable (See Figure 2-6)

- 24 in. (610 mm) Cable
- Black color-coded connector

FIGURE 2-6
DISPLAY CABLE
009272a

Display Module Mounting

Two types of mounting options are available.

- SURFACE MOUNT – Display Module includes integral index pins, foam gasket, rubber washer and securing nut to fasten the display module in place without a bracket. The foam gasket minimizes moisture and dust ingress though the opening.
- BRACKET MOUNT - The optional Mounting Bracket is constructed of durable high-strength glass-filled nylon material. The pivot and secure feature accommodates easy operator visual identification and access to the CHECKFIRE 210 Display Module for status indications and manual operation. See Figure 2-7.

NOTICE

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

CHECKFIRE 210 DISPLAY MODULE (Continued)

CHECKFIRE 110/210 Mounting Bracket Part No. 439564

Provides flexible bracket mounting for Display Module at various viewing angles. See Figure 2-7.

- 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 2-8

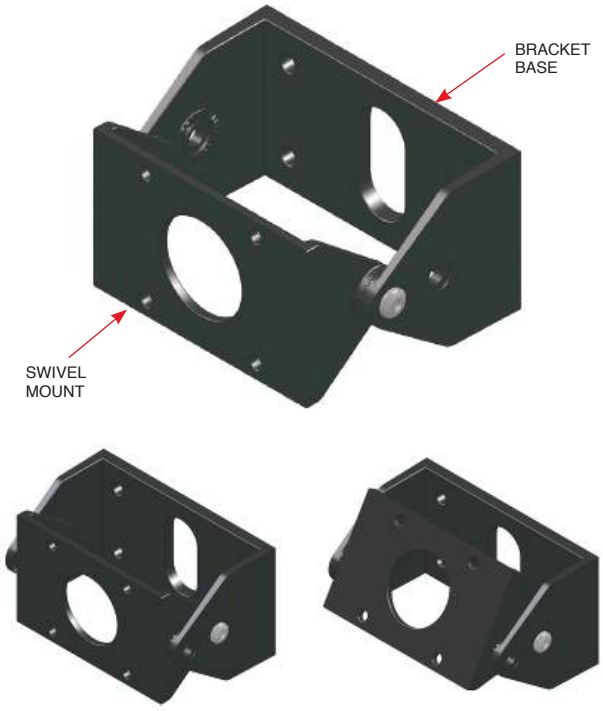


FIGURE 2-7
FLEXIBLE MOUNTING BRACKET
009152/ 009181

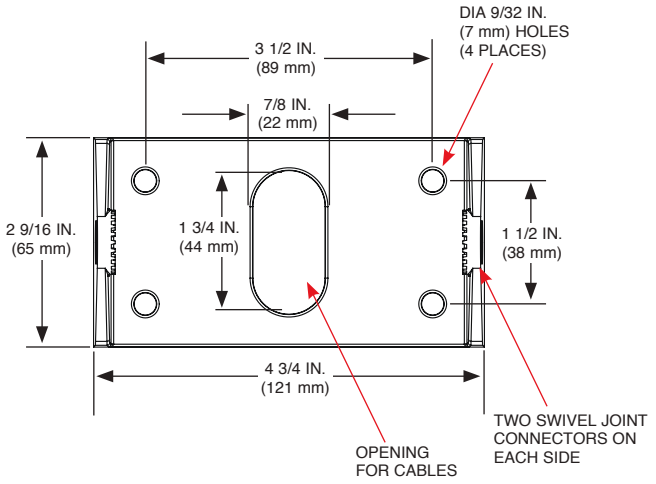


FIGURE 2-8
BRACKET BASE FRONT VIEW
009113

CIRCUIT CABLES

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

- Connector clamp
- Color-coded, anti-vibration connectors
- Temperature rating: 221 °F (105 °C)
- Multiple lengths for versatility
- Minimum bend radius: 2 1/2 in. (64 mm)

DISPLAY CIRCUIT

Connects the CHECKFIRE 210 Interface Control Module with Display Module for input/output communications. See Figure 2-9.

- Maximum circuit length 200 ft (60.96 m)
- Black color-coded connectors

Display Circuit Cable Part No. See table

Display Circuit Cable Part No.	Length ft	(m)
443536	2	(0.61)
443387	3	(1.53)
443537	5	(1.53)
443538	10	(3.05)
443539	20	(6.10)
443540	30	(9.15)
443541	50	(15.24)

FIGURE 2-9
DISPLAY CIRCUIT CABLE
009276

DETECTION CIRCUIT

- Red color-coded connectors
- Maximum total length of detection circuit cable plus Linear Detector is 750 ft (228.6 m)

Connects the CHECKFIRE 210 Interface Control Module to the detection circuit input components.

Detection Circuit Cable
Part No. See table

See Figure 2-10.

Detection Circuit Cable Part No.	Length ft	(m)
439384	2	(0.61)
443372	3	(0.91)
443425	3.3 (40 in.)	(1.02)
439386	5	(1.53)
439388	10	(3.05)
439390	20	(6.10)
440759	30	(9.15)
440762	50	(15.24)

FIGURE 2-10
DETECTION CIRCUIT CABLE
009158

Detection Circuit "h" Cable
Part No. 446539

Provides a connection for a branch detection circuit. See Figure 2-11.

- 15 in. (0.38 m) leads with connectors
- Overall length: 33.7 in. (0.86 m)

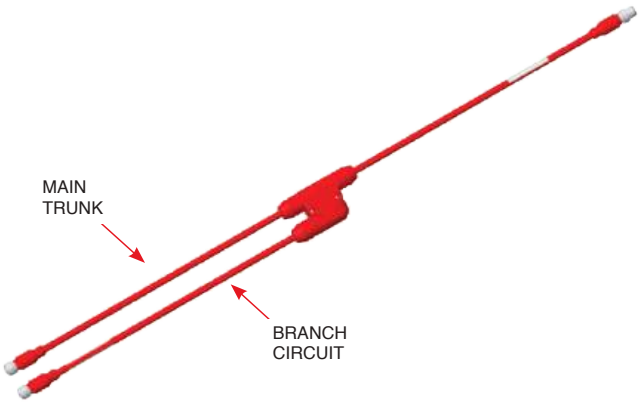


FIGURE 2-11
DETECTION CIRCUIT "h" CABLE
010351a

Detection Circuit 3-Branch Cable
Part No. 443381

Provides connection for three detection branch circuits. See Figure 2-12.

- Durable high-strength glass filled nylon material with UL94 Flame rating
- 15 in. (0.38 m) leads with connectors
- Overall length: 33.7 in. (0.86 m)
- Steel mounting plate, 1/8 in. (3.2 mm) thick, see Figure 2-13
- Unused branch circuits require Detection Circuit Branch Terminators

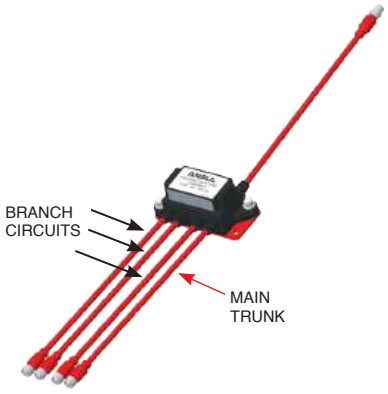
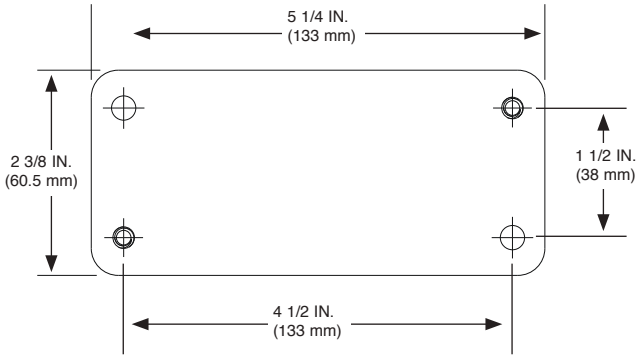


FIGURE 2-12
DETECTION CIRCUIT 3-BRANCH CABLE
010345a



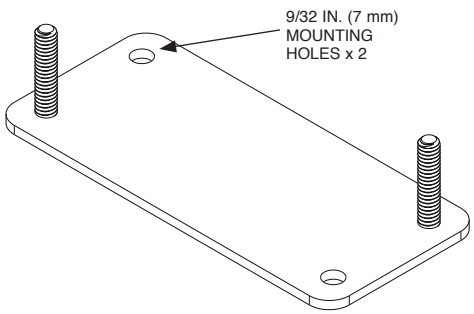


FIGURE 2-13
STEEL MOUNTING PLATE
011732/ 011733

DETECTION CIRCUIT (Continued)

Linear Detector
Part No. See table

Provides fire detection in the protected area with a choice of two temperature ratings. See Figures 2-14 and 2-15.

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

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

Linear Detector (red) Part No.	Length ft	(m)
439406	2	(0.61)
439478	5	(1.53)
439480	10	(3.05)
439408	20	(6.10)
439410	30	(9.15)
440765	50	(15.24)

FIGURE 2-14
LINEAR DETECTOR (RED)
009157

Linear Detector (white) Part No.	Length ft	(m)
452189	2	(0.61)
452190	5	(1.53)
452191	10	(3.05)
452192	20	(6.10)

FIGURE 2-15
LINEAR DETECTOR (WHITE)
009157w

Spot Thermal Detector
Part No. See Temperature Selections Table

Provides spot thermal detection in the protected areas. See Figure 2-16.

- Color-coded fixed-temperature design
- Temperature rating stamped on detector
- Includes retaining nut to secure detector in bracket and heat shield

Temperature Selections

Rated Operating Temperature °F	(°C)	Maximum Continuous Temperature °F	(°C)	Color	Spot Thermal Detector Part No.
250	(121)	210	(99)	Blue	438280
350	(177)	256	(125)	Red	438281

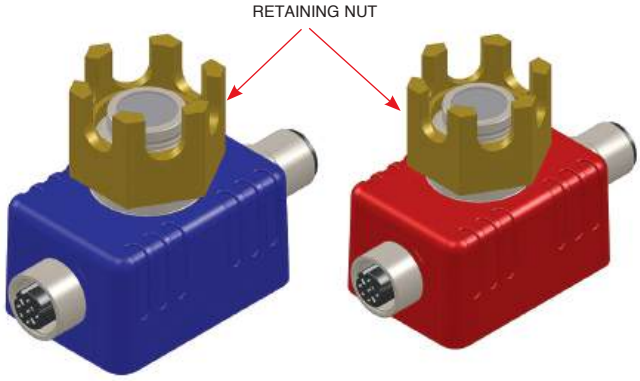


FIGURE 2-16
SPOT THERMAL DETECTORS
009280

Spot Thermal Detector Bracket and Heat Shield
Part No. 440905

Supports and protects Spot Thermal Detector. See Figure 2-17.

- Detector bracket provides secure mounting
- Heat shield provides additional protection for detector body and detection circuit connectors

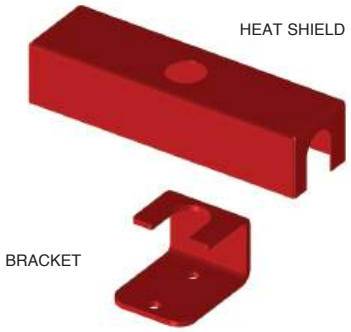


FIGURE 2-17
DETECTOR BRACKET AND HEAT SHIELD
009156

DETECTION CIRCUIT (Continued)

Electric Manual Actuator (EMA)
Part No. 448754

Provides electrical activation of the fire suppression system; typically accessible from ground level and/or in a path of egress. See Figure 2-18.

- Electronic signal sent to Interface Control Module that activates the fire suppression system after a 2 second delay
- Temperature range: -40 °F to 185 °F (-40 °C to 85 °C)
- Flexible 24 in. (610 mm) Detection Cable

FIGURE 2-18
ELECTRIC MANUAL ACTUATOR (EMA)
010871

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 2-19.

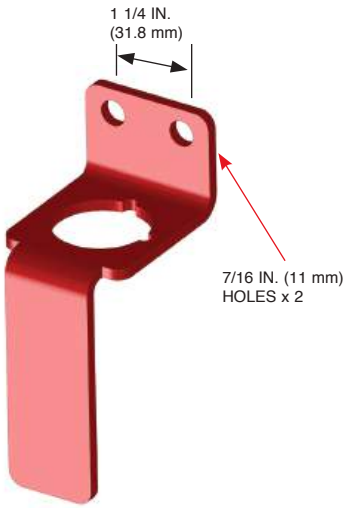


FIGURE 2-19
ELECTRIC MANUAL ACTUATOR BRACKET
009154

Detection Circuit Field Wireable Cable - Remote Activation
Part No. 442053

Connects auxiliary circuits provided by others to detection circuit. See Figure 2-20.

- Length 3 ft (0.9 m)

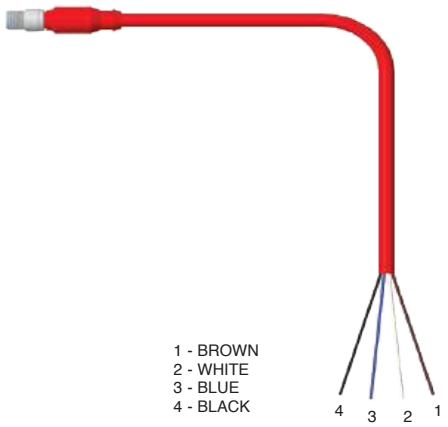


FIGURE 2-20
FIELD WIREABLE CABLE
009610a

Detection Circuit EOL (End-of-Line) Device
Part No. 439396

Provides circuit supervision and termination point for main detection circuit trunk. See Figure 2-21.

FIGURE 2-21
DETECTION CIRCUIT EOL
009161

DETECTION CIRCUIT (Continued)

Detection Circuit Branch Terminator Part No. 439398

- Terminates detection circuit branch line. See Figure 2-22.

FIGURE 2-22
BRANCH TERMINATOR
009162

Discharge Pressure Switch Part No. 440389

Provides pressure switch feedback to the ICM through Detection Circuit #2. See Figure 2-23.

- One integral cable, sealed to switch housing
- Manually resettable SPDT switch
- Rated for 6A with 12/36 VDC nominal
- Temperature range: – 40 °F to 175 °F (– 40 °C to 79 °C)
- Includes 1/4 in. brass tee and nipple

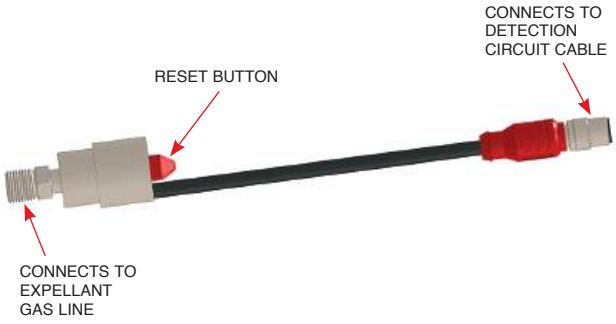


FIGURE 2-23
DISCHARGE PRESSURE SWITCH CONNECTIONS
009344

RELEASE CIRCUIT

Connects the CHECKFIRE 210 Interface Control Module to release circuit cables, Release Circuit "h" Cables, Release Circuit 4-Tank Cables, and Release Circuit Drop Cables.

- Blue color-coded connectors
- Maximum circuit length: 250 ft (76.4 m)

Release Circuit Cable
Part No. See table

See Figure 2-24.

Release Circuit Cable Part No.	Length ft	(m)
439418	2	(0.61)
443378	3	(0.91)
439420	5	(1.53)
439422	10	(3.05)
439424	20	(6.10)
439426	30	(9.15)
439428	50	(15.24)

FIGURE 2-24
RELEASE CIRCUIT CABLE
009163

Release Circuit "h" Cable
Part No. 446542

Provides connections for multiple Release Circuit Drop Cables. See Figure 2-25.

- 19.7 in. (0.5 m) leads with connectors
- Overall length: 43.1 in. (1.09 m)

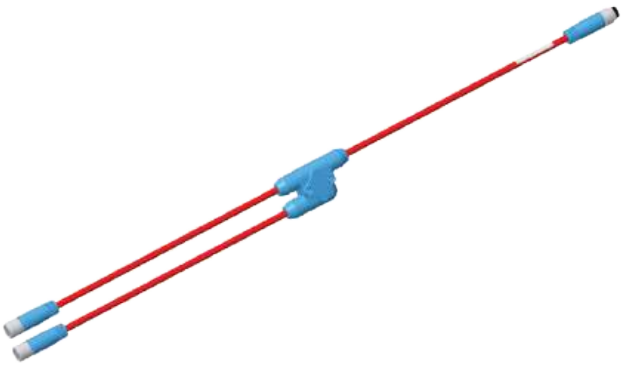


FIGURE 2-25
RELEASE CIRCUIT "h" Cable
010352a

Release Circuit 4-Tank Cable
Part No. 446545

Provides connections for multiple Release Circuit Drop Cables. See Figure 2-26 and 2-27.

- Durable high-strength glass filled nylon material with UL94 Flame rating
- 15 in. (0.38 m) leads with connectors
- Overall length: 33.7 in. (0.86 m)
- Steel mounting plate, 1/8 in. (3.2 mm) thick
- Unused circuits require Release Circuit Terminators

FIGURE 2-26
RELEASE CIRCUIT 4-TANK CABLE
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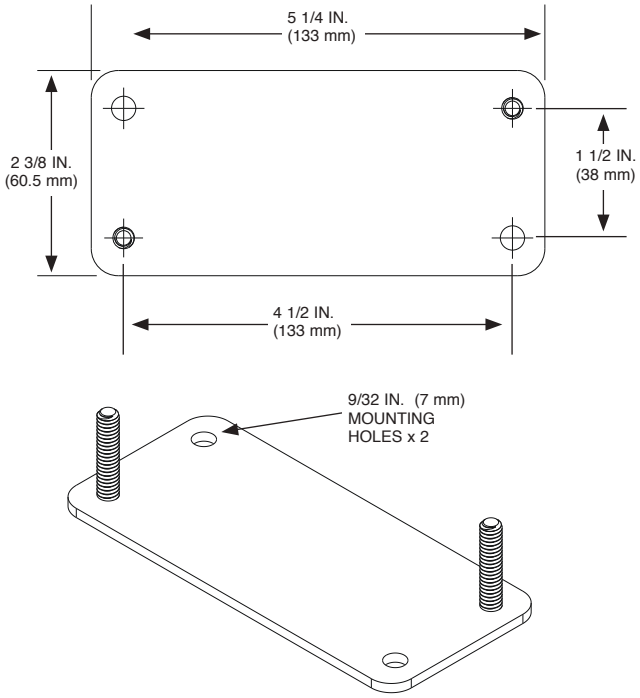


FIGURE 2-27
STEEL MOUNTING PLATE
011732/ 011733

RELEASE CIRCUIT (Continued)

Release Circuit Drop Cable
Part No. See table

Provides connectivity between release circuit cable and Electric-Pneumatic Actuator. See Figure 2-28.

Release Circuit Drop Cable Part No.	Length in.	(m)
439430	30	(0.76)
439432	38	(0.97)

FIGURE 2-28
RELEASE CIRCUIT DROP CABLE
009165

Protracting Actuation Device (PAD)
Part No. 439448

Provides electrical activation of the fire suppression system. See Figure 2-29.

⚠ 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 2-29.

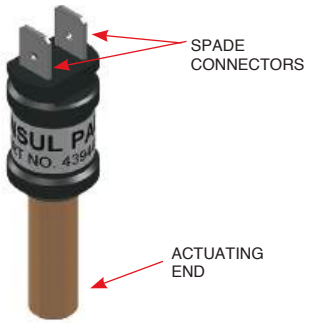


FIGURE 2-29
PAD
009169

Release Circuit Terminator
Part No. 439436

Identifies termination point in the release circuit. See Figure 2-30.

FIGURE 2-30
RELEASE CIRCUIT TERMINATOR
009167

Electric-Pneumatic Actuator
Part No. 439569

Installs on expellant gas cartridge and provides release of gas into agent tank. See Figure 2-31.

- 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

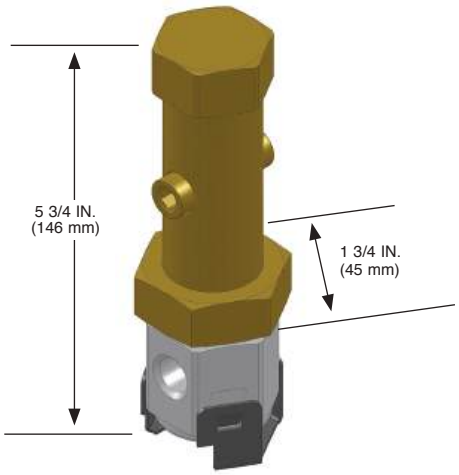


FIGURE 2-31
ELECTRIC-PNEUMATIC ACTUATOR
009168

POWER CIRCUITS

Connects the CHECKFIRE 210 Interface Control Module to Power Circuit Cables and Fused Power Circuit Cable.

- Green color-coded connectors
- Maximum circuit length: 50 ft. (15.24 m): Excludes 3 ft (10.9 m) Fused Power Circuit Cable

Power Circuit Cable
Part No. See table

See Figure 2-32.

Power Circuit Cable Part No.	Length ft	(m)
439438	2	(0.61)
443384	3	(0.91)
443423	3.3	(1.02)
439440	5	(1.53)
439442	10	(3.05)
439444	20	(6.10)
439446	30	(9.15)
440187	50	(15.24)

FIGURE 2-32
POWER CIRCUIT CABLE
009172

Fused Power Circuit Cable
Part No. 439492

Connects Power Circuit Cable to the 12/24 VDC external power source. See Figure 2-33.

- 3 amp in-line ATO/ATC blade style automotive fuse
- 1/2 in. ring terminals for power source connection

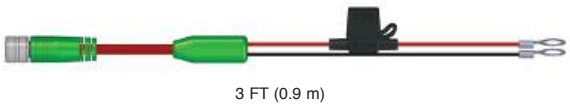


FIGURE 2-33
FUSED POWER CIRCUIT CABLE
009173

Power Circuit Cable with Over-Voltage Protection
Part No. 449133

Provides protection to the CHECKFIRE 210 ICM primary power input in the event of a severe overvoltage event that typically occurs when jump-starting the equipment or failure of the equipment charging system. See Figure 2-34.

- 3 amp in-line ATO/ATC blade style automotive fuse
- 1/2 in. ring terminals for power source connection

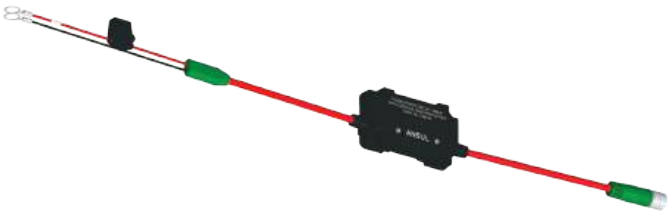


FIGURE 2-34
POWER CIRCUIT CABLE
WITH OVER-VOLTAGE PROTECTION
011756

Auxiliary Power Circuit Cable
Part No. 439450

Connects CHECKFIRE 210 Interface Control Module with auxiliary circuits provided by others. See Figure 2-35.

- Maximum circuit current rating: 1.5 A
- 3 ft (0.91 m) Length

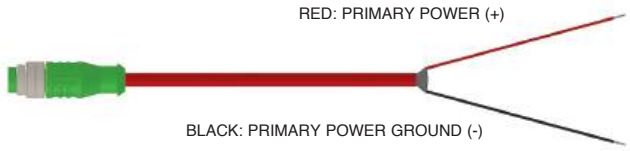


FIGURE 2-35
AUXILIARY OUTPUT POWER CABLE WITH LEADS
009284

RELAY CIRCUITS

Connects the CHECKFIRE 210 Interface Control Module to relay circuits provided by others.

- Yellow color-coded connectors for relay

Relay Circuit Cable (RELAY #1 and #2) (Yellow Connectors) Part No. See table

See Figure 2-36 and 2-37.

- Contact Rating for both relays: 6A @ 30VDC resistive, 3A @ 30VDC inductive

Relay Circuit Cable Part No.	Length ft	(m)
440410	2	(0.61)
443424	3.3	(1.02)
440413	5	(1.53)
439482	10	(3.05)
440416	20	(6.10)
439466*	3	(0.91)

* Relay Circuit Cable with Leads

FIGURE 2-36
RELAY CIRCUIT CABLE
009282

BROWN: RELAY 1 NC
WHITE: RELAY 1 COM
BLUE: RELAY 1 NO
BLACK: RELAY 2 NC
GRAY: RELAY 2 COM
PINK: RELAY 2 NO

FIGURE 2-37
RELAY CIRCUIT CABLE - LEADS
009283

12-Pin Power / Relay Cable with Over-Voltage Protection Part No. 443422

Combines the standard power and relay circuits into one single DT connection for ease of integrations by OEMs. Identify the additional Part No. listed in following table at time of order.

Mating DT connector Part No.:
Deutsch Connector - DT04-12PC

DT Connector Pin Out

Pin - 1	Battery Positive
Pin - 2	Battery Negative
Pin - 3	Not Used
Pin - 4	Not Used
Pin - 5	Not Used
Pin - 6	Not Used
Pin - 7	Relay Circuit # 1 N/O
Pin - 8	Relay Circuit # 1 Com
Pin - 9	Relay Circuit # 1 N/C
Pin - 10	Relay Circuit #2 N/O
Pin - 11	Relay Circuit #2 Com
Pin - 12	Relay Circuit #2 N/C

The cable also provides additional protection against unwanted voltage spikes due to jump starts and power surges. See Figure 2-38.

FIGURE 2-38
12-PIN POWER / RELAY CABLE WITH OVER-VOLTAGE PROTECTION
011755

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 2-39 thru 2-42.

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 2-39.

FIGURE 2-39
LABEL FOR ENGINE SHUTDOWN AND TIME DELAY
009174

If automatic vehicle/equipment shutdown is **NOT** part of the CHECKFIRE System, install the Stop Equipment and Exit Label near the operator's line of vision. See Figure 2-40.

FIGURE 2-40
LABEL TO STOP EQUIPMENT 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 2-41.

FIGURE 2-41
LABEL FOR PROTECTING LINEAR DETECTOR
011941

Install the In Case of Fire Label next to every Electric Manual Actuator (EMA). See Figure 2-42.

FIGURE 2-42
INSTRUCTION LABEL FOR EMA
009324a

TESTING EQUIPMENT AND TOOLS

Detection Circuit Tester
Part No. 440097

Simulates normal, fault, and alarm conditions for testing the CHECKFIRE 210 System performance. See Figure 2-43.

Switch settings:

- Normal
- Fault
- Alarm

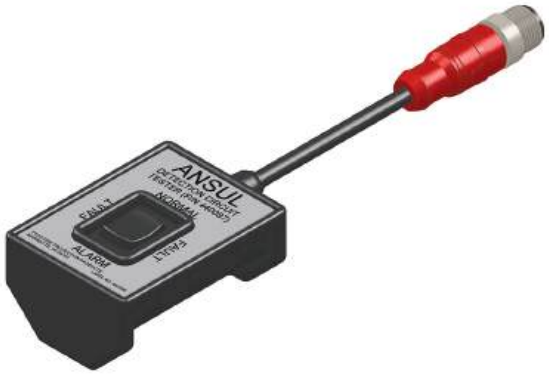


FIGURE 2-43
DETECTION CIRCUIT TESTER
009287

Release Circuit Tester
Part No. 441021

Indicates a successful release energy pulse to fire the PAD (pass or fail). See Figure 2-44.

FIGURE 2-44
RELEASE CIRCUIT TESTER
009288

Release Circuit Test Plug
Part No. 440912

Replaces a PAD for testing the CHECKFIRE 210 System. See Figure 2-45.

FIGURE 2-45
RELEASE CIRCUIT TEST PLUG
009289

Torque Wrench Assembly and Fitting
Part No. 439484: wrench, Part No. 440168: fitting

Provides the ability to torque connections as required (see Appendix for connector torque values). See Figure 2-46.

TORQUE WRENCH ASSEMBLY WITH SHAFT ADJUSTER, AND M12 FITTING

TORQUE FITTING (M16 FITTING)

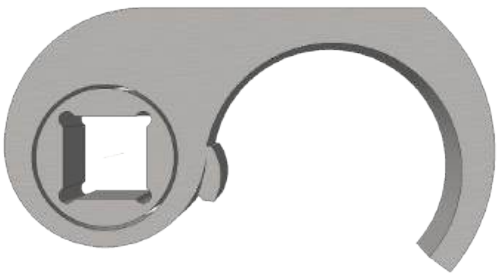


FIGURE 2-46
TORQUE WRENCH AND FITTING ASSEMBLIES
011757/ 011758/ 011759

NOTES:

USER INTERFACE

This section provides the user with overall information on features and operation of the CHECKFIRE 210 Display Module and Interface Control Module (ICM).

FIELD CONNECTIVITY – Cables and Devices

The CHECKFIRE 210 ICM communicates with the Display Module and other devices through cable assemblies.

DISPLAY MODULE FRONT PANEL BUTTONS

"DELAY/Reset/Silence" Button

Manage fault and/or alarm 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. Fault LED indicators continue pulsing until the fault condition has been cleared. Exception: Silencing a Primary Power Fault changes the sounder pulse rate from 1 x 10 sec to 1 x 30 sec.
  - During a post release condition the button will silence the sounder.
  - Any new alarm or fault conditions will reactivate the audible notification.
- **Restart Time Delay Sequence**

  Restart the time delay cycle during an alarm condition; must be initiated before Time Delay #1 (TD1) period expires.
- **System Reset**

  Press and hold (3 seconds) to reset the system.
- **Activate/Deactivate ISOLATE Mode**

  Press and hold for two consecutive resets (approximately 8 seconds).

FIGURE 3-1
DISPLAY MODULE FRONT PANEL BUTTONS
009290a

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 activates 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 system enters Post Release Activated mode.
- DETECTOR INITIATION - The "PUSH To Activate / Alarm When Lit" LED indicator displays the conditions listed in Table 3-1.

PRE-ALARM CONDITION (Previous to TD1)

LED pulses RED 1 x 1 second during an alarm only or first alarm condition with Cross-Zone programming or alarm condition in Isolate Mode.

ALARM CONDITION:

Time Delay #1 (TD1)

LED pulses RED 2 x 1 second until last 5 seconds of Time Delay #1 (TD1) period (sounder matches pulse rate).

In last 5 seconds of TD1, LED pulses RED 4 x 1 second for 4 seconds; in the final second LED is off (sounder matches shutdown LED pulse rate).

Time Delay #2 (TD2)

LED pulses RED 4 x 1 second until Time Delay #2 (TD2) period expires (sounder matches pulse rate).

Release Activated

LED illuminates RED and remains steady-on for 10 seconds (release circuit active) (sounder remains steady-on).

Post Release Activated

No LED indication (sounder matches other LED indications).

▸ DISPLAY MODULE FRONT PANEL INDICATORS

TABLE 3-1: ALARM CONDITION LED INDICATORS

			DETECTION CIRCUIT #1 and/or #2 LEDs*					"PUSH To Activate / Alarm When Lit" LED*					DISCHARGE LED*		SHUTDOWN LED*			
Manual Action (Immediate Release Circuit Activation)			1 x 1 sec.	2 x 1 sec.	4 x 1 sec.	Steady-on for 10 sec.	1 x 10 sec. until cleared & reset**	1 x 1 sec.	2 x 1 sec.	4 x 1 sec.	Steady-on for 10 sec.	1 x 10 sec. until cleared & reset**	Steady-on for 10 sec.	1 x 10 sec. until cleared & reset**	4 x 1 sec.	Steady-on for 1 sec.	Steady-on for 10 sec.	1 x 10 sec. until cleared & reset**
Push the "PUSH To Activate/Alarm When Lit" button, Release Activated																		
Post Release Activated																		
Pull ring pin and strike button on EMA*** Release Activated																		
Post Release Activated																		
Automatic Action (Detector Activation) (Detection Circuit #1 and/or #2 Input - Alarm Condition)																		
Alarm Only Programming or Isolate Mode																		
Time Delay #1 (TD1) Programmed for:	0 seconds		**Immediately Enters Time Delay 2**															
	10 or 15 seconds																	
	5, 10 or 15 seconds **(Starting the last five seconds of TD1)**																	
	5, 10 or 15 seconds **(Last second of TD1)**																	
Time Delay #2 (TD2) Programmed for:	0 seconds		**Immediately Activates Release Circuit When TD1 expires**															
	5, 10 or 15 seconds																	
	Release Activated (TD2 Expired - Release Circuit Activation)																	
Post Release Activated																		
Cross-Zone Programming	One Detection Circuit in Alarm (Pre-Alarm Condition)																	
	Both Detection Circuits in Alarm – Time Delay #1 (TD1) Programmed for:	0 seconds	**Immediately Enters Time Delay 2**															
		10 or 15 seconds																
		5, 10 or 15 seconds **(Starting the last five seconds of TD1)**																
		5, 10 or 15 seconds **(Last second of TD1)**																
	Both Detection Circuits in Alarm – Time Delay #2 (TD2) Programmed for:	0 seconds	**Immediately Activates Release Circuit When TD1 Expires**															
		5, 10 or 15 seconds																
		Release Activated (TD2 Expired - Release Circuit Activation)																
	Post Release Activated																	
Detection Circuit #2 Only	Pressure Switch Feedback Programming****																	
	Post Release Activated																	

* Sounder pulses at same rate as LED.

** Release LED also pulses Amber at this rate.

*** Detection Circuit 1 or 2 LED indicates; matching the circuit where EMA is installed. EMA activation may take up to 2 seconds after EMA pushbutton is depressed.

**** Release Circuit activates, if programmed.

DISPLAY MODULE FRONT PANEL INDICATORS (Continued)

Power LED (See Figure 3-2)

NOTICE

Both primary and secondary power sources must be used to maintain FM Approval.

- Dual Power/Primary Power Status – Power LED illuminates GREEN and remains steady-on during normal operation
- Secondary Power Status – Power LED pulses GREEN 1 x 3 seconds during normal operation
- Power Fault Conditions
  - Primary Power Fault status – Amber Power LED pulses 1 x 3 seconds and sounder pulses 1 x 10 seconds indicating power from the external power source dropped below acceptable level causing a fault condition.
  - System Powered Down – Amber Power LED and sounder pulse 1 x 1 for 10 seconds when secondary power is depleted and system is powering down (**Note:** occurs when the system is only being powered by the secondary power source).
  - Secondary Power Supply Life Fault – Amber Power LED and sounder pulse 1 x 10 seconds indicating power from the secondary power source dropped below acceptable level causing a fault condition.
  - Fault conditions will continue pulsing AMBER as long as fault exists or until system powers down.

