

Basic Vehicle

FIRE PROTECTION MANUAL

TABLE OF CONTENTS



Introduction	3
System Operation	5
Component Overview	7
Operator Controls	
Control Panel	9
Manual Discharge Switch	10
Detection Components	
Optical Infrared Detector	11
Linear Thermal Detector (LTD)	13
Spot Thermal Detector	14
End of Line Device	14
Suppression Components	
Vertical Fire Extinguisher	15
Horizontal Fire Extinguisher	16
Distribution System	17
System Maintenance	18
Pre-Trip Inspection	19
Every 6,000 Miles	20
Every 18,000 + Miles	22

INTRODUCTION

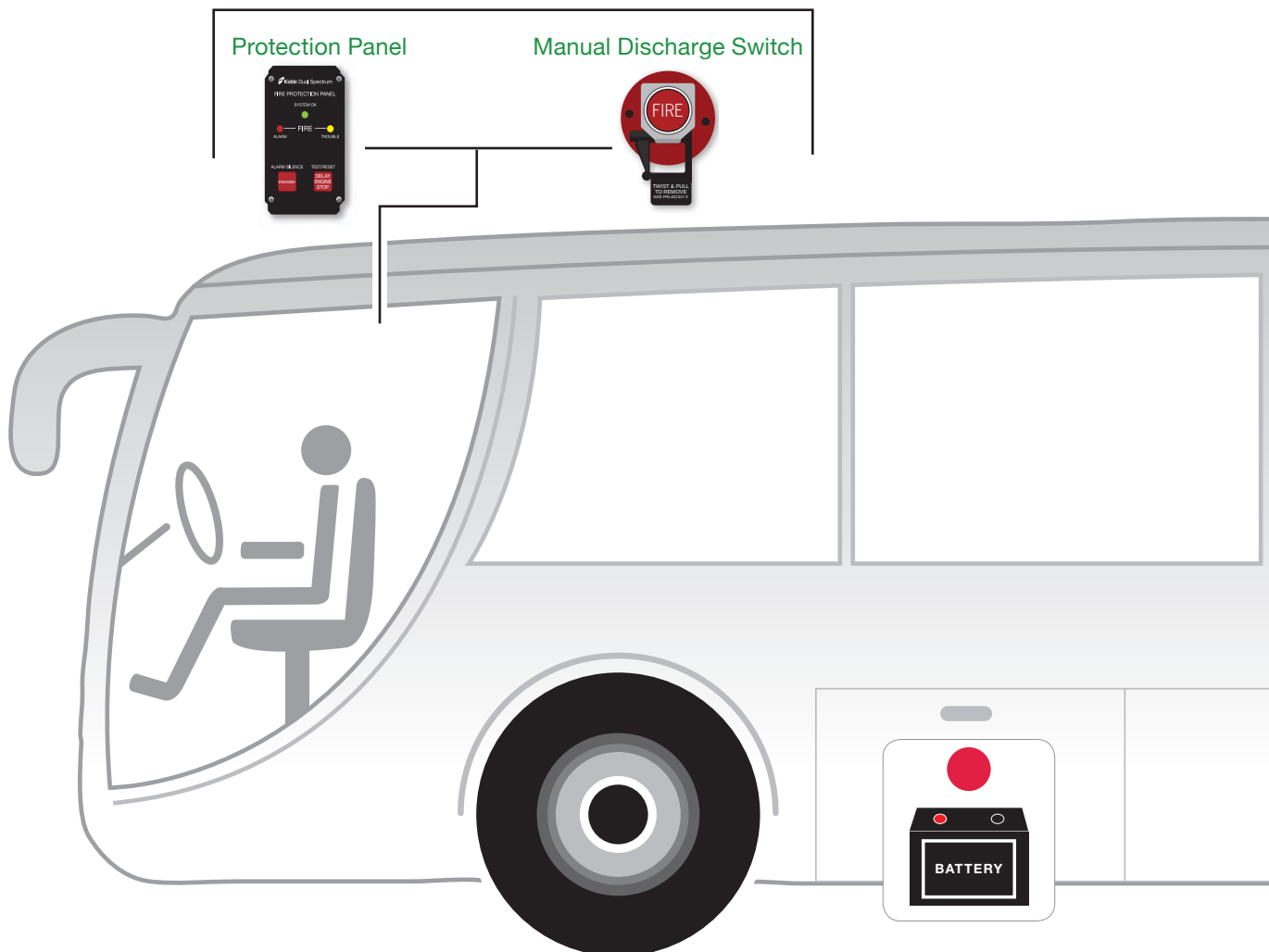
The Kidde Aerospace & Defense Automatic Fire Suppression System provides continuous monitoring of a vehicle's hazard areas. It responds to fires fueled by diesel, gasoline, CNG, LNG, propane, hydrogen, oil, lubricants and other flammable liquids. If a fire is detected, the system will alert the driver with both audible and visual alarms while immediately shutting down the ventilation system to prevent smoke from entering the passenger area. A time delay allows the driver the capability to bring the vehicle to a safe stop prior to the activation of the fire extinguisher and engine shutdown. The system can also be manually activated immediately by the driver.

The Kidde Aerospace & Defense Automatic Fire Suppression System consists of three elements: Operator Controls, Detection, and Suppression. The diagram below shows the components that makeup each of the three elements and how they are integrated on a vehicle.

