Generic AFSS Checkout Procedure:

Any sections in the document regarding hardware which are not part of the specific system being evaluated shall be skipped.

General Inspection:

Verify no obvious physical damage or condition exists that might prevent system operation.

Protection Panel

- Verify the Protection Panel's green 'SYSTEM OK' lamp is illuminated and that all other lamps are OFF.
- Press the TEST/RESET Switch. The following should occur:
  - All lamps and switches on the Protection Panel should illuminate.
  - An Audible Alarm should sound

Manual Activation Switch

- Verify tamper seal is intact and access to switch is unobstructed.

Fire Detectors

Spot Thermal Detector

- Verify there is no obvious physical damage and the device is free of excess contamination (dirt, oil, grease, etc). If necessary, clean using water soaked non-abrasive towel.

Liner Thermal Detector (LTD)

- Verify there is no obvious physical damage and the LTD is free of excess contamination (dirt, oil, grease, etc). If necessary, clean using water soaked non-abrasive towel.

Optical Detector

- Verify status lamp on the detector face is on solid green.
- Verify nothing is blocking the detector's field of view.
- Verify the windows on the face of the detector are free of excess contamination (dirt, oil, grease, etc). If necessary, clean using water soaked non-abrasive towel. (Do **not** use cleaning fluids or solvents!)

TLSE Detector (Module and Element)

- Verify the status lamp on the face of the TLSE Module is illuminated solid green.
- Verify the electrical connections of the TLSE module and element have no visible damage and all connections are secure.
- Verify the element has no visible damage or wearing and is properly held in place via the mounting clamps. If wear is found, adjust the positioning of the element so that it will not touch adjacent components and eliminates the point of wear. Replace the element if it is cut or if internal material can be seen.
- Visually examine the element to make sure that it is not twisted. If the element is twisted, the sheath will not be smooth. If found, replace the element.
- Visually examine the element's terminal lugs for excessive contamination, clean as necessary.
- Visually examine the element's terminal lugs for hardware that is loose, damaged, or not present.
- If torque marker is used on the TLS element lug nuts, inspect the lug nuts for loosening.

Electrical Harness

- Verify electrical connectors and electrical wiring have no visible damage and all connectors are securely seated.

Extinguisher & Distribution System

- Verify the extinguisher is oriented correctly.
- Verify the extinguisher pressure gauge pointer is in the green arc at room temperature.
- Verify distribution piping and nozzles are intact, unobstructed, and that nozzle blow-off caps are in place.
- Visually inspect the extinguisher for damage such as pits, gouges, dents, or corrosion. Have the extinguisher evaluated by a qualified fire protection equipment company familiar with Kidde equipment if:
    - If a pit, gouge, or cut exceeds a depth of 0.08 inches.
    - If the depth of a dent exceeds 0.25 inches or one-tenth of the average diameter of the dent.
    - if corrosion exceeds a depth of 0.05 inches or a coverage area larger than 15% of the extinguisher's outer surface.

System Testing:

Perform a comprehensive fire system test using appropriate Kidde Fire System Test Kit (Basic Test Kit P/N 420871-1 or Optical Test Kit P/N 420871-2).

Test Preparation

Install Valve Simulator

CAUTION: DISCONNECT **ALL** EXTINGUISHERS AND INSTALL VALVE SIMULATORS IN ACCORDANCE WITH FOLLOWING STEPS BEFORE CONDUCTING ANY TESTING OR TROUBLESHOOTING. FAILURE TO DO SO WILL RESULT IN EXTINGUISHER DISCHARGE.

1. Unplug the extinguisher's firing mechanism connector from the wiring harness.

   NOTE: The "TROUBLE" lamp and the audible alarm on the protection panel shall turn on and system OK shall turn off.

2. Plug the Valve Simulator (420871-98) into the wiring harness.

   NOTE: The "TROUBLE" lamp and the audible alarm on the protection panel shall turn off and system OK shall turn on.