Release Circuit LED (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

Discharge LED (See Figure 3-2)

This LED is only active when Pressure Switch Feedback is programmed.

- Illuminates RED steady-on when pressure switch activates for the remainder of Release Activated period (see Table 3-1)
- Pulses RED 1 x 10 seconds in post release activated (see Table 3-1)
- Controlled by an external pressure switch and provides indication of rising pressure in the expellant gas line

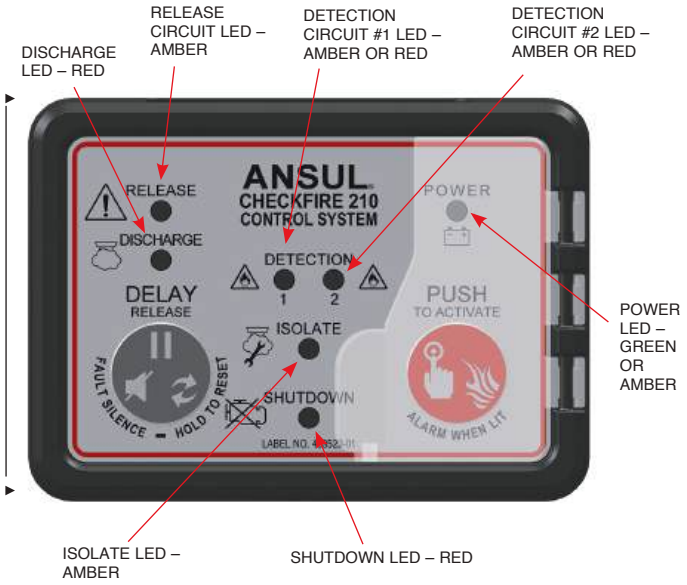


FIGURE 3-2
DISPLAY MODULE FRONT PANEL
009290a

Detection Circuit #1 and #2 LED (See Figure 3-2)

- Pulses RED in an alarm condition (see Table 3-1)
- Pulses AMBER 1 x 10 seconds (sounder matches pulse rate) during an open-circuit fault condition
- Pulses AMBER 2 x 10 seconds Connection Fault
- Returns to normal (no indication) when fault or alarm condition is cleared

Isolate LED (See Figure 3-2)

- Pulses AMBER 2 x 10 seconds to indicate the system is in Isolate Mode
- Use Isolate Mode when performing maintenance on the vehicle/equipment to inhibit automatic release of the fire suppression system

Shutdown LED (See Figure 3-2)

- Pulses RED 4 x 1 second in an alarm condition beginning in the last 5 seconds of TD1 (see Table 3-1)
- Illuminates RED steady-on in the last second of TD1 (see Table 3-1)
- Pulses RED 4 x 1 second during TD2
- Indicates Release Activated and Post Release Activated conditions (see Table 3-1)

POWER

FM Approved Power Configuration

To be compliant to FM 5970, the CHECKFIRE 210 System must utilize both primary and secondary power sources. Utilization of a single power source will void FM Approval.

When both primary power and secondary power are connected, the secondary power source serves as the reserve power source.

Primary Power

The CHECKFIRE 210 System uses equipment power as the primary power source. The Power LED illuminates GREEN steady-on for external power. The primary power circuit requires 12/24 VDC nominal and is supervised for low power conditions.

Secondary Power

The CHECKFIRE 210 System has a secondary power source (ICM Battery Module) providing power under normal operating conditions. The Power LED pulses GREEN 1 x 3 seconds while on secondary power only. The battery module is supervised for low power conditions.

INTERFACE CONTROL MODULE

The CHECKFIRE 210 Interface Control Module (ICM) includes system electronics, and receptacles for system cables. The battery compartment cover helps protect the secondary power supply, mini USB port, and programming interface. See Figures 3-3 and 3-4.

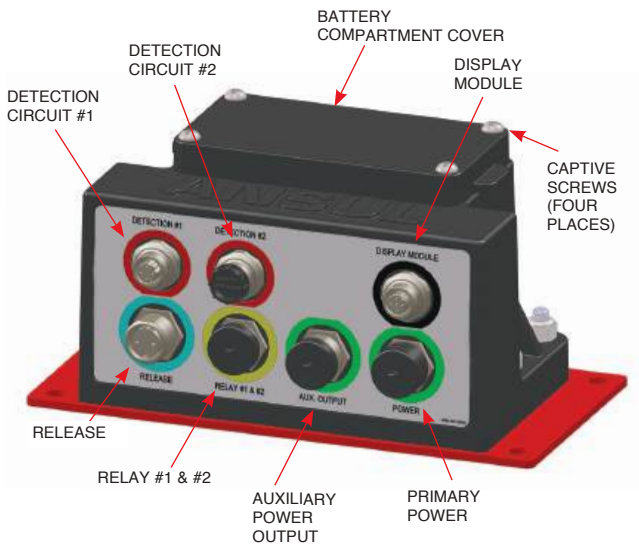


FIGURE 3-3
CHECKFIRE 210 ICM RECEPTACLES
009273a

Detection Circuit #1 Receptacle (Red)

Provides connection point for detection circuit cable and devices.

Detection Circuit #2 Receptacle (Red)

Provides connection point for detection circuit cable, devices or pressure switch.

Display Module Receptacle (Black)

Provides the connection point for the display cable.

Release Circuit Receptacle (Blue)

Provides the connection point for the release circuit cable to electric-pneumatic actuators.

Relay #1 & #2 Receptacle (Yellow)

Provides the connection point for a maximum of two internal relays to control external devices (by others). The Relay Circuit Cable with Leads component has 6 lead wires (3 wires for each relay).

Auxiliary Output Receptacle (Green)

Provides the connection point for output power (for horns, strobes, etc.), regulated to the system voltage 12/24 VDC (1.5 amps maximum). This power output is only available when using primary (vehicle/equipment) power to operate the CHECKFIRE 210 System.

Power Receptacle (Green)

Provides the connection point for primary power.

Battery Compartment Cover

The battery compartment cover is located on the ICM near the embossed ANSUL® logo and can be removed by loosening the four captive screws, see Figure 3-3. The cover fits over an o-ring seal on the ICM enclosure and provides an IP67 rated seal when properly installed. See Figure 3-4.

FIGURE 3-4
ICM COVER REMOVED
009279

INTERFACE CONTROL MODULE (Continued)

ICM Programming Panel

Remove the battery cover for access to the programming button and associated program indicator lights (LEDs). The mini USB port and battery cable for the internal battery module are next to the LEDs. See Figure 3-5.

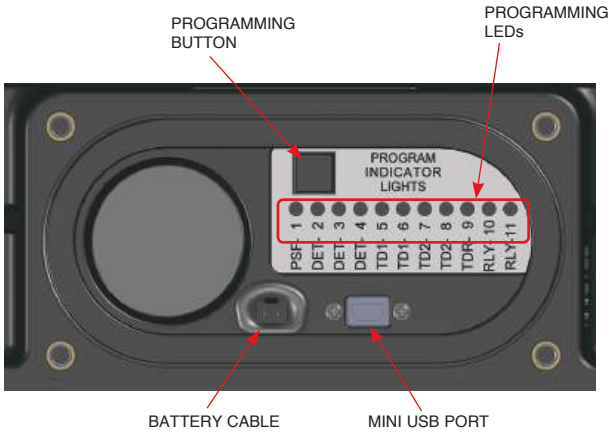


FIGURE 3-5
ICM PROGRAMMING PANEL
009292

System Isolate Function

The CHECKFIRE 210 System includes an isolation feature for end-users to minimize the occurrence of a false discharge when service or maintenance is being performed on the protected vehicle/equipment (not intended for CHECKFIRE 210 System maintenance).

The System is placed in isolate mode by one of the following mechanisms:

1. Operating the isolate switch located on the side of the ICM enclosure. See Figure 3-6.
2. Pressing and holding the “DELAY/Reset/Silence” button on the Display Module for two consecutive resets (approximately 8 seconds). See Figure 3-7.

Note: The position of the ICM Isolate Switch takes priority over the Display Module procedure.

While in isolate mode, the LED and sounder on the Display Module quickly pulse 2 x 10 seconds. If desired, to silence the sounder push the “DELAY/Reset/Silence” button.

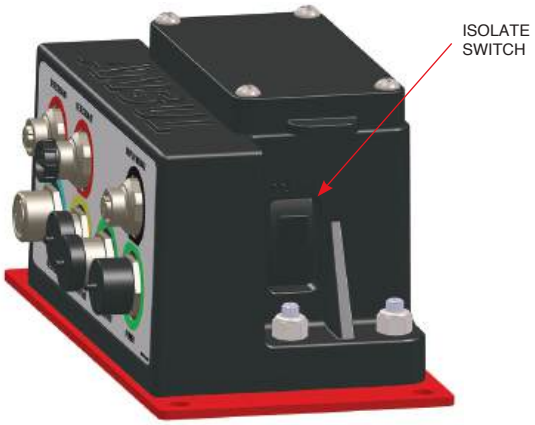


FIGURE 3-6
ICM ISOLATE SWITCH
009277a

FIGURE 3-7
ISOLATE MODE
009290a

When placed in isolate mode, an automatic detection circuit input (alarm condition) will not initiate the release circuit.

However, a manual actuation by either an EMA, if the Isolate Mode EMA Activation is enabled, or the “PUSH to Activate/Alarm When Lit” button, will bypass the isolation feature.

Pressing the “PUSH to Activate/Alarm When Lit” button on the Display Module will cause immediate activation of the release circuit whereas an EMA actuation will activate the release circuit after a four second delay. This functionality can be changed with the CHECKFIRE 210 Programmer software.

NOTES:

HAZARD IDENTIFICATION BASIC PLANNING

Individuals responsible for planning (or designing) a CHECKFIRE 210 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/equipment 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 because of dripping or running flammable liquids.

Examples of ignition (heat) sources:

- Engines
- Exhaust manifolds and piping
- Turbochargers
- Power source compartments
- Electrical system equipment
- Torque converters
- Transmissions
- Hydraulic pumps
- Parking brakes (engaged while moving)
- Bearings, clutches or gears
- Malfunctioning components
- Friction from debris packed around parts

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, and more)
- Broken fuel lines/fittings
- Slow leaks – fuel or hydraulic fluid
- Broken hydraulic lines or pumps
- High pressure hoses
- Belly pan (fuel and debris accumulation)
- Ruptured fuel or hydraulic tank
- 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 equipment 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 has a rating, and the rating determines how the hazard is mitigated. For example: If a battery compartment has a low rating, no detection or protection is required.

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 for automatic equipment shutdown can be made utilizing either the internal relay in the ICM or the Discharge Pressure Switch. When the pressure switch alone is used, shutdown will occur simultaneously with system release. When the pressure switch is used in conjunction with Detection Circuit #2 as pressure switch feedback, and pneumatic actuation is utilized, the programmable #2 internal relay contacts will transfer, and connected equipment will become energized or de-energized depending on how the relay is wired.

Consult the vehicle/equipment manufacturer, the manufacturer's dealer, the site maintenance manager or customer for details when planning for either shutdown method.

HAZARD IDENTIFICATION BASIC PLANNING (Continued)

Notification – Operator Safety

Fire can occur in locations not visible to the vehicle operator. In addition, noisy vehicle operation may result in difficulty hearing the internal sounder in the CHECKFIRE 210 Display Module. In adverse conditions such as these and others, a high decibel alarm with or without flashing strobe (provided by others) may warn the operator the CHECKFIRE 210 System is in an alarm condition, is in a fault condition or the fire suppression system is discharging.

Options for controlling these external devices include two internal programmable relays on the CHECKFIRE 210 ICM, and the Discharge Pressure Switch. The relays can provide indication for system fault, shutdown, and alarm conditions. Options for powering external devices include the auxiliary power output from the ICM or connecting to the vehicle/equipment power.

For safety, plan to evacuate the vehicle/equipment at the earliest possible moment.

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

SPECIFIC PLANNING INFORMATION

Review the following information to plan the CHECKFIRE 210 System layout. Create a drawing of the proposed plan showing locations of components and cable on the vehicle/equipment. This will help avoid unforeseen installation problems. Once an acceptable layout is complete; record and keep it for future reference.

⚠ CAUTION

Verify all mounting locations and methods of proposed equipment are approved by owner of vehicle/equipment manufacturer.

Programming Options

The versatility of the CHECKFIRE 210 System provides multiple options such as detection, user notification, and confirmation of system discharge. Review the following sections and determine proper programming for the system. Track programming selections on the Planning Checklist, see page 4-11.

PRESSURE SWITCH FEEDBACK

With the Pressure Switch Feedback option enabled, Detection Circuit #2 becomes the input circuit for System pressure switches. The System monitors the circuit for both open conditions and shorted conditions.

An open condition on the circuit is indicated by a Fault condition on Detection Circuit #2 and could indicate low pressure in an expellant gas cartridge.

A shorted condition on the circuit is indicated by an alarm condition on Detection Circuit #2 and could be initiated by rising pressure in the expellant gas piping. When activated, the display module Discharge LED and sounder notify the operator of the fire suppression system discharge.

A programmable option for the pressure switch feedback is sending a release signal to PADs when the switch activates. This provides redundant activation of all associated PADs.

Note: When Pressure Switch Feedback is programmed, the Cross-Zone option is not available.

CROSS-ZONE DETECTION

Selecting Cross-Zone Detection requires both detection circuits (#1 and #2) to have an alarm condition before the start of Time Delay #1 (TD1) and the automatic release process.

If an alarm condition is present on one detection circuit, the System will provide audible and visual alarm indication (pulsing 1 x 1 second). TD1 will not start until an alarm condition occurs in the other detection circuit. Once both detection circuits are in alarm, the System will start TD1 (pulsing 2 x 1 second).

If one of the detection circuits clears during TD1, the system returns to indicating audible and visual alarm indication only (pulsing 1 x 1 second) clearing TD1.

If both detection circuits stay in alarm condition during TD1 the system proceeds through time delays and automatically activates the fire suppression system.

Manual activation of the System is always available to the operator by pushing the “PUSH To Activate / Alarm When Lit” button, or operating an EMA.

Note: EMA activation will cause activation of the release circuit after a two second delay if the circuit is programmed for EMA functionality.

Note: When Cross-Zone is programmed, the Pressure Switch Feedback option is not available.

ALARM ONLY

For certain situations requiring manual actuation of the fire suppression system, the CHECKFIRE 210 System can be programmed to provide Alarm Only notification (pulsing 1 x 1 second) of an alarm condition on Detection Circuit #1, Detection Circuit #2, or both together. The Alarm Only programming provides visual and audible indication for the operator of an alarm condition and will not start the automatic release process for the fire suppression system.

If only one circuit is programmed to Alarm Only, the other circuit can function as an independent detection/release circuit.

⚠ CAUTION

Programming both Detection Circuit #1 and Detection Circuit #2 for Alarm Only functionality will disable all automatic release functions of the CHECKFIRE 210 System. Manual activation of the fire suppression system is required for release. Failure to manually activate the system can result in significant property damage or personnel injury.

When manual activation is required, perform one of the following to manually operate the system:

- Open guard door on CHECKFIRE 210 Display Module (break visual seal), and push the “PUSH To Activate / Alarm When Lit” button.
- Pull ring pin and strike red button on an Electric Manual Actuator (EMA).

  Note: EMA activation will cause activation of the release circuit after a two second delay, if EMA functionality is enabled on the circuit.
- If an optional pneumatic actuation system is installed, pull ring pin and strike red button on the pneumatic manual actuator.

SPECIFIC PLANNING INFORMATION (Continued)

Programming Options (Continued)

TIME DELAYS AND RESTART PROGRAMMING

Two programmable time delays are available with the CHECKFIRE 210 System. Time Delay #1 (TD1) starts when a detection circuit receives an alarm condition (unless programmed for Alarm Only or Cross-Zone Detection). Time Delay #1 can be restarted by the operator. Time Delay #2 (TD2) starts at the end of TD1, and cannot be restarted.

The Time Delay #1 Restarts option allows the operator to restart TD1 by pushing the "DELAY/Reset/Silence" button. This gives the operator more time, if needed, before fire suppression system release and, if included, equipment shutdown. The Time Delay Restart option is programmable to one restart or unlimited restarts.

Determine the proper time delay for the hazard, type of equipment, and operating environment. Time delay should be used for safety of operator and others nearby. Time delay duration should be as minimal as needed, because the fire suppression system should be activated as soon as possible.

NOTICE

Factory Mutual approved installations allow a maximum Time Delay of 15 sec. To satisfy the FM requirements, factory defaults are set at:

TD1 = 10 seconds
TD2 = 10 seconds
Time Delay Restart of TD1 = 1

The total time delay including any extensions shall not exceed 30 seconds.

Time Delay and Restart programming provides the following options: See Table 4-1 for FM 5970 Approved time delay settings.

- Time Delay #1 (TD1) is the initial time delay period and can be programmed for 0, 5, 10 (default), or 15 seconds.
- Time Delay #2 (TD2) is a second time delay period between equipment shutdown (if programmed) and system activation, which can be programmed for 0, 5 , 10 (default) or 15 seconds.
- Time Delay Restart of TD1 can be programmed for either 1 restart (default) or unlimited restarts.

Planning should include a selection for each option.

Note: Programming Time Delay Restarts to "unlimited" voids FM Approval.

TABLE 4-1: FM APPROVED TIME DELAYS

	TD2 sec			
TD1 sec	**0**	**5**	**10**	**15**
0	✓	✓	✓	✓
5	✓	✓	✓	✓
10	✓	✓	✓	–
15	✓	–	–	–

Note: All delay settings correspond to Time Delay Restarts being programmed for '1' restart. Programming Time Delay Restarts to 'unlimited' will void FM Approval.

CAUTION

TD1 is the delay period between an alarm condition and equipment shutdown. If using the shutdown relay function, programming TD1 to zero seconds results in immediate equipment shutdown and immediate start of TD2 upon initiation of an alarm condition

CAUTION

TD2 is the delay period between TD1 and fire suppression release. If using the shutdown relay function, programming TD2 to zero seconds results in immediate fire suppression release at the same time as equipment shutdown.

⚠ CAUTION

Programming both Time Delay #1 and Time Delay #2 to zero seconds results in immediate System activation following an alarm condition. This situation could lead to immediate equipment shutdown (if using the shutdown relay function) or other unforeseen issues which could result in significant property damage or personal injury.

⚠ CAUTION

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

EMA FUNCTIONALITY AND PROGRAMMING

The Electric Manual Actuator (EMA) is a device that provides an electrically-supervised manual means of activating the suppression system. Depression of the red palm button will cause all relays programmed for Alarm or Shutdown to transfer state as well as activation of the release circuit. When the CHECKFIRE 210 system is in a normal state of operation, the time between depression of the palm button and release circuit activation is two seconds to ensure a valid EMA signal is being sent to the ICM. If the system is in ISOLATE mode, this verification time delay is four seconds. These programming options are only available using the CHECKFIRE 210 PC Programmer.

Isolate Mode EMA Actuation: This feature controls EMA operation while the CHECKFIRE 210 system is in ISOLATE mode. The default setting for this feature is ENABLED. When enabled, this allows EMA actuation when the system is in ISOLATE or maintenance mode. If this setting is set to DISABLED, EMA actuation will not occur when the system is in ISOLATE mode. Instead, if a valid EMA signal is detected while in ISOLATE mode, after the four second delay period, the Display Module will annunciate a fault on the circuit by pulsing the corresponding AMBER detection circuit LED 2 x 10 seconds.

Note: Disabling EMA activation while in ISOLATE mode will not allow EMA activation during ISOLATE even if a detection circuit is programmed to enable EMA activation.

SPECIFIC PLANNING INFORMATION (Continued)

Programming Options (Continued)

EMA FUNCTIONALITY AND PROGRAMMING (Continued)

Detection Circuit #1 EMA: The default setting for this feature is ENABLED. When enabled, this allows EMA actuation on Detection circuit #1. A delay of two seconds occurs between EMA actuation and release circuit activation. When this programming feature is set to DISABLED, a valid EMA signal will not cause EMA activation of the system. Instead, the Detection Circuit #1 AMBER LED will pulse 2 x per second every 10 seconds, indicating an EMA signal was received on a circuit that is not programmed for EMA operation.

Detection Circuit #2 EMA: The default setting for this feature is ENABLED. When enabled, this allows EMA actuation on Detection circuit #2. A delay of two seconds occurs between EMA actuation and release circuit activation. When this programming feature is set to DISABLED, a valid EMA signal will not cause EMA activation of the system. Instead, the Detection Circuit #2 AMBER LED will pulse 2 x per second every 10 seconds, indicating an EMA signal was received on a circuit that is not programmed for EMA operation.

RELAY CIRCUITS #1 AND #2

The CHECKFIRE 210 System includes two programmable internal, Form C relays (provides normally open (NO) and normally closed (NC) contacts) that can be programmed to transfer on a System alarm, fault or shutdown condition. These relays can control external audible and/or visual signaling devices for either alarm or fault indication. If programmed, relay #2 can be directly connected to equipment shutdown circuitry providing automatic equipment shutdown.

Contact Rating for both relays: 30 VDC nominal at 6 amps (resistive).

Relay #1 programming provides the following options:

- Alarm relay (default)
- Fault relay

Relay #2 programming provides the following options:

- Shutdown relay (default)
- Alarm relay

Display Module Location

1. Mount Display Module in full view, easily accessible, and within reach of the operator. Select a flat surface that will properly support the Display Module during all vehicle/equipment operating and environmental conditions (e.g., shock and vibration).

   Note: The Display 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 bracket.
4. Confirm access for proper cable connection, 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.

NOTICE

The ambient temperature range for the Display Module location must not fall below –40 °F nor exceed 185 °F (–40 °C to 85 °C).

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 vehicle fire suppression system manual (latest revision).

CHECKFIRE 210 Circuit Cables

Plan on routing circuit cables in accessible locations, protected from undue wear, damage, and heat. Cables should not be installed in areas where temperature will 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.

SPECIFIC PLANNING INFORMATION (Continued)

Detection Circuit Cable

Connects input devices to the CHECKFIRE 210 Interface Control Module (ICM) such as:

- Electric Manual Actuators (EMA)
- Linear Detectors
- Spot Thermal Detectors

1. Determine appropriate detection method (Linear Detectors or Spot Thermal Detectors) and placement for specific cable end points.
2. Review Figure 4-1, plan route for the cable from the ICM to the detection component end points (record the end points for cable lengths) and use the following rules:
   - Detection Circuit “h” Cables and Detection Circuit 3-Branch Cable can only be installed on the main trunk
   - Branch line must end with Detection Circuit Branch Terminator or EMA. The Detection Circuit “h” Cable provides a straight cable connection to Detection Circuit Cables, Linear Detectors and Spot Thermal Detectors
   - The Detection Circuit 3-Branch Cable eliminates the need to use multiple Detection Circuit “h” Cables. The use of the Detection Circuit 3-Branch Cable provides:
     – Main trunk out connection
     – Branch circuit connections
   - If used, EMAs must be first components on circuit
   - Each EMA must be on a single use branch line
   - Linear Detector may be used anywhere in the main trunk after the EMAs (if installed)
   - Main detection circuit trunk must be terminated with EOL Device
3. Select appropriate cable lengths for area of installation. Total detection circuit length is calculated with the Linear Detector length. Maximum total length of detection circuit main trunk plus Linear Detector is 750 ft (228.6 m). Maximum length for individual branch lines shall not exceed 250 ft (76 m) (each with a maximum quantity of branch circuits not to exceed 6).

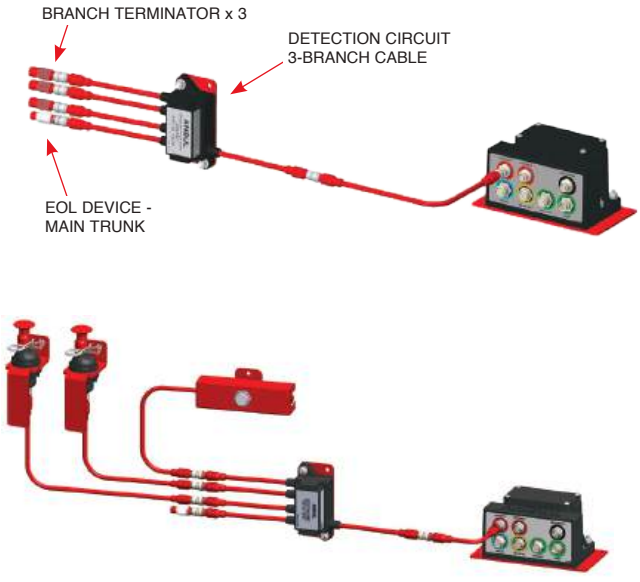


FIGURE 4-1
CORRECT DETECTION CIRCUIT INSTALLATION
011754/ 009293a

ELECTRIC MANUAL ACTUATOR (EMA)

If used, ensure the EMA actuation is enabled for the appropriate detection circuit on the ICM (for programming details see Section 5 – Installation and Programming). For more information, see EMA Functionality and Programming on page 4-3.

1. Locate EMAs where accessible, preferably in the path of egress and reachable from ground level. If EMA is required in the operator’s compartment for manual actuation, locate within line-of-sight and easy reach.
2. Connect EMA before other detection components on a branch circuit from the main detection circuit. See Figure 4-2.
3. Only one EMA is allowed per branch circuit.
4. When using a Detection Circuit 3-Branch Cable, unused branch circuits must be terminated with a Detection Circuit Branch Terminator.

FIGURE 4-2
CORRECT EMA INSTALLATION
009294a

SPECIFIC PLANNING INFORMATION (Continued)

Detection Circuit Cable (Continued)

LINEAR DETECTOR

- Linear Detector connects directly to the main Detection Circuit Cable.
  - Only install in main detection circuit trunk
  - If used, must be installed after EMAs
  - 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 ºF (79 ºC)

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

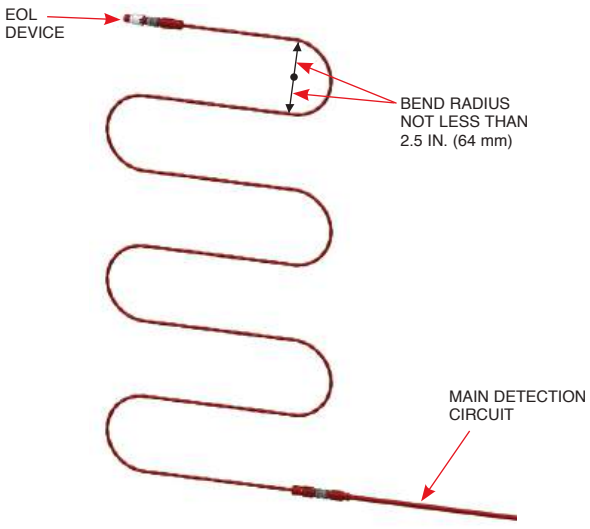


FIGURE 4-3
LINEAR DETECTOR INSTALLATION
009194

SPOT THERMAL DETECTOR SELECTION AND PLACEMENT

- Use Spot Thermal Detectors to meet point detection requirements.

Note: When using Spot Thermal Detectors, plan to locate a minimum of two detectors in each hazard area.

1. Select according to temperature range relative to hazard temperature (refer to table).

Rated Operating Temperature		Maximum Hazard Temperature		Detector	
°F	(°C)	°F	(°C)	Color	Part No.
250	(121)	210	(99)	Blue	438280
350	(177)	256	(125)	Red	438281

2. Mount using required bracket and heat shield on a flat surface that will properly support the detector during all equipment operating and environmental conditions (e.g., shock and vibration).
3. Spot Thermal Detectors may be run in a branch line from main detection circuit trunk. A branch terminator is required when installed on a branch line. See Figure 4-4.

CAUTION

Do not use an EOL Device at the end of a branch line. The EOL Device will cause incomplete detection circuit supervision and the system will not function properly.

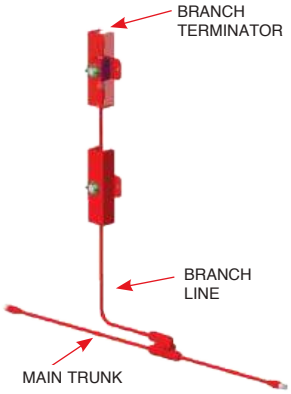


FIGURE 4-4
SPOT THERMAL DETECTOR BRANCH INSTALLATION
009295a

4. Install an EOL Device at the end of the main detection circuit trunk. See Figure 4-5.

FIGURE 4-5
SPOT THERMAL DETECTOR MAIN TRUNK INSTALLATION
009296

SPECIFIC PLANNING INFORMATION (Continued)

Detection Circuit Field Wireable Cable – Remote Actuation

The CHECKFIRE Detection Circuit Field Wireable Cable is a cable for connecting to a remote controller, PLC, or other appropriate components for remote activation of the CHECKFIRE 110 or 210 Detection System.

Three types of activation are available for installation:

1. DPDT Switch Activation – (Double Pole/Double Throw)
2. SPDT Switch Activation – (Single Pole/Double Throw)
3. Relay Activation

A 1/4 Watt 650 Ohm ± 5% supplied resistor configuration option will cause the circuit to function similar to an Electric Manual Actuator (EMA). If the resistor is not used, the programmed time delays will be initiated when activated.

Optional Discharge Pressure Switch

Provides pressure switch feedback to the ICM through Detection Circuit #2.

The switch must be on a branch line in detection circuit #2 with an EOL Device completing the main trunk of the Detection Circuit “h” Cable.

Note: Pressure switch activates on expellant gas release.

Display Cable (Black Connectors)

Connects Display Module to CHECKFIRE 210 ICM.

- Communicates commands, and system status with ICM

1. Determine location of display module for specific cable end points.
2. Select appropriate cable lengths for area of installation. Maximum circuit length is 200 ft (60.96 m).

Release Circuit Cable (Blue Connectors)

Connects Electric-Pneumatic Actuators to CHECKFIRE 210 ICM.

- System activates a maximum of 8 Actuators.
- For electrical activation include a Release Circuit Drop Cable for each actuator.
- Release Circuit “h” Cable or Release Circuit 4-Tank Cable required for each additional actuator.
- For optional pneumatic actuation refer to appropriate vehicle fire suppression system manual (latest revision):

1. Determine location of agent tanks, expellant gas cartridge assemblies, and actuators for specific cable end points.
2. Select appropriate cable lengths for area of installation.

Release Circuit "h" Cable

The Release Circuit "h" Cable provides a straight cable connection to Release Circuit Cables, and release Circuit Drop Cables. All Release Circuit installation rules apply to the use of the release "h" cables. Review the rules in the *Release Circuit Cables* section page 5-15.

The supplied Connector Clamps must be installed on all cable connections to provide additional IP protection and further secure the cable connections.

Release Circuit 4-Tank Cable

The Release Circuit 4-Tank Cable eliminates the need to bank Release Circuit "h" Cables when multiple connections are required. The single release circuit cable pigtail is the main release circuit "In" cable from the ICM. The four release circuit cable pigtails are release circuit connections "Out" of the assembly and are labeled "To PAD's/Tanks or Terminator."

The Release Circuit 4-Tank Cable may have additional Release Circuit 4-Tank Cables and/or Release Circuit "h" Cables attached to any of the output connections to allow for additional tank installations. If a release circuit "Out" is not used it must have a Release Circuit Terminator installed.

Relay Circuit Cable (Yellow Connectors)

Connects external devices and components to CHECKFIRE 210 ICM.

- System controls external devices (supplied by others) using two (2) internal, programmable, Form C relays
- Relays can be programmed to provide indication for Alarm or Fault (Relay #1), and Shutdown or Alarm (Relay #2).

1. Determine location of connection points for external devices.
2. Select appropriate cable lengths for area of installation.

Auxiliary Output Circuit Cable (Green Connectors)

Provides a power source via the CHECKFIRE 210 ICM for use with external components and devices.

- Auxiliary Output Voltage is only available if operating the CHECKFIRE 210 System on external power

1. Determine location of connection points for external devices.
2. Select appropriate cable lengths for area of installation. Maximum circuit current rating is 1.5A.

SPECIFIC PLANNING INFORMATION (Continued)

Power Circuit Cables (Green Connectors)

Connects CHECKFIRE 210 ICM to 12/24 VDC nominal external power source using the Power Circuit Cable and the Fused Power Circuit Cable (connects to external power supply).

1. Determine location of power source that will provide the current load capabilities. See page 1-1 for current load capabilities.
2. Select appropriate cable lengths for area of installation.

Label Package

Include a Label Package to identify specific procedures of the system to equipment 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 external power source)
- Routes for all connecting circuits with cable lengths identified.

Indicate areas where cable must pass-through bulkheads. (Confirm acceptable pass-through locations with vehicle/ equipment 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 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.

PLANNING CHECKLIST

(COPY BEFORE USE)

Components

- ☐ CHECKFIRE 210 Display Module
- ☐ ICM Cable Clamp
- ☐ Mounting Bracket
- ☐ Display Cable
- ☐ CHECKFIRE 210 Interface Control Module
- ☐ Detection Circuit Cables, Detection Circuit "h" Cable, Detection Circuit 3-Branch Cable, EOL Device, and Branch Terminators
- ☐ Electric Manual Actuators (EMA) and Brackets
- ☐ Linear Detectors
- ☐ Spot Thermal Detectors (include bracket and heat shield), if applicable
- ☐ Release Circuit Cables, Release Circuit "h" Cable and Release Circuit 4-Tank Cable
- ☐ Release Circuit Drop Cables
- ☐ PADs
- ☐ Electric-Pneumatic Actuators (may be supplied with agent tanks)
- ☐ Pneumatic Manual Actuators (optional)
- ☐ Relay Circuit Cables
- ☐ Auxiliary Output Cables
- ☐ Power Circuit Cables and Fused Power Circuit Cable
- ☐ Discharge Pressure Switch, if applicable
- ☐ Connector Clamps
- ☐ Cable Grommets (3-hole, 2-hole, Linear Detector)
- ☐ Double-Loop Cable Ties
- ☐ Bulkhead Cord Grips
- ☐ Alarms and/or Strobes
- ☐ Label Package

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

Programming Options

(Certain options will affect availability of other options)

Pressure Switch Feedback (PSF)

- ☐ Disabled (default)
- ☐ Enabled, uses Detection Circuit #2 for pressure switch input.
  - ☐ Enable auto-release activation of PADs

  Note: Cross-Zone not available

Cross-Zone Protection

- ☐ Disabled (default)
- ☐ Enabled, Detection Circuit #1 and #2 are independent detection and both must detect alarm condition to start time delays.