Typical Hazards Protected

- Engine Compartment
- Battery Compartment
- AC
- Fuel Tanks

Operators Control

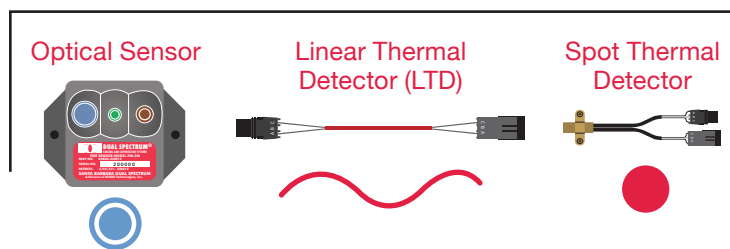




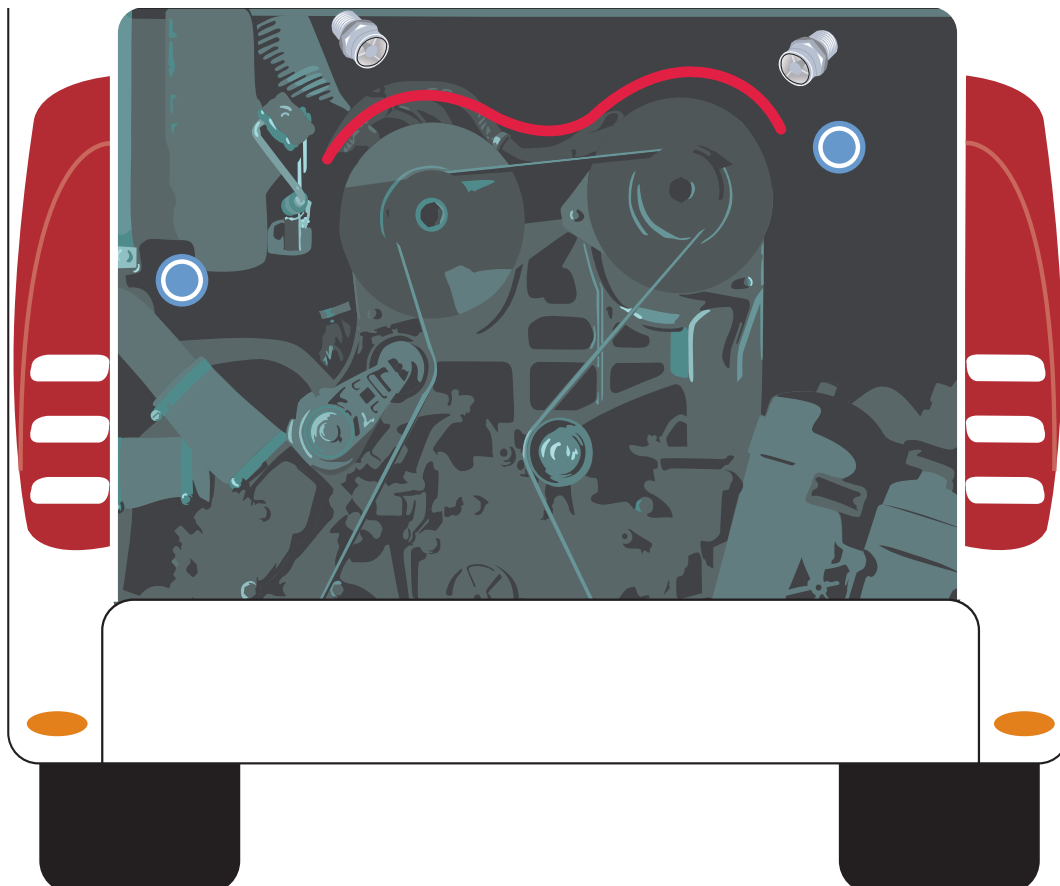
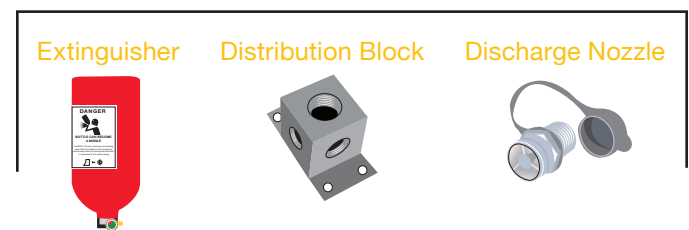
System features include:

- Audible and visual alarms to operator
- Integration with vehicle to shutdown engine and other devices to prevent spread of smoke and fire
- Coded trouble diagnostics
- Fire detectors provide rapid detection without false alarms

Detection

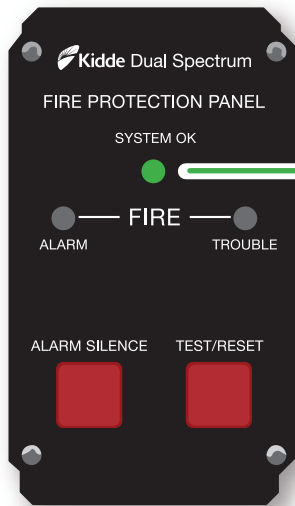


Suppression



SYSTEM OPERATION

NORMAL (SYSTEM OK)

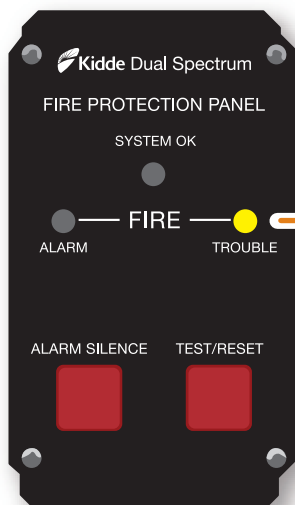


If battery power to the system is low, the SYSTEM OK lamp will blink

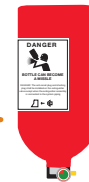
TROUBLE

Refer to the Trouble Shooting Guide for detailed diagnostics


Audible Alarm
(Intermittent)



YELLOW (Solid)

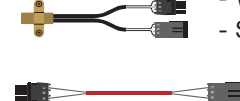


Extinguisher Fault
- Wiring Problem
- Extinguisher Discharged

YELLOW (Blinking)



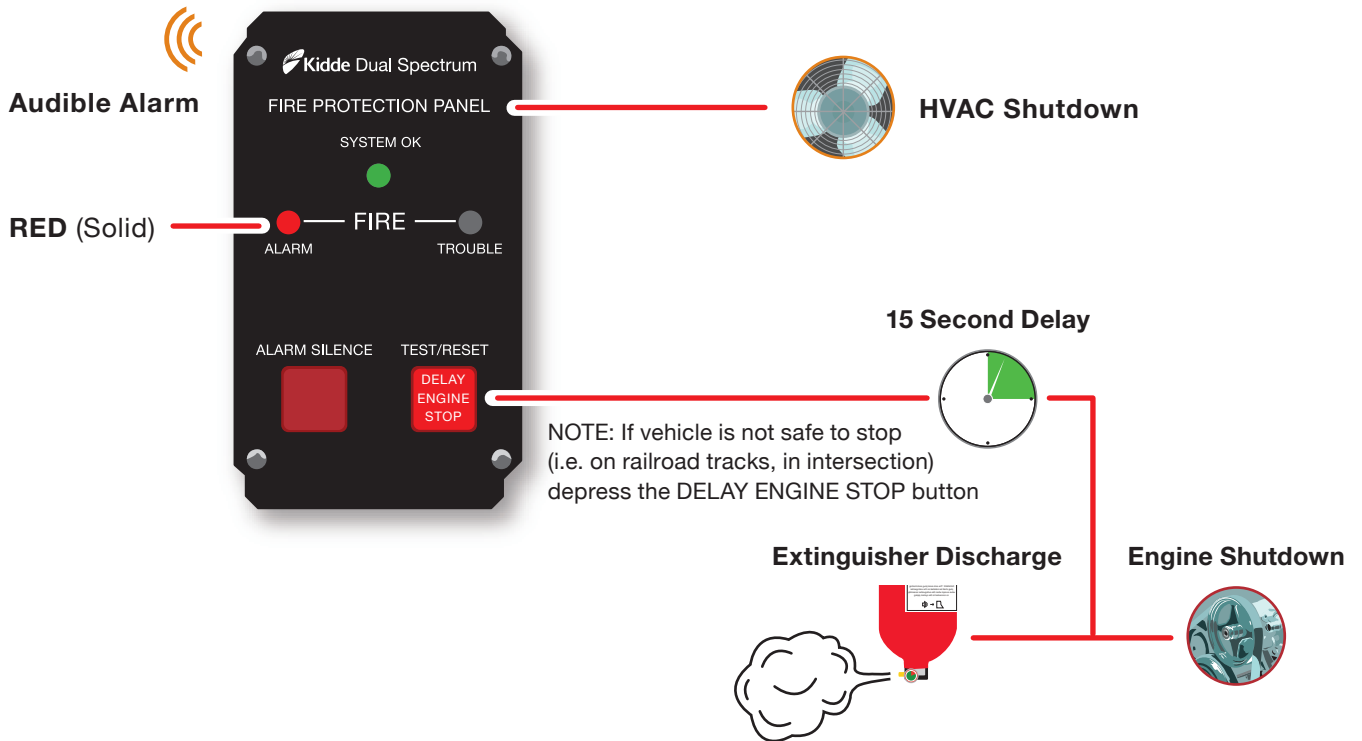
Detection Circuit Fault
- Wiring Problem
- Sensor Problem