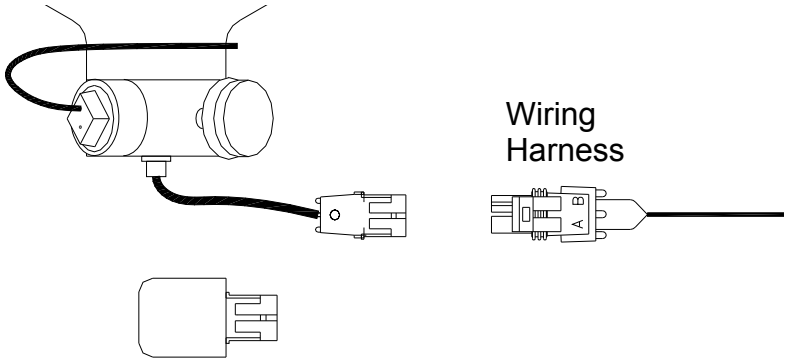

Figure 1 – Valve Simulator Installation

Install Test Switch

1. Locate the detection circuit End of Line (EOL) device installed on the last detector in the detection circuit and remove it.

   NOTE: The "TROUBLE "lamp and the audible alarm on the control panel should be on and system OK should be off.

2. Plug the test switch into the last detector where the EOL was removed.

   NOTE: The "TROUBLE" lamp and the audible alarm on the control panel should *be off and the "SYSTEM OK" lamp should be on.*

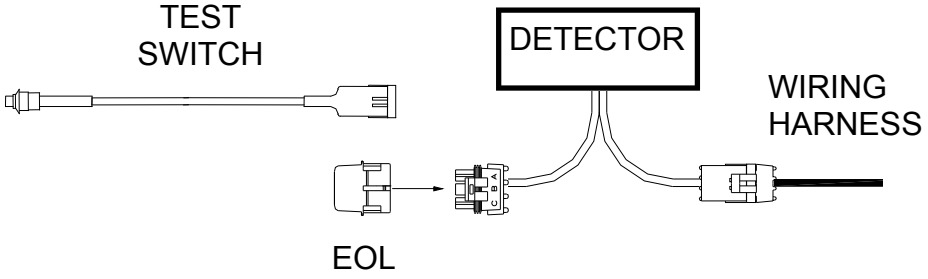

Figure 2 – Test Switch Installation

Setup Optical Detector Source Simulator

Connect the Source Simulator to 24VDC as shown

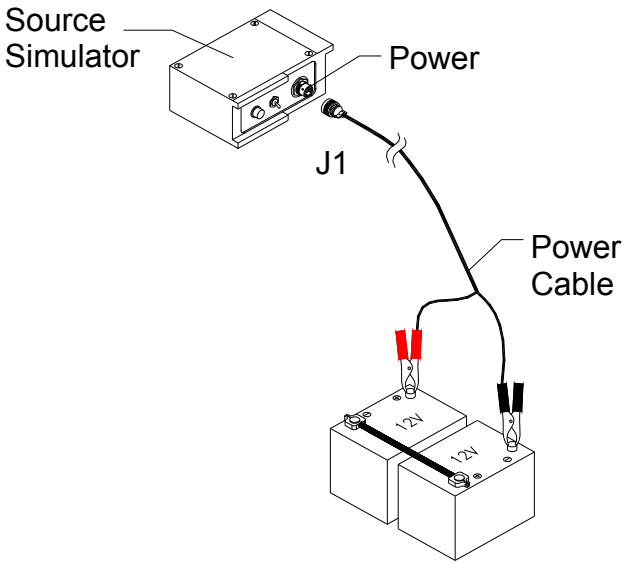

Figure 3 – Source Simulator Installation

1. Attach the J1 connector of the power cable to the POWER connector on the source simulator.
2. Attach the red lead to (+) positive 24VDC power source (typically the vehicle batteries) and then connect the black (-) lead to negative 24VDC.