  Note: Pressure Switch Feedback not available

Detection Circuit #1 (Cross-Zone disabled)

- ☐ Independent detection/release (default)
- ☐ Detection (Alarm Only)

Detection Circuit #2 (Cross-Zone disabled)

- ☐ Independent detection/release (default)
- ☐ Detection (Alarm Only)

Detection Circuit #2 (Pressure Switch Feedback enabled)

- ☐ Alarm Only (default)
- ☐ Release activation (PADs)

Time Delay #1 (Seconds)

☐ 0 ☐ 5 ☐ 10 (default) ☐ 15

Time Delay #2 (Seconds)

☐ 0 ☐ 5 ☐ 10 (default) ☐ 15

Time Delay #1 (Restarts)

☐ 1 (default) ☐ Unlimited

Relay Circuit #1

☐ Alarm (default) ☐ Fault

Relay Circuit #2

☐ Shutdown (default) ☐ Alarm

NOTES:

INSTALLATION

Before installing the CHECKFIRE 210 Detection and Actuation System, Section 4 – System Planning should be studied in its entirety. In addition, a resulting system layout drawing with information on hazard areas, component locations, and routing of connecting circuits, along with all cable lengths identified, should be available. Review this drawing and become familiar with all applicable steps and instructions before installing any component.

NOTICE

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

When supporting components from the vehicle/equipment make certain any support device requiring drilling or welding is approved by owner or vehicle/equipment manufacturer.

MOUNTING INTERFACE CONTROL MODULE (ICM)

Mount on a flat surface that will properly support the ICM during all vehicle/equipment operating and environmental conditions (e.g. shock and vibration).

1. Refer to layout drawing for planned location. Verify the location meets approval of the vehicle/equipment owner and/or vehicle/equipment service manager.
2. Confirm access to the ICM 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 ICM mounting plate as a template (see Figure 5-1), mark and drill 9/32 in. (7 mm) holes in the flat surface (4 places).
4. Secure ICM to mounting surface using appropriate length fasteners (1/4 in. (6 mm) screws or bolts with lock washers and nuts). See Torque Specifications in the Appendix for the Nyloc nuts.

FIGURE 5-1
ICM SURFACE MOUNTING
009273a

ICM Cable Clamp

The ICM Cable Clamp is designed to provide a means to secure cable connections from the ICM prior to routing to specific hazard areas.

The clamp mounting base should be installed 5 in. (127 mm) from the ICM mounting plate, see Figure 5-2. Secure base to vehicle surface. The mounting base is provided with 1/4 in. (6.4 mm) dia. holes for bolting or may be welded if approved by equipment manufacturer.

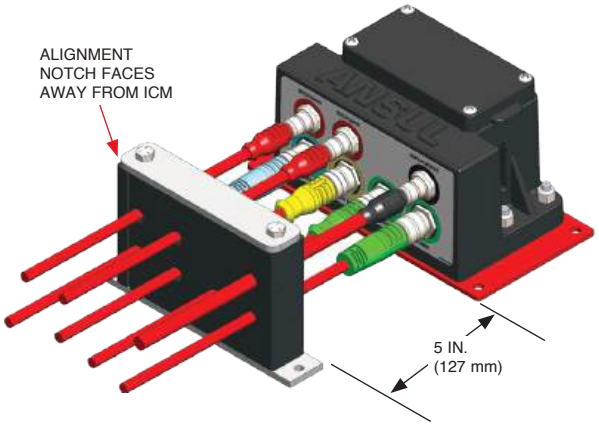


FIGURE 5-2
010642a

Mount the base (A), see Figure 5-3, so the cable retaining holes in the molded cable retainers align with the receptacles on the ICM (alignment notch faces away from the ICM). After the base is aligned and secure, assemble the remaining components, see Figure 5-3:

1. Install bottom cable retainer (B) to mounting base (A) with alignment notch facing away from the ICM.
2. Route cables over matching holes then install cable retainer (C) as shown, matching alignment notch.
3. Install cable retainer (D) as shown, matching alignment notch and route cables over matching holes.
4. Install top cable retainer (E) as shown, matching alignment notch.
5. Install metal top plate (F) align bolt holes and install two bolts (G). See Torque Specifications in the Appendix and correctly tighten bolts.

MOUNTING INTERFACE CONTROL MODULE (ICM) (Continued)

ICM Cable Clamp (Continued)

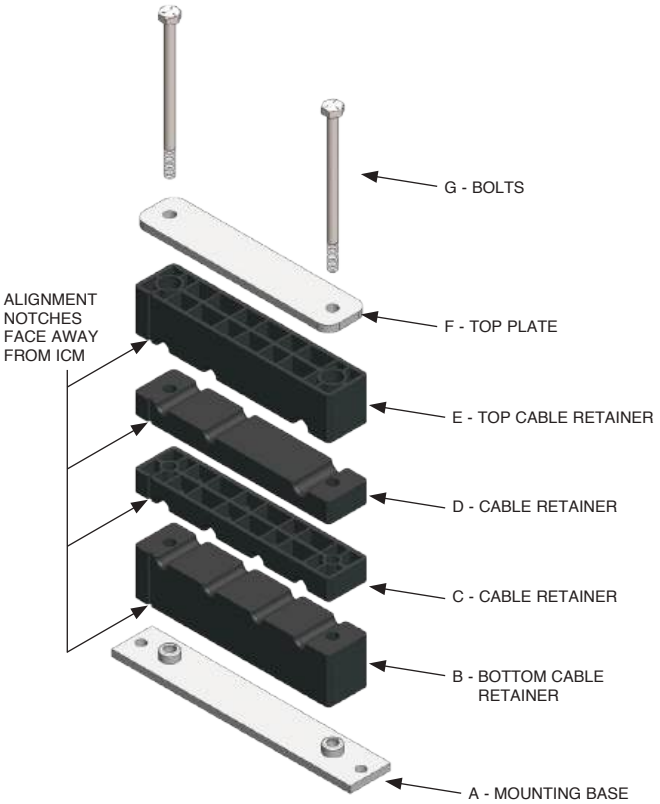


FIGURE 5-3
010643

CABLE CONNECTIVITY

Each cable shipping assembly includes a required connector clamp.

Refer to the layout drawing for circuit routing and cable components assembly.

CIRCUIT CABLE IDENTIFICATION

Circuit	Pins
Detection #1	4
Detection #2	4
Display	5
Release	2
Relay #1 & #2	6
Auxiliary Output	2
External Power	2

Connector Assembly

Perform the following steps when connecting all circular threaded connectors.

1. Align the male end with the female end by positioning keyed slots and pins in the proper orientation, see Figure 5-4.

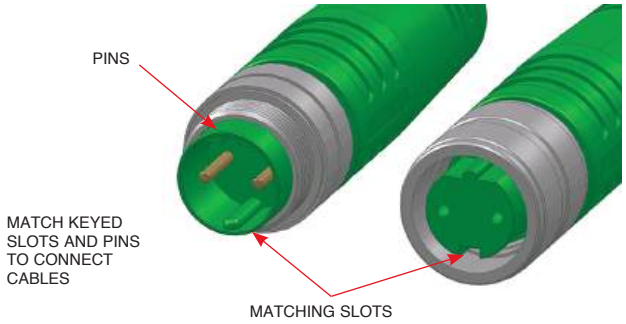


FIGURE 5-4
ALIGN PINS AND KEYS
009209

2. Lightly press connectors together while rotating until the keys align.
3. Firmly press connectors together while threading the swivel nut. If connectors do not go together easily, recheck keyed slots and pins to ensure proper alignment.
4. Use the torque wrench assembly, to torque the fittings according to the torque specs in the Appendix.

CABLE CONNECTIVITY (Continued)

Connector Clamp

The Connector Clamp is required for resistance to steam cleaning and pressure washing. Secure the clamp using a 3/8 in. (M10) bolt and nut or weld lug. The Connector Clamp may be used either free floating or mounted to the structure.

The following instructions apply to all cables.

1. Install rubber grommet, centering over the cable connectors. Slide the stainless steel clamp on the cable. Ensure the slit in the grommet is positioned at least 180° away from the location of the clamp opening. See Figure 5-5.

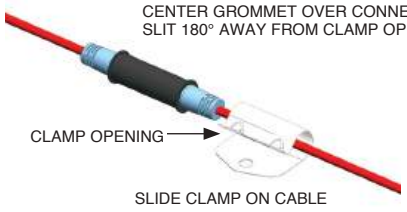


FIGURE 5-5
INSTALL GROMMET
010355

2. Slide the stainless steel clamp over the rubber grommet. It may be necessary to slightly spread the stainless steel clamp to slide it over the rubber grommet. See Figure 5-6.

FIGURE 5-6
SLIDE CLAMP OVER GROMMET
010356

3. Secure the Connector Clamp using a 3/8 in. (M10) bolt and nut or weld lug. The Connector Clamp may be used either free floating (see Figure 5-7) or mounted to the structure, see Figure 5-8.

FIGURE 5-7
SECURE CLAMP
010357

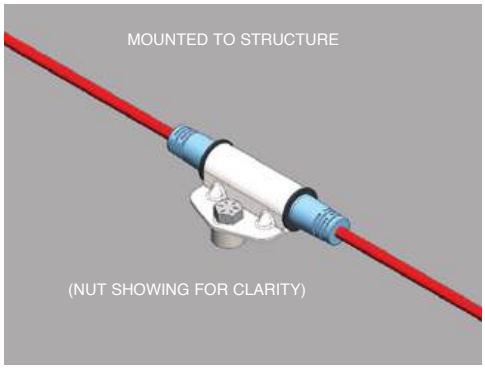


FIGURE 5-8
STRUCTURE MOUNTING
010359

If used free floating, cable should be supported a maximum of 18 in. (457 mm) on each side of the Connector Clamp. If mounted to structure, support cable a maximum of 36 in. (914 mm) from the Connector Clamp. If necessary, use additional supports to ensure cable is not subjected to snagging, crushing or abrasion. Cable Grommets (with P-Clamps), Rubber Coated P-Clips or Double Loop Cable Ties or industry acceptable methods of attachment may be used to support cables.

General Instructions for Cable Installation

All cable assemblies must be supported appropriately.

- Cables must be supported within 18 in. (457 mm) of connect points, and a minimum of every 3 ft (0.9 m) with an industry acceptable method of attachment.
- Cable grommets provide proper support and separation from the securing structures.
- 2-Hole, 3-Hole and Linear Detection Circuit Cable Grommets are listed in the Appendix to aid in mounting cables as needed.
  - The 3-Hole Grommet supports Detection, Release, and Power or Relay cables and fits 1 to 3 cables as needed.
  - The 2-Hole Grommet supports 1 or 2 Display Cables.
  - The Linear Detector Grommet provides support for Linear Detectors and should be used in place of the existing rubber sleeves.

1. Follow planned route in the layout drawing and install each circuit starting at the ICM receptacle and work outward. Completely install one circuit at a time, finishing with the power circuit.

CABLE CONNECTIVITY (Continued)

General Instructions for Cable Installation (Continued)

2. If attachment points are not available for cable grommets the use of industry standard attachment is acceptable. See Figure 5-9.

NOTICE

Cables should not be supported by hydraulic hoses.

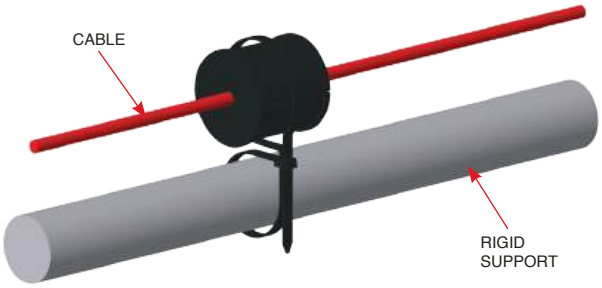


FIGURE 5-9
DOUBLE-LOOP CABLE TIE
009211

Double-loop cable ties may also be used to secure cable grommets if necessary.

3. Adjust slack to avoid droops in cable. Allow appropriate slack through areas that are intended to move under normal vehicle/equipment operation.
4. When cables pass through a partition, it is recommended to use a Bulkhead Cord Grip.

Note: Cables must never be routed through a hole or near sharp edges without being properly protected.

DETECTION CIRCUIT CABLES

The Detection Circuit #1 and #2 receptacles on the CHECKFIRE 210 ICM are starting points for detection circuits. See Figure 5-10. Each detection circuit consists of a main trunk and branch lines may be added with a Detection Circuit "h" Cable or a Detection Circuit 3-Branch Cable on the main trunk. See sample branch lines in Figure 5-11.

FIGURE 5-10
ICM RECEPTACLES
009314a

FIGURE 5-11
DETECTION CIRCUIT INSTALLATION
009293b

Install Detection Circuits using the following rules:

1. An Electric Manual Actuator (EMA), if used, must be installed prior to any other detection device. Install a Detection Circuit "h" Cable or a Detection Circuit 3-Branch Cable. See Figure 5-12.

FIGURE 5-12
DETECTION CIRCUIT – EMA
009294a

2. Install each EMA on a separate branch (only one device on a branch). See Figure 5-12.

DETECTION CIRCUIT CABLES (Continued)

3. Spot Thermal Detectors connect in the main trunk of the detection circuit or on a branch circuit using a Detection Circuit "h" Cable or a Detection Circuit 3-Branch Cable and detection circuit cable. If installed on a branch circuit, a Detection Circuit Branch Terminator must be connected to the last detector. See Figure 5-13.

CAUTION

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

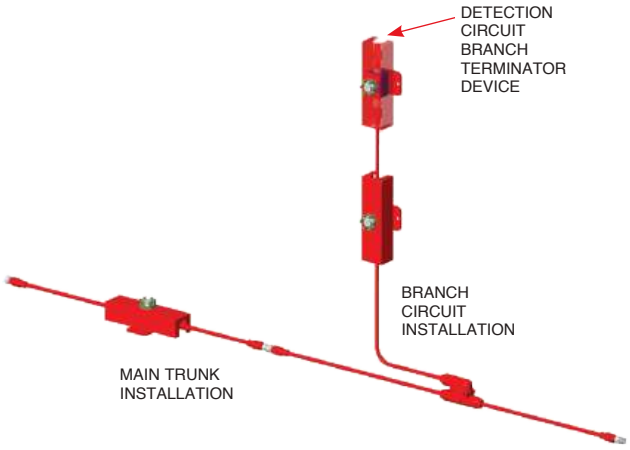


FIGURE 5-13
DETECTION CIRCUIT – SPOT THERMAL DETECTORS
009223

4. The Linear Detector may be installed anywhere in the main detection circuit trunk after EMA. If last device, the Linear Detector is terminated with an EOL Device. See Figure 5-14.

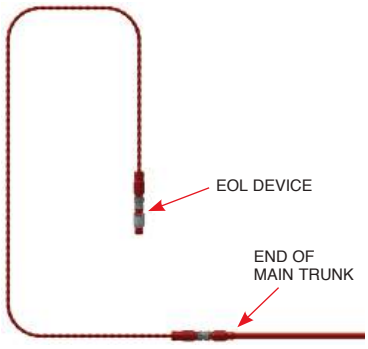


FIGURE 5-14
DETECTION CIRCUIT – LINEAR DETECTOR
009224

Review complete installation to verify correctness.

DETECTION CIRCUIT "h"CABLE

The Detection Circuit "h" Cable, see Figure 5-15, provides a straight cable connection to detection circuit cables, Linear Detectors and Spot Thermal Detectors. Use the holes in the over-mold body to install the cable or other industry acceptable methods of attachment.

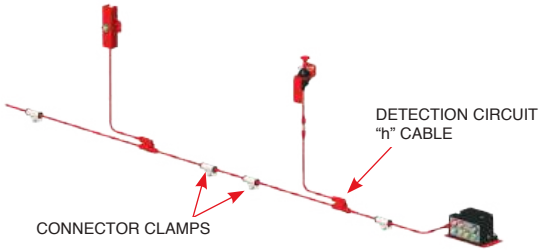
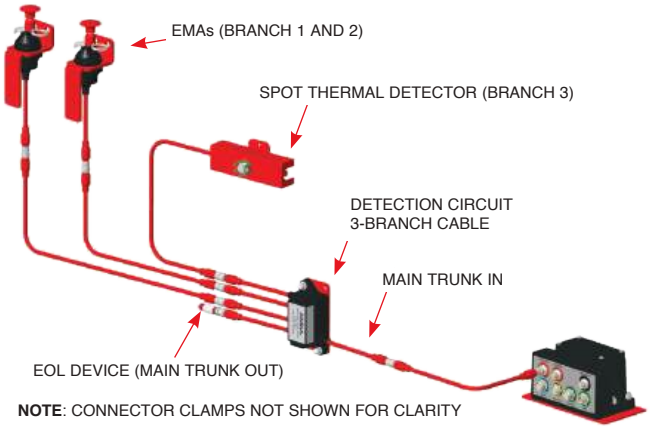


FIGURE 5-15
010362a

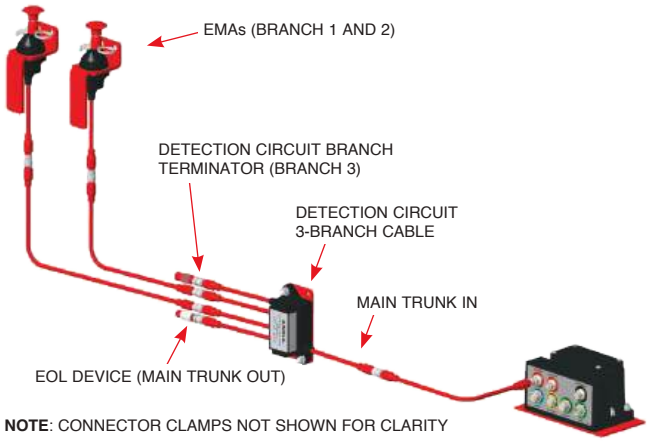
DETECTION CIRCUIT 3-BRANCH CABLE

Install the Detection Circuit 3-Branch Cable on a flat surface with the provided steel mounting plate, and 1/4 in. bolts and washers. Support cables as recommended. All EMA's must be installed prior to spot thermal detectors using Branch 1 and Branch 2. See sample installations Figures 5-16 and 5-17.



NOTE: CONNECTOR CLAMPS NOT SHOWN FOR CLARITY

FIGURE 5-16
DETECTION CIRCUIT 3-BRANCH CABLE SAMPLE INSTALLATION
010361a



NOTE: CONNECTOR CLAMPS NOT SHOWN FOR CLARITY

FIGURE 5-17
DETECTION CIRCUIT 3-BRANCH CABLE SAMPLE INSTALLATION
010360a

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 5-19).

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 210 ICM 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 5-18.

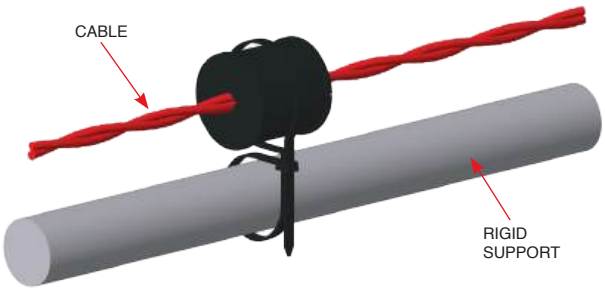


FIGURE 5-18
GROMMET AND DOUBLE-LOOP CABLE TIE
009213

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 5-19.

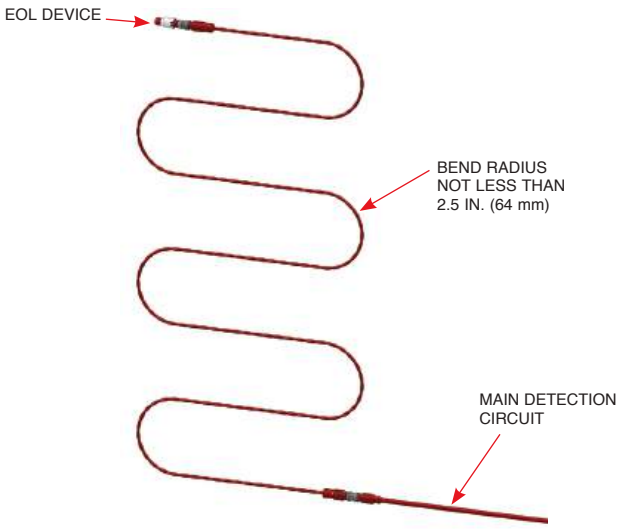


FIGURE 5-19
SAMPLE LINEAR DETECTOR INSTALLATION
009194

SPOT THERMAL DETECTOR

Mount in a location where detector head points in a downward position with exposure over the hazard area (refer to layout drawing).

1. Attach Spot Thermal Detector Bracket securely to mounting surface by bolting with two 1/4 in. bolts of appropriate length (secure with lock washers and nuts). See Figure 5-20.
   Note: When supporting from the vehicle/equipment make certain any support device requiring drilling or welding is approved by owner or vehicle/equipment manufacturer.
2. After securing bracket, remove retaining nut from detector head and slide detector in bracket. Confirm detector has male/female connectors in correct position for connection to detection circuit cable. See Figure 5-21.

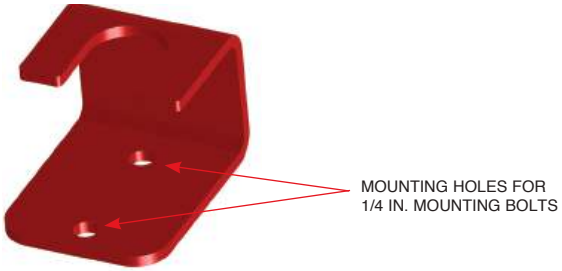


FIGURE 5-20
SPOT THERMAL DETECTOR BRACKET
009234

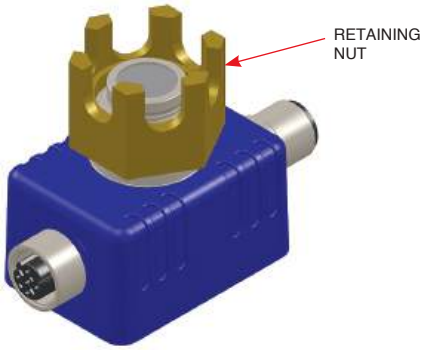


FIGURE 5-21
SPOT THERMAL DETECTOR
009280

3. Place the required heat shield over the detector head and loosely install retaining nut. See Figure 5-22.
   Note: Remove Heat Shield to connect Detection Circuit Cables.

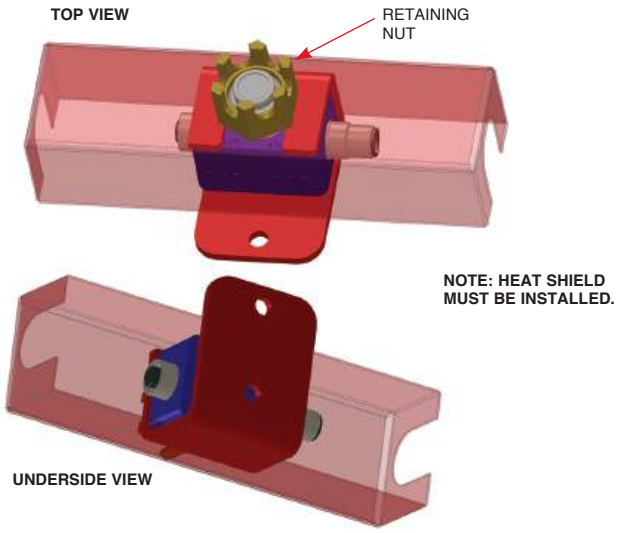


FIGURE 5-22
DETECTOR IN BRACKET WITH HEAT SHIELD
009214

4. During final installation, apply a medium-strength thread-locking compound (e.g., LOCTITE THREADLOCKER BLUE 242) to the base of threaded detector head near the heat shield.
5. Tighten retaining nut wrench-tight until the retaining nut is snug. Do not over tighten. Torque not to exceed 25 in.-lb (2.82 N•m).

CAUTION

Over tightening of the retaining nut can damage the detector. Do not over-tighten. Torque not to exceed 25 in.-lb (2.82 N•m).

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. (6.3 mm) maximum thickness) or bracket mounted. For bracket mounting use the EMA Bracket.

Surface Mounting Instructions

1. Drill a 1 9/16 in. (40 mm) hole in selected surface (always deburr and smooth edges of hole). See Figure 5-23.
2. Determine position and add keyway for EMA orientation index nub. See Figure 5-23.

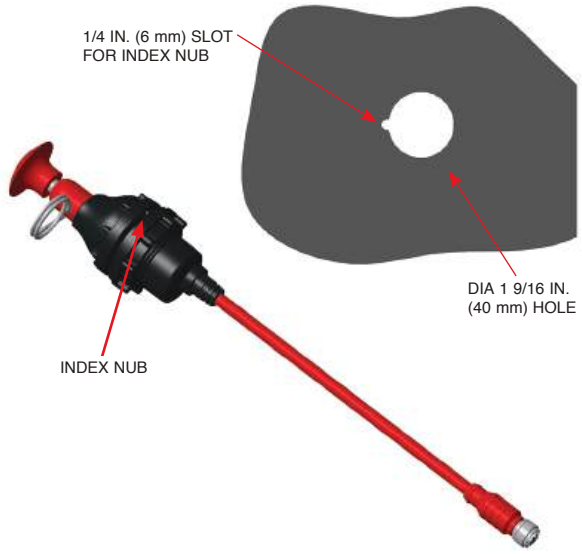


FIGURE 5-23
EMA SURFACE MOUNT DIMENSIONS
009216a/ 009153a

3. Remove nut and rubber washer from threaded boss and insert boss through drilled hole fitting index nub into slot. Install rubber washer and hand-tighten nut on threaded boss. See Figure 5-24.

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

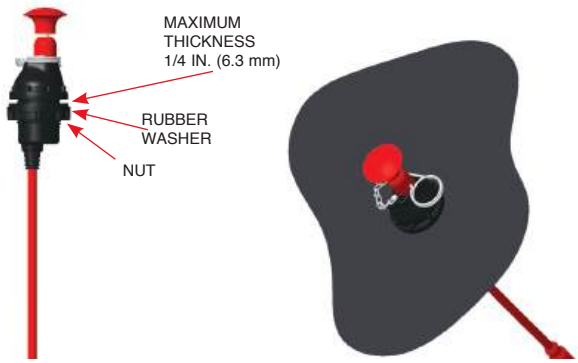


FIGURE 5-24
EMA SURFACE MOUNT INSTALLED
009217

Bracket Mounting Instructions

1. Install the EMA Bracket by bolting or welding.
   a. **Bolting:** Using bracket base as a template (see Figure 5-25), 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 5-25
EMA BRACKET MOUNT
009154

ELECTRIC MANUAL ACTUATOR (EMA) (Continued)

Bracket Mounting Instructions (Continued)

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 5-26.

> ***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.

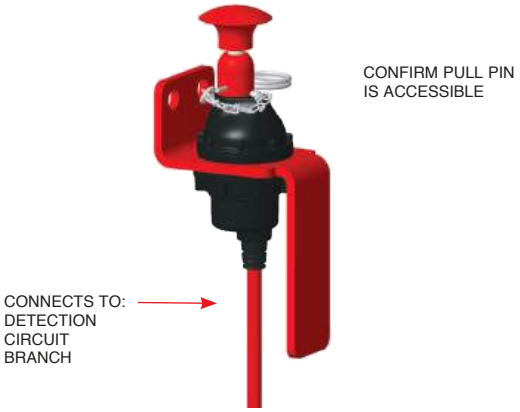


FIGURE 5-26
EMA INSTALLED IN BRACKET
009219

CHECKFIRE 210 REMOTE ACTIVATION

When Installing the Detection Circuit Field Wireable Cable - Remote Actuation, complete the following steps:

1. Install on a branch circuit with a Detection Circuit “h” Cable or a Detection Circuit 3-Branch Cable. The Field Wireable Cable - Remote Actuation is the only component allowed on that specific branch circuit.
2. If installed on a shared detection circuit, the Field Wireable Cable must be installed prior to any Linear Detector or Spot Thermal Detector.
3. Select from Figures 5-27 to 5-29 for the type of activation required (DPDT, SPDT, or Relay).

To complete the installation, refer to the applicable figure for the type of actuation required. See Figures 5-27 to 5-29

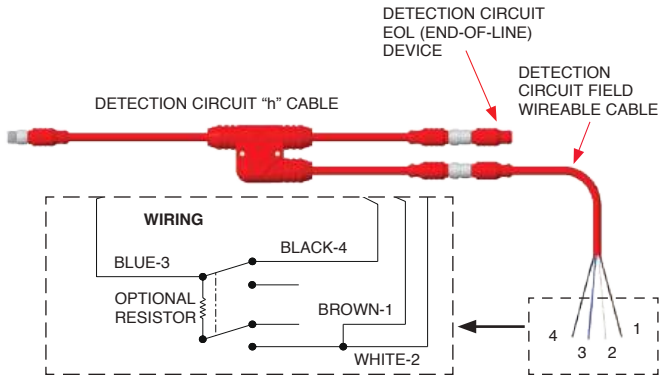


FIGURE 5-27
DPDT SWITCH ACTIVATION
009610 / 009610a

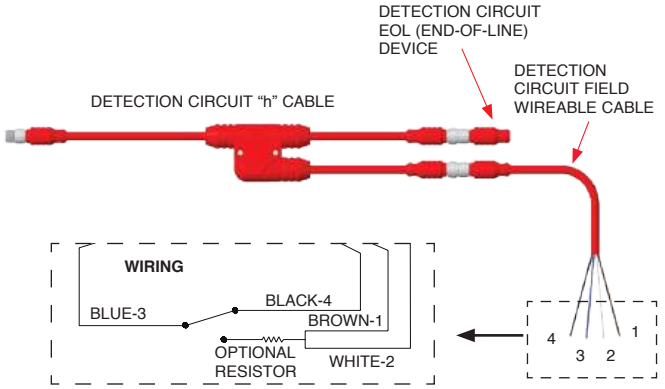


FIGURE 5-28
SPDT SWITCH ACTIVATION
009610 / 009611

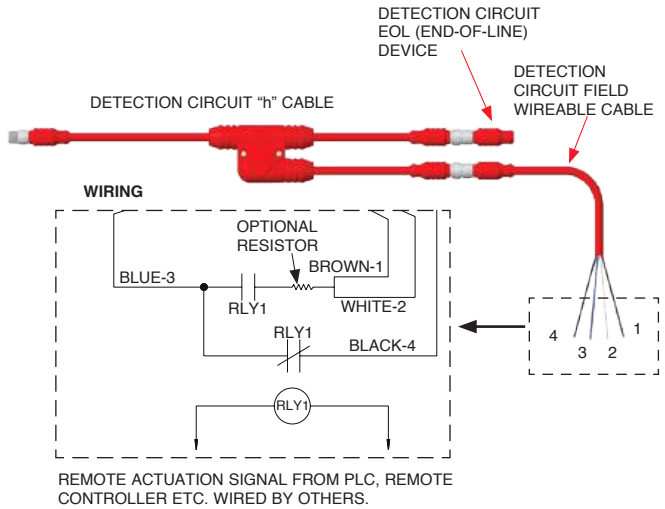


FIGURE 5-29
RELAY ACTIVATION
009610 / 009609

DISCHARGE PRESSURE SWITCH

Standard installation of the Discharge Pressure Switch is at the agent tank (see Figure 5-30).

⚠ CAUTION

Locate pressure switch next to agent tank at end of expellant gas line. Failure to comply will cause pressure switch to not function properly.

1. Install pressure switch in expellant gas actuation line next to agent tank inlet port. Make certain to protect switch and connections from potential damage.

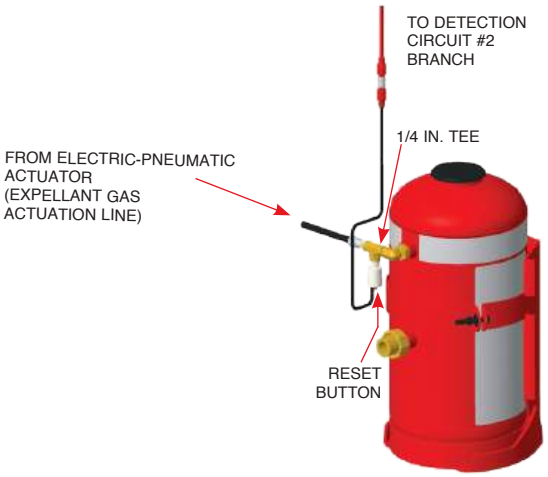


FIGURE 5-30
INSTALLED PRESSURE SWITCH
009345

2. The switch installs in a standard 1/4 in. NPT female fitting. Insert the included 1/4 in. tee between expellant gas line hose from actuator and tank inlet port. Use TEFLON tape on the male threads. See Figure 5-31 for proper wrench grip area.

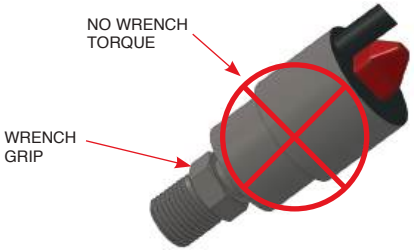


FIGURE 5-31
PRESSURE SWITCH WRENCH GRIP AREA
009231

CAUTION

When threading the pressure 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.

Pressure Switch Reset

To reset the pressure switch, press the red reset button located on the back of the switch. An audible click should be heard. See Figure 5-30.

CAUTION

The Discharge Pressure Switch must be manually reset **before** resetting the CHECKFIRE system. Failure to reset the switch could result in system activation.

System Connection

The Discharge Pressure Switch includes a red color-coded connector for direct connection to Detection Circuit #2. Use a Detection Circuit “h” Cable or Detection Circuit 3-Branch Cable to connect the switch on the branch line of the tee. Install a Detection Circuit EOL Device to complete Detection Circuit #2. See Figure 5-32.