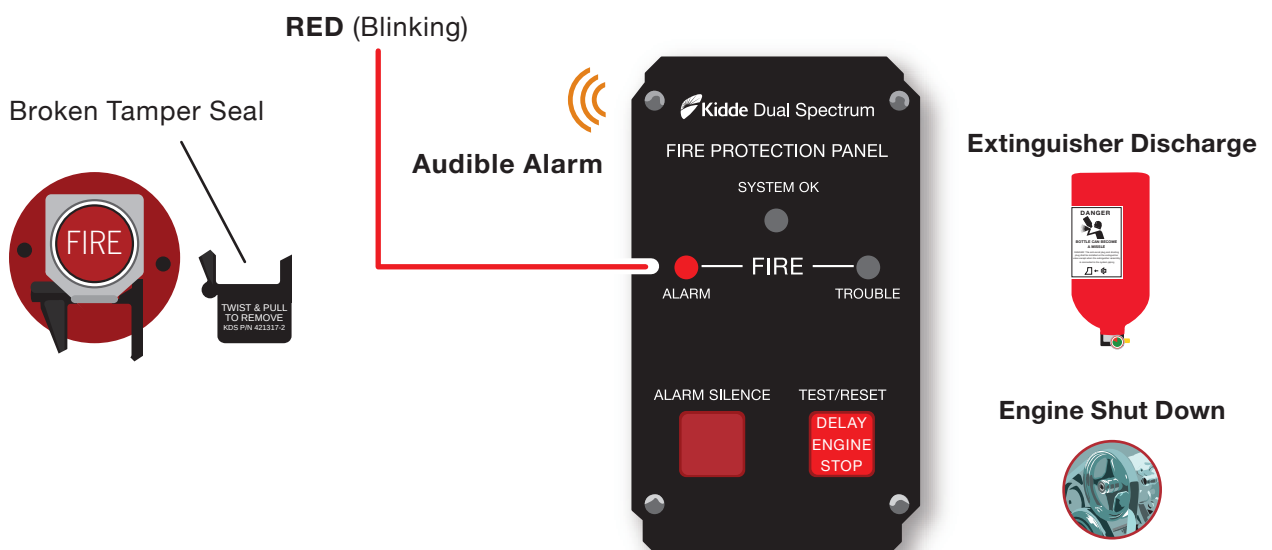
SYSTEM OPERATION



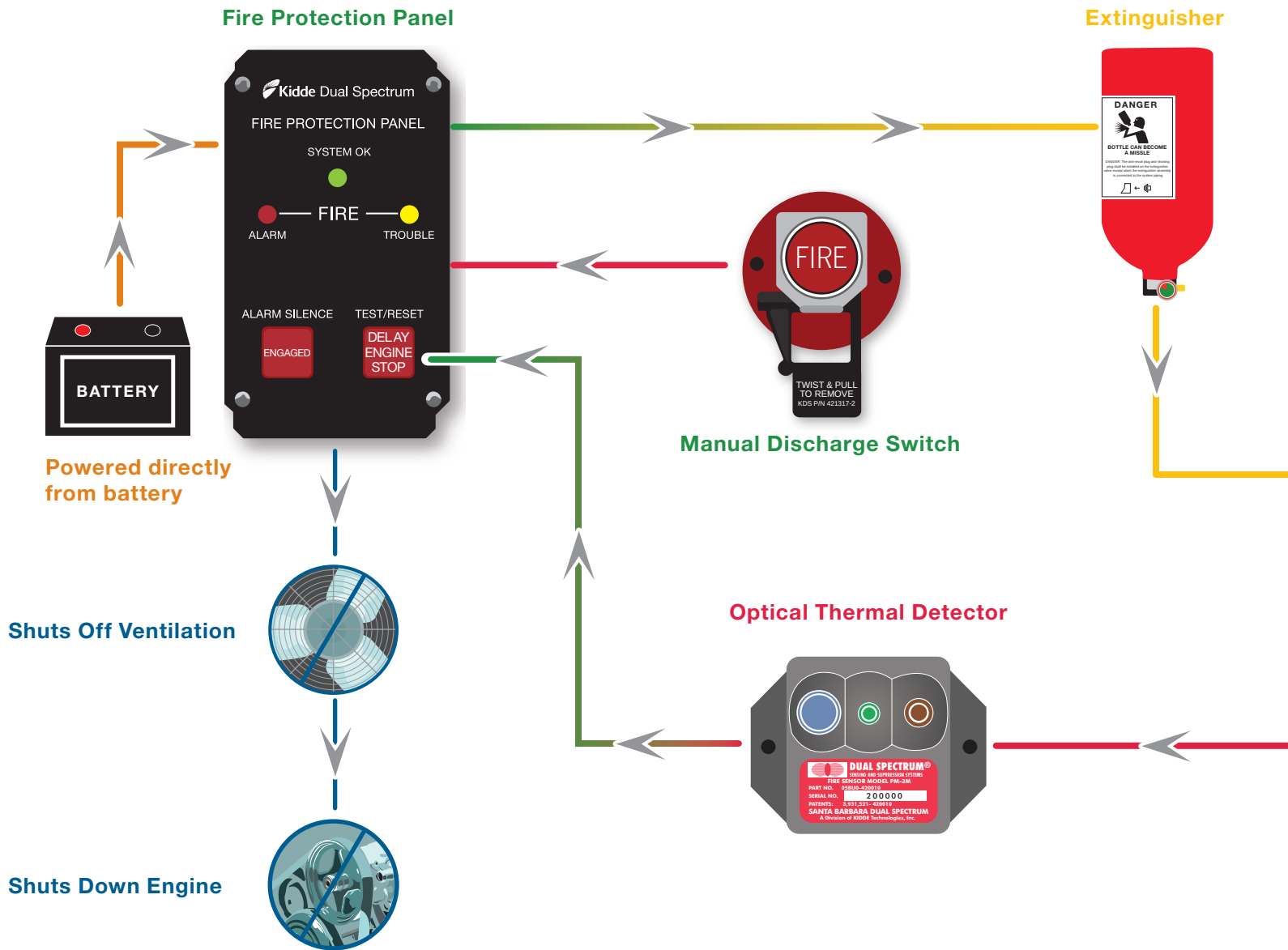
FIRE DETECTOR ACTIVATED



MANUAL DISCHARGE SWITCH ACTIVATED



COMPONENT OVERVIEW



COMPONENT OVERVIEW

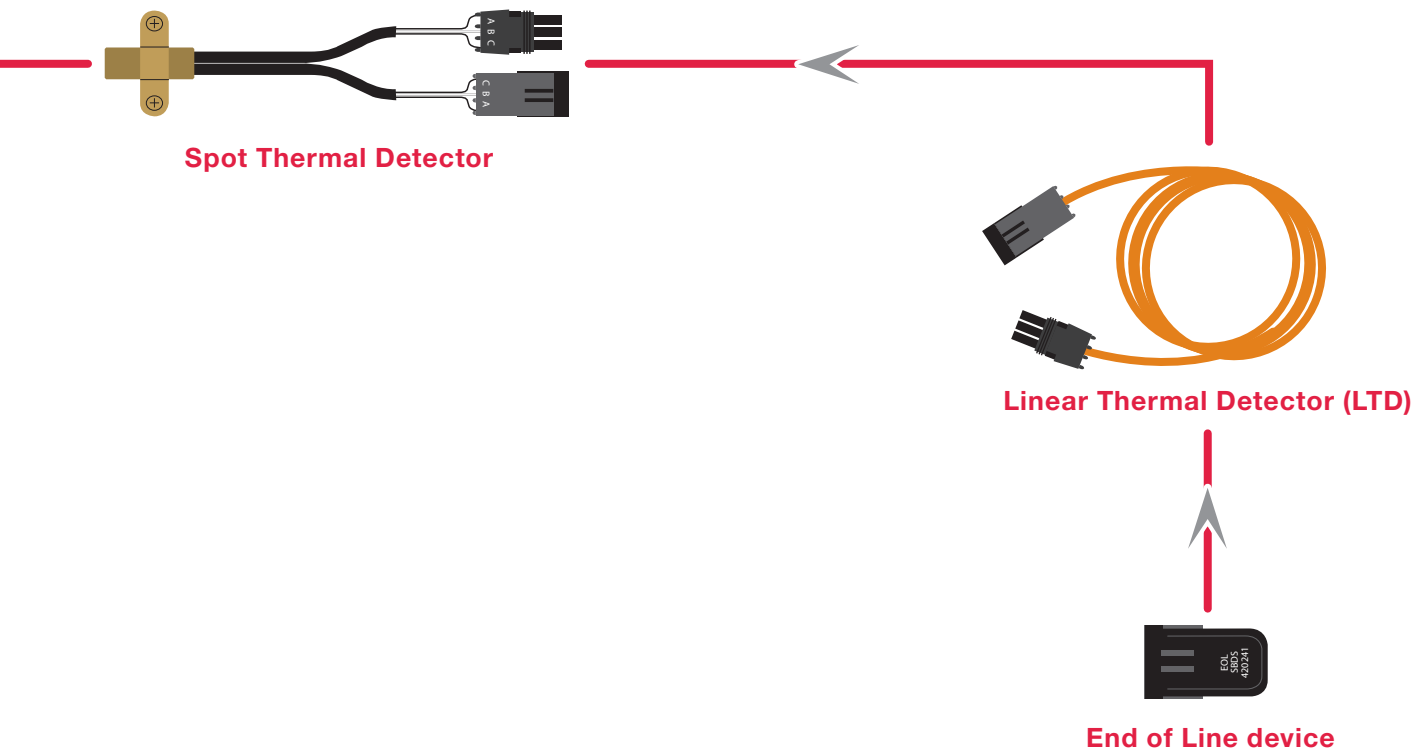
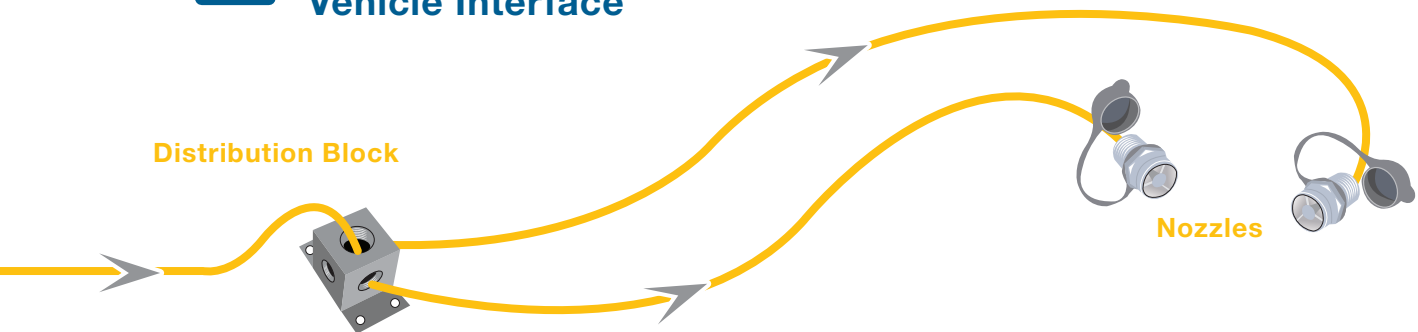


— Operators Control

— Detection

— Suppression

— Vehicle Interface

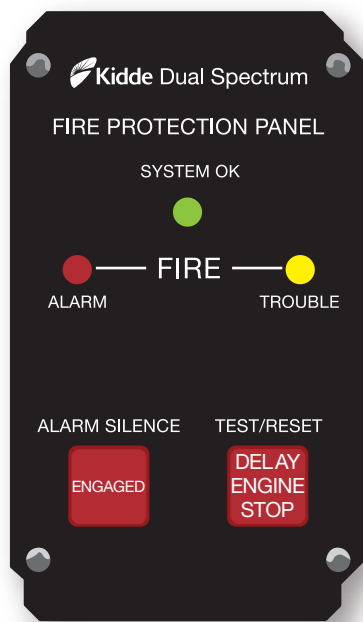


CONTROL PANEL

The control panel is contained in an aluminum housing which can be surface or flush mounted. It is factory programmed for specific vehicle requirements.