Testing the System

This testing requires two people for approximately 15 minutes per vehicle. One person will test the fire detector and valve circuits and one person will monitor and operate the Protection Panel. If there is more than one fire detection circuit, each circuit must be tested. If HVAC shutdown and/or the engine shutdown are utilized, the HVAC and/or engine should be running while conducting this test.

NOTE: Proper operation of the HVAC and Engine Shutdown features should be verified during fire detection circuit test(s) and manual activation test, these features do not need to be repeatedly tested during individual detector tests.

CAUTION: VERIFY **ALL** EXTINGUISHERS ARE DISCONNECTED AND VALVE SIMULATORS ARE INSTALLED BEFORE CONDUCTING ANY TESTING OR TROUBLESHOOTING.

IMPORTANT: IF YOUR SYSTEM CONTAINS MORE THAN ONE ZONE OF PROTECTION, EACH ZONE SHOULD BE COMPLETELY TESTED USING THE FOLLOWING TESTS.

To begin testing, press the Test Switch that is plugged into the last detector and verify the following:

◊ FIRE ALARM lamp turns ON.

◊ ALARM buzzer activates.
NOTE: Silence by pressing the ALARM SILENCE button.

◊ Engine Shutdown circuit activates if enabled.

◊ TEST/RESET button illuminates and reads "DELAY ENGINE STOP".

◊ Following the system's time delay:

- The Engine Shutdown circuit activates if enabled.
- The Valve Simulator chirps indicating discharge.

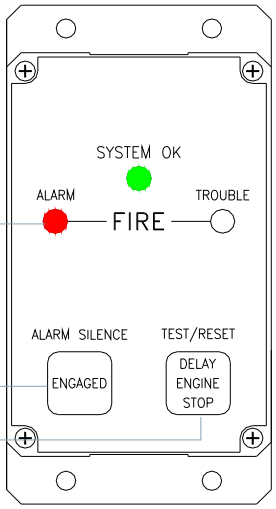

Figure 4 – Fire Protection Panel

Resetting the System

Once the System has activated the valve, the system can be reset by pressing the TEST/RESET button on the Protection panel.

Testing Optical Detectors

Test each optical detector in the system using a source simulator. The operation of the Protection Panel will be exactly the same when the optical detector activates as when the test switch is pressed.

NOTE: If proper operation of the HVAC and Engine Shutdown features has been verified during fire detection circuit testing, it does not need to be repeated during the testing of each optical detector.

Testing False Alarm Immunity

1. Set source simulator toggle switch to FAR.
2. Align source simulator with fire detector face. Make sure the source simulator housing guides are aligned with the top of the fire detector housing.
3. Press the TEST button on the source simulator. It will light-up for a few seconds. Maintain source simulator position against the fire detector until the light goes out.
4. The status LED on the detector *should not be flashing* and the system *should not activate*.
5. Repeat the test with the toggle switch set to NEAR.

Testing Detection

1. Set source simulator toggle switch to DUAL.
2. Align source simulator with fire detector face as shown. Make sure the source simulator housing guides are aligned with the top of the fire detector housing.
3. Press the TEST button on the source simulator. It will light-up for a few seconds. Maintain source simulator position against the fire detector until the light goes out.
4. The Status LED on the detector should be flashing indicating it is in alarm and the HVAC should shutdown if enabled.
5. Following the system configured time delay, the engine should shutdown and the valve simulator should chirp indicating discharge.

Figure 5 – Optical Source Simulator

Resetting Optical Detectors

The RESET switch on the control panel will not reset the status LED on an activated optical detector. The status LED on the detector will continue to blink until the power to the system has been cycled. This can be done after each individual detector test or you can wait until all detectors have been tested.

Testing TLSE Detectors

Testing the TLS Element

Isolating the TLS element

The TLS element must be disconnected from the system before performing the following tests. To disconnect the sensing element from the system, disconnect the gray Deutsch connection at the TLSE module.

Testing Element Grounding (Digital Multimeter Required)

Verify there is less than 10 ohms of resistance between the outer metal sheath of the TLS element and the harness ground wire that connects to pin B of the TLSE module's J1 connector (Black Dephi Weather-Pack shroud connector).