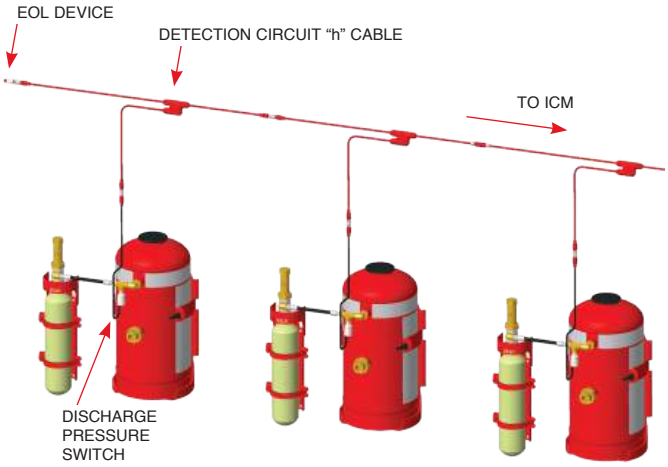


FIGURE 5-32
DETECTION CIRCUIT #2 CONNECTION
009352a

DISPLAY CIRCUIT CABLE

The Display Module receptacle on the CHECKFIRE 210 ICM is the starting point for the display circuit. See Figure 5-33.

The display circuit is a single cable providing circuit connection between the ICM and the CHECKFIRE 210 Display Module for communication of commands and system status.

FIGURE 5-33
DISPLAY CABLE RECEPTACLE
009273a

CHECKFIRE 210 DISPLAY MODULE

The CHECKFIRE 210 Display 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 display module should never be mounted in an area subject to pressure washing or steam cleaning.

Surface Mounting Instructions

Although recommended, the CHECKFIRE 210 Display Module does not require a bracket when surface mounting in a flat location. The location must properly support the display 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 display module LEDs and easy access to display module buttons.
2. Drill three holes matching the correct diameter and layout for surface mounting, see Figure 5-34.
   a. Use the foam gasket as a template to carefully mark hole locations. See Figure 5-35.
   b. After drilling holes, remove burrs and sharp edges.
3. Remove protective backing exposing gasket adhesive then install foam gasket on Display Module.

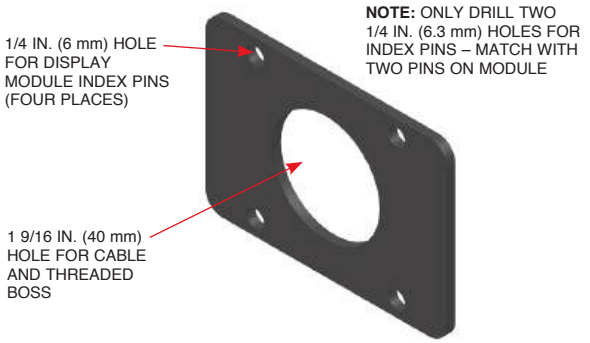


FIGURE 5-34
SURFACE MOUNTING TEMPLATE (FOAM GASKET)
009203

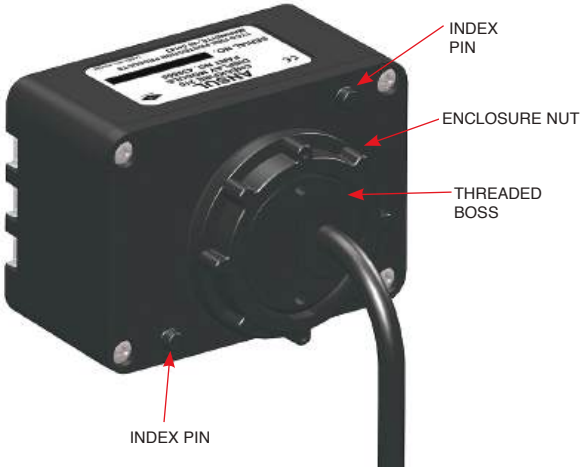


FIGURE 5-35
INDEX PINS AND THREADED BOSS
009303

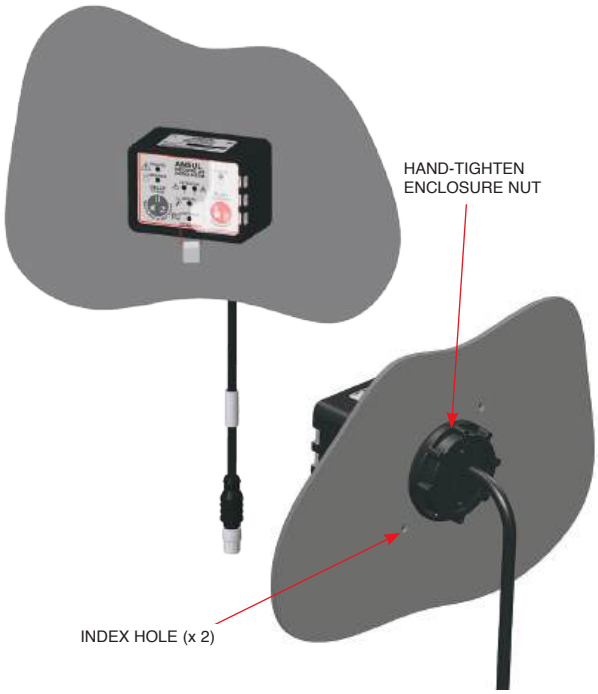
CHECKFIRE 210 DISPLAY MODULE (Continued)

Surface Mounting Instructions (Continued)

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 5-36.

NOTICE

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



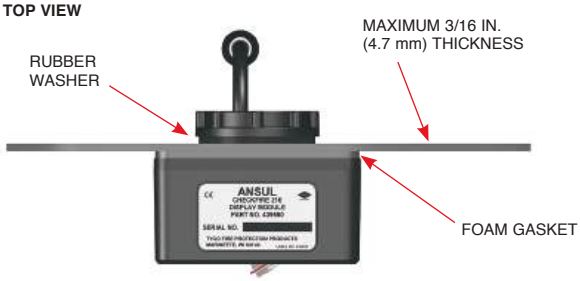


FIGURE 5-36
SURFACE MOUNT 210 DISPLAY MODULE
009304/ 009305/ 009306

Bracket Mounting Instructions

Bracket mounting requires the CHECKFIRE 110/210 Mounting Bracket, see Figure 5-37. The bracket is a two piece, multi-position bracket for securing the Display Module in a variety of configurations. Mount on a flat surface that will properly support the Display Module during all vehicle/equipment operating and environmental conditions (e.g. shock and vibration).

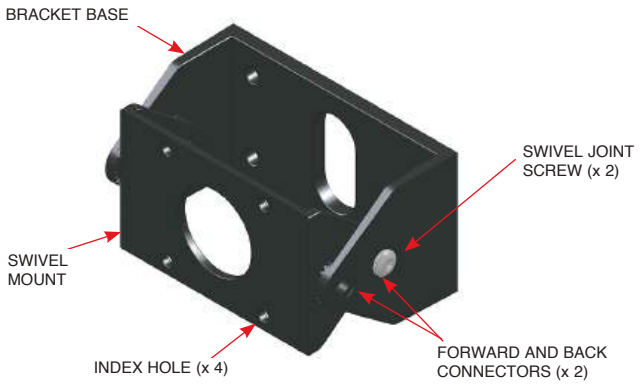


FIGURE 5-37
CHECKFIRE 110/210 MOUNTING BRACKET
009181

1. Refer to layout drawing for planned location and determine a position within the operator's reach with the best viewing angle for Display Module LEDs and easy access to Display Module buttons. Verify the location meets approval of the vehicle/equipment owner and/or vehicle/equipment service manager. See Figure 5-38 for sample mounting options. Note the positions of the swivel mount and connectors.

CHECKFIRE 210 DISPLAY MODULE (Continued)

Bracket Mounting Instructions (Continued)

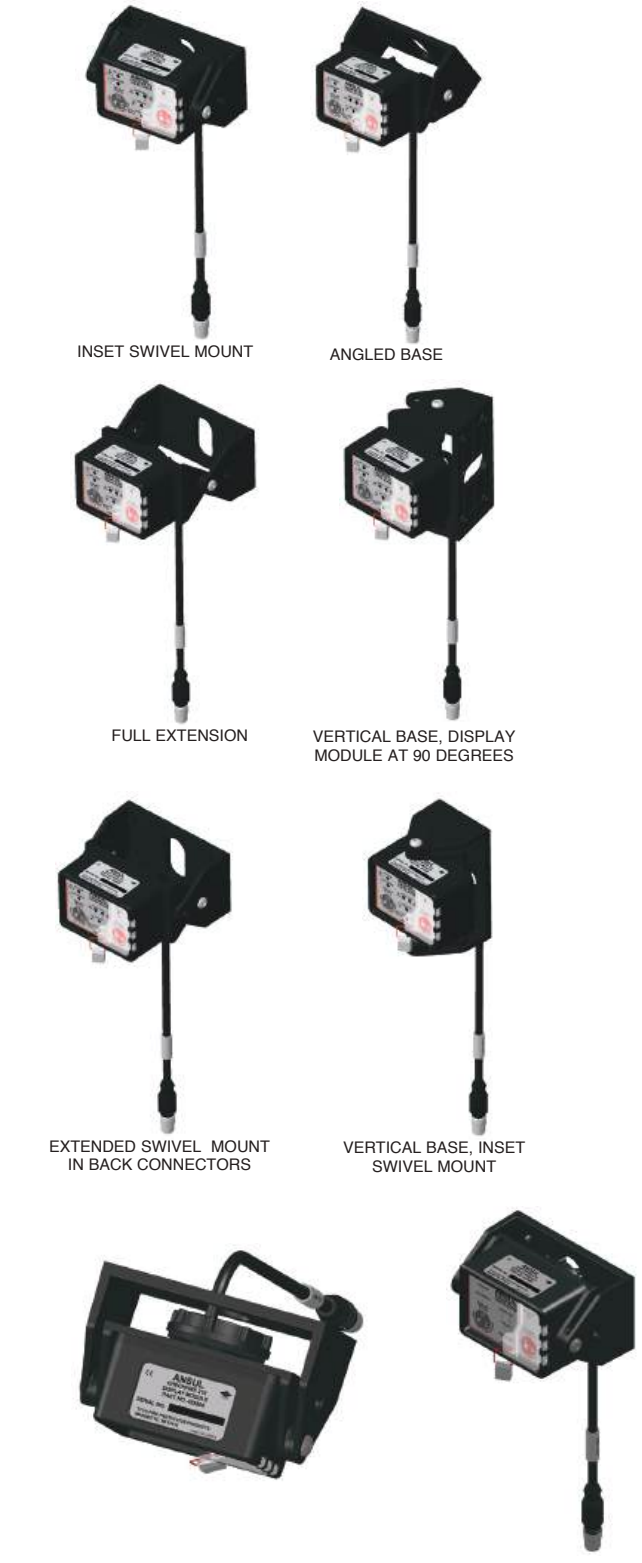


FIGURE 5-38
SAMPLE MOUNTING OPTIONS
009307.1-2/ 009308.1-2/ 009309.1-2/ 009309a-b

2. Confirm access to the display 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 5-39), mark and drill 9/32 in. (7 mm) holes in the flat surface (4 places).
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 5-39. Drill the marked hole. Remove burrs and sharp edges; protect cables as needed.

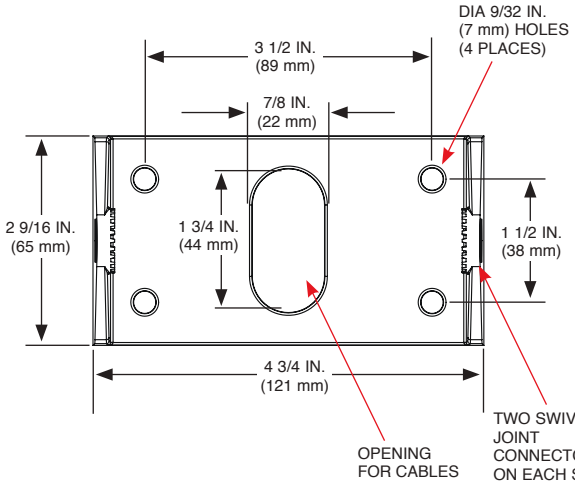


FIGURE 5-39
BRACKET BASE FRONT VIEW
009113

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 display module to swivel mount according to the position determined in Step 1. See Figure 5-40.
   a. Retrieve enclosure nut and rubber washer for threaded boss from separate bag in the CHECKFIRE 210 Display Module.
   b. Carefully feed cables through center hole in Swivel Mount, rubber washer, and enclosure nut.
   c. Insert index pins into index holes and hand-tighten enclosure nut to threaded boss.

CHECKFIRE 210 DISPLAY MODULE (Continued)

Bracket Mounting Instructions (Continued)

Step 6. c. (Continued)

NOTICE

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

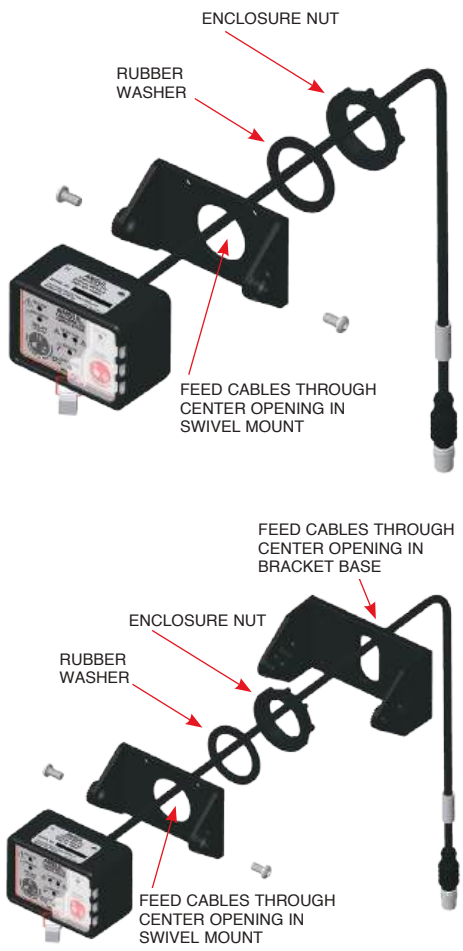


FIGURE 5-40
HAND-TIGHTEN ENCLOSURE NUT
009310a

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 5-41.

FIGURE 5-41
MOUNTING BRACKET WITH CHECKFIRE 210 DISPLAY MODULE
009311

RELEASE CIRCUIT CABLES

The Release Circuit receptacle on the CHECKFIRE 210 ICM is the starting point for the release circuit. See Figure 5-42. The release circuit consists of a main trunk with Release Circuit "h" Cables, Release Circuit 4-Tank Cables and Release Circuit Drop Cables.

FIGURE 5-42
RELEASE CIRCUIT RECEPTACLE
009273a

Install the release circuit using the following rules (see Figures 5-43, 5-44 and 5-45):

1. Use a Release Circuit "h" Cable or Release Circuit 4-Tank Cable for each additional actuator. Additional release circuit cable may be used after the Release Circuit "h" Cable or Release Circuit 4-Tank 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 5-2.
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.

NOTICE

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

Release Circuit Cable

SINGLE TANK – NO RELEASE CIRCUIT "h" CABLE REQUIRED

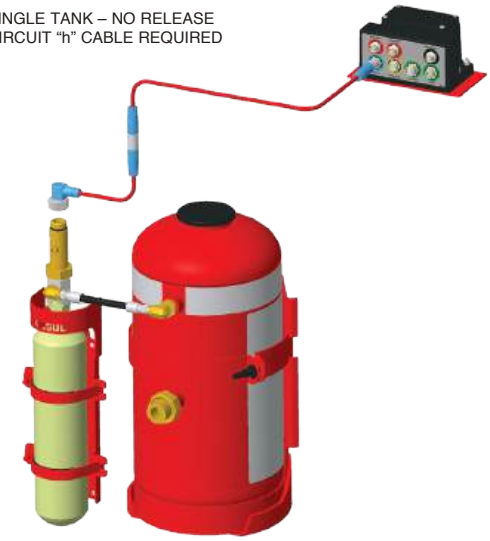


FIGURE 5-43
RELEASE CIRCUIT – SINGLE TANK
009316a

Release Circuit "h" Cable

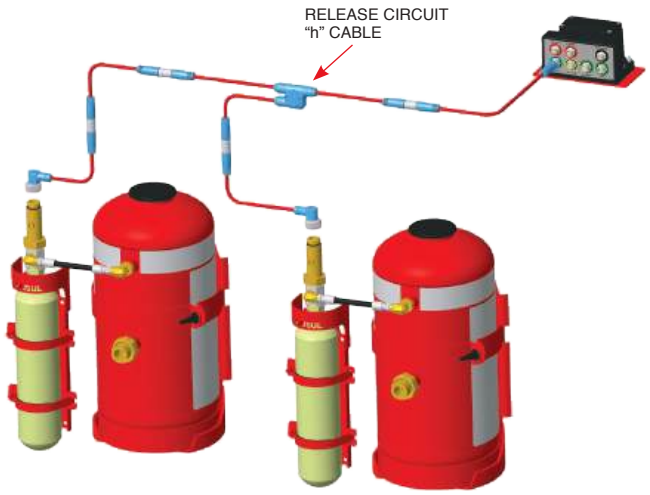


FIGURE 5-44
RELEASE CIRCUIT – TWO TANKS
009315a

RELEASE CIRCUIT CABLES (Continued)

Release Circuit 4-Tank Cable

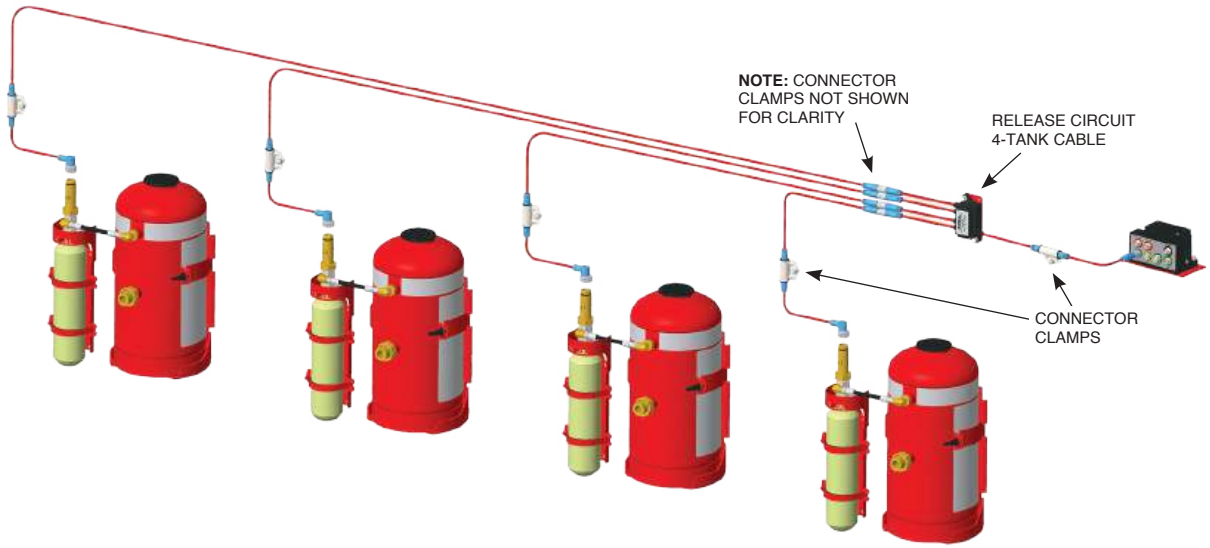


FIGURE 5-45
RELEASE CIRCUIT – FOUR TANKS
010364a

RELAY CIRCUIT CABLES

The Relay #1 & #2 Output receptacle on the CHECKFIRE 210 ICM is the starting point for the relay circuits. Each circuit provides connection points to contacts for two internal SPDT Form C relays. See Figure 5-46. The relays can be used to activate external notification devices or provide inputs to vehicle/equipment onboard monitoring systems. Connections to vehicle/equipment components are made by others.

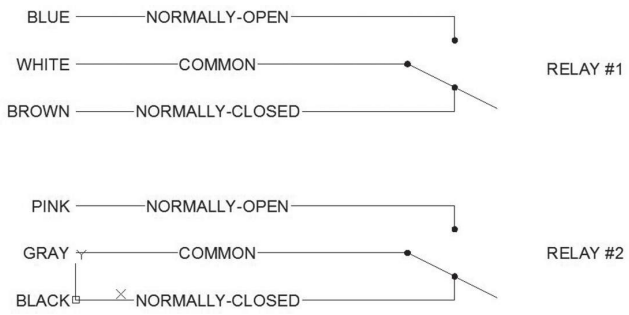


FIGURE 5-46
RELAY CIRCUIT CONDUCTORS
009317

AUXILIARY OUTPUT CABLES

The Auxiliary Output receptacle on the CHECKFIRE 210 ICM is the starting point of the Auxiliary Output Power Circuit.

The auxiliary output circuit is powered by feedthrough of 12/24 VDC @ 1.5 A nominal provided from primary power supply.

The Circuit is disabled when the CHECKFIRE 210 System is operating on the secondary power supply.

Connections to equipment components are made by others.

POWER CIRCUIT CABLES

The Power Circuit Receptacle on the CHECKFIRE 210 ICM is the starting point of the external power circuit. See Figure 5-47.

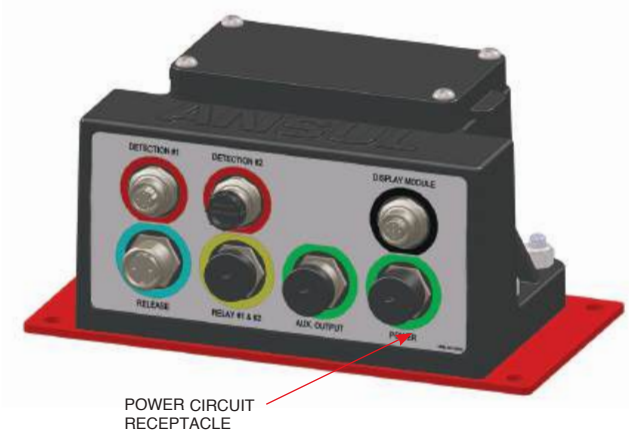


FIGURE 5-47
POWER CIRCUIT RECEPTACLE
009273a

POWER CIRCUIT CABLES (Continued)

The power circuit consists of Power Circuit Cables and a Fused Power Circuit Cable. See Figure 5-48.

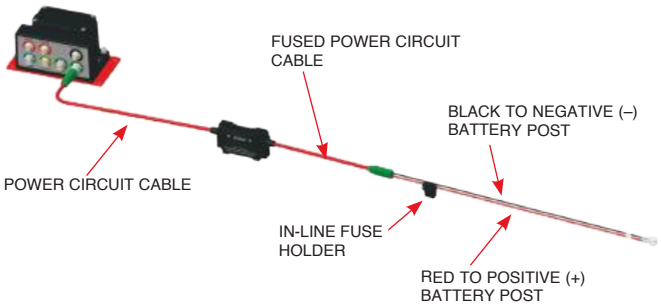


FIGURE 5-48
POWER CIRCUIT
009318a

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 1/2 in. (13 mm) ring terminal on black jacketed conductor, labeled "– VEH BATT" to the negative post on battery or 12/24 VDC nominal power source.
3. Install 1/2 in. (13 mm) ring terminal on 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 5-2.
5. Do not install fuse until entire system is ready for testing (refer to Section 6 – Operational Test and Place in Service). When ready, install fuse following required steps (a – e) to help ensure an IP67 connection. See Figure 5-49.
   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 Display Module.

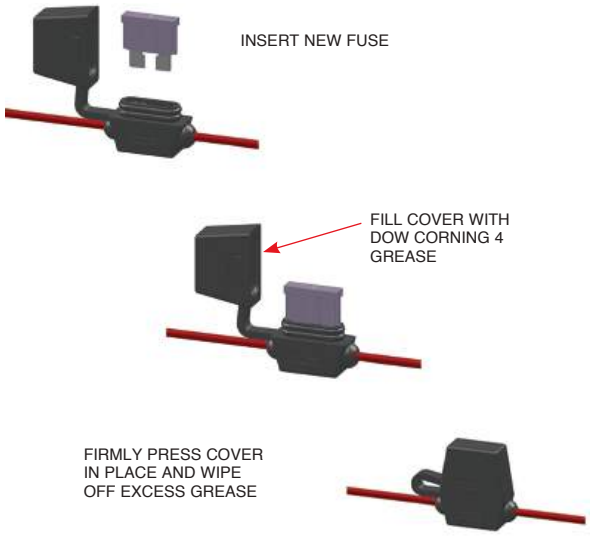


FIGURE 5-49
FUSE INSTALLATION
009228

NOTICE

Anytime fuse cover is opened or fuse is removed, review steps (a-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
PART NO. 440798

Provides reminders for equipment operators and service personnel on system operation and protection.

Attach appropriate labels as needed in the specified locations. See Figures 5-50 to 5-53.

If automatic vehicle 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 5-50.

FIGURE 5-50
LABEL FOR ENGINE SHUTDOWN AND TIME DELAY
009174

If automatic vehicle shutdown is **NOT** part of the CHECKFIRE System, install the Stop Equipment and Exit Label near the operator's line of vision. See Figure 5-51.

FIGURE 5-51
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 5-52.

FIGURE 5-52
LABEL FOR PROTECTING LINEAR DETECTOR
011941

Install the In Case of Fire Label next to every Electric Manual Actuator (EMA). See Figure 5-53.

FIGURE 5-53
INSTRUCTION LABEL FOR EMA
009324

FINAL COMPONENT CONNECTIONS

Electric activation: Refer to 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 (refer to 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).

PROGRAMMING

The CHECKFIRE 210 System may be programmed manually or using a Personal Computer (PC). For manual programming with the ICM and Display Module (internal or external power required) use the Programming Button to turn programming LEDs on or off similar to dip switches (see Table 5-2 and 5-3). Instructions for manually saving the Event History Log are in Table 5-4.

If the Display Module or power is not available, the ICM can be programmed with a PC and the ANSUL® CHECKFIRE 210 Programmer software (see Table 5-5). Programming system options and internal system information including a 4,000+ Event History Log are viewable on one screen.

A list of all circuits and a summary of programming options for each circuit, that can be programmed manually, are provided in Table 5-1.

Note: Some programming features are only available via PC Programming. Refer to Table 5-5 for these additional options.

▸ **TABLE 5-1: MANUAL ICM PROGRAMMING SUMMARY (See Note 1 below)**

▸ LED Identifier	Function Description	LED STATUS	
		LED OFF / Disabled (unless otherwise noted) (Default Function*)	**LED ON / Enabled (Optional Function*)**
PSF-1	Pressure Switch Feedback	No pressure switch feedback function	Pressure Switch Feedback – Pressure switch communicates to ICM through Detection Circuit #2 *(for additional functionality see Optional DET-4).* **Note:** Pressure Switch Feedback and Cross-Zone Detection can NOT operate together.
DET-2	Cross-Zone Detection	Det. Ckt. #1 and Det. Ckt. #2 operate as independent circuits	Cross-Zone Detection – Requires an alarm condition on both detection circuits #1 and #2 before starting Time Delay #1 (TD1).
DET-3	Detection Circuit #1	Independent detection/release	Alarm Only – Prohibits start of TD1 countdown for any alarm condition on Detection Circuit #1. (Not available when cross-zone detection, DET-2, is enabled.)
DET-4	Detection Circuit #2	Independent detection/release	Alarm Only – Prohibits start of TD1 countdown for any alarm condition on Detection Circuit #2. (Not available when cross-zone detection, DET-2, is enabled.)
DET-4 (Optional) (PSF-1 enabled)	*Pressure Switch Feedback - Enabled*	*System provides release notification, and sends release signal to PADs* ***(Optional = OFF)***	*System provides release notification, and does not send release signal to PADs.* ***(Default = ON when Pressure Switch Feedback is enabled.)***
TD1-5 and TD1-6	Time Delay #1	10 second initial time delay period between an alarm condition and Time Delay #2 (TD2). **Sec.** **TD1-5** **TD1-6** 10 OFF OFF **Note:** Cross-Zone requires alarm condition in both detection circuits before start of TD1.	Time Delay #1 (TD1) – Optional delay periods (0, 5 or 15 seconds) between an alarm condition and Time Delay #2 (TD2). **Sec.** **TD1-5** **TD1-6** 0 ON ON 5 ON OFF 15 OFF ON
TD2-7 and TD2-8	Time Delay #2	10 second time delay period between Time Delay #1 (TD1) and system release. **Sec.** **TD2-7** **TD2-8** 10 OFF OFF	Time Delay #2 (TD2) – Optional delay periods (0, 5 or 15 seconds) starting after Time Delay #1 (TD1). **Sec.** **TD2-7** **TD2-8** 0 ON ON 5 ON OFF 15 OFF ON
▸ TDR-9	Time Delay #1 (TD1) Restarts	1 Restarts	Unlimited restarts
RLY-10	Relay #1	Alarm – Relay contacts transfer on an alarm condition. **Note:** The relay returns to normal if the alarm condition clears.	Fault – Relay contacts transfer on any fault condition. **Note:** The relay returns to normal if the fault condition clears.
RLY-11	Relay #2	Shutdown: - Relay contacts transfer when TD1 expires. **Note:** Latching relay only transfers back to normal when system is reset from the Post Release Activated condition.	Alarm – Relay contacts transfer on an alarm condition. **Note:** The relay returns to normal if the alarm condition clears.

▸ **Note 1**: *Detection 1 EMA*, *Detection 2 EMA*, and *EMA While In Isolate* functionality can only be programmed using
▸ the PC programmer.

* When PSF-1 is enabled, DET-4 “ON” is the default and DET-4 “OFF” is optional.

Review the following tables with instructions on programming options for the CHECKFIRE 210 System.

TABLE 5-2: PREPARATION – ICM MANUAL PROGRAMMING MODE

Manual Programming with the ICM Programming Button (PB)

(For programming with a computer see page 5-32.)

When using the Programming Button (PB), the ICM must be connected to the display module to save changes and powered with the internal battery or external power source.

Programming steps are not saved until the display module is reset to Normal.

Access the Programming Button (PB)

The Manual Programming Button is located under the ICM Battery Compartment cover

Loosen the four screws of the battery compartment cover and remove to gain access.

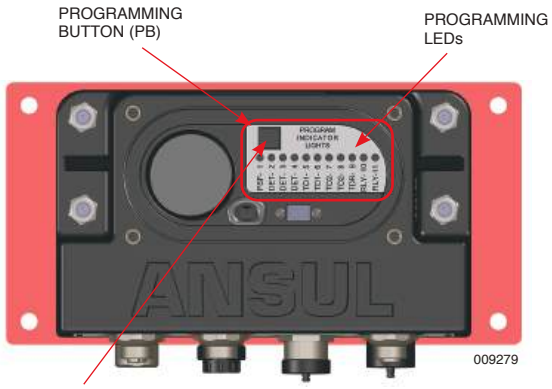
009320a

Programming Mode

First confirm the ICM is connected to a display module and power source.

Place the ICM into programming mode by pressing the PB 3 times in 1 second.

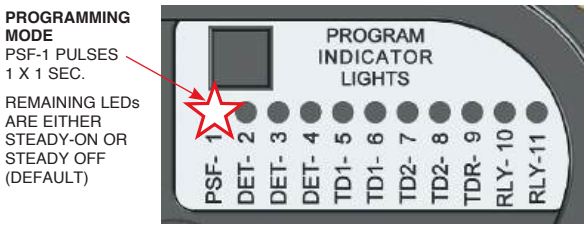
All programming indicator lights will remain lit for 1 second to confirm the ICM is in programming mode.



009279

IDENTIFY LEDs As:

LED STEADY–ON | LED PULSING | LED OFF



009321

TABLE 5-2: PREPARATION – ICM MANUAL PROGRAMMING MODE

Manual Programming with the ICM Programming Button (PB)

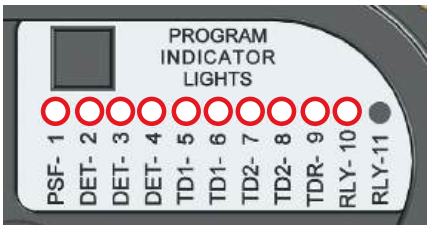
Battery Life Remaining Feature

Next, the LED's display the battery life remaining status with the programming indicator lights 1 to 10 to indicate a percentage range for the remaining battery life.

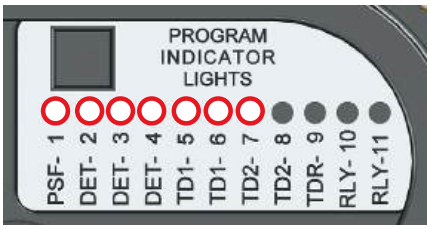
Review the 3 examples defining the percentage values per the number of steady-on LEDs.

Note: The internal battery must be replaced when the battery life is less than 25%.

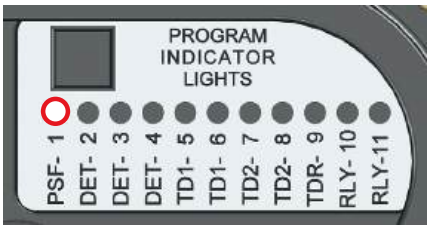
BATTERY LIFE
LEDs 1 TO 10
STEADY-ON =
96% TO 100%



BATTERY LIFE
LEDs 1 TO 7
STEADY-ON =
70% TO 80%



BATTERY LIFE
LED 1 (PSF-1)
STEADY-ON =
10% TO 20%



After the Battery Life Remaining feature is displayed the ICM will show the current ICM programming.

The programmed default status will be shown by all indicator lights being off.

CURRENT PROGRAMMING:
TD2-7

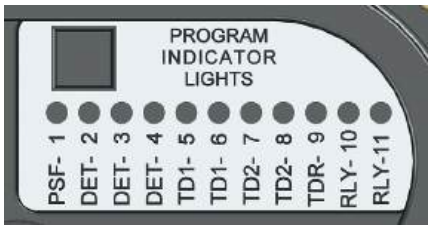


TABLE 5-2: PREPARATION – ICM MANUAL PROGRAMMING MODE (Continued)

Manual Programming With The ICM Programming Button (PB) (Continued)

Change Selections

The PSF-1 LED will then pulse 1 time per second indicating PSF-1 is the currently selected option.

To change the selected indicator light, momentarily press the Programming Button (PB) once. The blinking LED will advance to the next Indicator light.

To select the status of the blinking LED, press and hold the programming button longer than 1 second.

NOTICE

After 30 seconds of inactivity, Programming Mode automatically times out. Any modifications not saved to the System by a reset to normal on the Display Module will be lost.