The Control panel performs the following functions:

- Provides visual and audible warnings to the driver
- Provides switches for Testing, Resetting, Silencing Alarms and Delaying Engine Shutdown
- Continuously monitors circuits for faults
- Interfaces with the vehicles controls to perform shutdowns, warnings and other signals.



Fire Protection Panel
(P/N 413410)

Specs:

Operating Temperature	-4° F to 158° F (-20° C to 70° C)
Current	50mA
Operating Voltage	12 or 24 VDC
Weight	0.6 lbs.

MANUAL DISCHARGE SWITCH



The Manual Discharge Switch provides the operator the ability to immediately activate the fire suppression system (HVAC and engine shutdown and bottle activation) at any time.

The switch is equipped with a one-time use, replaceable tamper seal.

Activation of the switch is accomplished by removing the tamper seal, lifting the cover, and pressing the red “FIRE” button.



Manual Discharge Switch
(P/N 421437)

— **Replaceable Tamper Seal**
(P/N 421317-2)

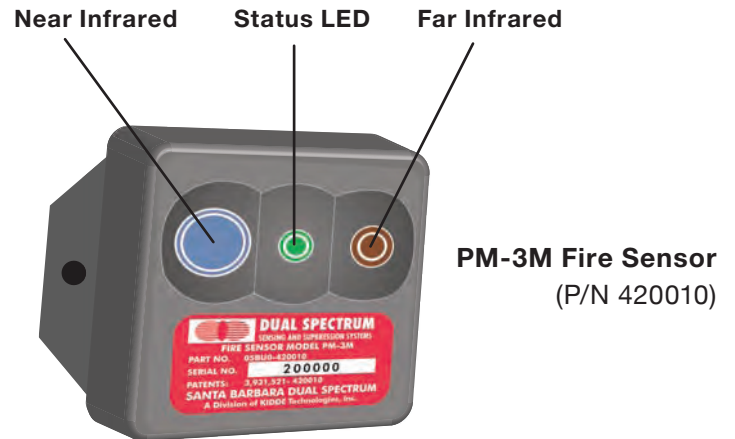
Specs:

Operating Voltage	12 or 24 VDC
Weight	0.1 lbs.

OPTICAL INFRARED DETECTOR

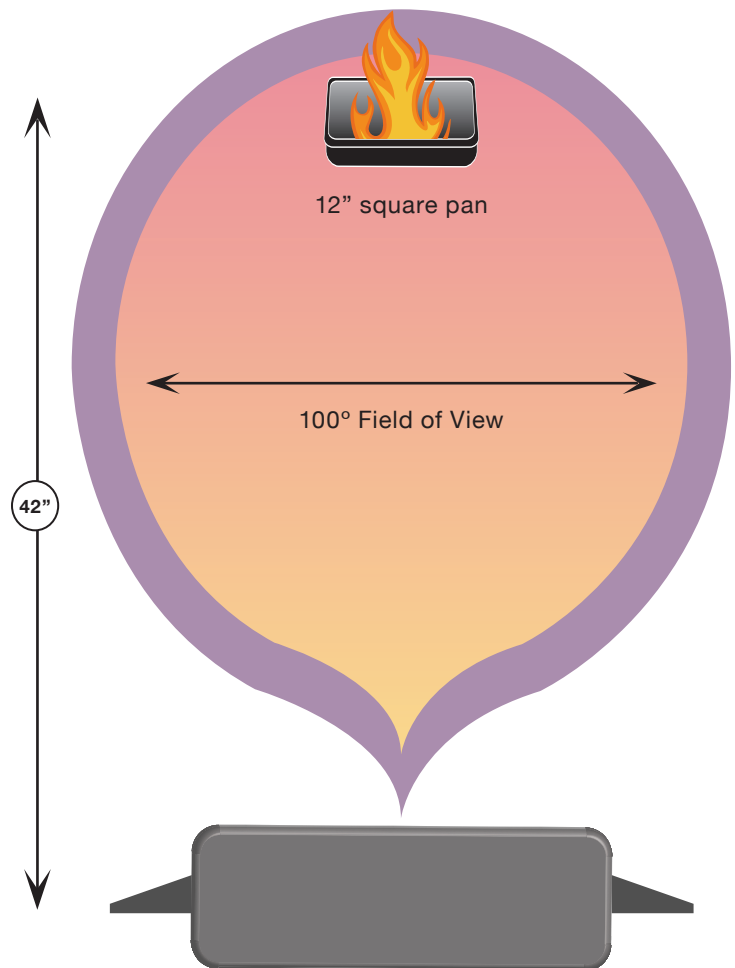
Model PM-3M

The PM-3M optical infrared flame detector can respond in less than 1 second to flames within its field of view. The detectors patented dual band sensors will ignore non-threat type flames and infrared energy typically found in vehicle environments (see diagram on opposite page). The status lamp provides diagnostics for maintenance personnel.



Specs:

Temperature	-40° F to 257° F (-40° C to 125° C)
Current Draw	15mA Nominal 15mA (Max)
Weight	0.6 lbs.
Detection Response	Less than 1 second



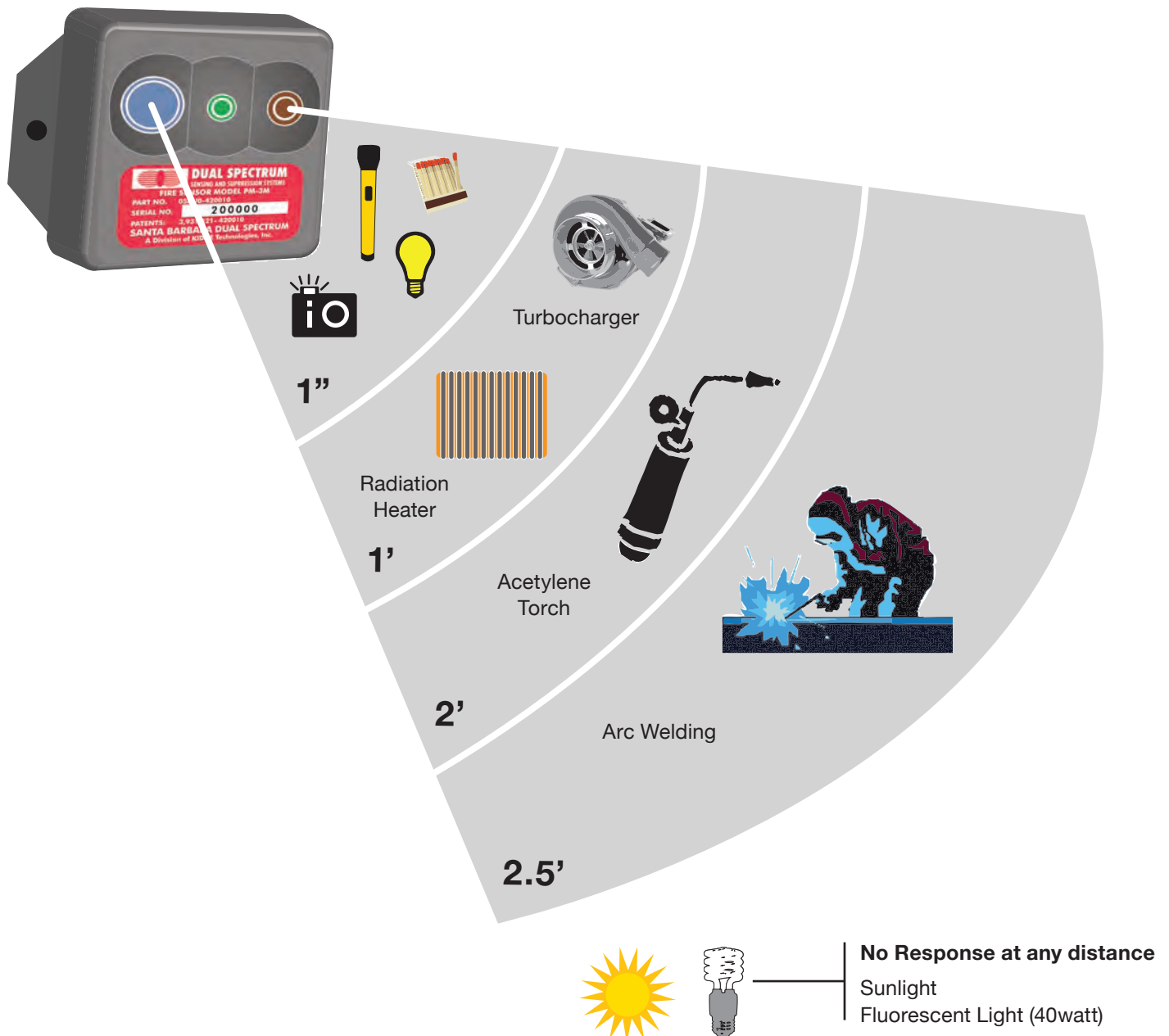
OPTICAL INFRARED DETECTOR



False Alarm Immunity

- **Superior False Alarm Immunity** - will not respond to typical heat or flame sources used in the maintenance or operation of the vehicle.
- **Can look directly at turbocharger and exhaust components.**

PM-3M Fire Sensor
(P/N 420010)

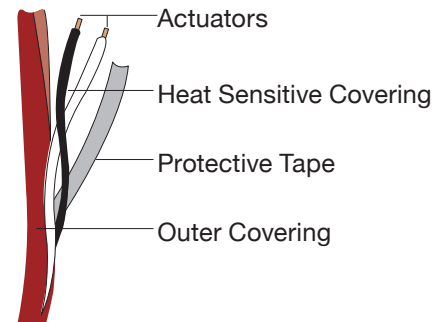


LINEAR THERMAL DETECTOR (LTD)

The LTD is a twin conductor cable with a heat-sensitive covering protected by an outer sheath.

In a fire or overheat condition, the heat-sensitive covering melts, causing the conductors to short, which alarms the system.

If the wire alarms to a fire, the wire must be replaced or the damaged section cut out and a new section added prior to returning the system to service.



Applications

- Alternator Cable
- Starter Cable
- Cable Bundles
- Overheat of large areas

Specs:

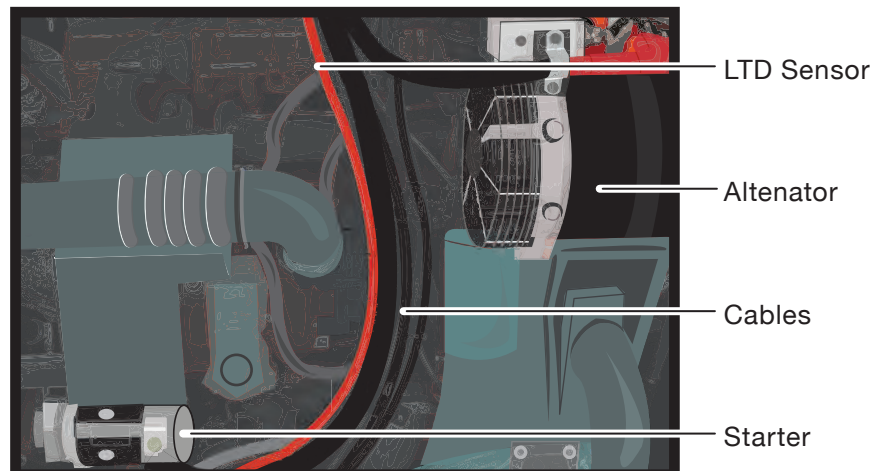
Alarm temperature of the LTD cable	356° F (180° C)
Maximum continuous installation location temperature	221° F (105° C)

LTD Sensor

(P/N 420413)–xx = feet in length.



LTD routing diagram



SPOT THERMAL DETECTOR

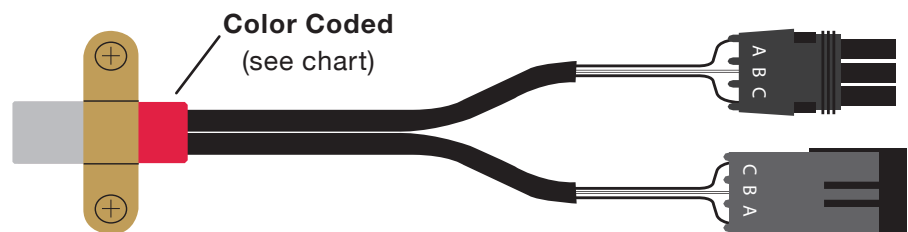


The Spot Thermal Detector is a point thermal switch. The switch contacts close when the temperature of the surrounding air exceeds the pre-set temperature of the detector. The detectors are available with three different set points.

Specs:

Part Number	420419-280	420419-350	420419-450
Alarm Temp (F°)	280°	350°	450°
Max Continuous Temp (F°)	180°	220°	257°
Weight	0.2 lbs.	0.2 lbs.	0.2 lbs.
Typical Applications	Cool Ambient Areas , A/C Electrical, Battery	Normal Engine Areas	Hot Engine Areas; Above Turbo, Exhaust

Spot Thermal Detector
P/N (420419)



End-of-Line Device

The End-of-Line device completes the circuit and is required for supervision of the detection input circuits. The End-of-Line device is installed after the last detector in the series of detectors for each zone.



End of Line Device
P/N (420421)

VERTICAL FIRE EXTINGUISHER

The Fire extinguisher consists of a fast opening valve and a pressure gauge that is attached to a DOT certified cylinder. The extinguisher contains 22 lbs. of dry chemical agent and is charged to 360 psi with nitrogen.

The bracket assembly is mounted to the vehicle and securely holds the extinguisher.

Vertical Fire Extinguisher
P/N (408876)



Fire Extinguisher Bracket
P/N (409475)

***Recharge Kit Available**
P/N (406262-1)

Specs:

Charge Pressure	360 ± 10psi @70
Temperature Range	-20° F to 150° F (-29° C to 66° C)
Extinguisher Weight	46 lbs.
Bracket Weight	2 lbs.

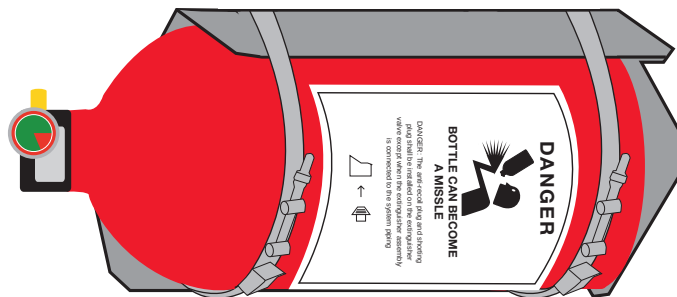
HORIZONTAL FIRE EXTINGUISHER



The Fire extinguisher consists of a fast opening valve and a pressure gauge that is attached to a DOT certified cylinder. The extinguisher contains 22 lbs. of dry chemical agent and is charged to 360 psi with nitrogen.

The bracket assembly is mounted to the vehicle and securely holds the extinguisher.

Horizontal Fire Extinguisher P/N (413102)



Fire Extinguisher Bracket P/N (409475)

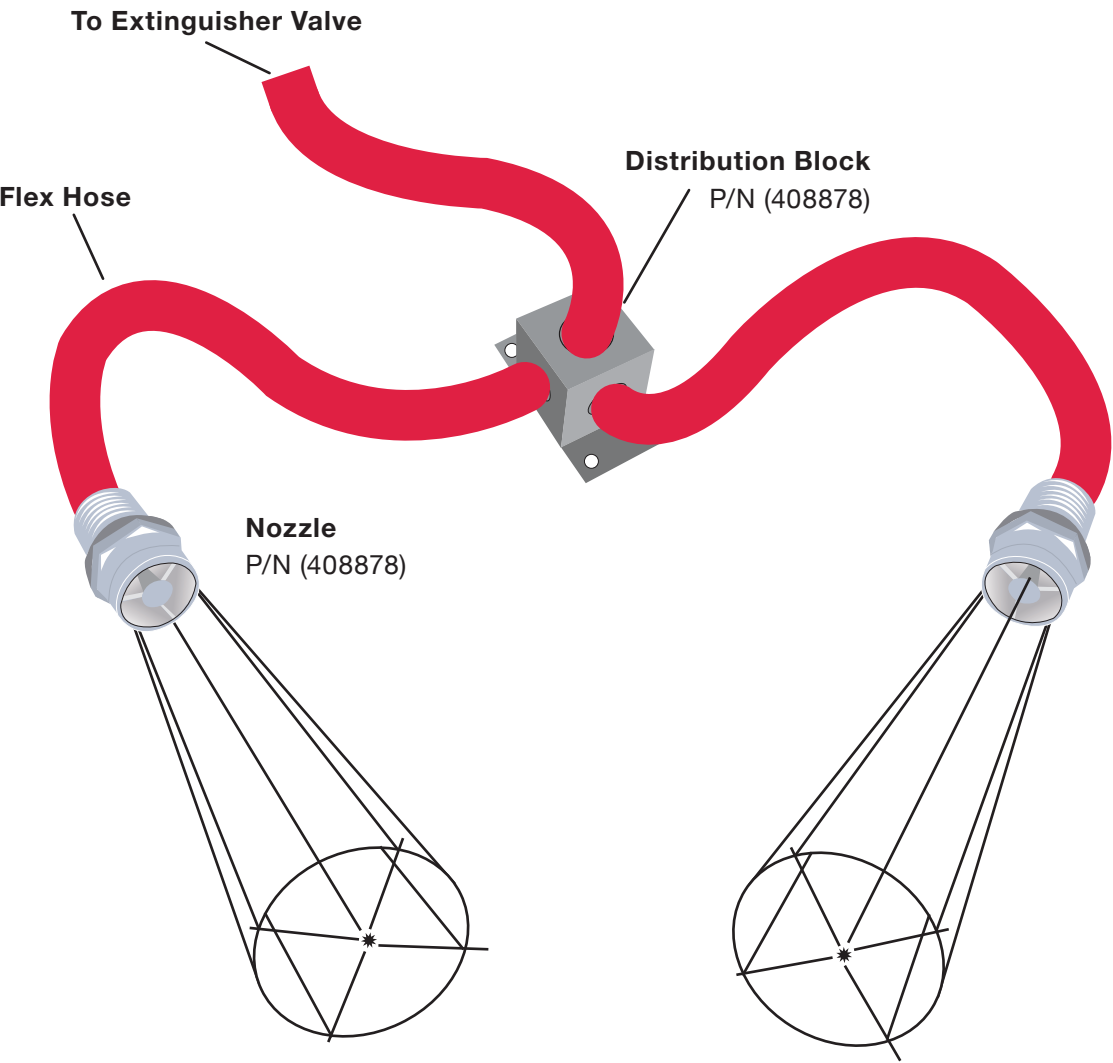
***Recharge Kit Available**
P/N (406262-1)

Specs:

Charge Pressure	360 ± 10psi @70
Temperature Range	-20° F to 150° F (-29° C to 66° C)
Extinguisher Weight	46 lbs.
Bracket Weight	2 lbs.

DISTRIBUTION SYSTEM

The distribution system is comprised of flex hoses or tubing that carries the agent from the extinguisher to the nozzles that are aimed at critical fire threats in the hazard area.