If there is more than 10 ohms of resistance between the TLS element's outer metal sheath and the TLSE module's ground wire, check the grounding locations and connections.

Continuity Test (Digital Multimeter Required)

Verify the resistance between each terminal lug of the element is less than the maximum permitted resistance. The calculated maximum resistance of TLS Element Kidde PN 23119200 is 16Ω.

NOTE: Let the temperature of the sensing element become stable at ambient temperature before performing this test.

a. Connect the multimeter test leads to the terminal lug at each end of the sensing element.

b. Measure the continuity resistance of the sensing element. The measured resistance must not be greater than the calculated maximum resistance.

c. If the measured resistance is more than the calculated maximum resistance, the sensing element must be replaced.

Insulation Resistance Test (Megohmmeter Required)

Verify the resistance between the conductor that is not grounded and the grounded conductor of the element is more than the minimum permitted resistance.

NOTE: Before performing this test, let the temperature of the sensing element become stable at ambient temperature and record the ambient temperature.

Step 1: Calculate the minimum insulation resistance

a. Refer to the Minimum Insulation Resistance Chart (Table 1). Find the applicable ambient temperature and document the corresponding insulation resistance number.

b. Divide the insulation resistance number by 192 (the element length, in inches) to get the minimum insulation resistance in megaohms.

Example: If an element is at the ambient temperature of 70°F (21°C), the corresponding insulation resistant factor from Table 1 is 1.61. Therefore, the minimum insulation resistance is 0.00839 MΩ (8390Ω).

Minimum Insulation Resistance Chart (In Meg Inches)			
TEMP °F/°C	Insulation Resistance Factor @10VDC	TEMP °F/°C	Insulation Resistance Factor @10VDC
65/18	1.82	82/28	1.21
66/19	1.78	83/28	1.18
67/19	1.74	84/29	1.15
68/20	1.69	85/29	1.12
69/21	1.65	86/30	1.10
		87/31	1.07
70/21	1.61	88/31	1.05
71/22	1.58	89/32	1.02
72/22	1.54		
73/23	1.50	90/32	1.00
74/23	1.47	91/33	.977
75/24	1.43	92/33	.954
76/24	1.40	93/34	.931
77/25	1.36	94/34	.909
78/26	1.33	95/35	.887
79/26	1.30	96/36	.866
		97/36	.845
80/27	1.27	98/37	.825
81/27	1.24	99/37	.806

Table 1 - Minimum Insulation Resistance Chart

Step 2: Perform the minimum insulation resistance test

a. Connect the negative megohmmeter lead to the sensing element shell. See Figure 6

b. Connect the positive megohmmeter lead to one of the two terminal lugs.

c. Set the megohmmeter test voltage to 10VDC.

d. Read the megohmmeter. The resistance value must not be less than the value calculated in step 1.

e. If the sensing element has a lower insulation resistance than the value you calculated, replace it.