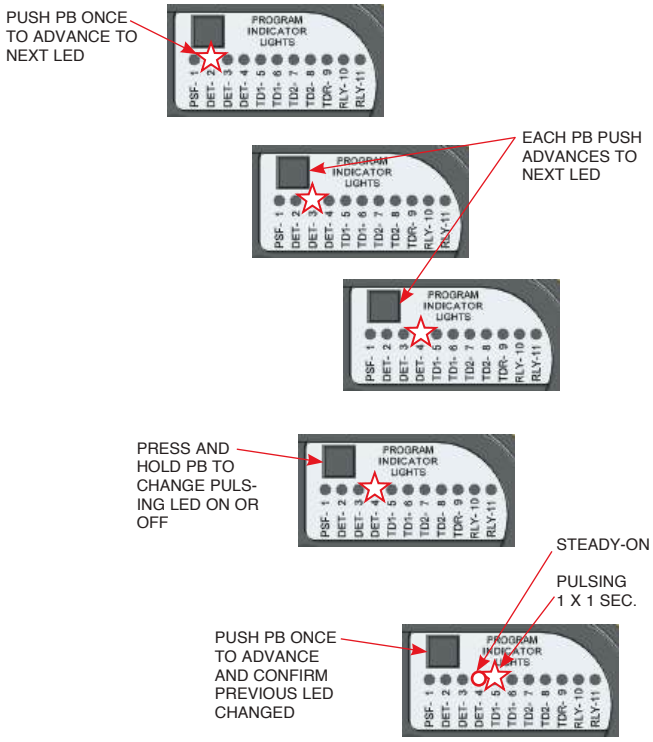
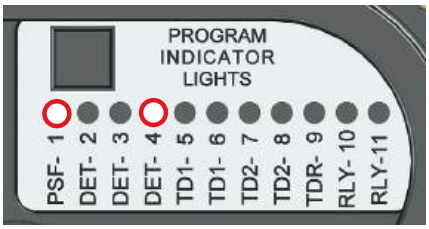


TABLE 5-3: MANUAL PROGRAMMING OPTIONS

Pressure Switch Feedback, PSF-1

PSF-1 changes the function of Detection Circuit #2 between an independent detection/release circuit input and pressure switch feedback input.

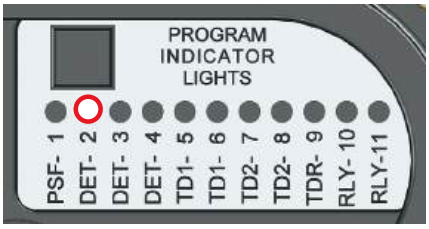
1. To select this function turn on indicator light PSF-1.
2. Indicator LED's should show the following:
   - PSF-1 is steady-on
   - DET-4 is steady-on



Cross-Zone Detection, DET-2

Cross-Zone detection requires an alarm event on both Detection Circuits #1 and #2 before CHECKFIRE 210 System starts Time Delay #1 (TD1) for automatic release.

1. To select this function turn on indicator light DET-2.
2. Indicator LED's should show the following:
   - DET-2 is steady-on



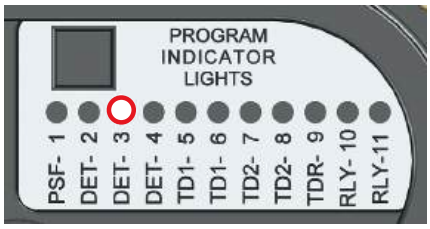
Alarm Only, Detection Circuit #1, DET-3 (DET-2 must be OFF)

DET-3 changes Detection Circuit #1 between independent detection/release operation and Alarm Only functionality.

The Alarm Only detection programming prohibits the CHECKFIRE 210 System from entering into automatic release countdown for any alarm condition detected by Detection Circuit #1. The System will continue to show alarm condition indefinitely, and will NOT activate the fire suppression system.

1. To select this function turn on indicator light DET-3.
2. Indicator LED's should show the following:
   DET-3 is steady-on

Note: If cross zone detection is turned on, this function is not available.



⚠ CAUTION

Programming both Detection Circuit #1 and Detection Circuit #2 for Alarm Only functionality will disable all automatic release functions of the CHECKFIRE 210 System. Manual actuation of the fire suppression system is required and failure to manually activate the system can result in significant property damage or personnel injury.

TABLE 5-3: MANUAL PROGRAMMING OPTIONS (Continued)

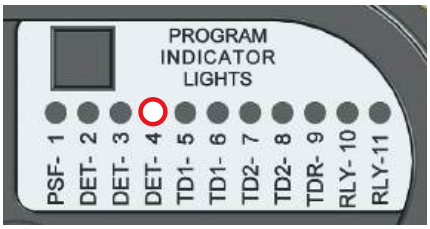
Alarm Only, Detection Circuit #2, DET-4
(PSF-1 and DET-2 must be OFF)

DET-4 changes Detection Circuit #2 between independent detection/release operation and Alarm Only functionality.

The Alarm Only detection programming prohibits the CHECKFIRE 210 System from entering into an automatic release countdown for any alarm condition detected by Detection Circuit #2. The System will continue to show Alarm indication indefinitely, and will NOT activate the suppression system.

1. To select this function turn on indicator light DET-4.
2. Indicator LED's should show the following:
   DET-4 is steady-on

Note: If cross zone detection is turned on, this function is not available.



⚠ CAUTION

Programming both Detection Circuit #1 and Detection Circuit #2 for Alarm Only functionality will disable all automatic release functions of the CHECKFIRE 210 System. Manual actuation of the fire suppression system is required and failure to manually activate the system can result in significant property damage or personnel injury.

TABLE 5-3: MANUAL PROGRAMMING OPTIONS (Continued)

Time Delay #1 (TD1) Programming, TD1-5 and TD1-6

TD1 is the delay period between an alarm condition and TD2.

1. Review system plan to determine value for TD1. Change indicator lights to match the required time delay - see the following table.

Seconds	TD1-5	TD1-6
0	ON	ON
5	ON	OFF
10	OFF	OFF (default)
15	OFF	ON

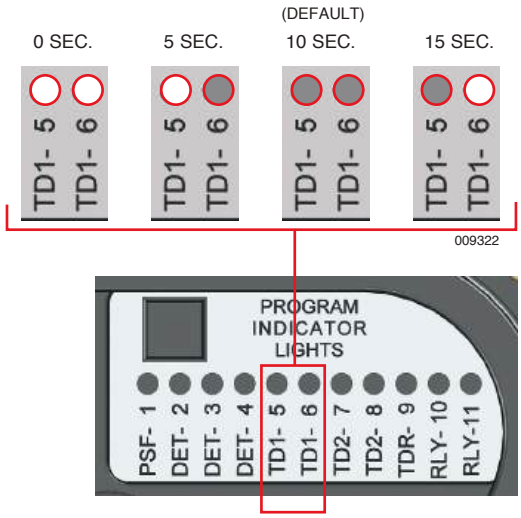
2. Confirm the correct LED's have been selected.
3. Total allotted time delay, when a time delay restart is utilized, must not exceed 30 seconds.

CAUTION

TD1 is the delay period between an alarm condition and equipment shutdown. If using the shutdown relay function, programming TD1 to zero seconds results in immediate equipment shutdown and immediate start of TD2 upon initiation of an alarm condition.

⚠ CAUTION

Programming both Time Delay #1 and Time Delay #2 to zero seconds results in immediate System activation following an alarm condition. This situation could lead to immediate equipment shutdown (if using the shutdown relay function) or other unforeseen issues which could result in significant property damage or personal injury.



FM APPROVED TIME DELAY SETTINGS

	TD2 sec			
TD1 sec	**0**	**5**	**10**	**15**
0	✓	✓	✓	✓
5	✓	✓	✓	✓
10	✓	✓	✓	–
15	✓	–	–	–

TABLE 5-3: MANUAL PROGRAMMING OPTIONS (Continued)

Time Delay #2 (TD2) Programming, TD2-7 and TD2-8

TD2 is the delay period between Time Delay #1 (TD1) and system release.

1. Review system plan to determine value for TD2. Change indicator lights to match the required time delay - see the following table.

Seconds	TD2-7	TD2-8
0	ON	ON
5	ON	OFF
10	OFF	OFF (default)
15	OFF	ON

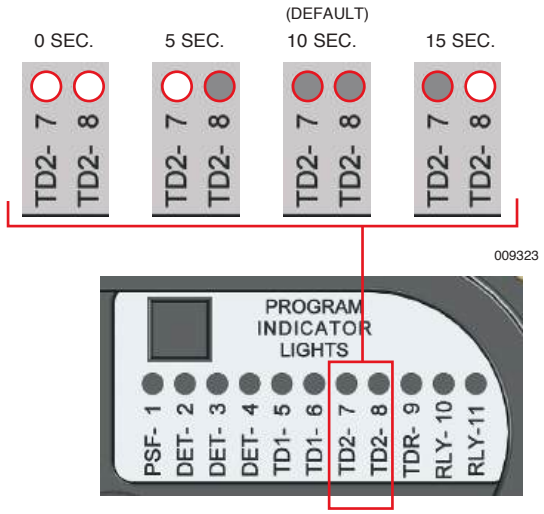
2. Confirm the correct LED's have been selected.
3. Total allotted time delay, when a time delay restart is utilized, must not exceed 30 seconds.

CAUTION

TD2 is the delay period between TD1 and fire suppression release. If using the shutdown relay function, programming TD2 to zero seconds results in immediate fire suppression release at the same time as equipment shutdown.

⚠ CAUTION

Programming both Time Delay #1 and Time Delay #2 to zero seconds results in immediate System activation following an alarm condition. This situation could lead to immediate equipment shutdown (if using the shutdown relay function) or other unforeseen issues which could result in significant property damage or personal injury.



FM APPROVED TIME DELAY SETTINGS

TD1 sec	TD2 sec			
	0	5	10	15
0	✓	✓	✓	✓
5	✓	✓	✓	✓
10	✓	✓	✓	–
15	✓	–	–	–

TABLE 5-3: MANUAL PROGRAMMING OPTIONS (Continued)

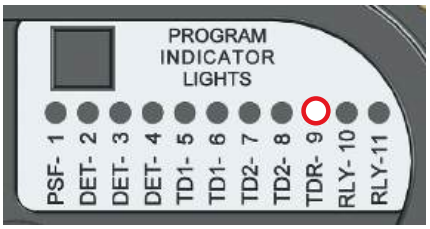
Time Delay Restarts for TD1, TDR-9

TDR-9 changes the number of times Time Delay 1 can be restarted from the display module.

1. To select this option turn on indicator light TDR-9.
2. Indicator LED's should show the following:
   - TDR-9 is steady-on

⚠ WARNING

Delay of system operation may allow the fire to intensify, which could result in a more difficult fire to suppress. Programming of unlimited time delays will void FM Approval.

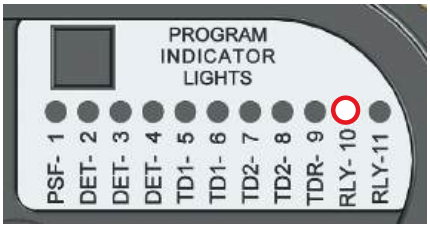


Relay #1, RLY-10

RLY-10 changes the function of the internal relay between an alarm and fault condition. The default relay transfers upon an alarm signal. When changed, a fault condition will cause the relays to transfer.

The relay is a non-latching relay, and will return to normal once the fault or alarm clears.

- RLY-10 is steady-on

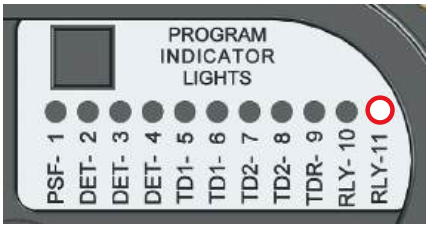


Relay #2, Shutdown/Alarm, RLY-11

RLY-11 changes the function of Internal Relay #2 between a Shutdown Relay and an Alarm Relay. When programmed to the Shutdown functionality the relay contact transfers when TD1 expires. The latching relay will not transfer back to normal until the CHECKFIRE 210 System is reset from the Post Release Activated condition.

When programmed to the Alarm Relay functionality, the initiation of an alarm condition transfers the relay contact. The relay will return to normal once the alarm condition clears.

1. To select this function turn on indicator light RYL-11.
2. Push the programming button to move to the next LED and confirm
   - RLY-11 is steady-on



Save Programming

Once all programming changes have been completed, reset the system at the Display Module to save the changes. Press and hold the "DELAY/Reset/Silence" button for 3 seconds to reset the system.

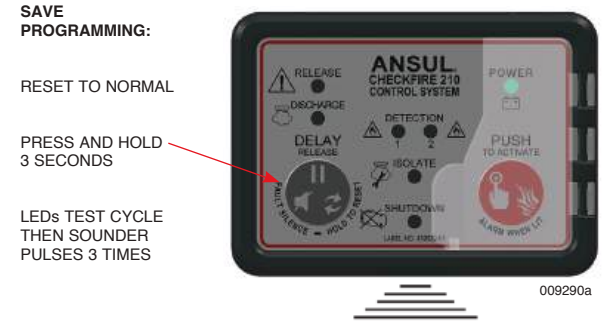


TABLE 5-4: DOWNLOAD EVENT HISTORY LOG

The Event History Log of the CHECKFIRE 210 System can be downloaded as a text file directly to a USB memory device (by others) without connection to a personal computer (PC). The USB memory device may then be plugged into a PC to print or save the file to a different location.

- Allows service personnel to retrieve programming and Event History Log without connecting a PC to ICM.
- Allows service personnel to save a text file which helps verify maintenance and operation of the CHECKFIRE 210 System.

Communication adapter cable (by others) is required to connect a standard USB memory device to the mini USB port on the ICM. Items needed:

1. Interface Cable: USB A Female receptacle and Mini A plug x 4 in. (102 mm) long
2. Standard USB memory device

TABLE 5-4: DOWNLOAD EVENT HISTORY LOG (Continued)

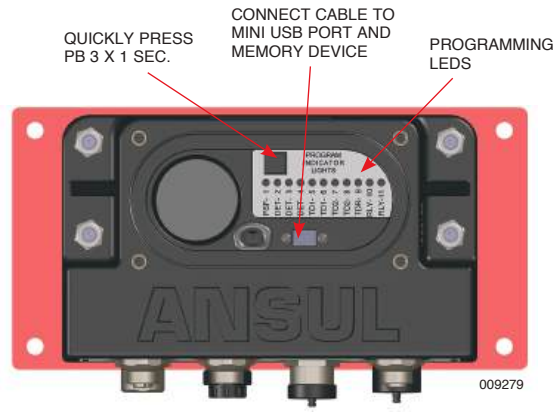
Accessing and Downloading the Event History Log

The Programming Button (PB) and programming LEDs are located under the ICM battery compartment cover. The programming button controls the download process and the programming LEDs indicate the start and end of the download.

Note: The Event History Log download should be performed at or near normal temperature conditions. Corrupted or incomplete history file data can occur if downloads are attempted at extreme high or low temperatures.

1. Loosen the (4) captive screws and remove cover to gain access to programming button and view LEDs.
2. Connect the USB communication cable and memory device to the mini USB port near the programming LEDs.
3. Push programming button 3 x 1 second to begin the file download. (ICM senses connection with a USB memory device and starts the download.)
4. Programming LEDs pulse briefly to indicate system has initiated the download. Then all LEDs pulse in marquee fashion to indicate the ICM is writing the contents of the Event History Log to the USB memory device.
5. When complete, all LEDs illuminate steady-on for 5 seconds. A text file is saved on the USB memory device with the current date. The text file name will be LOGxxxx where the x place holders will be a number (e.g. 0001, 0002) determined by the last number of any previously saved text files on the USB memory device.

   Note: The writing of the Event History Log can take several seconds to complete and **should not be interrupted.** If the writing is not successful after 30 seconds, the ICM will quickly pulse all LEDs together multiple times indicating an unsuccessful file download.
6. Disconnect cable and USB memory device. Re-install battery cover.



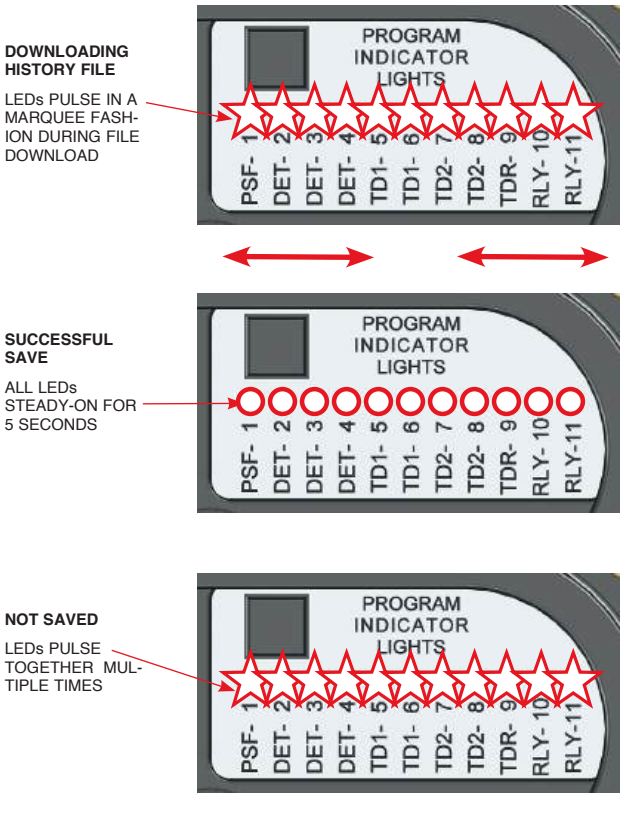


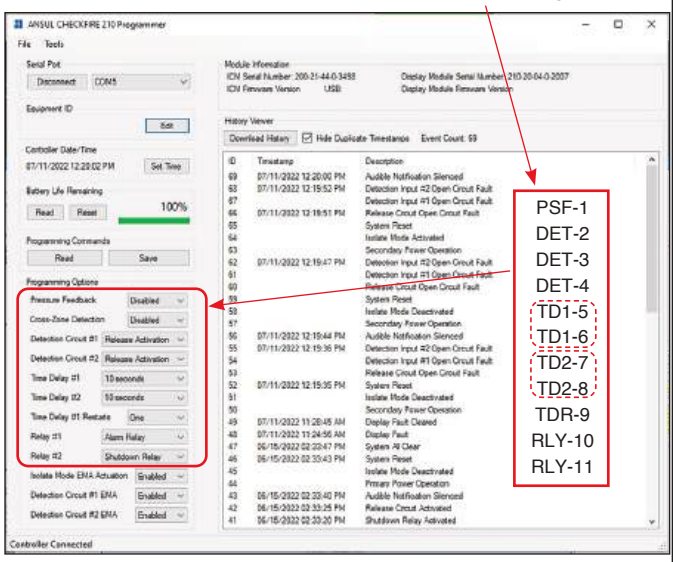
TABLE 5-5: PERSONAL COMPUTER (PC) OPTIONS

Personal Computer (PC) Programming

Authorized ANSUL® Distributors with CHECKFIRE 210 System contracts have access to the ANSUL® CHECKFIRE 210 Programmer software. The same programming options described in the previous table for the ICM have matching programming in the PC software.

Install the latest version of the ANSUL® CHECKFIRE 210 Programmer utility software on a PC to read and write information to the ICM. See Download and Setup instructions at end of page.

Note: It is not necessary to install a battery module or provide external power to the CHECKFIRE 210 ICM when using the PC interface. The PC provides power for system operation through the USB communication cable.



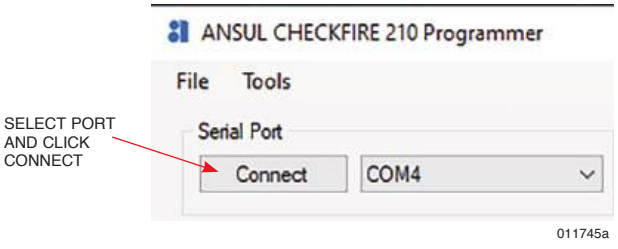
Connecting the ICM to a PC

Establish communication between the ICM and a PC using the mini USB serial port under the ICM battery compartment cover.

Connect an Interface cable:

USB A Male plug and Mini B plug x 10 ft (3 m) long

1) Loosen the four captive screws and remove cover to gain access to the programming button.
2) Connect an appropriate USB Communication Cable (specified in bold above) between the mini B USB port on the CHECKFIRE 210 ICM and a Standard A USB port on your PC.
3) Launch the CHECKFIRE 210 Programmer application software on the PC.
4) If Serial Port does not auto-populate with an available COM port, select the appropriate COM port from the drop down list at the top left of the application window then click Connect.



Note: PC programming should be performed at or near normal temperature conditions. Corrupted or incomplete data can occur if programming is attempted at extreme high or low temperatures.

Download and Setup

Locate the CHECKFIRE 210 Programmer Setup most current file on the ANSUL® Navigator under Literature: then select your company and the following options:

Select **Product Family**: ANSUL® CHECKFIRE 110/210 Vehicle Det/Actuation Sys

Select **Product Lines**: ANSUL® CHECKFIRE 110/210 Vehicle Det/Actuation Sys

Select **Literature Type**: Software Download

Download the file to your computer. When the file download is complete, open the CHECKFIRE 210 Programmer Setup most current file and follow the instructions in the Programmer Setup Wizard. Close all other applications and click yes to allow the Programmer app to make changes to your computer.

TABLE 5-5: PERSONAL COMPUTER (PC) OPTIONS (Continued)

Reading System Information

With proper communications established the software automatically populates system information, including serial numbers, firmware versions, and current programming.

At initial System startup, all programming options are programmed to factory defaults.

Note: If display module is not connected to the ICM, the display module information is shown as "No response."

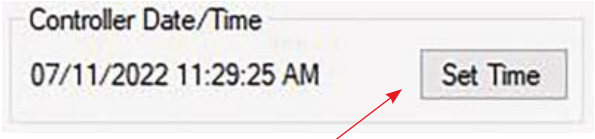
SERIAL NUMBER AND FIRMWARE VERSIONS

011747

Programming The System Clock

The internal real-time clock, default programmed to Greenwich Mean Time (GMT), can be programmed to the date and time on the PC (typically local time). In the Controller Date/Time section click the Set Time button to synchronize the ICM clock with the PC date and time. The system clock can be updated multiple times as required.

Note: Programming the date/time does not affect the history file.



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SYNCHRONIZES ICM CLOCK WITH PC CLOCK

TABLE 5-5: PERSONAL COMPUTER (PC) OPTIONS (Continued)

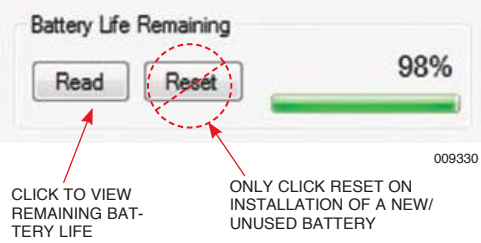
Battery Life Remaining

The ICM monitors the expected lifetime of the internal battery. Click the Read button under Battery Life Remaining section to view remaining battery life percentage.

Internal battery must be replaced when there is a low power indication or battery life remaining is less than 25%.

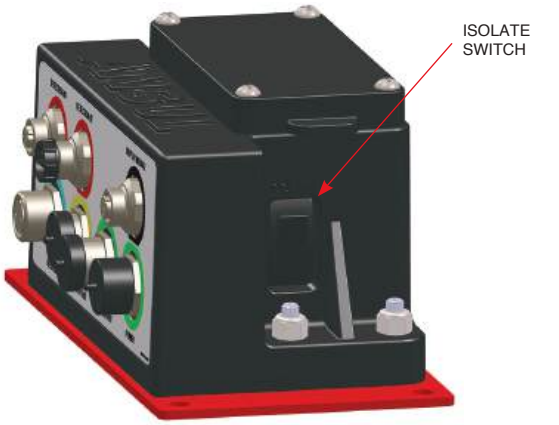
Note: When performing semi-annual maintenance, system tests require system to be tested on both primary and secondary power. If a "test" battery is not used, the secondary battery must be changed semi-annually.

Only click the Reset button for installation of a new/unused battery module. When clicked, the battery life indicator resets to full.



Note: When replacing the battery module (e.g., during semi-annual maintenance) the battery life indicator can be reset from the ICM without connecting to a PC. (Section 8 – Recharge, Inspection, and Maintenance also has the following instructions.)

1) Replace the battery module with a new/unused unit. Record the replacement date on the inside sticker of the battery compartment cover and on the battery itself.
2) Place the CHECKFIRE 210 System into Isolate Mode using the isolate switch on the side of the ICM or press and hold the "DELAY/Reset/Silence" button on the CHECKFIRE 210 Display for approximately 8 seconds (two consecutive resets).
3) Press and hold the Programming Button for more than five (5) seconds then release.
4) All programming LEDs pulse 3 x 1 second to confirm battery life indicator is reset.
5) Cancel Isolate Mode by returning the isolate switch to the normal position or press and hold the "DELAY/ Reset/Silence" button on the CHECKFIRE 210 Display for approximately 8 seconds (two consecutive resets).



CAUTION

Performing a reset of the battery life indicator without installing a new/unused replacement battery module can result in faulty battery indications and unpredictable CHECKFIRE 210 System operation.

Programming Commands

The Read button in the Programming Commands section uploads the current ICM programming for the CHECKFIRE 210 System. When making changes to the programming, click the Save button to save the change to the ICM.

TABLE 5-5: PERSONAL COMPUTER (PC) OPTIONS (Continued)

Modifying Programming Options

Each of the options shown in Table 5-1 – Programming Summary (page 5-20) is programmed using a drop down menu and clicking the desired options. Certain options will be grayed out when others are selected. When options turn red, the programming has not been saved to the ICM.

Default Programming

Circuit Option	Function
1. Pressure Feedback (PSF-1)	Disabled
2. Cross-Zone Detection (DET-2)	Disabled
3. Detection Circuit #1 (DET-3)	Release Act.
4. Detection Circuit #2 (DET-4)	Release Act.
5. Time Delay #1 (TD1-5 and TD1-6)	10 sec. delay
6. Time Delay #2 (TD2-7 and TD2-8)	10 sec. delay
7. Time Delay #1 Restarts (TDR-9)	One restart
8. Relay #1 (RLY-10)	Alarm
9. Relay #2 (RLY-11)	Shutdown
10. Isolate Mode EMA Actuation	Enabled
11. Detection Circuit #1 EMA	Enabled
12. Detection Circuit #2 EMA	Enabled

FACTORY DEFAULT SETTINGS

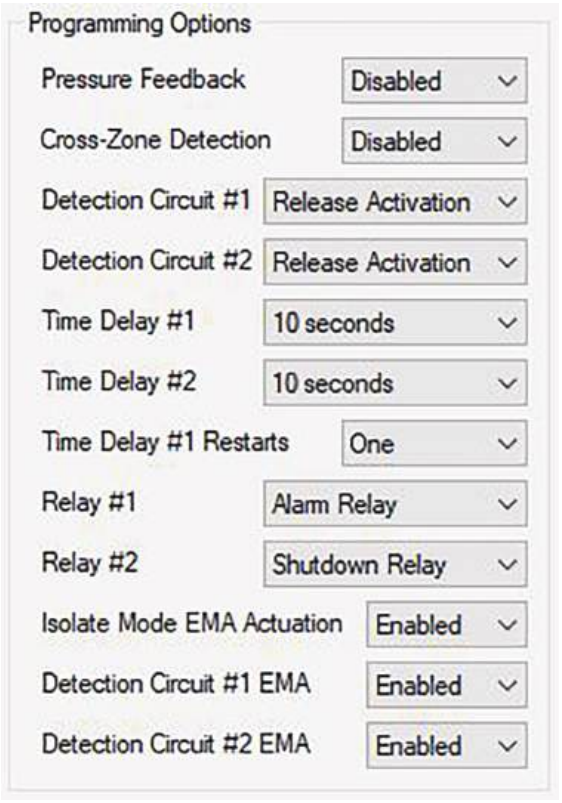


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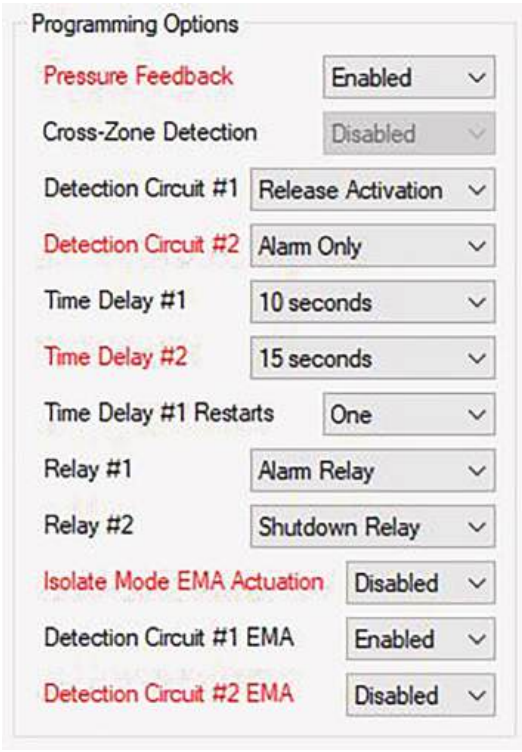
TABLE 5-5: PERSONAL COMPUTER (PC) OPTIONS (Continued)

Alternate Programming:

1. Pressure Switch Feedback – Pressure switch communicates to ICM through Detection Circuit #2.
2. Cross-Zone Detection – Requires an alarm condition on both Detection Circuits #1 and #2 before starting Time Delay #1 (TD1).
3. Det. Ckt. #1 - Alarm Only – Prohibits start of TD1 countdown for any alarm condition on Detection Circuit #1. (Not available when cross-zone detection is enabled.)
4. Det. Ckt. #2 - Alarm Only – Prohibits start of TD1 countdown for any alarm condition on Detection Circuit #2. (Not available when cross-zone detection is enabled.)
   a. *Alarm Only - System provides release notification, and does not send release signal to PADs* ***(Default when Pressure Switch Feedback is enabled)***
   b. *Release Activation - System provides release notification, and sends release signal to PADs* ***(Optional when Pressure Switch Feedback is enabled)***
5. Time Delay #1 (TD1) – Optional delay periods (0, 5 or 15 seconds) between an alarm condition and Time Delay #2 (TD2). See FM Approved Time Delay Settings table in right column.
6. Time Delay #2 (TD2) – Optional delay periods (0, 5 or 15 seconds) starting after time delay #1 (TD1). **Note: See FM Approved Time Delay Settings table in right column for FM Approved TD2 settings.**
7. Time Delay #1 Restarts - Unlimited restarts.
8. Relay #1 - Fault – Relay contacts transfer on any fault condition.
9. Relay #2 - Alarm – Relay contacts transfer on an alarm condition.
10. Isolate Mode EMA Actuation – Disabled. While the system is in ISOLATE mode, activation of an EMA will not cause activation of the release circuit even if the corresponding detection circuit is programmed to allow EMA activation. Activation of an EMA will cause the corresponding AMBER detection LED to pulse 2 x per second every 10 seconds.
11. Detection Circuit #1 EMA – Disabled. Disables EMA activation on Detection Circuit #1. An EMA signal will cause the Detection 1 AMBER LED to pulse 2 x per second every 10 seconds and will not cause release activation.
12. Detection Circuit #2 EMA – Disabled. Disables EMA activation on Detection Circuit #2. An EMA signal will cause the Detection 2 AMBER LED to pulse 2 x per second every 10 seconds and will not cause release activation.

RED HIGHLIGHTING INDICATES PROGRAMMING NOT SAVED TO ICM

GREYED OUT DROP DOWN INDICATES OPTION NOT AVAILABLE



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FM APPROVED TIME DELAY SETTINGS

	TD2 sec			
TD1 sec	**0**	**5**	**10**	**15**
0	✓	✓	✓	✓
5	✓	✓	✓	✓
10	✓	✓	✓	–
15	✓	–	–	–

TABLE 5-5: PERSONAL COMPUTER (PC) OPTIONS (Continued)

History Viewer

The History Viewer section displays upto 4,096 events in the Event History Log and automatically uploads all events when changes are made.

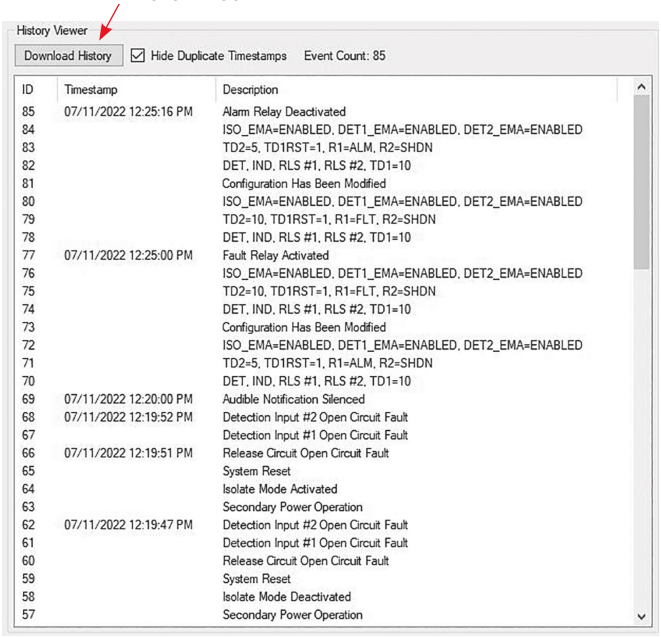
Each event record includes a timestamp with real date and time. When multiple events share the same timestamp duplicate timestamps can be hidden by selecting the Hide Duplicate Timestamps checkbox. Events occurring at the same time are listed underneath a single timestamp.

See Section 8 – Recharge, Inspection and Maintenance for a list of Event History Log messages.

To save the Event History Log as a text file select Save from the drop down list under File on the Menu Bar.