Specs:

Nozzle Weight	.25 lbs.
Distribution Block Weight	2 lbs.

FIRE SYSTEM MAINTENANCE



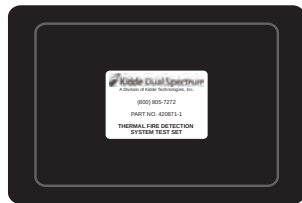
Recommended maintenance intervals specified herein are for typical bus applications and operations; however more frequent intervals may be required based on operational use and environmental conditions.

In order to perform the recommended maintenance you will need to use one of the following test kits.

Thermal Test Kit (P/N 420871-1) This kit is for use with either Spot Thermal Detectors (420419) and/or Linear Thermal Detectors (421430).

Thermal and Optical Test Kit (P/N 420871-2) This kit provides the same test equipment as the “Thermal Test Kit” but also includes an IR Source Simulator which is used to test the Model PM-3M Optical Infrared Detector.

- Refer to the Test Kit Manual supplied with the Test Kits for instruction on connecting and using the kit.



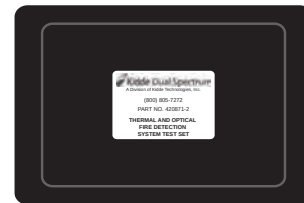
**Thermal
Test Kit**
P/N (420871-1)
(Manual included)



Valve Simulator



Shorting Switch



**Thermal and
Optical Test Kit**
P/N (420871-2)
(Manual included)



Valve Simulator



Shorting Switch

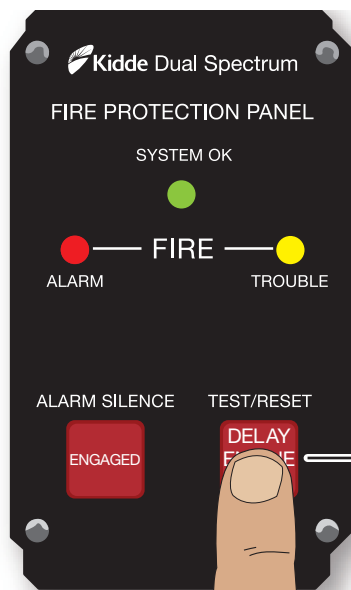


IR Source Simulator



Power Cable

PRE-TRIP INSPECTION

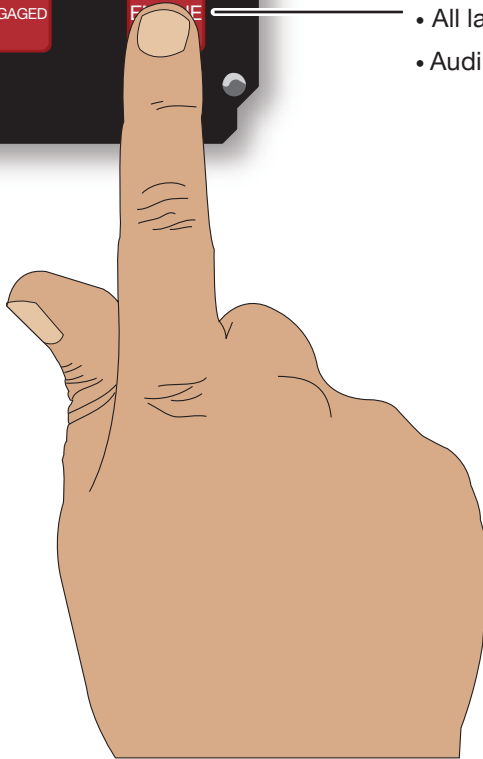


Audible Alarm

1

Press the TEST/RESET Switch.
The Following should occur:

- All lamps and switches should be illuminated.
- Audible Alarm should sound



2

Verify tamper seal on the manual
discharge switch is intact and
access to switch is unobstructed.



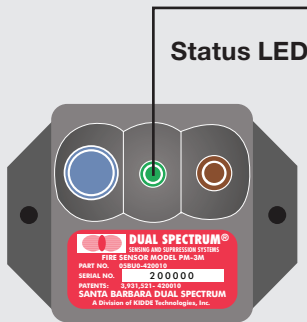
Every 6000 Miles or Monthly (whichever occurs first)



Manual Discharge Switch



Verify tamper seal on the manual discharge switch is intact and access to switch is unobstructed.



Optical Flame Detector



Verify status lamp on the detector face is illuminated solid green.



Verify nothing is blocking the detector's field of view.

Verify the windows on the face of the detectors are free of excess contamination (dirt, oil, grease, etc).



If necessary, clean using water soaked non-abrasive towel.

Spot Thermal Detector



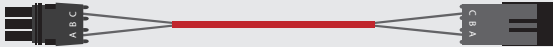
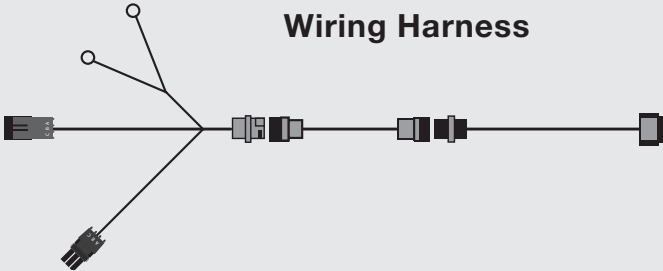
Verify the windows on the face of the detectors are free of excess contamination (dirt, oil, grease, etc).

Verify there is no obvious physical damage.



If necessary, clean using water soaked non-abrasive towel.

SYSTEM MAINTENANCE

Every 6000 Miles or Monthly (whichever occurs first)	
Linear Thermal Detector 	 Verify there is no obvious physical damage.  Verify that the covering to the wires have not been damaged.  Verify that the wire is not bent in any location at a distance of less than six inches Verify wire is secured at least once every 12 inches.
Wiring Harness 	Verify electrical connectors and electrical wiring have no visible damage and all connectors are securely seated.
Extinguisher and Distribution System 	 Verify the extinguisher pressure gauge pointer is in the green area.  Verify distribution piping and nozzles are intact and unobstructed and that nozzle blow-off caps are in place.



Every 18000 Miles or Semi-Annually (whichever occurs first)

Perform a comprehensive fire system test using a Kidde Dual Spectrum System Test Set.

Every Six Years

Have the fire extinguisher rebuilt by a qualified fire protection equipment company familiar with the extinguisher used.

Every Twelve Years

Have the fire extinguisher cylinder hydrostatically tested by a qualified fire protection equipment company familiar with the extinguisher used.



Basic Vehicle FIRE PROTECTION MANUAL