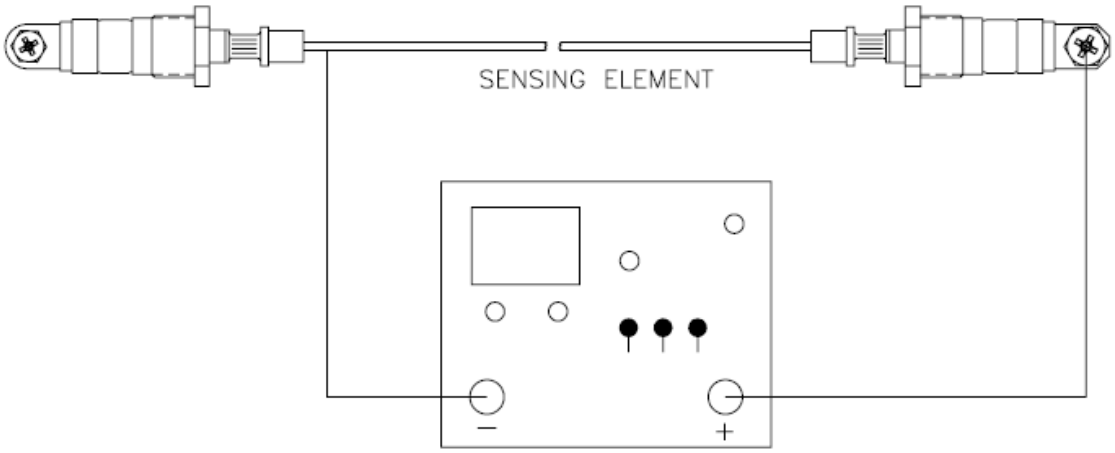

Figure 6 - Megohmmeter Connection

Reconnecting the TLS Element

Reconnect the gray Deutsch connection at the TLSE module.

Testing TLSE Detector Operation

Test each TLSE detector in the system using a heat gun with a 3 inch wide flattened nozzle. Using a thermocouple at the nozzle outlet, set the heat gun so that the output temperature at the nozzle is 850ºF and the fan speed is on the highest setting.

Heat a section of TLSE with the opening of the nozzle within a 1/4inch of the element. The system shall go into alarm in less than 45 seconds. The operation of the system shall be exactly the same as when the test switch is pressed.

Resetting TLSE Detectors

The RESET switch on the control panel will not reset the status LED on an activated TLSE detector. The status LED on the detector will continue to blink until the power to the system has been cycled. This can be done after each individual detector test or you can wait until all detectors have been tested.

Testing the Manual Discharge Switch

If your vehicle is equipped with a Manual Discharge Switch, perform the following test.

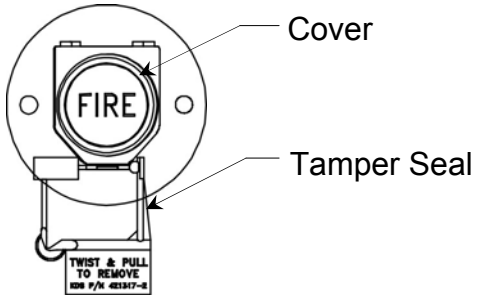

Figure 7 – Manual Discharge Switch

1. Break the tamper seal
2. Lift the cover and push button.
3. Verify the following:

◊ FIRE ALARM lamp turns ON [flashing red]

◊ Valve simulator(s) chirps immediately indicating extinguisher(s) discharges

◊ HVAC shutdown circuit activates immediately if enabled

◊ Engine shutdown circuit activates immediately if enabled

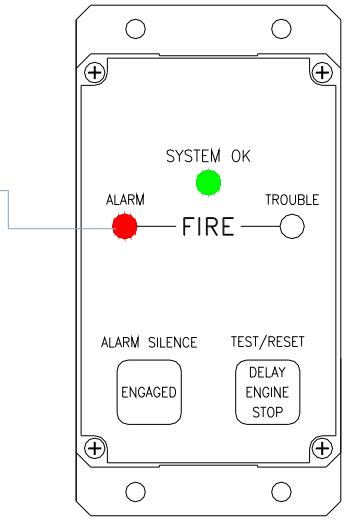

Figure 8 – Fire Protection Panel

Resetting the System after manual discharge

The RESET switch on the control panel will not reset the control panel if a manual discharge switch has been activated. To reset the system after a manual discharge, cycle the power to the system.

Replacing the Seal on the Manual Discharge Switch

The Manual Discharge Switch seal (PN 421317-2) should be replaced after conducting the above test. Do not use unapproved materials, such as zip ties, to replace the seal on the Manual Discharge Switch.

Revision History

Revision	Date	Preparer	Comments
A	Nov. 17, 2010	Chad Rouse	Initial Release
B	June 15, 2012	Chad Rouse	Incorporated TLSE
C	Aug. 16, 2012	Chad Rouse	Expanded TLSE tests