EVENT HISTORY LOG SHOWING CHANGES IN PROGRAMMING

CLICK TO VIEW EVENT HISTORY LOG



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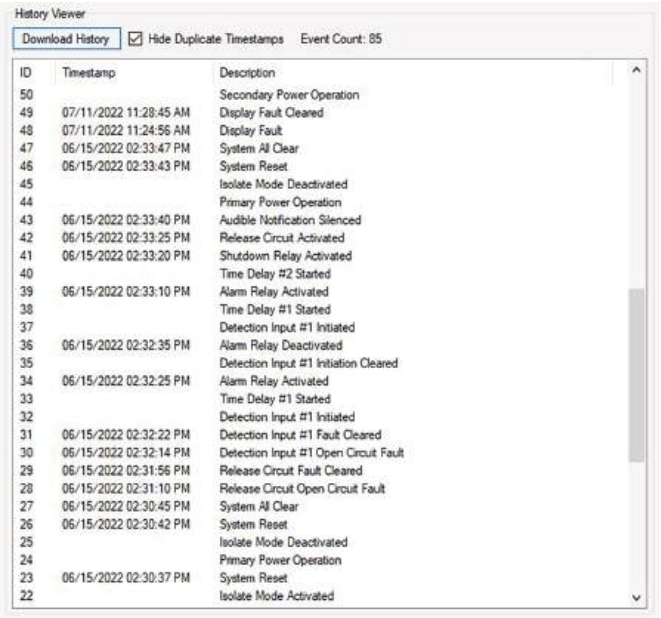
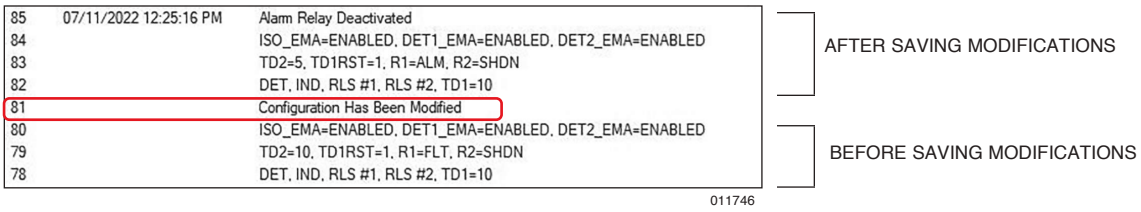
EVENT HISTORY LOG SHOWING ACTIVATION MESSAGES



011741

EVENT HISTORY LOG - PROGRAMMING

The CHECKFIRE 210 System records changes made to System Programming in the Event History Log. Each programming change is indicated with the message "Configuration Has Been Modified." The message includes the programming before and after modification. Two lines of lower ID sequential numbers before the message list the previous configuration; two lines of higher ID sequential numbers after the message report the modified configuration. Refer to Table 5-6 – Event History Log Programming Descriptions to identify the acronyms representing programming options.



For Example: In the sample Event History Log shown above, the System was modified on July 11, 2022 at 12:25 PM. Two changes were made: Detection Circuit #1 was re-programmed to Alarm Only, and Time Delay #1 was re-programmed from a 10 second delay (default) to a 15 second delay. Remaining programming options were unchanged.

TABLE 5-6: EVENT HISTORY LOG PROGRAMMING DESCRIPTIONS

Position	Default	Optional Programming	Description
1	DET		DET Detection Circuit #2 programmed as a detection circuit
		PSF	PSF Programmed for Pressure Switch Feedback.
2	IND		IND Detection Circuits #1 & #2 programmed as detection circuits
		CRZ	CRZ Programmed for Cross-Zone Detection
3	RLS #1		RLS #1 Detection Circuit #1 programmed for independent detection/release
		ALM #1	ALM #1 Detection Circuit #1 programmed for Alarm Only indication
4	RLS #2		RLS #2 Detection Circuit #2 programmed for independent detection/release
		ALM #2	ALM #2 Detection Circuit #2 programmed for Alarm Only indication
5 *	TD1=10		TD1=10 Time Delay #1 programmed for 10 seconds (default)
		TD1 = (0, 5, 15)	TD1= xx TD1 programmed for 0, 5, or 15 seconds.
6 *	TD2=10	TD2 = (0, 5, 15)	TD2=10 Time Delay #2 programmed for 10 seconds (default)
			TD2= xx TD2 programmed for 0, 5, or 15 seconds.
7	TD1RST=2		TD1RST=2 Time Delay #1 programmed for one restarts
		TD1RST =INF	TD1RST=INF Time Delay #1 programmed for infinite restarts **
8	R1=ALM		R1=ALM Relay #1 programmed for Alarm relay
		R1 = FLT	R1=FLT Relay #1 programmed for Fault relay ()
9	R2=SHDN		R2=SHDN Relay #2 programmed for Shutdown relay
		R2 = ALM	R2=ALM Relay #2 programmed for Alarm relay
10	ISO_EMA = ENABLED		ISO_EMA = ENABLED Enables EMA activation while in ISOLATE mode
		ISO_EMA = DISABLED	ISO_EMA = DISABLED Disables all EMA activation while in ISOLATE mode
11	DET1_EMA = ENABLED		DET1_EMA = ENABLED Enables EMA activation on Detection circuit #1
		DET1_EMA = DISABLED	DET1_EMA = DISABLED Disables EMA activation on Detection circuit #1
12	DET2_EMA = ENABLED		DET2_EMA = ENABLED Enables EMA activation on Detection circuit #2
		DET2_EMA = DISABLED	DET2_EMA = DISABLED Disables EMA activation on Detection circuit #2

* See table on page 5-42 for a list of FM Approved Time Delay settings.
** This programming feature voids FM Approval.

EVENT HISTORY LOG - PROGRAMMING (Continued)

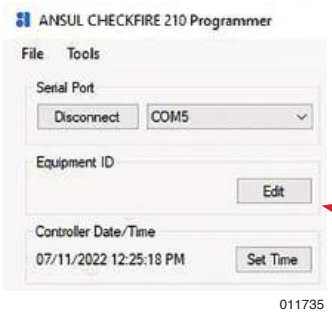
TABLE 5-7: EVENT HISTORY MESSAGES

1.	“System Reset”
2.	“System All Clear”
3.	“Audible Notification Silenced”
4.	“Audible Notification Silence Expired”
5.	“Primary Power Operation”
6.	“Primary Power Fault”
7.	“Primary Power Low, Dual Power Operation”
8.	“Secondary Power Operation”
9.	“Primary Power Operation, Secondary Power Fault”
10.	“Battery Accumulator Reset”
11.	“System Powered Down”
12.	“Release Circuit Ground Fault”
13.	“Release Circuit Open Circuit Fault”
14.	“Release Circuit Fault”
15.	“Release Circuit Fault Cleared”
16.	“Detection Input #1 Ground Fault”
17.	“Detection Input #1 Open Circuit Fault”
18.	“Detection Input #1 Connection Fault”
19.	“Detection Input #1 Fault Cleared”
20.	“Detection Input #2 Ground Fault”
21.	“Detection Input #2 Open Circuit Fault”
22.	“Detection Input #2 Connection Fault”
23.	“Detection Input #2 Fault Cleared”
24.	“Time Delay #1 Started”
25.	“Time Delay #1 Restarted”
26.	“Time Delay #2 Started”
27.	“Release Circuit Activated”
28.	“Detection Input #1 Electric Manual Activation”
29.	“Detection Circuit #1 Electric Manual Activation Disabled”
30.	“Detection Input #2 Electric Manual Activation”
31.	“Detection Circuit #2 Electric Manual Activation Disabled”
32.	“Detection Input #1 Initiated”
33.	“Detection Input #1 Initiation Cleared”
34.	“Detection Input #2 Initiated”
35.	“Detection Input #2 Initiation Cleared”
36.	“PUSH TO ACTIVATE Button Pressed”
37.	“Discharge Confirmed by Pressure Switch”
38.	“Alarm Relay Activated”
39.	“Fault Relay Activated”
40.	“Shutdown Relay Activated”
41.	“Alarm Relay Deactivated”
42.	“Fault Relay Deactivated”
43.	“Shutdown Relay Deactivated”
44.	“Isolate Mode Activated”
45.	“Isolate Mode Deactivated”
46.	“Configuration Has Been Modified”
47.	“History Erased”
49.	“Display Fault”
50.	“Display Fault Cleared”
51.	“Firmware Upgrade”

EQUIPMENT ID FEATURE

Adding “Equipment ID” to the CHECKFIRE 210 Programmer:

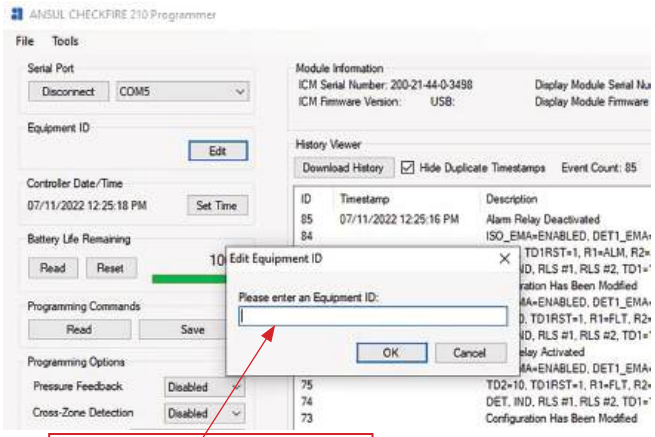
STEP 1



011735

ACCESS THE “EQUIPMENT ID” FIELD BY CLICKING THE EDIT BUTTON.

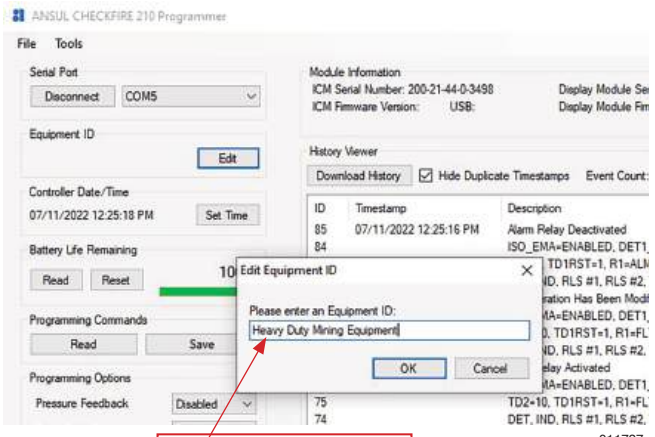
STEP 2



011736

THE “EQUIPMENT ID” FIELD ALLOWS ENTRY OF 30 CHARACTERS.

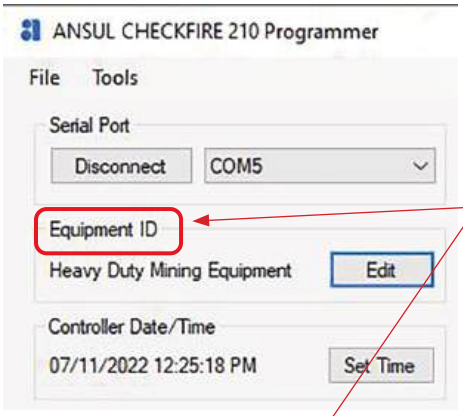
STEP 3



011737

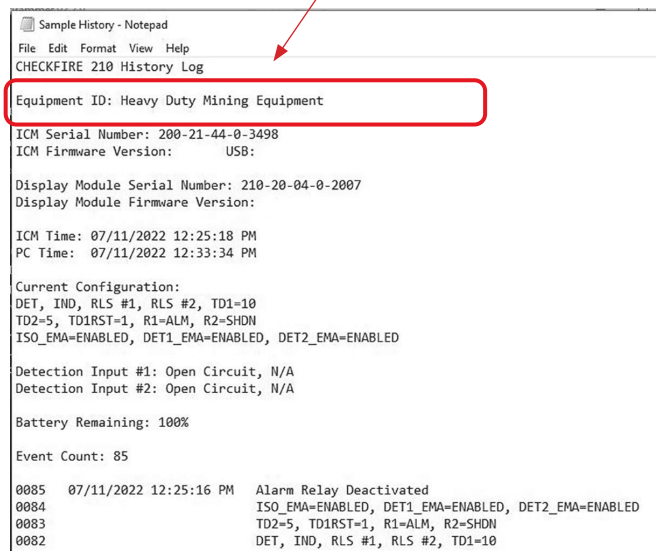
ENTER ID AND CLICK OK TO SAVE INFORMATION.

STEP 4



011738

THE “EQUIPMENT ID” INFORMATION DISPLAYS WHENEVER THE CHECKFIRE 210 PROGRAMMER IS CONNECTED TO THE ICM. THE ID ALSO DISPLAYS IN THE HISTORY LOG DOWNLOAD FILE.



011734

The history log when saved as a .txt file will have a default title using the following format:

<ICM Serial No> <YYYY-MM-DD> <HHMMSS> <Equipment ID>.txt

The above sample file is saved as:

“200-21-44-0-3498 2022-07-11 132956 Heavy Duty Mining Equipment History Log.txt”

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 6-3), confirm all installed Release Circuit Drop Cables have a Release Circuit Tester (RCT) and/or a Release Circuit Test Plug installed.

1. Insert Release Circuit Test Plug in socket of Release Circuit Drop Cables. (If installed remove PAD.)
2. On last Release Circuit Drop Cable 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.

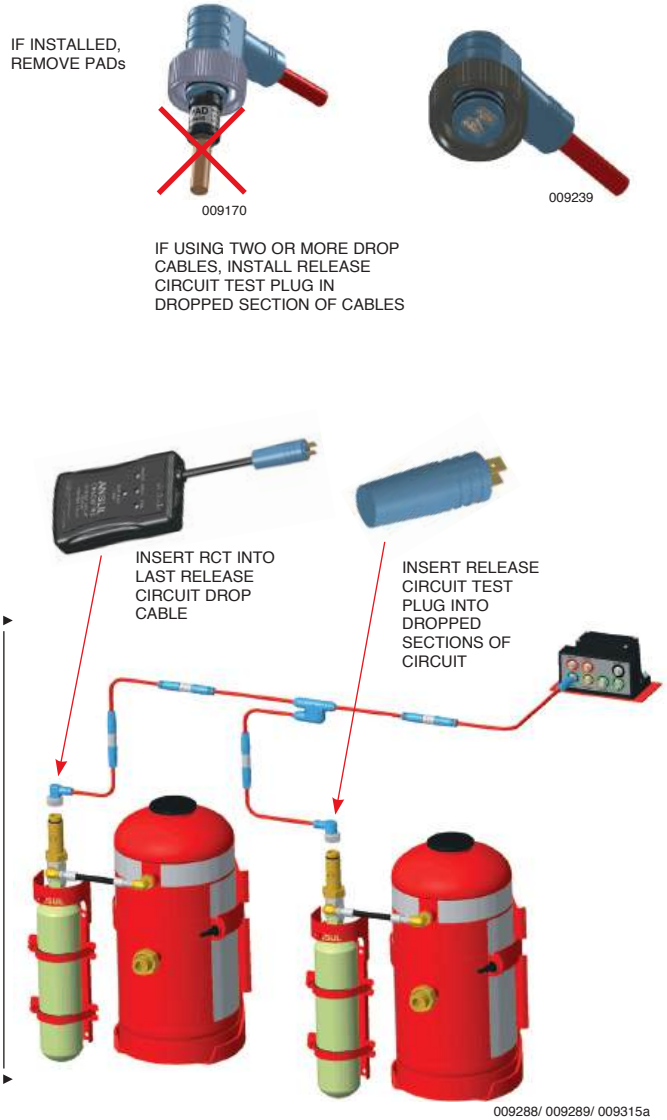
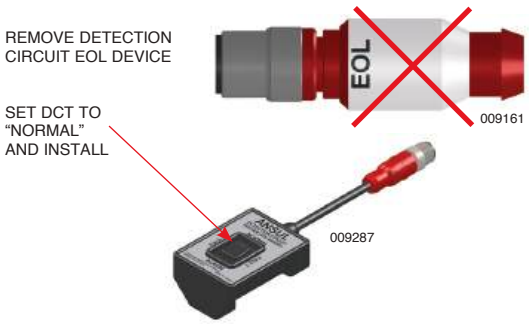


TABLE 6-1: PREPARATION – OPERATIONAL TEST (Continued)

Detection Circuit #1 (and #2)

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

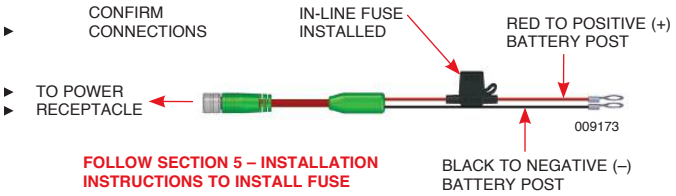
1. Remove the Detection Circuit EOL Device from detection circuit.
2. Set DCT to “Normal” condition then install DCT.



Power Up

Before conducting the OPERATIONAL TEST, make certain primary power is properly connected to CHECKFIRE 210 System (see Section 5 – Installation and Programming, page 5-17).

- If 3 amp fuse is not installed for primary power, follow instructions in Section 5 – Installation and Programming, page 5-17 (step 5).



1. Remove battery compartment cover.
2. Insert battery into battery well; align connector keyways and connect battery pigtail with battery cable on the ICM.

NOTICE

It is recommended to use a test battery for test and place in service.

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

Power Up (Continued)

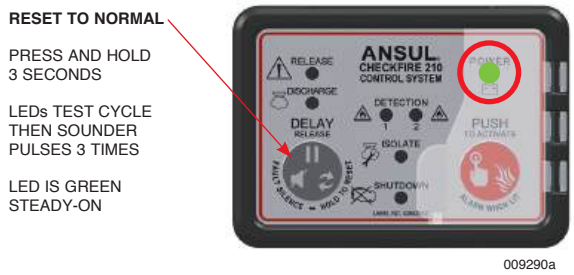
- Reset to Normal: Press and hold the "DELAY/Reset/ Silence" button for 3 seconds; Green and Red LEDs are steady-on for 1 second; then Amber LEDs are steady-on for 1 second; at end sounder quickly pulses 3 times.
- Power LED is Green steady-on

KEY TO DISPLAY MODULE INDICATIONS – IDENTIFY LEDs AS:

LED STEADY-ON (Red or Green) | LED PULSING (Amber, Red or Green) | LED OFF

NOTICE

Confirm no other LEDs are pulsing. If fault or alarm conditions are indicated, refer to Section 9 – Troubleshooting to clear all conditions prior to performing the operational test.



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Power Up (Secondary power only)

Before conducting the OPERATIONAL TEST, make certain secondary power is properly connected to CHECKFIRE 210 System.

- Install battery:
  1. Remove battery compartment cover.
  2. Insert battery into battery well; align connector keyways and connect battery pigtail with battery cable on the ICM.
- Reset to Normal: Press and hold the "DELAY/Reset/ Silence" button for 3 seconds; Green and Red LEDs are steady-on for 1 second; then Amber LEDs are steady-on for 1 second; at end sounder quickly pulses 3 times.
- Power LED pulses Green 1 x 3 seconds for secondary power

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Note: For system running on secondary power only, refer to Table 6-4: Secondary Power Circuit Only – Operational Test, for specific testing procedures.

NOTICE

Confirm no other LEDs are pulsing. If fault or alarm conditions are indicated, refer to Section 9 – Troubleshooting to clear all conditions prior to performing the operational test.

009290a

TABLE 6-2: ISOLATION FEATURE – OPERATIONAL TEST

The CHECKFIRE 210 System includes an Isolation Feature for 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 210 System maintenance).

⚠ 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

CAUTION

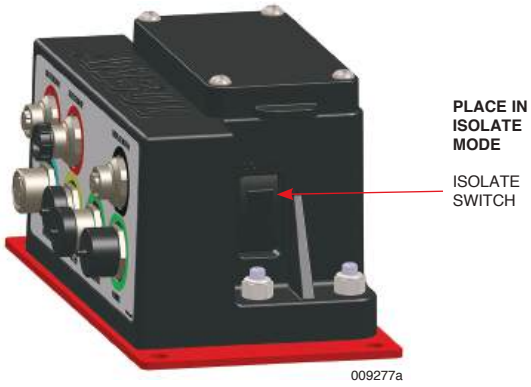
Before performing any operational tests, protect the fire suppression system from unintentional actuation. Verify Release Circuit Drop Cables are not connected to Electric-Pneumatic Actuators and any pneumatic manual actuators are ring-pinned for safety and/or actuation cartridges removed.

CAUTION

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

Place the CHECKFIRE 210 System in isolate mode then confirm: system will not auto release and will manually actuate while in isolate mode.

Note: While in isolate mode, service personnel can perform service and maintenance on the vehicle/equipment as needed.



1. Put system in isolate mode using the isolate switch on the side of the ICM or pressing and holding the "DELAY/ Reset/Silence" button on the CHECKFIRE 210 Display Module for approximately 8 seconds (two consecutive resets).

2. The Amber isolate LED and sounder on the Display Module will quickly pulse 2 x 10 seconds.
3. If desired, push the "DELAY/Reset/Silence" button to silence the sounder.

TABLE 6-2: ISOLATION FEATURE - OPERATIONAL TEST (Continued)

4. Set DCT switch to "Alarm" position. Confirm Red Detection 1 LED, Red "Push to Activate / Alarm When Lit" LED and sounder pulse 1 x 1 second; Amber Isolate LED and sounder pulse 2 x 10 seconds.

   Verify time delays do not start.

ALARM CONDITION
DCT = ALARM

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

VERIFY TIME DELAYS
DO NOT START

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.

   Note: There is no time delay upon manual activation.

6. **Release Activated** – The Red "PUSH to Activate / Alarm When Lit" LED, Red Shutdown LED, Red Detection 1 LED, and sounder are steady-on for 10 seconds; Amber Isolate LED pulses 2 x 10 seconds.

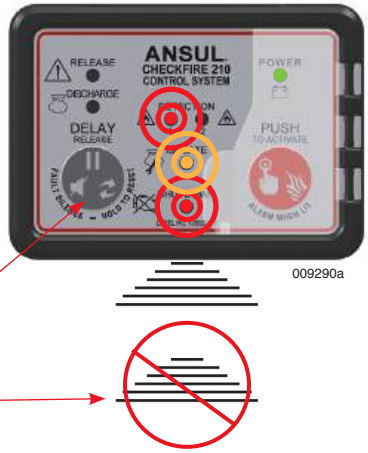
RELEASE ACTIVATED

RED LEDs AND SOUNDER STEADY-ON FOR 10 SECONDS, AMBER LED PULSES
2 X 10 SECONDS

7. **Post Release Activated** – The Red Shutdown LED, Red Detection 1 LED, and sounder pulse 1 x 10 seconds; and Amber Isolate LED and sounder pulse 2 x 10 seconds.

POST RELEASE ACTIVATED

RED LEDs AND SOUNDER PULSE
1 X 1 SECOND,
AMBER LED PULSES
2 X 10 SECONDS



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

TABLE 6-2: ISOLATION FEATURE - OPERATIONAL TEST (Continued)

9. Confirm successful release signal (Pass) on RCT.
10. Reset DCT to “Normal” position.
11. Reset RCT.
12. Cancel isolate mode by returning the isolate switch to the normal position or pressing and holding the “DELAY/Reset/Silence” button on the CHECKFIRE 210 Display Module for approximately 8 seconds (two consecutive resets).

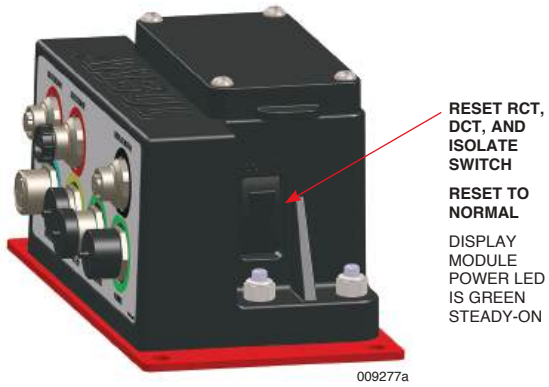


TABLE 6-3: OPERATIONAL TEST

The following tests verify system operation for:

1. Circuit Supervision: Confirm supervisory function of each circuit.
2. Detection Circuit Input: Receive electrical signal from a detection device on #1 and #2 detection circuits (simulated fire condition).
3. Time Delay: Verify accuracy of time delay programming.
4. Spot Thermal Detectors: Verify contact closure.
5. 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 vehicle/equipment is connected to a shutdown device through the pressure switch, verification needs to be made at the pressure switch.

NOTICE

During testing, verify any devices connected to Relay #1 and Relay #2 function as intended.

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.

CAUTION

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

TABLE 6-3: OPERATIONAL TEST (Continued)

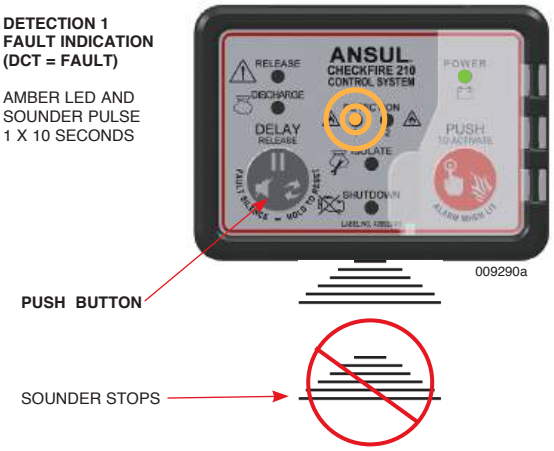
Detection Circuit #1 (and #2) - Supervision Test

Confirm DCT is in place of the EOL Device on Detection Circuit #1. Set DCT switch to "Fault" position. The CHECKFIRE 210 Display Module indicates the following:

1. Amber Detection 1 LED and sounder pulse 1 x 10 seconds.
2. If fault relay is programmed, confirm activation of connected devices.
3. Push the "DELAY/Reset/Silence" button to test sounder silence. Sounder silences and LED continues.

DETECTION 1 FAULT INDICATION (DCT = FAULT)

AMBER LED AND SOUNDER PULSE 1 X 10 SECONDS



4. Reset the DCT to the "Normal" position.
5. CHECKFIRE 210 Display 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

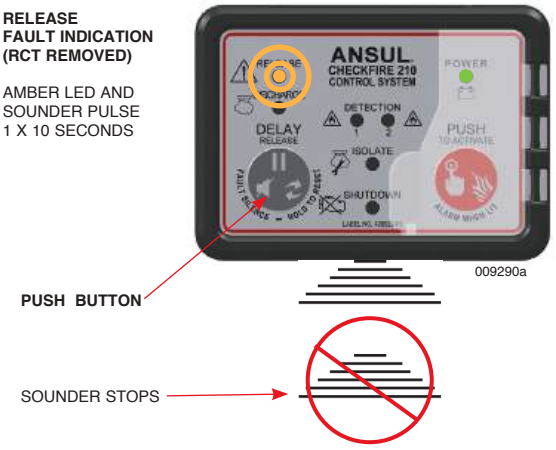
Release Circuit - Supervision Test

Remove RCT from the Release Circuit. The CHECKFIRE 210 Display Module indicates the following.

1. Amber Release LED and sounder pulse 1 x 10 seconds.
2. Push the "DELAY/Reset/Silence" button to test sounder silence. Sounder silences and LED continues.

RELEASE FAULT INDICATION (RCT REMOVED)

AMBER LED AND SOUNDER PULSE 1 X 10 SECONDS



3. Reconnect RCT to release circuit.
4. CHECKFIRE 210 Display Module returns to normal status; Power LED is GREEN steady-on.

RECONNECT RCT

MODULE RETURNS TO NORMAL STATUS

POWER LED IS GREEN STEADY-ON

TABLE 6-3: OPERATIONAL TEST (Continued)

Primary Power Circuit – Supervision Test

Disconnect the primary power circuit connection at the CHECKFIRE 210 ICM Power Circuit receptacle.

1. Power LED pulses AMBER 1 x 3 seconds.
2. Reset to Normal: Press and hold “DELAY/Reset/ Silence” button for 3 seconds; Green and Red LEDs are steady-on for 1 second; then Amber LEDs are steady-on for 1 second; at end sounder quickly pulses 3 times.

   After reset, Power LED pulses GREEN 1 x 3 seconds confirming primary power loss and operation on secondary power.

   Note: Operation on secondary power only will void FM Approval.

POWER SUPERVISION (REMOVE POWER CABLE)

AMBER LED PULSES 1 X 3 SECONDS

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POWER SUPERVISION AFTER RESET WITHOUT PRIMARY POWER

GREEN LED PULSES 1 X 3 SECONDS

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3. Reconnect primary power circuit at the ICM. The CHECKFIRE 210 Display Module Power LED is GREEN steady-on.

RECONNECT PRIMARY POWER

SYSTEM RETURNS TO NORMAL STATUS

POWER LED IS GREEN STEADY-ON

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TABLE 6-3: OPERATIONAL TEST (Continued)

Detection Circuit #1 (and #2): Alarm Condition Test

CAUTION

Before beginning this test, verify:

- Release Circuit Test Plugs and RCT are connected in the Release Circuit.
- DCT replaces the EOL Device in Detection Circuit #1.
- Determine the delay periods of TD1 and TD2 from the programming options.

1. Simulate alarm condition by turning switch on DCT to "Alarm" position.
2. If alarm relay is programmed, confirm activation of connected devices.
3. Verify accuracy of time delay:
   a. The Red "PUSH to Activate / Alarm When Lit" LED, the Red Detection 1 LED, and sounder pulse two times per second until last 5 seconds of the TD1 period.

      In the last 5 seconds of TD1, the Red LEDs listed above, Red Shutdown LED, and sounder pulse 4 x 1 second for 4 seconds, then only the Red Shutdown LED is steady-on for the last second.

   b. During TD2 period the pulse rate continues at 4 x 1 second.
4. Release Circuit Activation: Upon expiration of both TD1 and TD2 time delays, the Release Circuit activates.

CAUTION
VERIFY RCT AND DCT INSTALLED!

START OF DETECTION CIRCUIT ALARM CONDITION (DCT = ALARM)

RED LEDs AND SOUNDER PULSE 2 X 1 SECOND UNTIL LAST 5 SECONDS OF TD1 PULSE 4 X 1 SECOND.

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5 SECONDS BEFORE TD1 END, RED LEDs AND SOUNDER PULSE 4 X 1 SECOND FOR 4 SECONDS THEN STEADY-ON FOR LAST SECOND.

DURING TD2 RED LEDS AND SOUNDER PULSE 4 X 1 SECOND.

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ONLY SHUTDOWN LED IS STEADY-ON FOR LAST SECOND OF TD1.

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DURING TD2 RED LEDs AND SOUNDER PULSE 4 X 1 SECOND.

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TABLE 6-3: OPERATIONAL TEST (Continued)

Detection Circuit #1 (and #2): Alarm Condition Test (Continued)

5. **Release Activated:** The Red "PUSH to Activate / Alarm When Lit" LED, Red Detection 1 LED, Red Shutdown LED, and sounder remain steady-on for 10 seconds.

RELEASE ACTIVATED

RED LEDs AND SOUNDER REMAIN STEADY-ON FOR 10 SECONDS

6. **Post Release Activated:** The Red Detection 1 LED, Red Shutdown LED, and sounder pulse 1 x 10 seconds.
7. Push the "DELAY/Reset/Silence" button to test sounder silence. Sounder silences and LEDs continue.
8. Confirm RCT displays "PASS."

POST RELEASE ACTIVATED

RED LEDs AND SOUNDER PULSE 1 X 10 SECONDS

PUSH BUTTON

SOUNDER STOPS

CONFIRM RCT DISPLAYS "PASS"

Detection Circuit #1 (and #2): Test Time Delay Restart

1. Reset DCT to "Normal" position.
2. Reset RCT - press reset button.
3. Reset to Normal: Press and hold "DELAY/Reset/Silence" button for 3 seconds; Green and Red LEDs are steady-on for 1 second; then Amber LEDs are steady-on for 1 second; at end sounder quickly pulses 3 times.

   After reset, Power LED remains GREEN steady-on.

RETURN TO NORMAL STATUS

RESET DCT, RCT, AND DISPLAY MODULE

POWER LED IS GREEN STEADY-ON

TABLE 6-3: OPERATIONAL TEST (Continued)

Detection Circuit #1 (and #2): Test Time Delay Restart (Continued)

4. Initiate alarm condition by turning DCT switch to "Alarm."
5. Before the TD1 time delay period expires, push "DELAY/Reset/Silence" button to restart time delay (3 quick pulses indicate time is restarted). Time delay #1 restarts to full programmed delay period. (Restarts may be limited to 1 restarts or repeated indefinitely* based on optional programming.)

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

   Note: During TD2 time delay cannot be restarted.

   * Programming unlimited Time Delay Restarts voids FM Approval.

TEST TIME DELAY DCT = ALARM

BEFORE END OF TD1, PUSH BUTTON TO RESTART TD1 (MAY PUSH BUTTON MULTIPLE TIMES IF ALLOWED)

3 PULSES INDICATE RESTART

6. Allow System to complete time delay cycles (TD1 and TD2). During Release Activated* (LEDs and sounder steady-on) push the "DELAY/Reset/Silence" button. Verify:
   a. Time delay will not restart.
   b. Sounder will not silence.
   * Red "PUSH to Activate / Alarm When Lit" LED, Red Shutdown LED, Red Detection 1 LED, and sounder remain steady-on for 10 seconds.
7. Confirm successful release signal (Pass) on RCT.

COMPLETE TIME DELAYS

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

– VERIFY NO RESPONSE TO PUSHING BUTTON

CONFIRM RCT DISPLAYS "PASS"

8. Return to normal:
   a. Reset DCT to normal position.
   b. Reset RCT - press reset button.
   c. Reset to Normal: Press and hold "DELAY/Reset/Silence" button for 3 seconds; Green and Red LEDs are steady-on for 1 second; then Amber LEDs are steady-on for 1 second; at end sounder quickly pulses 3 times.

      After reset, Power LED remains GREEN steady-on.
9. If Detection Circuit #2 is part of the system, repeat Detection Circuit Tests (listed below) using Detection Circuit #2 in place of Detection Circuit #1. Confirm DCT is in place of the EOL device on Detection Circuit #2. All figures with Detection 1 LED indicators will be Detection 2 LED indicators.

   Detection Circuit Supervision Test, page 6-7

   Detection Circuit Alarm Condition Test, page 6-9

   Detection Circuit Test Time Delay Restart, page 6-10

RETURN TO NORMAL STATUS

RESET DCT, RCT, AND DISPLAY MODULE

POWER LED IS GREEN STEADY-ON

TABLE 6-3: OPERATIONAL TEST (Continued)

Field Test Spot Thermal Detectors

This field test procedure is not intended to determine the exact operating temperature of any detector. It is designed to test functionality only.

To properly perform the following test procedure, the following materials will be required:

- Programmable heat gun
- Appropriate source of AC power (or converters)
- Appropriate safety gear (safety glasses, heat resistant hand protection, etc.)

CAUTION

Do NOT apply any direct flame or other unregulated heat sources to the detector head as this could damage the temperature-sensing element. Damage to the temperature-sensing element in the detector head will result in system impairment.

CAUTION

This test procedure requires the use of test equipment that can develop hazardous temperatures capable of causing injury to personnel. Persons conducting the testing must read and follow all safety rules that are included in the Operating Manual for the particular heat gun being used prior to beginning this test procedure.

CAUTION

This test procedure requires personnel to work around potential hazardous temperatures and voltages. Ensure all equipment, around the detectors to be tested, is de-energized and properly locked-out prior to beginning this test procedure.

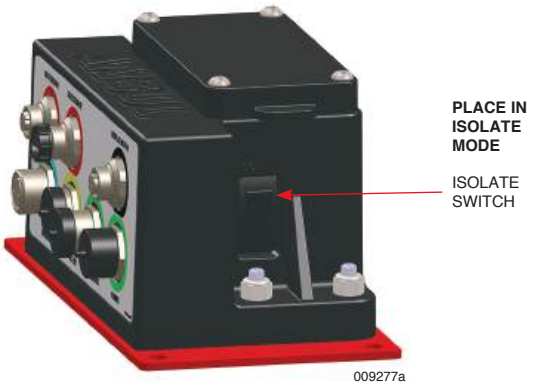
TABLE 6-3: OPERATIONAL TEST (Continued)

Field Test Spot Thermal Detectors (Continued)

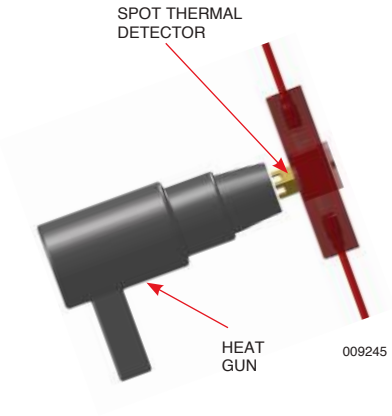
To test the functionality of the Spot Thermal Detector:

1. Put system in isolate mode using the isolate switch on the side of the ICM or pressing and holding the "DELAY/ Reset/Silence" button on the CHECKFIRE 210 Display Module for approximately 8 seconds (two consecutive resets).

   Confirm Isolate LED and sounder pulse 2 x 10 seconds.
2. Ensure the heat gun is properly connected per the manufacturer's recommendations and turn it on. The applied temperature for the 250 °F (121 °C) detector should not exceed 400 °F (204 °C), and the applied temperature for the 350 °F (176.6 °C) detector should not exceed 500 °F (260 °C).



3. Position the tip of the heat gun as close to the detector head as possible and begin applying heat to the unit. The direction of the applied heat should be as perpendicular to the face of the detector head as possible.
4. Continue to apply heat to the detector head until contact closure occurs. An audible click should be heard from the detector head and the System should go into alarm (LEDs and sounder pulse 1 x 1 second).
   Note: Reaction times between detectors will vary. Air movement in the vicinity of the detectors should be minimized to the greatest extent possible. Excessive air movement will affect heat transfer to the detector which may extend activation times.
5. As soon as contact closure occurs, immediately and carefully remove the tip of the heat gun from the detector head.
   Note: Detector will remain in alarm for several seconds before contacts re-open.
6. Allow the detector head to cool enough for the contacts to re-open. Verify the alarm condition clears.
7. Repeat Steps 2 – 6 for each detector that requires testing.
8. Once all detectors have been tested and contacts are re-opened (see step 6), the detection system should be returned to normal operation. Cancel isolate mode by returning the isolate switch to the normal position and holding the "DELAY/Reset/Silence" button on the CHECKFIRE 210 Display Module for approximately 8 seconds (two consecutive resets).



APPLY PERPENDICULAR TO DETECTOR FACE

TABLE 6-3: OPERATIONAL TEST (Continued)

Manual Activation Release Circuit Test – including programmable equipment shutdown

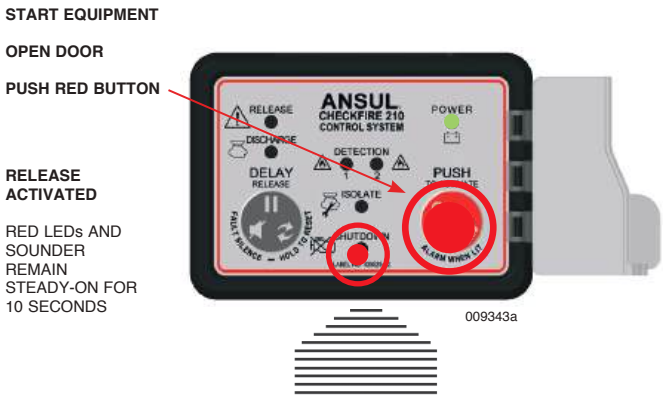
If system is utilizing the equipment shutdown feature through the internal relay, the following steps confirm the proper operation of the shutdown. These steps will require operation of equipment.

Note: If needed, contact appropriate personnel for authorization of equipment start up and testing.

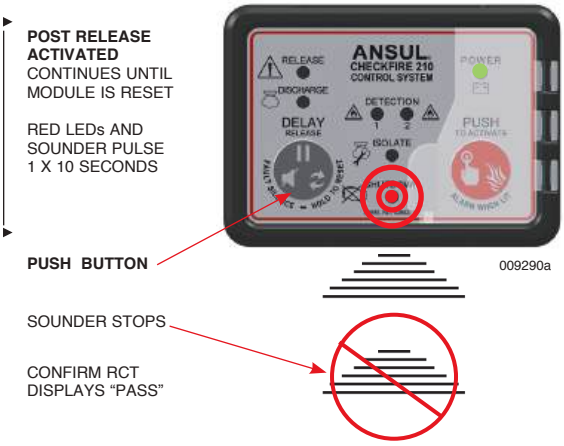
1. Start up equipment.
2. Open the protective guard door and push the “PUSH to Activate / Alarm When Lit” button. Release Activated starts immediately.

   Confirm successful equipment shutdown.

   Note: There is no time delay upon manual activation.
3. **Release Activated –** The Red “PUSH to Activate / Alarm When Lit” LED, Red Shutdown LED, and sounder are steady-on for 10 seconds.



4. **Post Release Activated –** The Red Shutdown LED, and sounder pulse 1 x 10 seconds.
5. Push the “DELAY/Reset/Silence” button to test sounder silence. Sounder silences and LEDs continue.
6. Confirm successful release signal (Pass) on RCT.



7. Reset RCT.
8. Reset to Normal: Press and hold “DELAY/Reset/Silence” button for 3 seconds; Green and Red LEDs are steady-on for 1 second; then Amber LEDs are steady-on for 1 second; at end sounder quickly pulses 3 times.

   After reset, Power LED remains GREEN steady-on.

TABLE 6-3: OPERATIONAL TEST (Continued)

Electric Manual Actuator (EMA) Test

CAUTION

If the system includes Pneumatic Manual Actuators, test these components separately in accordance with the appropriate system manual (latest revision):

The actuators also have ring pins and red strike buttons. Actuation can cause fire suppression system release.

PULL RING PIN AND STRIKE RED BUTTON

009240a

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

   Note: There is a two second delay upon manual activation if EMA activation is enabled on the circuit. If EMA activation is disabled, go to step 5.

2. **Release Activated –** The Red "PUSH to Activate / Alarm When Lit" LED, Red Shutdown LED, Red Detection 1 (or Detection 2) LED and sounder are steady-on for 10 seconds.

RELEASE ACTIVATED

RED LEDs AND SOUNDER REMAIN STEADY-ON FOR 10 SECONDS

NOTE: DETECTION 2 LED WILL PULSE WHEN EMA IS INSTALLED ON DETECTION CIRCUIT #2

009290a

3. **Post Release Activated –** The Red Detection 1 (or Detection 2) LED, Red Shutdown LED, and sounder pulse 1 x 10 seconds.
4. Confirm successful release signal (Pass) on RCT. Proceed to step 6.
5. If EMA activation is disabled, after a two second delay, the Detection 1 (or Detection 2) Amber LED will pulse 2 x per second every 10 seconds. If Relay #1 is programmed to activate on a fault condition, Relay #1 will transfer. No release activation will occur.

POST RELEASE ACTIVATED

CONTINUES UNTIL MODULE IS RESET

RED LEDs AND SOUNDER PULSE 1 X 10 SECONDS

009290a

TABLE 6-3: OPERATIONAL TEST (Continued)

Electric Manual Actuator (EMA) Test (Continued)

6. Reset EMA by pulling red strike button up to set position, re-install ring pin. Do not reseal at this time.
7. Reset RCT, if applicable.
8. Reset to Normal: Press and hold “DELAY/Reset/ Silence” button for 3 seconds; Green and Red LEDs are steady-on for 1 second; then Amber LEDs are steady-on for 1 second; at end sounder quickly pulses 3 times.
9. Repeat Test for each remaining EMA following above steps.

CAUTION

If the system includes Pneumatic Manual Actuators, test these components separately in accordance with the appropriate system manual (latest revision):

The actuators also have ring pins and red strike buttons. Actuation can cause fire suppression system release.

RESET EMA:
PULL RED BUTTON UP,
INSERT RING PIN

009240a

RETURN TO NORMAL STATUS

RESET RCT, AND MODULE

POWER LED IS GREEN STEADY-ON

009290a

TABLE 6-4: SECONDARY POWER – OPERATIONAL TEST

System Test on Secondary Power Only* (not allowed under FM 5970)

1. Instructions to disconnect Primary Power.
2. Power LED pulses AMBER 1 x 3 seconds.
3. Press and hold “Delay/Reset/Silence” button for 3 seconds - Power LED pulses GREEN 1 x 3 seconds.
4. Complete the following tests (pages 6-9 thru 6-16) with system on secondary power:
   - Detection Circuit: Alarm Condition Test
   - Detection Circuit: Test Time Delay Restart
   - Field Test Spot Thermal Detectors
   - Manual Activation Release Circuit Test
   - Electric Manual Actuator (EMA) Test
5. Install new/unused battery (if a test battery was not used).
   Note: Multiple release circuit activations deplete battery life.

Note: For above tests the Power LED continues to pulse GREEN 1 x 3 seconds.

Note: If battery is low, Power LED pulses AMBER 1 x 10 seconds.

* Operation on secondary power **only,** voids FM Approval.

SECONDARY POWER TESTING

GREEN LED PULSES 1 X 3 SECONDS

REPEAT TESTS PAGES 6-9 TO 6-16 ON **SECONDARY** POWER

009290a

TABLE 6-5: PLACING CHECKFIRE 210 SYSTEM IN SERVICE

1. Disconnect all power. Disconnect primary power circuit connection at the CHECKFIRE 210 ICM Power receptacle. Disconnect ICM battery cable from battery pigtail.

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

DISCONNECT ALL POWER

009290a

ALL EMAs IN UP/PINNED POSITION AND SEALED

009153a

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

009275a

SEAL GUARD DOOR PROTECTING RED BUTTON

4. Replace DCTs with Detection EOL Devices in the detection circuits.

REPLACE DCT WITH EOL DEVICE IN DETECTION CIRCUITS

009161

5. Remove RCT and/or Release Circuit Test Plugs from Release Circuit Drop Cables.

REMOVE RCT AND RELEASE CIRCUIT TEST PLUGS

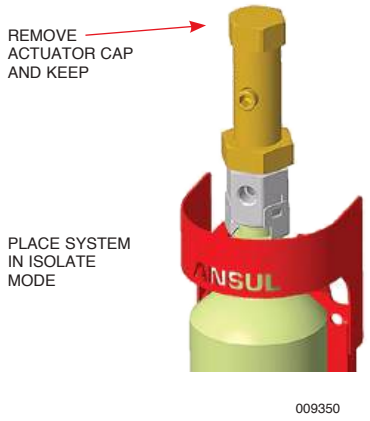
009239

TABLE 6-5: PLACING CHECKFIRE 210 SYSTEM IN SERVICE (Continued)

6. Remove actuator cap on top of Electric-Pneumatic Actuator and retain for future use.
7. Put system in isolate mode using the isolate switch on the side of the ICM or pressing and holding the "DELAY/ Reset/Silence" button on the CHECKFIRE 210 Display Module for approximately 8 seconds (two consecutive resets).

⚠ 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.



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 (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).

Install all PADs in the Release Circuit Drop Cables.

PAD FIELD INSTALLED IN CABLE

9. Lubricate PAD, Electric-Pneumatic Actuator and Release Drop Cable o-rings with Dow Corning #4 (or equivalent). Attach Release Circuit Drop Cable with installed PAD to Electric-Pneumatic Actuator and hand-tighten the connector. Once the actuator cap is fully seated, an additional 1/16 to 1/8 turn may be applied with an appropriate tool. (Keep actuator cap for recharge and maintenance procedures.)

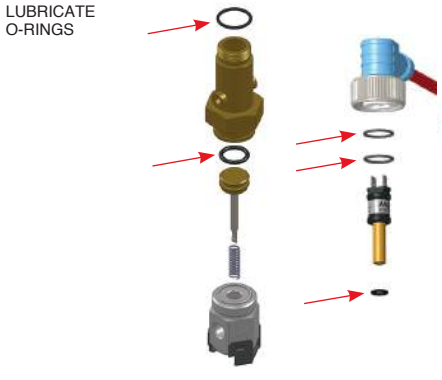


TABLE 6-5: PLACING CHECKFIRE 210 SYSTEM IN SERVICE (Continued)

10. If needed complete installation of optional Pneumatic Manual Actuators. Refer to Section 5 – Installation and Programming, page 5-24.
11. Re-install Pneumatic Manual Actuator cartridges if previously removed.
12. Reconnect all power as required. Reconnect primary power circuit connection at the CHECKFIRE 210 ICM power receptacle. Reconnect ICM battery cable to battery pigtail, secondary power.
    - When replacing the battery module the battery life indicator must be reset using the ICM or connect to a PC with the ANSUL® CHECKFIRE 210 Programmer software.
      a. Replace the battery module with a new/unused unit. Record the replacement date on the inside sticker of the battery compartment cover and on the battery itself.
      b. Reset Battery Life Indicator:

      ICM Instructions:

      1) Put system in isolate mode using the isolate switch on the side of the ICM or pressing and holding the “DELAY/Reset/Silence” button on the CHECKFIRE 210 Display Module for approximately 8 seconds (two consecutive resets).
      2) Press and hold the programming button for more than five seconds then release.
      3) All programming LEDs pulse 3 times in one second to confirm battery life indicator is reset.
13. Confirm system is clear of faults and alarm conditions.
14. Cancel isolate mode by returning the isolate switch to the normal position, or by holding the “DELAY/Resert/Silence” button on the CHECKFIRE 210 Display Module for approximately 8 seconds (two consecutive resets).

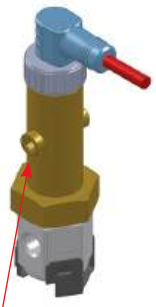
ELECTRONIC ACTIVATION INSTALLATION COMPLETE

IF REMOVED, RE-INSTALL MANUAL ACTUATOR CARTRIDGES

RECONNECT ALL POWER

CONFIRM SYSTEM CLEAR OF FAULTS AND/OR ALARM CONDITIONS

REMOVE SYSTEM FROM ISOLATE MODE



009171

CAUTION

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

15. Reset to Normal: Press and hold “DELAY/Reset/Silence” button for 3 seconds; Green and Red LEDs are steady-on for 1 second; then Amber LEDs are steady-on for 1 second; at end sounder quickly pulses 3 times.
16. Confirm all test results are recorded in a permanent record. See sample on next page. If desired, download Event History Log, refer to Section 5 – Installation and Programming, pages 5-34 and 5-35 . When complete re-install battery cover.

RESET TO NORMAL

PRESS AND HOLD 3 SECONDS

POWER LED IS GREEN STEADY-ON

009290

CHECKFIRE 210 Operational Test Check List

(COPY BEFORE USE)

Item **Test Date:** _____	**Yes**	**No**
a) Vehicle Primary Power operation verified	☐	☐
b) Internal Secondary Battery Power operation verified	☐	☐
c) Isolate mode tested and verified	☐	☐
d) Detection Circuit #1 tested (Supervisory and Activation)	☐	☐
e) Detection Circuit #2 tested [if used] (Supervisory and Activation)	☐	☐
f) Time Delays tested (Factory default: TD1 = 10 sec and TD2 = 5 sec) **Note:** If default 'Time delays' are changed, indicate TD settings below: **TD1 in sec.** _____ **TD2 in sec.** _____	☐	☐
g) Time Delay Restart tested (Factory default: 1 restarts) **Note:** If default 'Restarts' are changed to 'Unlimited', indicate Yes below: **Unlimited Yes:** ☐	☐	☐
h) Release Circuit tested (Supervisory and Activation)	☐	☐
i) Relay function tested (Factory default: Rly 1 – Alarm, Rly 2 – Shutdown) **Note:** If default 'Relay Settings' are changed, indicate below: **RLY 1:** _____ **RLY 2:** _____	☐	☐
j) Manual Actuation at "Push to Activate Button" tested	☐	☐
k) Manual Actuation at Electric Manual Actuators tested	☐	☐
l) Above tests with both Primary (machine) and Secondary (battery) power	☐	☐
m) Install NEW (Unused) Battery [date and sign] – **Record Date:** _____	☐	☐
n) Reset Battery Life Indicator	☐	☐
o) Install Protracting Actuation Device (PAD) – **Record Date:** _____	☐	☐
p) All visual seals in place and secure	☐	☐
q) Maintenance tag signed and in place	☐	☐
r) All required Warning and Hazardous Labels in place	☐	☐

NOTES:

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 to operate the CHECKFIRE 210 Detection and Actuation System. 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 re-ignite the fire with heat or sparks.
- If possible, safely exit and move a safe distance from equipment, 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 210 Detection and Actuation System includes a thermal detection devices located in each protected area. On detecting an alarm condition, the CHECKFIRE 210 System 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 the guard door on CHECKFIRE 210 Display Module (break visual seal), and push the “PUSH To Activate / Alarm When Lit” button, see Figure 7-1.
- Pull ring pin and strike the 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 equipment, and stand by with hand portable extinguisher.

⚠ CAUTION

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

Automatic Equipment Shutdown

The CHECKFIRE 210 System includes programmable relays that may be connected to a shutdown device. If a shutdown device is connected to a CHECKFIRE 210 relay, 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 Display Module) is pushed and released **before the end of Time Delay #1 (TD1)** (5, 10 or 15 seconds), the time delay restarts the time delay period. This will delay transfer of the shutdown relay and the start of Time Delay #2 (TD2) (0, 5, 10 or 15 seconds), and eventual system activation. This delay can be repeated (using the “DELAY/Reset/Silence” button) if necessary, to safely stop the equipment before the shutdown relay transfers automatically shutting down the equipment and activating the system.

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/Equipment 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/equipment (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 re-ignite after fire suppression system has been discharged. Remain alert until equipment cools and possibility of re-ignition is no longer a threat.

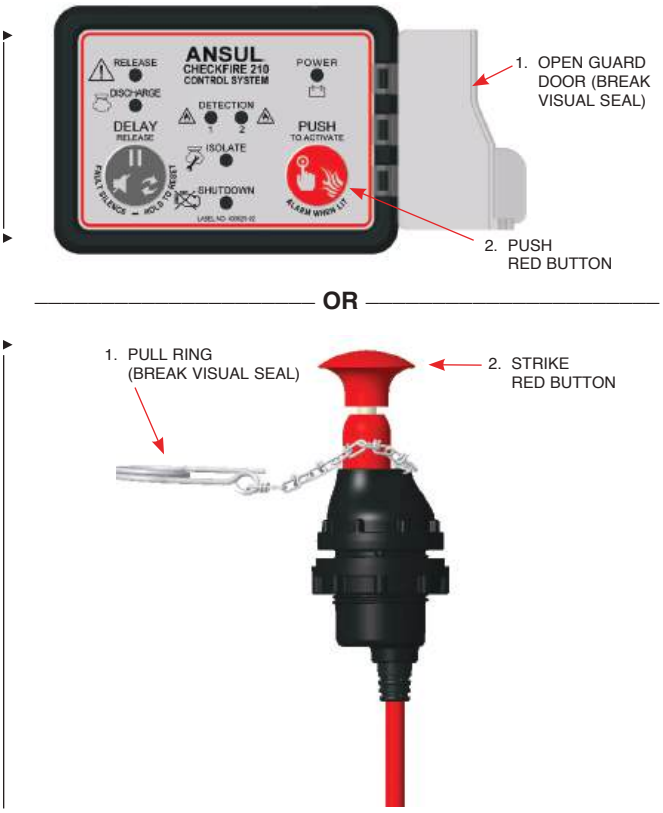


FIGURE 7-1
IMMEDIATE RELEASE OPTIONS
009343a/ 009240a

CHECKFIRE 210 OWNERS' GUIDE

The CHECKFIRE 210 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 210 ICM.

FIGURE 7-2
CHECKFIRE 210 OWNERS' GUIDE HANDBOOK
011937

docs.jci.com/ANSUL/CHECKFIRE210_OwnersGuide

FIGURE 7-3
QR CODE – CHECKFIRE 210 OWNERS' GUIDE
210 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)

Power: ☐ Internal Only ☐ Dual (External & Internal)

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

_____

TD1 (Time Delay 1, seconds): ☐ 0 ☐ 5 ☐ 10 ☐ 15

TD2 (Time Delay 2, seconds): ☐ 0 ☐ 5 ☐ 10 ☐ 15

Time Delay Restarts: ☐ 1 ☐ Unlimited

Relay #1: ☐ Alarm ☐ Fault ☐ Not Used

Relay #2: ☐ Shutdown ☐ Alarm ☐ Not Used

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
011938/ 011939

INSPECTION AND MAINTENANCE

To help ensure the CHECKFIRE 210 Detection and Actuation System will operate as intended, proper inspection and maintenance procedures must be performed at the specified intervals.

DAILY INSPECTIONS

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

- Power LED is Green and steady-on with primary power or pulsing 1 x 3 seconds with secondary power, see Figure 8-1. **Note:** Must operate on dual power (primary and secondary) to maintain FM Approval.
- 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 210 System.

WITH PRIMARY POWER, LED IS GREEN STEADY-ON

WITH SECONDARY POWER, LED IS PULSING GREEN 1 X 3 SECONDS *

* MUST OPERATE ON DUAL POWER (PRIMARY AND SECONDARY) TO MAINTAIN FM APPROVAL.

FIGURE 8-1
NORMAL CONDITION
009275a

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 equipment hazard areas.

If system is displaying faults, go to Section 9 – Troubleshooting prior to continuing Maintenance.

1. Check condition of the CHECKFIRE 210 Display Module.
   a. Confirm securely mounted. Verify all fasteners are tight and display module enclosure nut is hand-tight.
   b. If secured in bracket, check bracket for damage or wear to ratchet teeth.
   c. Check Display Module for damage or undue wear.
2. Check condition of CHECKFIRE 210 Interface Control Module (ICM).
   a. Confirm CHECKFIRE 210 Mounting Plate is securely mounted and CHECKFIRE ICM is securely affixed to Mounting Plate.
   b. Confirm cable connections to ICM receptacles are correctly torqued.
3. 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)

4. 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

   c. Confirm Spot Thermal Detector is:
      - Securely mounted and heat shields in place
      - Proper location
      - Inspect for damage to face of detector
      - Verify tightness of the heat shield and retaining nut. Torque not to exceed 25 in.-lb (2.82 N•m).

5. If optional Pneumatic Manual Actuator is part of system refer to appropriate suppression system manual for inspection and maintenance instructions (latest revision).
6. 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.
7. Check and perform maintenance on each Electric-Pneumatic Actuator (installed on each agent tank expellant gas cartridge):
   a. Remove power from system both external and internal as applicable.
   b. 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.

   c. Check PAD and maintenance records for installation date of PAD to determine if PAD needs replacement. Refer to Five-Year PAD Replacement instructions, page 8-6.
   d. Confirm PAD o-ring is in place; if absent, check inside actuator and remove. (New PAD comes with new o-ring.) See Figure 8-2.

CAUTION

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

   e. Examine actuating end of PAD to determine if PAD has actuated.

      Note: Occasionally the actuating pin will pull back into the PAD. Inspect actuating end where pin extends. If pin is visible, PAD has actuated. See Figure 8-3.

   f. 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 8-2
CHECK PAD
009246

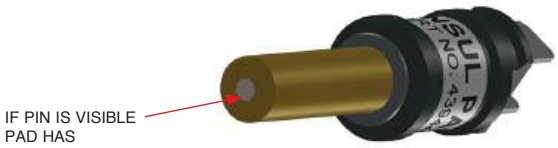


FIGURE 8-3
CHECK END OF PAD
009243

8. Electric-Pneumatic Actuator – Unscrew actuators from nitrogen cartridges and install cartridge safety shipping caps and set aside. Inspect all threaded areas for nicks, burrs, and cross-threads.

   ELECTRIC-PNEUMATIC ACTUATOR, see Figure 8-4.
   - If needed, remove 1/4 in. gas actuation hoses.

MAINTENANCE (Continued)

Step 8 (Continued)

- Loosen and slide base of Electric-Pneumatic Actuator sideways to remove from each expellant gas cartridge.
- Disassemble actuator and inspect for damage. Remove puncture pin spring and pull puncture pin out of body being careful not to bend puncture pin. Retain all parts for re-assembly. See Figure 8-4.

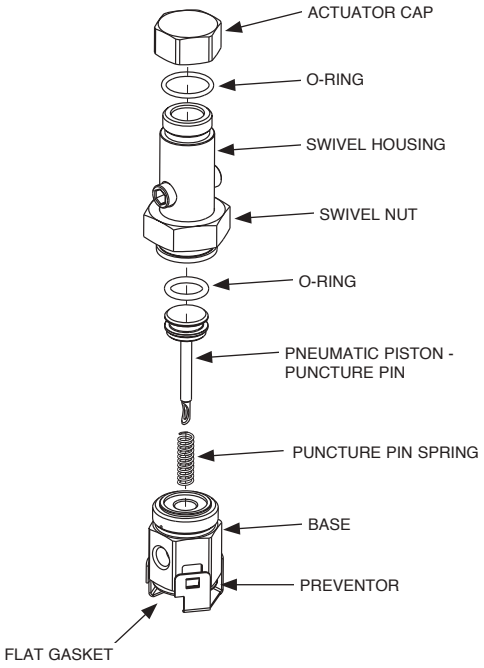


FIGURE 8-4
ELECTRIC-PNEUMATIC ACTUATOR
009538

- Inspect and replace all damaged components (o-rings, flat gaskets, etc.).
- Lubricate all o-rings with Dow Corning #4 (or equal) and reinstall.
- Replace flat gasket semi-annually and lubricate.
- Install spring on puncture pin and insert into body. Push down several times to confirm ease of movement.
- Reassemble actuator.
- Install electric-pneumatic actuator cap or drop cable if used. Ensure components are tight for testing the actuation lines.

9. Test system and place into service by completing all steps in Section 6 – Operational Test and Place in Service, prior to proceeding to Step 10.
10. Internal Secondary Power Replacement:
    - Secondary power, internal battery must be replaced when there is a low power indication (i.e., Power LED pulses Amber 1 x 10 seconds) or battery life remaining is less than 25%. Percent of battery life remaining is listed in the header information of the Event History Log. To save or view the Event History Log review Section 5 – Installation and Programming, page 5-34, for manual download instructions or page 5-36 for viewing with the ANSUL® CHECKFIRE 210 Programmer software.

NOTICE

If a test battery is not used for maintenance and recharge – replace battery semi-annually.

PC Instructions:

When connected to the ANSUL® CHECKFIRE 210Programmer software, click the Reset button in the Battery Life Remaining section.

CAUTION

Performing a reset of the battery life indicator without installing a new/unused replacement battery module can result in faulty battery indications and unpredictable CHECKFIRE 210 System operation.

CAUTION

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

MAINTENANCE (Continued)

11. For fire suppression system maintenance refer to appropriate suppression system manual (latest revision).
12. Confirm all system equipment has been correctly serviced and recharged, and visual seals are in place on all EMAs and CHECKFIRE 210 Display Module.
13. Record date of maintenance on tag and in permanent record file. Notify operating personnel system is back in service.

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.

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 8-5.

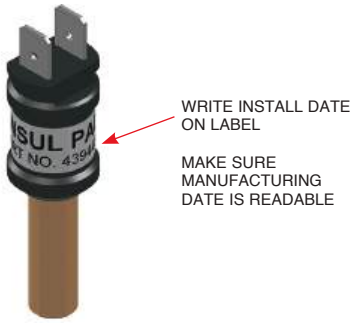


FIGURE 8-5
WRITE DATE ON PAD
009169

   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 8-6.

FIGURE 8-6
PAD MANUFACTURING DATE
009247

   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 PADs. DO NOT cover manufacturing date on label. See Figure 8-5. Do not install PADs until testing is complete.
3. If needed, follow instructions in Section 5 – Installation and Programming, page 5-9, to complete re-installation of the Electric-Pneumatic Actuator.
4. Place in service by completing Table 6-6: Placing CHECKFIRE 210 System in Service, pages 6-20 to 6-22 (Section 6 – Operational 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.

RECHARGE

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

For continued protection, the CHECKFIRE 210 System and fire suppression system must be recharged immediately after activation.

Before performing the recharge steps, inspect the CHECKFIRE 210 Detection and Actuation System to determine cause of system release.

1. Remove power from system, both primary and secondary.
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 suppression system manual (latest revision).
4. Closely examine all Detection Circuit Cable, Linear Detector, and Spot Thermal Detectors for loose connectors and damage (cut, abraded, burnt, blackened, melted, deformed, etc.).
   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 system activation.

   b. If a fire event was the cause of discharge, all Linear Detector cables in the hazard area must be replaced; otherwise, inspect for damage and replace if damaged. **Note:** Splicing of Linear Detector cable is **not allowed.**
   c. If a fire event was the cause of discharge, all Spot Thermal Detectors and related cable installed in immediate areas of fire must be replaced. When subject to high temperatures, set-point drift and damage may occur that is not visible for field observation. (The “automatic resetting” feature of the detector is for field-testing (with appropriate test equipment), not for resetting after a fire.)

Note: Spot Thermal Detectors will be field-tested in step 9.

⚠ CAUTION

Failure to replace spot thermal detectors can result in system malfunction.

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 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.

CAUTION

The Release Circuit Drop Cable with PAD must be removed from Electric-Pneumatic Actuator to retract 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 8-7.

CAUTION

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

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. Inspect actuating end where pin extends. If pin is visible PAD has actuated. See Figure 8-8.

d. If PAD actuated, remove PAD from the connector and discard. See Figure 8-7.

NOTICE

Do not install new PAD until testing is complete, see Step 9.

Find and discard small brass disk ejected from the actuating end of the PAD during release.

e. If PAD has not actuated (system actuated with optional pneumatic manual actuator), refer to Five-Year PAD Replacement instructions, page 8-4, and replace if needed.

FIGURE 8-7
ACTUATED PAD
009242

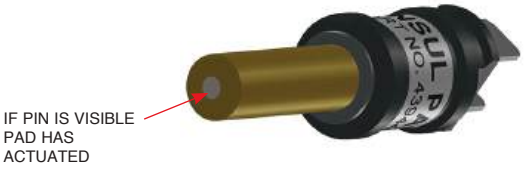


FIGURE 8-8
CHECK END OF PAD
009243

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

CAUTION

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

g. Disassemble and clean the electric-pneumatic actuator by following the instructions in Maintenance, Step No. 8, page 8-2.

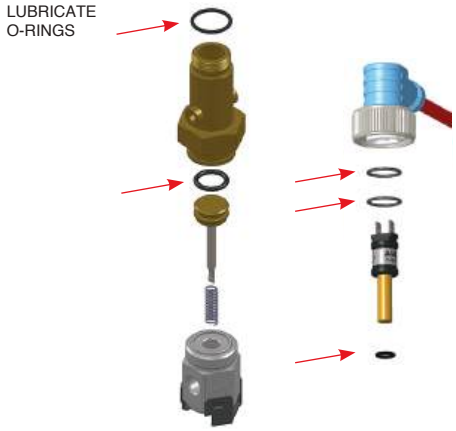


FIGURE 8-9
ELECTRIC-PNEUMATIC ACTUATOR
RETAIN ALL PARTS FOR RE-ASSEMBLY
009244/ 009244a

h. Lubricate all o-rings (puncture pin o-ring, EPA o-ring, PAD o-ring and Release Drop Cable o-rings) and gaskets with Dow Corning #4 (or equal) and reinstall . See Figure 8-9.

7. Recharge the fire suppression system in accordance with the appropriate A-101 or LVS 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 Actuators. See Figure 8-10.

⚠WARNING

Before attaching Electric-Pneumatic Actuator to 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 (Continued)

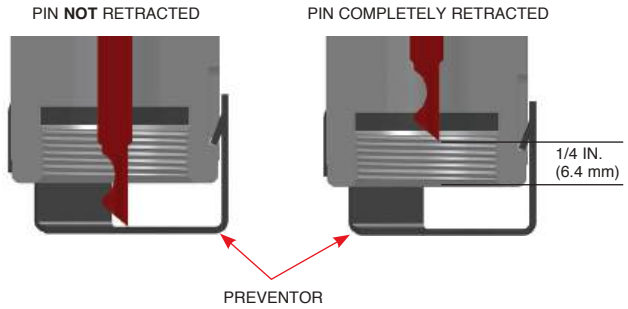


FIGURE 8-10
RETRACT ACTUATOR PIN
009220

b. Re-install Electric-Pneumatic Actuators on expellant gas cartridges.

9. Test system and place into service by completing all steps in Section 6 – Operational Test and Place in Service, prior to proceeding to Step 10.

10. Complete steps 1 through 4 in the Maintenance Section.

11. Confirm all system equipment has been correctly serviced and recharged, and visual seals are in place on all EMAs and Display Module.

12. Record date of recharge on tag and in permanent record file. Notify operating personnel system is back in service.

NOTES:

TROUBLESHOOTING

The following tables provide information on normal operating and fault condition indications for the CHECKFIRE 210 Detection and Actuation System. **For detailed circuit testing procedures, refer to Table 9-7 – Specific Circuit Testing Procedures.** When all faults are cleared, confirm proper operation of the entire CHECKFIRE 210 System by completing Section 6 – Operational Test and Place in Service.

TABLE 9-1: POWER LED INDICATIONS

Normal Operating Condition – Primary/Secondary Power

Green Power LED is steady-on indicating a normal condition.

System is monitoring all circuits and is ready to respond to a fault/alarm condition.

KEY TO DISPLAY MODULE INDICATIONS – IDENTIFY LEDs AS:

LED STEADY-ON (Red or Green) | LED PULSING (Amber, Red or Green) | LED OFF

NORMAL CONDITION PRIMARY AND SECONDARY SYSTEMS OPERATING FOR DUAL POWER

LED IS GREEN STEADY-ON

009290a

Secondary Power Condition

Green Power LED pulses 1 x 3 seconds indicating normal operation on secondary power supply only*.

System is monitoring all circuits and is ready to respond to a fault/alarm condition.

* Must operate on dual power (primary and secondary) to maintain FM Approval.

SECONDARY POWER ONLY

(NOT FM APPROVED)

GREEN LED PULSES 1 X 3 SECONDS

009290a

TABLE 9-1: POWER LED INDICATIONS (Continued)

AMBER Power LED

Primary or Secondary Power Fault

Amber Power LED and Sounder pulsing 1 x 10 seconds indicating power from the power source dropped below acceptable level causing a fault condition.

- Check Power Circuit Cable and Fused Power Circuit Cable for proper connections and for proper voltage
- Confirm fuse is good and installed correctly (See Section 5 – Installation and Programming, page 5-17 for correct removal and replacement of fuse.)
- Replace cables if unable to clear fault indication
- Check connection of the Battery Module to the ICM battery cable located under the battery compartment cover.
- Check and replace secondary power Battery Module with a new/unused battery module. See Internal Secondary Power Replacement in Section 8 – Inspection, Maintenance and Recharge, page 8-3.

PRIMARY/ SECONDARY POWER FAULT

AMBER LED AND SOUNDER PULSE 1 X 10 SECONDS

Primary Power Fault

Amber Power LED pulsing 1 x 3 seconds indicating power from the primary power source dropped below acceptable level causing a fault condition. When primary power source drops below an acceptable level system automatically draws power from secondary power source.

- Check Power Circuit Cable and Fused Power Circuit Cable for proper connections and for proper voltage
- Confirm fuse is good and installed correctly (See Section 5 – Installation and Programming, page 5-17 for correct removal and replacement of fuse.)
- Replace cables if unable to clear fault indication

For more information see TABLE 9-7: Specific Circuit Testing Procedures.

DUAL POWER FAULT

AMBER LED PULSES 1 X 3 SECONDS

TABLE 9-2: RELEASE LED INDICATIONS

AMBER Release LED

Amber Release LED and Sounder pulsing 1 x 10 seconds indicating Release Circuit fault.

- Check Release Circuit Cables for an open circuit or a ground fault; replace cables as needed
- Check connections
- Indicates post release activated when combined with Shutdown LED and/or other LEDs. Check for activated or missing PADs; replace as needed following Section 8 – Recharge, Inspection, and Maintenance, page 8-1, for Recharge instructions.

RELEASE CIRCUIT FAULT

AMBER LED AND SOUNDER PULSE 1 X 10 SECONDS

009290a

RED Shutdown LED

Red Shutdown LED, and Sounder pulsing 1 x 10 seconds indicating Post Release Activated Mode/Release Circuit Fault.

- Indicates Post Release Activated Mode, System released, proceed to Section 8 – Recharge, Inspection, and Maintenance, page 8-1, for Recharge instructions.

For more information see TABLE 9-7: Specific Circuit Testing Procedures.

POST RELEASE ACTIVATED MODE/ RELEASE CIRCUIT FAULT

RED LED AND SOUNDER PULSE 1 X 10 SECONDS

009290a

TABLE 9-3: DETECTION LED INDICATIONS

AMBER Detection 1 and/or 2 LED

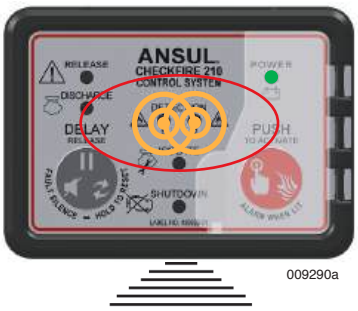
Applies to Detection Circuit #1 and/or #2.

Amber Detection Circuit #1 and/or #2 LED and sounder pulsing 1 x 10 seconds indicating Detection Circuit fault.

- Check connections on the indicated circuits
- Check connections for the presence of moisture or debris. Clean with an off-the-shelf electrical contact cleaner.
- Check Detection Circuit Cables for an open circuit or a ground fault; replace cables as needed
- Verify Linear Detector or Spot Thermal Detector continuity or ground fault condition. Replace as needed

DETECTION CIRCUIT FAULT

AMBER LEDs AND SOUNDER PULSE 1 X 10 SECONDS



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Amber Detection Circuit #1 and/or #2 LED and sounder pulsing 2 x per second every 10 seconds indicating the resistance on the Detection circuit has dropped below normal limits.

- Ensure no EMA devices on the circuit are in the actuated position
- Ensure the detection circuit is programmed to enable EMA activation if EMA devices are installed on the circuit
- Inspect connections for moisture/debris and clean with an off-the-shelf electrical contact cleaner

DETECTION CIRCUIT CONNECTION FAULT

AMBER LEDs AND SOUNDER PULSE 2 X PER SECOND EVERY 10 SECONDS

009290a

RED Detection 1 and/or 2 LED

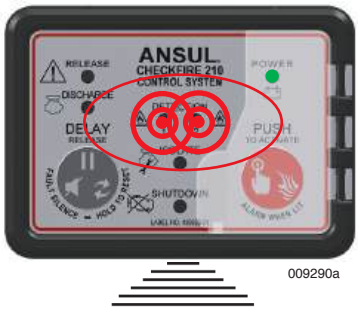
Applies to either Detection Circuit #1 or #2.

Red Detection Circuit #1 and/or #2 LED and Sounder pulsing 1 x 1 second indicating Detection Circuit alarm condition.

- Investigate alarm condition in hazard area
- Check for damaged or activated detectors
- Check for damaged cables
- Check connections on the indicated circuits

DETECTION CIRCUIT ALARM CONDITION

RED LEDs AND SOUNDER PULSE 1 X 1 SECONDS



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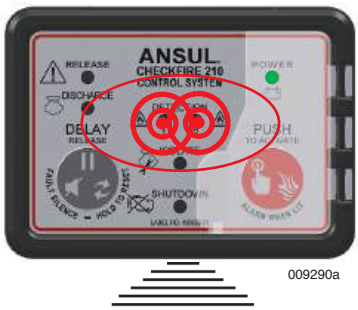
Red Detection Circuit #1 and/or #2 LED and Sounder pulsing 1 x 10 seconds indicating Detection Circuit alarm condition during Post Release Activated Mode. Refer to Section 8 – Recharge, Inspection, and Maintenance, page 8-1, for Recharge instructions.

- Investigate alarm condition in hazard area
- Check for damaged or activated detectors
- Check for damaged cables
- Check connections on the indicated circuits

DETECTION CIRCUIT ALARM CONDITION - DURING POST RELEASE ACTIVATED MODE

RED LEDs AND SOUNDER PULSE 1 X 10 SECONDS



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For more information see TABLE 9-7: Specific Circuit Testing Procedures.

TABLE 9-4: ISOLATE MODE

AMBER Isolate LED

Amber Isolate LED and Sounder pulsing quickly 2 x 10 seconds indicate CHECKFIRE 210 System is in isolate mode.

Placing the System in isolate mode minimizes occurrence of a false release during service or maintenance procedures on the protected vehicle/equipment.

⚠ CAUTION

When System 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 isolate mode for immediate release. To operate manually:

- Press "PUSH to Activate/ Alarm When Lit" button

Or

- Pull ring pin and operate RED Strike button on an EMA (if *Isolate Mode EMA Activation* is programmed for ENABLED) 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, do not return the System to normal until cause of detection notification is found and cleared. Switching the Isolate switch to the normal position during an alarm condition results in an immediate start of the Time Delay sequences leading to a release.

ISOLATE MODE

AMBER LED AND SOUNDER PULSE 2 X 10 SECONDS

009290a

TABLE 9-5: MULTIPLE AMBER LED INDICATIONS

Amber Release, Detection 1 and 2, Power LEDs, and Sounder pulsing quickly 1 x 1 second indicates a loss of communication between Display Module and ICM processor.

1. Remove all power from the system, disconnect primary power and secondary power if used.
2. Reconnect power; if the system still shows the four amber LEDs, replace ICM with a new ICM.

Loss of communications can be confirmed by a review of the Event History Log for the message: Display Fault.

LOSS OF COMMUNICATION

AMBER LEDs AND SOUNDER PULSE 1 X 1 SECOND

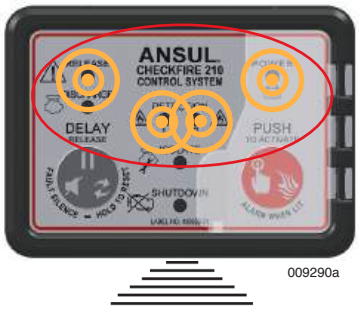

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TABLE 9-6: NO LED INDICATIONS

All LEDs - No Indication

- Confirm Display Cable is not damaged and connected to ICM
- Determine if power is available at the ICM by temporarily putting the System into programming mode using the programming button (press 3 x 1 second) under the battery cover. If LEDs illuminate when entering programming mode, the ICM has power (go to next bullet). If the LEDs do not illuminate, then the System does not have power or ICM has an internal hardware fault; complete the following steps:

1. Check connection of Battery Module to ICM battery cable located under the Battery Compartment Cover.
2. Replace Battery Module with a new/unused battery module. See Battery Replacement in Section 8 – Recharge, Inspection, and Maintenance, page 8-5.
3. Check primary power connections, fuse, and cables, if utilized, for damage.
4. Check primary power supply for proper voltage, if connected.
5. If proper voltage is verified at the ICM, and Power LED remains off, check display cable connections between display module and ICM.

- If the ICM has power, there is loss of communication between Display Module and ICM

1. Remove all power from the system, disconnect primary power and secondary power.
2. Reconnect power; if the system still shows no indication, replace Display Module with a new display module.
3. If new Display Module still has no LED indication, replace the ICM with a new ICM.

009290a

For more information see TABLE 9-7: Specific Circuit Testing Procedures.

TABLE 9-7: SPECIFIC CIRCUIT TESTING PROCEDURES

General Instructions

If faults are indicated on the CHECKFIRE 210 Display Module, test the connecting cables and end of circuit devices (EMAs, EOL Device, branch terminators, PADs, etc.), for proper connection to the system.

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

Note: Remove power from system before replacing components.

Note: Once all faults are cleared, confirm proper operation of the entire CHECKFIRE 210 System by completing Section 6 – Operational Test and Place in Service.

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

Power Circuit

If Power LED is showing no indication for more than 10 seconds check the connection of the Display Module to the ICM as well as all power connections.

Secondary Power Only*: If Power LED is pulsing AMBER 1 x 10 seconds and only using secondary power this indicates the Battery Module is below an acceptable level.

- Inspect battery cable on ICM for damage
- Inspect cable and connector sockets on battery for damage/deformation
- Replace with a new/unused battery module

Primary / Dual Power: If Power LED is pulsing AMBER 1 x 3 seconds (dual power) use the following steps to troubleshoot the primary power circuit.

Required Test Equipment:

- New Fuse: (3 amp in-line ATO/ATC blade style automotive fuse)
- Digital Multimeter

1. Disconnect Power Circuit Cable at the ICM (green receptacle). Use the Digital Multimeter to confirm proper voltage is available at the end of the Power Circuit Cable. If voltage on Power Circuit Cable is correct, there is an internal problem and the CHECKFIRE 210 ICM must be replaced.

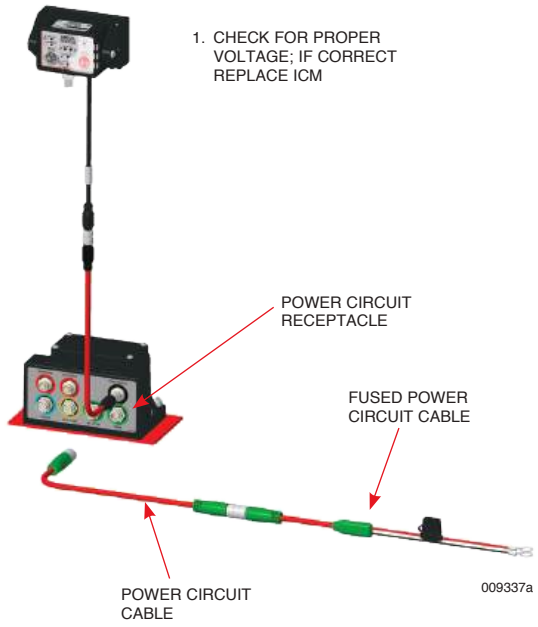
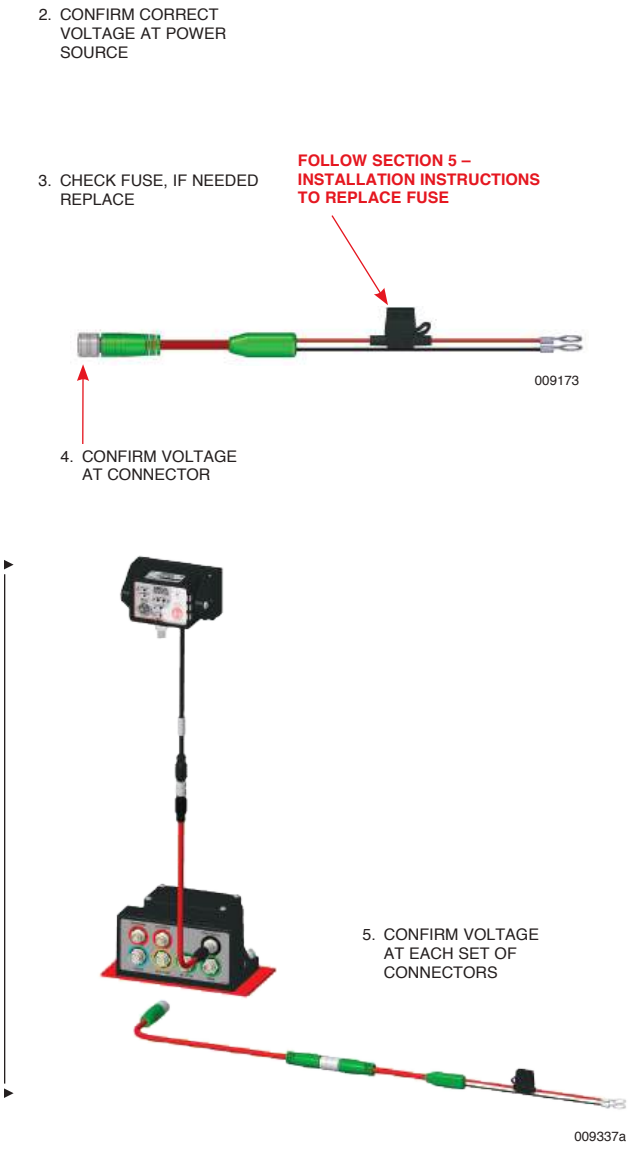


TABLE 9-7: SPECIFIC CIRCUIT TESTING PROCEDURES (Continued)

Power Circuit (Continued)

2. If voltage on Power Circuit Cable is not correct, use the Digital Multimeter to check for proper voltage at the equipment power source (battery).
   a. If voltage is correct move to step 3.
   b. If power source voltage is incorrect or indicates no power, contact equipment service personnel to correct. When voltage is restored reconnect entire power circuit to see if power fault clears. If fault does not clear return to step one.
3. Check fuse in the Fused Power Circuit Cable connected to equipment power source. If needed replace fuse following instructions in Section 5 – Installation and Programming, page 5-17 (step 5).
4. After confirming correct voltage at the power source and a good fuse, disconnect Fused Power Circuit Cable connector from power circuit and check for proper voltage with the Digital Multimeter. If voltage on Fused Power Circuit Cable is correct, the cable is functioning properly. If voltage is incorrect the Fused Power Circuit Cable must be replaced.
5. After confirming correct voltage at end of Fused Power Circuit Cable continue checking the remaining power circuit at each set of connectors for proper voltage from the power source. Replace non-functioning cable with an identical new part.



6. After replacing non-functioning cable and confirming correct voltage through entire power circuit, reconnect to ICM. Power LED returns to GREEN steady-on.

   If all faults are clear, verify proper operation of the CHECKFIRE 210 System by completing Section 6 – Operational Test and Place in Service.

6. CONFIRM CORRECT VOLTAGE THROUGH ENTIRE CIRCUIT AND RECONNECT

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

TABLE 9-7: SPECIFIC CIRCUIT TESTING PROCEDURES (Continued)

Release Circuit

If Release LED is pulsing AMBER indicating a release circuit fault and cannot be cleared check release circuit cable.

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

- Release Circuit Tester
- Release Circuit Terminators
- Release Circuit Test Plugs – one for each PAD

1. Power down system.
2. Replace all PADs with Release Circuit Test Plugs.
3. Power up system.
4. If fault clears, there is at least one faulty PAD. Repeat above steps (1 to 3) for each PAD except at step 2 replace 1 Release Circuit Test Plug with a PAD one at a time to determine the faulty PAD.
5. If fault does not clear, disconnect Release Circuit Cable at the blue ICM release receptacle. Install Release Circuit Terminator directly to the receptacle on the ICM.
6. If the Release LED continues to pulse AMBER, reconnect the Release Cable to the ICM release receptacle.
7. Replace one of the Release Circuit Test Plugs with the Release Circuit tester. Ensure all other Release test plugs remain in place.
8. Turn on the Release Circuit Tester. Wait for the “Ready” light to illuminate.
9. Perform a PTA release.
10. If the RCT registers a PASS, there may be a damaged release circuit cable. Replace as needed.
11. If the RCT registers a FAIL, there is an internal failure of the release circuit and the ICM must be replaced.

⚠ 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.

1. POWER DOWN
2. REPLACE ALL PADs WITH TEST PLUGS
3. POWER UP
4. IF FAULT CLEARS, CHECK FOR FAULTY PAD.

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5. IF FAULT DOES NOT CLEAR, INSTALL TERMINATOR; IF FAULT CONTINUES, FOLLOW STEPS 6 TO 11.

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RELEASE CIRCUIT RECEPTACLE, INSTALL TERMINATOR

TABLE 9-7: SPECIFIC CIRCUIT TESTING PROCEDURES (Continued)

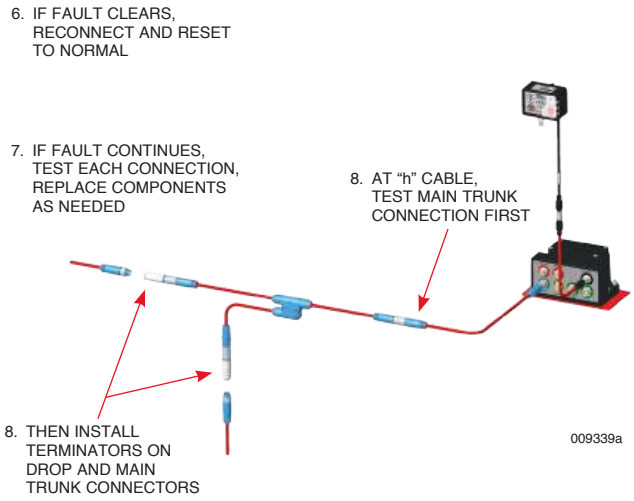
Release Circuit (Continued)

6. If Release Circuit fault clears, the ICM is functioning properly and the fault is in the cabling or connectors. Re-install complete release circuit to the ICM Receptacle. Reset to Normal: Press and hold “DELAY/ Reset/Silence” button for 3 seconds; Green and Red LEDs are steady-on for 1 second; then Amber LEDs are steady-on for 1 second; at end sounder quickly pulses 3 times.
7. If Release Circuit fault does not clear, continue testing the release circuit at each set of connectors starting at the next connection point from the ICM. Separate connectors and install Release Circuit Terminator at the end of the cable connected to the ICM. 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.

NOTICE

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.

8. At a 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 fault clears “h” Cable is good. If fault does not clear replace “h” Cable.



9. After checking a Release Circuit “h” Cable, continue testing drop line to the end of the Release Circuit Drop Cable.
10. Test Release Circuit Drop Cable using a Release Circuit Test Plug. If the Release Circuit Drop Cable causes a fault, replace it with an identical new part and retest.

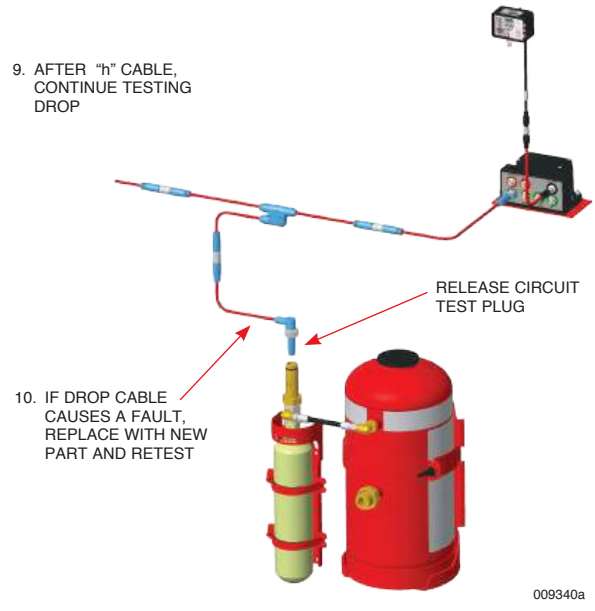


TABLE 9-7: SPECIFIC CIRCUIT TESTING PROCEDURES (Continued)

Release Circuit (Continued)

11. After drop line 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.

    When all faults are clear, verify proper operation of the CHECKFIRE 210 System by completing Section 6 – Operational 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.

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

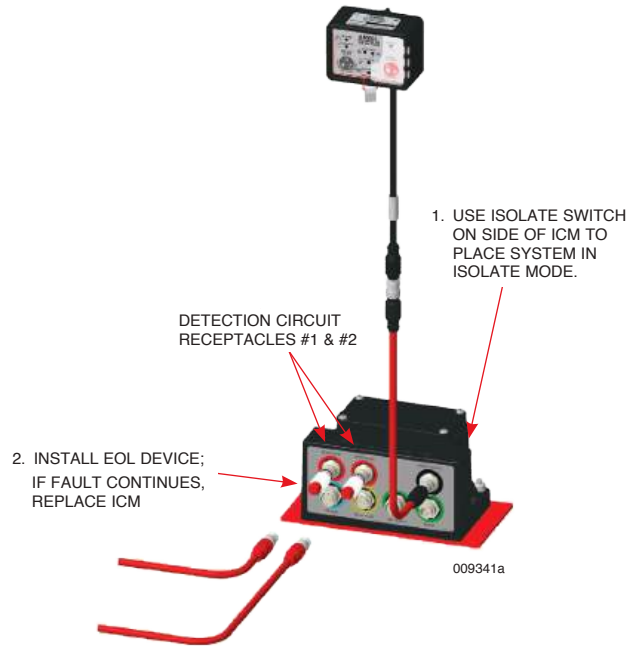
Detection Circuit #1 and/or #2

If Detection Circuit #1 LED is pulsing AMBER and cannot be cleared check detection circuit #1 cable. Detection Circuit #2 is checked in a similar manner as the one described below, but should be investigated separately to avoid confusion.

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

- Detection Circuit EOL Device
- Detection Circuit Tester (DCT) - set to “Normal” position
- Detection Circuit Branch Terminator

1. Prior to testing the circuit, put system in isolate mode using the isolate switch on the side of the ICM or press and hold the DELAY/Reset/Silence button on the CHECKFIRE 210 Display Module for approximately 8 seconds (two consecutive resets).
2. Disconnect Detection Circuit #1 Cable (and #2 if part of system) at the ICM receptacle. Install EOL Device or DCT on the ICM receptacle. If Detection Circuit #1 LED continues pulsing AMBER, there is an internal problem and the CHECKFIRE 210 ICM must be replaced.



3. If Detection Circuit #1 fault clears, the ICM is functioning properly. Re-install complete detection circuit to the ICM detection circuit receptacle.

   Reset to Normal: Press and hold “DELAY/Reset/Silence” button for 3 seconds; Green and Red LEDs are steady-on for 1 second; then Amber LEDs are steady-on for 1 second; at end sounder quickly pulses 3 times.

3. IF FAULT CLEARS, RECONNECT AND RESET TO NORMAL

TABLE 9-7: SPECIFIC CIRCUIT TESTING PROCEDURES (Continued)

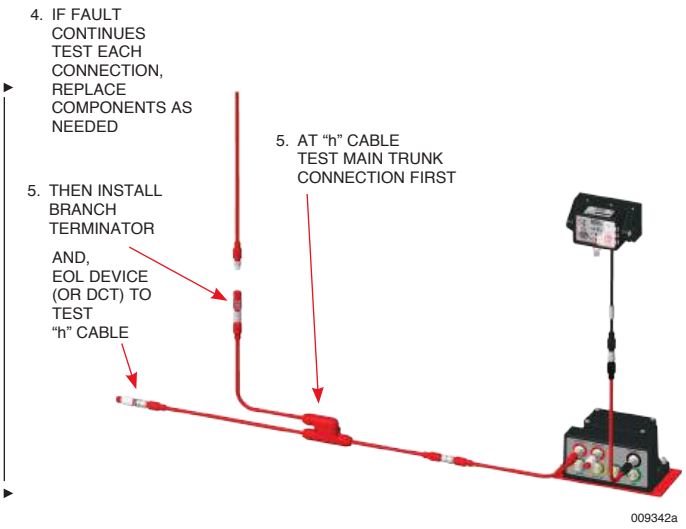
Detection Circuit (Continued)

4. If Detection Circuit #1 fault does not clear, continue testing the detection circuit at each set of connectors starting at the next connection point from the ICM. Separate connectors and install EOL Device or DCT at the end of the cable connected to the ICM. 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.

   NOTICE

   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.

5. 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 branch side of "h" cable, and the EOL Device or DCT on main trunk side. If fault clears "h" cable is good; if fault does not clear replace "h" cable



6. After checking a Detection Circuit "h" Cable, continue testing components to the end of the branch line.

   If a non-functioning component is found and replaced on a branch line, 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 detection circuit fault clears.

   Cancel isolate mode by returning isolate switch to the normal position or press and hold the DELAY/Reset/ Silence button on the CHECKFIRE 210 Display Module for approximately 8 seconds (two consecutive resets).

   If all faults are clear, verify proper operation of the CHECKFIRE 210 System by completing Section 6 – Operational Test and Place in Service.

6. IF FAULT IS CORRECTED IN BRANCH LINE, RECONNECT ENTIRE CIRCUIT;

   IF FAULT OCCURS, CONTINUE TESTING CIRCUIT FROM LAST GOOD CONNECTION UNTIL FAULT CLEARS

When Detection Circuit #2 is part of the system, troubleshoot and correct faults on Detection Circuit #2 in a similar manner to those described above.

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

COMPONENT INDEX

Part No.	Description
	System Components
439560	CHECKFIRE 210 Display Module
439564	Mounting Bracket, CHECKFIRE 110/210
439561	Interface Control Module (ICM), CHECKFIRE 210
439569	Electric-Pneumatic Actuator (EPA)
448754	Electric Manual Actuator (EMA)
440537	Electric Manual Actuator Bracket
440352	CHECKFIRE 210 Battery
	Detection Circuit Cables, and Detectors
439384	2 ft (0.61 m) Detection Circuit Cable
443372	3 ft (0.91 m) Detection Circuit Cable
443425	40 in. (1.01 m) Detection Circuit Cable
439386	5 ft (1.53 m) Detection Circuit Cable
439388	10 ft (3.05 m) Detection Circuit Cable
439390	20 ft (6.10 m) Detection Circuit Cable
440759	30 ft (9.15 m) Detection Circuit Cable
440762	50 ft (15.24 m) Detection Circuit Cable
446539	”h” Cable, Detection Circuit
443381	Detection Circuit 3-Branch Cable
439396	EOL (End-of-Line) Device, Detection Circuit
439398	Branch Terminator, Detection Circuit
442053	Field Wireable Cable, Detection Circuit
438280	Spot Thermal Detector, 250 °F (121 °C)
438281	Spot Thermal Detector, 350 °F (177 °C)
440905	Bracket and Heat Shield, Spot Thermal Detector
	Linear Detectors (Red)
439406	2 ft (0.61 m) Linear Detector
439478	5 ft (1.53 m) Linear Detector
439480	10 ft (3.05 m) Linear Detector
439408	20 ft (6.10 m) Linear Detector
439410	30 ft (9.15 m) Linear Detector
440765	50 ft (15.24 m) Linear Detector
	Linear Detectors (White)
452189	2 ft (0.61 m) Linear Detector
452190	5 ft (1.53 m) Linear Detector
452191	10 ft (3.05 m) Linear Detector
452192	20 ft (6.10 m) Linear Detector

Part No.	Description
	Release Circuit Cables
439418	2 ft (0.61 m) Release Circuit Cable
443378	3 ft (0.91 m) Release Circuit Cable
439420	5 ft (1.53 m) Release Circuit Cable
439422	10 ft (3.05 m) Release Circuit Cable
439424	20 ft (6.10 m) Release Circuit Cable
439426	30 ft (9.15 m) Release Circuit Cable
439428	50 ft (15.24 m) Release Circuit Cable
439430	30 in. (0.77 m) Release Circuit Drop Cable
439432	38 in. (0.97 m) Release Circuit Drop Cable
446542	”h” Cable, Release Circuit
446545	Release Circuit 4-Tank Cable
439436	Branch Terminator, Release Circuit
439448	Protracting Actuation Device (PAD)
	Power Circuit Cables
439438	2 ft (0.61 m) Power Circuit Cable
443423	40 in. (1.01 m) Power Circuit Cable
439440	5 ft (1.53 m) Power Circuit Cable
439442	10 ft (3.05 m) Power Circuit Cable
439444	20 ft (6.10 m) Power Circuit Cable
439446	30 ft (9.15 m) Power Circuit Cable
440187	50 ft (15.24 m) Power Circuit Cable
439492	Fused Power Circuit Cable - 3 ft (0.91 m) (w/Fuse Holder)
449133	Power Circuit Cable w/Over-Voltage Protection
443422	12-Pin Power/Relay Cable with Over-Voltage Protection
439450	Auxiliary Power Circuit Cable
	Display Circuit Cables
443536	2 ft (0.61 m) Display Circuit Cable
443387	3 ft (0.91 m) Display Circuit Cable
443537	5 ft (1.53 m) Display Circuit Cable
443538	10 ft (3.05 m) Display Circuit Cable
443539	20 ft (6.10 m) Display Circuit Cable
443540	30 ft (9.15 m) Display Circuit Cable
443541	50 ft. (15.24 m) Display Circuit Cable

COMPONENT INDEX (Continued)

Part No.	Description
	Relay Circuit Cable
439466	3 ft (0.91 m) Relay Circuit Cable w/Leads
440410	2 ft (0.61 m) Relay Circuit Cable
443424	40 in. (1.01 m) Relay Circuit Cable
440413	5 ft (1.53 m) Relay Circuit Cable
439482	10 ft (3.05 m) Relay Circuit Cable
440416	20 ft (6.10 m) Relay Circuit Cable
	Cable Accessories, Clamps, and Grommets
448174	Bulkhead Cord Grip, (Pkg. 50)
440737	Double Loop Cable Tie (Pkg. 50)
447044	ICM Cable Clamp
447934	Connector Clamp (Detection/Display) (25 Pack)
447935	Connector Clamp (Release/Power/Relay) (25 Pack)
447931	2-Hole Grommet (25 Pack)
447928	3-Hole Grommet (25 Pack)
447321	Linear Detector Grommet (Pkg. 25)
	Pressure Devices
440389	Discharge Pressure Switch
440090	A-101 Discharge Pressure Switch

Part No.	Description
	Test Devices
440097	Detection Circuit Tester
441021	Release Circuit Tester
440912	Release Circuit Test Plug
	Service Components
440798	Label Package
440802	Label, In Case of Fire
009182	Extreme Temperature Silicone Grease Dow Corning No.4
439568	Mounting Plate, Interface Control Module (ICM)
440179	O-ring, Interface Control Module (ICM) (Pkg. of 5)
439567	Battery Cover, Interface Control Module (ICM)
440082	Guard Door, Display Module
440083	Enclosure Nut, Display Module
440489	Receptacle Cap, Female, Detection Circuit #2 (Pkg. of 5)
440490	Receptacle Cap, Female, Relay #1, #2 or Aux. Output (Pkg. of 5)
440491	Receptacle Cap, Male, Power (Pkg. of 5)
439484	Torque Wrench
440168	Torque Wrench Fitting, 16 mm
016047	O-ring #011, PAD
076076	O-ring #016, Release Circuit Drop Cable
1599	Visual Seal

TORQUE SPECIFICATIONS

Component*	Torque Specification in.-lb	(N·m)	Comments
Interface Control Module (ICM)	77	(8.8)	Torque Nylok nut using Torque wrench
ICM Cable Clamp	-	(10)	Torque cable clamp bolts using Torque wrench
Display Circuit Cable Connector	-	(0.8 to 1)	Torque using Torque wrench and M12 fitting.
Detection Circuit Connector	-	(0.8 to 1)	Torque using Torque wrench and M12 fitting.
Release Circuit Connector	-	(1)	Torque using Torque wrench and M12 fitting.
Relay Circuit Connector	-	(1)	Torque using Torque wrench and M12 fitting.
Power/Auxiliary Connector	-	(1)	Torque using Torque wrench and M12 fitting.
Cord Grip Lock Nut Cord Grip Lock Sealing Nut	75 to 80 80 to 85	(8.5 to 9.0) (9.0 to 9.6)	–
Electric-Pneumatic Actuator (EPA) to Cartridge	38 to 42	(51.5 to 57)	–
Display Module Swivel Joint Screws	20 to 25	(2.26 to 2.82)	–
CHECKFIRE 210 Display Module Enclosure Nut	20 to 30	(2.26 to 3.39)	–
EMA Nut	20 to 30	(2.26 to 3.39)	–
Spot Detector – Retaining Nut	25	(2.82)	LOCTITE THREADLOCKER BLUE 242 must be used.
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 the LVS NF-40 Liquid Agent Manual (latest revision).

NOTES: