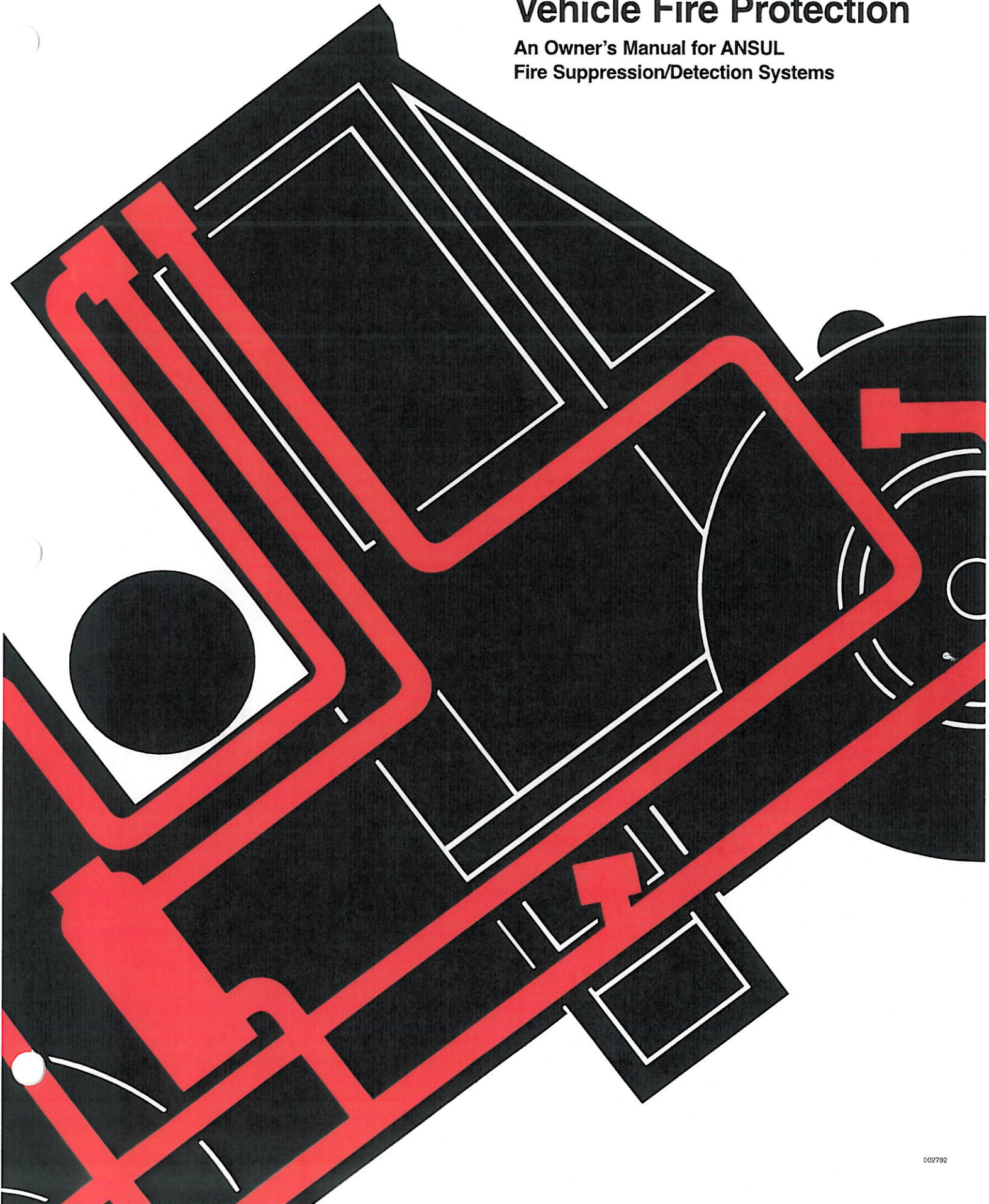


Vehicle Fire Protection

An Owner's Manual for ANSUL
Fire Suppression/Detection Systems



Off-road vehicles do have fires

Statistics show that off-road vehicles burn...with alarming frequency. These vehicles are susceptible to fire for several reasons. They often operate steady for several hours at a time (sometimes around the clock). They use flammable liquids – lubricating oil, gasoline, diesel oil, greases and hydraulic fluids – in their normal operation. They also generate heat – from engine blocks, manifolds, turbochargers and brake systems – which can ignite these flammable liquids and debris.

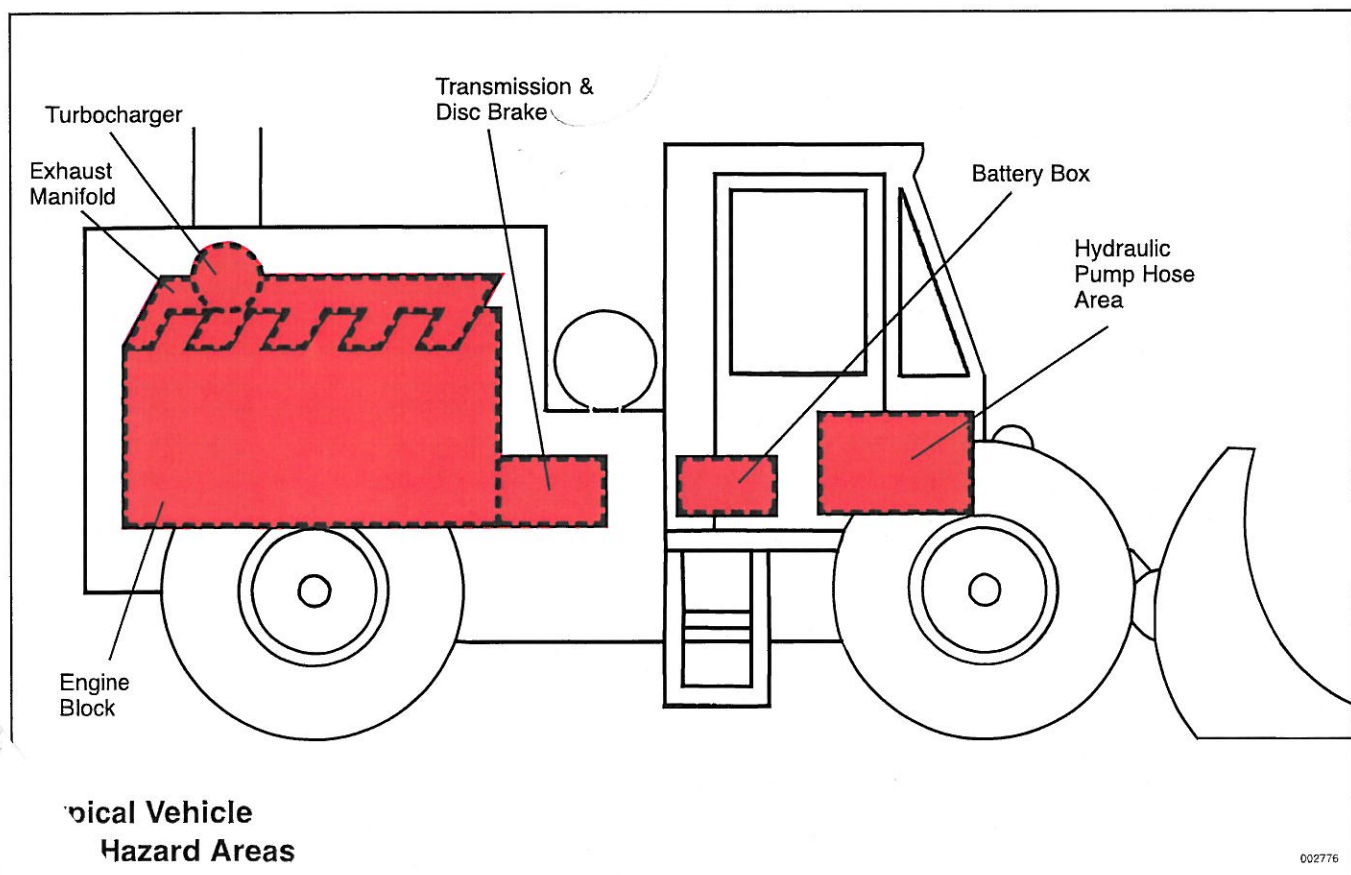
Since the passage of the federal and state clean air acts, many vehicles, including most busses operated by mass transit authorities and state agencies, have been converting to cleaner burning fuels such as LPG, LNG, and CNG instead of gasoline or diesel fuel. Use of these fuels is an essential component of improving our environment, but their use raises the possibility of dangerous gas leaks.

When fire breaks out, it can result in expensive repair or replacement of valuable equipment, costly downtime or loss of business continuity. Worse yet, it can mean serious personal injury to vehicle operators or passengers.

Insurance companies are well aware of these facts. That's why insurance rates are skyrocketing.

As the owner of a vehicle equipped with an ANSUL Fire Detection/Suppression System, you've taken an important step in facing the fire problem. You are dramatically reducing your potential fire loss and helping to ensure personnel safety.

This owner's guide has been provided to help you understand how your ANSUL Fire Detection/Suppression System works, your responsibilities for fire prevention and maintenance, and what to do in case of fire. In no way is this guide intended to provide detailed installation instructions. Should you have any questions or require assistance, contact your nearest authorized ANSUL products distributor or ANSUL Technical Services.



SAFETY PRECAUTIONS

The fire system described in these materials is a suppression system only and is not designed or intended to extinguish all fires, particularly when unusual amounts of combustible materials and an ample oxygen supply are present. It is extremely important that alternative firefighting equipment be available in case the system does not totally extinguish a fire.

Use extreme care to prevent the accumulation of debris, combustible materials and fluids which could intensify the fire or cause it to spread to areas where there was no previous potential for fire.

If modifications are made to the equipment being protected or if the fire detection and/or suppression system is disconnected for any reason, make certain the fire equipment is immediately inspected and tested by an authorized ANSUL vehicle systems distributor.

If an automatic fire detection and actuation system has not been supplied or has been disconnected, system actuation and discharge will not occur unless the fire suppression system is manually actuated. Reliance on a manual release system usually results in a slower reaction to fire.

Your role in protecting your vehicle from fire

Your ANSUL Fire Suppression System is custom-designed to protect specific hazard areas on your vehicle. It's been carefully engineered for reliability and built to the highest quality standards. Every component has been tested to ensure long life and dependable performance.

With proper maintenance, your ANSUL Fire Suppression System should give you years of fire protection.

The main purpose of the manual, however, is to explain the most basic form of fire protection – fire prevention. It outlines steps you can take to prevent a disastrous fire. Precautions which can greatly reduce the risk of serious fire damage.

Fire prevention on vehicles relies upon two basic factors:

- 1.** Inspection and preventative maintenance at points where fires are most likely to start – engine blocks, electrical systems, turbochargers, exhaust manifolds and brake systems.
- 2.** Regular cleaning of all areas where flammable materials such as fuel, oil, grease, hydraulic fluid and combustible debris may collect.

Vehicle Fire Prevention Maintenance

The following is a suggested daily maintenance outline which can help reduce the risk of fire on your vehicle.

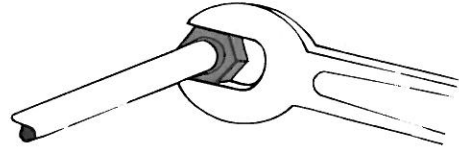
CAUTION: Take care during vehicle maintenance, cleaning, or welding. To avoid unintentionally setting off the system and the discharge of agent, do not cut, pinch, or apply heat exceeding 200 °F (93 °C) to the detection lines of the system.

1. Check all oil, hydraulic fluid and gas lines for cuts, abrasions or undue wear. Replace as needed.



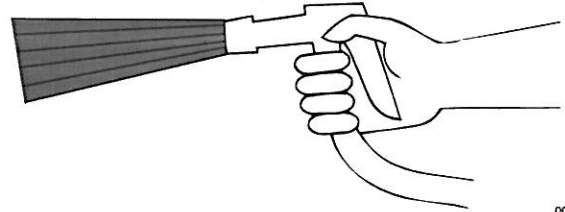
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2. Inspect all oil, hydraulic and gas line fittings for tightness. Clean off all residue and tighten.



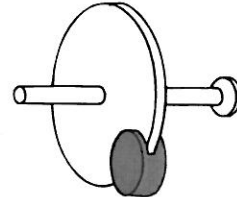
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3. Inspect and clean engine area. Depending upon the operation of the vehicle, use water or steam to clean it. Schedule cleaning for the end of the work shift when heat buildup may occur after the engine is shut down.



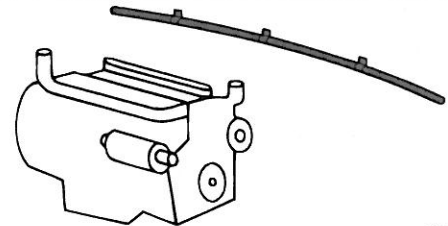
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4. Check braking system for proper adjustment – especially if brakes overheat when not engaged.



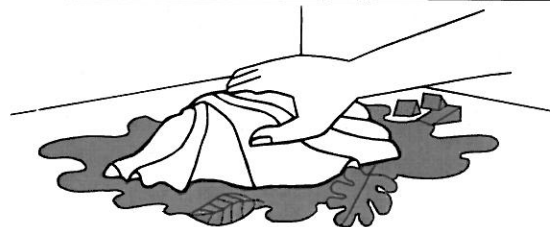
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5. Check all possible ignition points (engine block, exhaust manifolds, turbochargers, etc.). Make sure oil, hydraulic fluid and gas lines are not in contact with these ignition points.



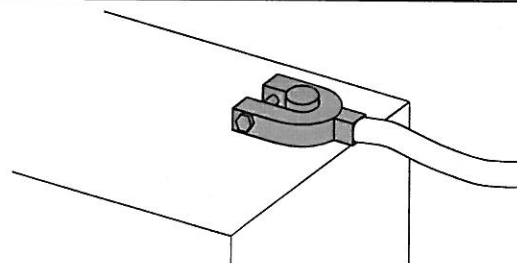
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6. Clean vehicle of all combustible debris – dry vegetation, grain particles, coal dust, etc. Also, remove any oil and fuel drippings.



000625

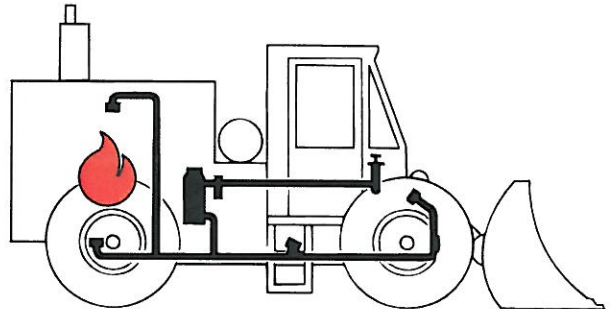
7. Check all electrical lines and connections for tight fit, wear or abrasion. Replace any defective electrical equipment or wiring.



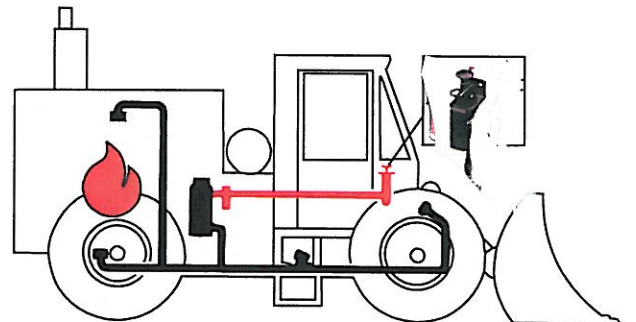
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How your ANSUL Fire Suppression System works . . . manually

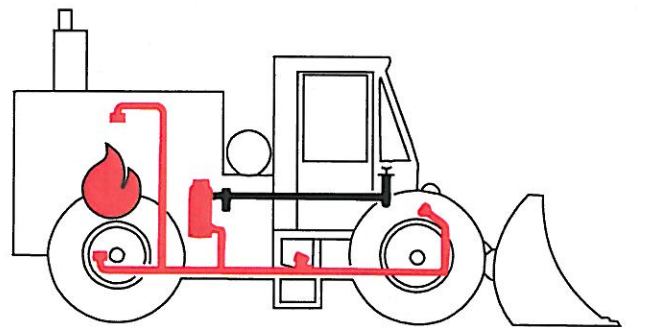
1. A fire starts in the protected area. Equipment operator should bring equipment to a complete stop, set the brake, and turn off the engine.



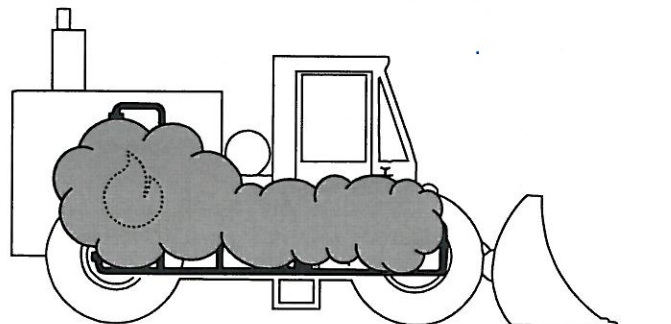
2. Equipment operator pulls the ring pin and strikes the plunger on the manual actuators. Pressure from the actuator causes the ANSUL Fire Suppression System to actuate.



3. Expellant gas pressure "fluidizes" the dry chemical extinguishing agent and propels it through distribution hose.



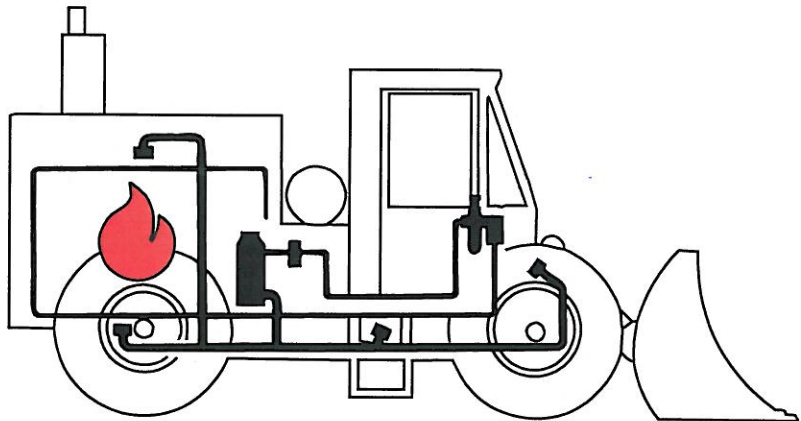
4. Dry chemical extinguishing agent is discharged through fixed nozzles into protected areas, suppressing the fire.



**And you can have automatic 24 hour protection with
ANSUL CHECKFIRE Detection and Actuation Systems . . .**

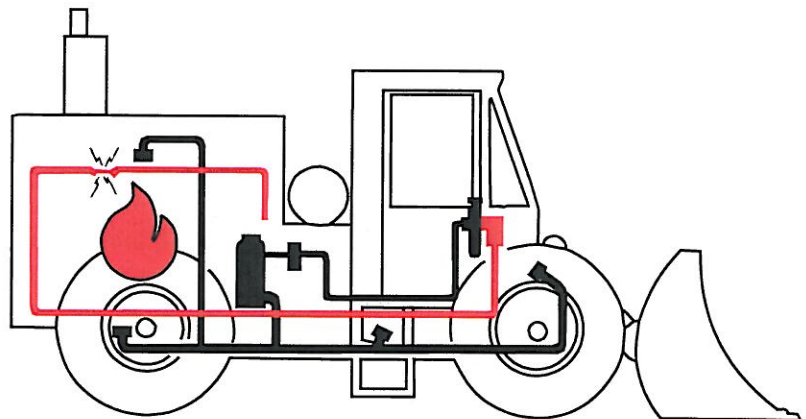
How the system works with optional CHECKFIRE Electric Detection and Actuation

1. A fire starts in the protected area.



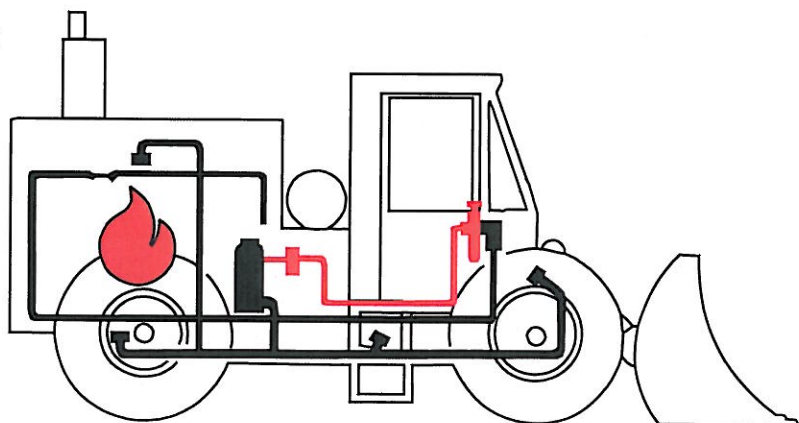
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2. Linear, spot detectors, or Triple IR flame detectors signal the system control module indicating that a fire has started in the protected area.



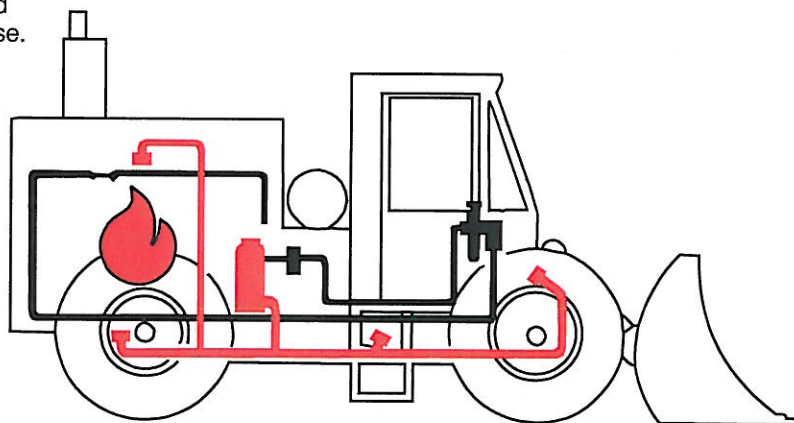
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3. The Control Module actuates the fire suppression system. The module will also provide time delay, shut down functions and activation of auxiliary vehicle components in accordance with your installation.



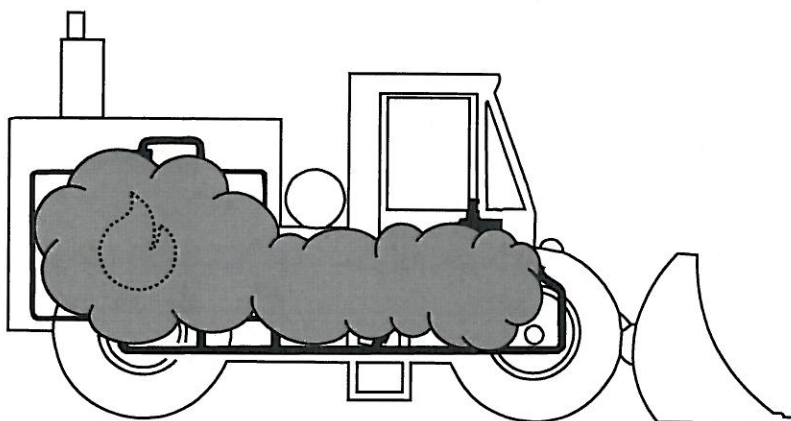
002783

-
4. Expellant gas pressure “fluidizes” the dry chemical extinguishing agent and propels it through the distribution hose.



002784

-
5. Dry chemical extinguishing agent is discharged through fixed nozzles into protected areas, to suppress the fire.



002785

Optional LVS (Twin Agent) Fire Suppression System

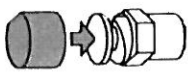
Along with dry chemical fire suppression system protection, some vehicles, because of their size, require an additional type of system. This type of system is called a twin agent system. An ANSUL LVS, Liquid Agent System, is designed to discharge wet chemical into the protected hazard areas simultaneously with the dry chemical discharge. The addition of the wet chemical produces a cooling effect onto the flammable fuel and the surrounding surface areas. The wet chemical can flow into hard to reach areas where fuels may have flowed into.

Make sure your ANSUL Fire Suppression System is

The ANSUL Fire Suppression System is your second line of fire defense in case your fire prevention efforts are not enough. However, in order to perform properly, your ANSUL System requires periodic inspection and maintenance.

Nozzles

BLOW-OFF CAPS
IN PLACE



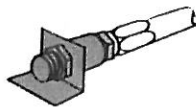
002797

NOZZLES NOT CLOGGED
OR COVERED WITH DEBRIS



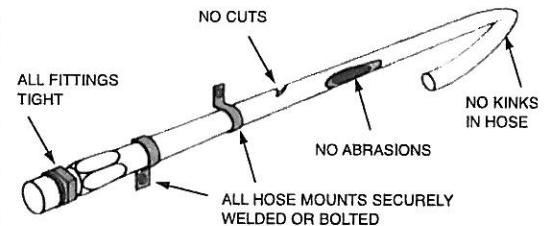
002798

NOZZLES TIGHT
IN BRACKETS



002799

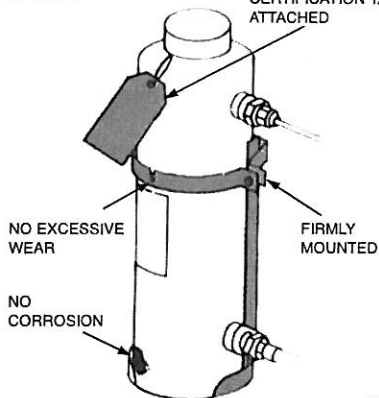
System Hydraulic Hose



002786

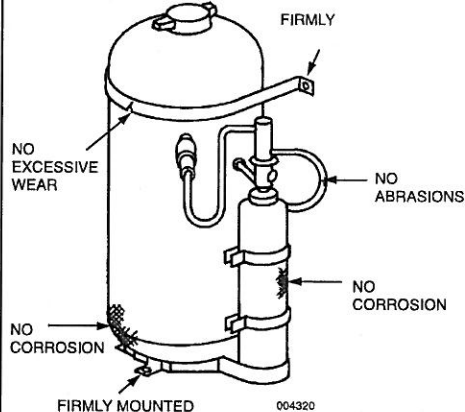
Agent Tank A-101

AUTHORIZED ANSUL
DISTRIBUTOR
CERTIFICATION TAG
ATTACHED



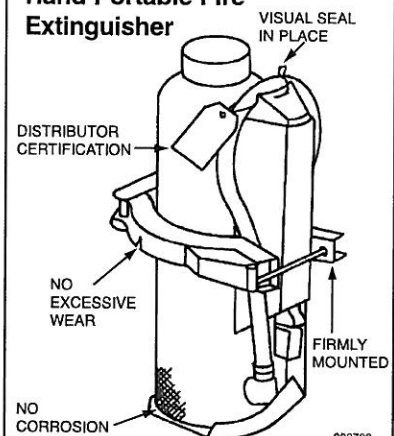
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Agent Tank LVS or LT-A-101-125/250



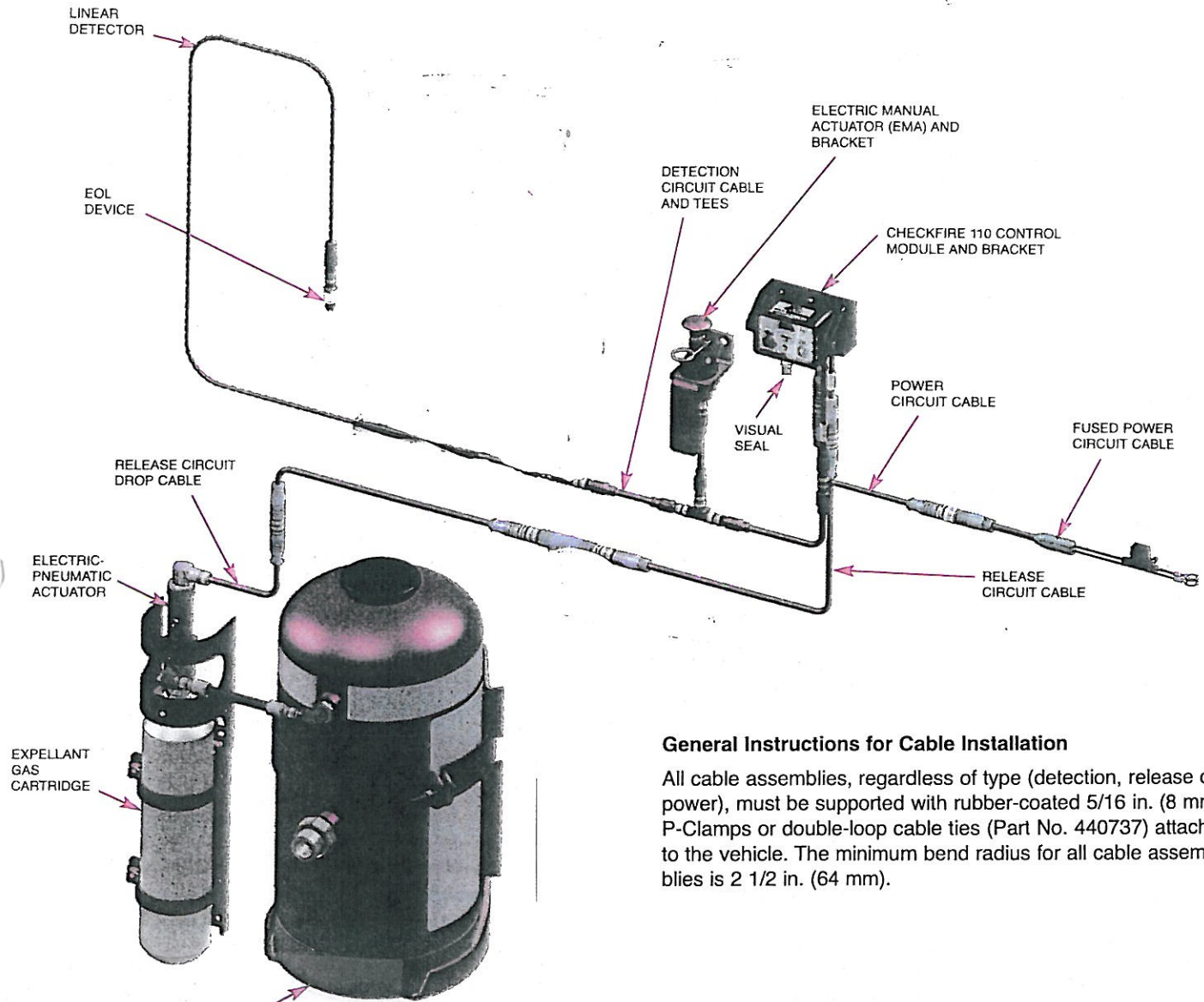
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Hand Portable Fire Extinguisher



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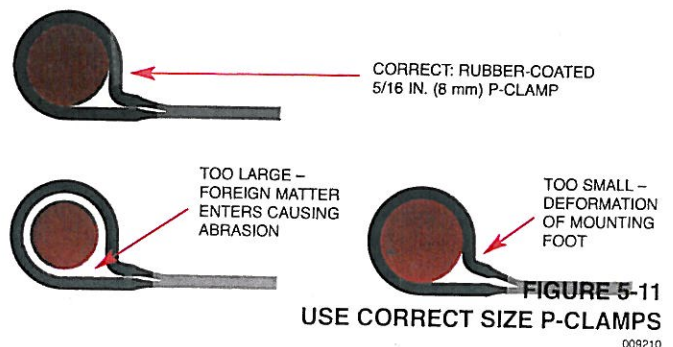
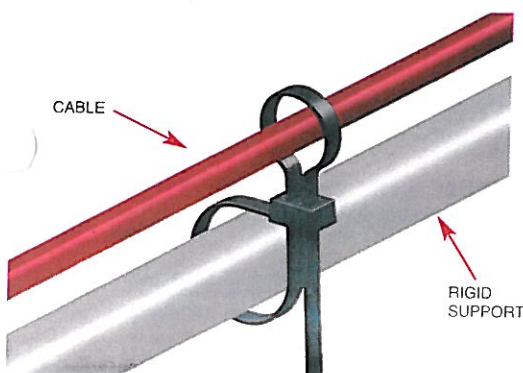
kept in good working order.



General Instructions for Cable Installation

All cable assemblies, regardless of type (detection, release or power), must be supported with rubber-coated 5/16 in. (8 mm) P-Clamps or double-loop cable ties (Part No. 440737) attached to the vehicle. The minimum bend radius for all cable assemblies is 2 1/2 in. (64 mm).

If attachment points are not available for P-Clamps, a double-loop cable tie (Part No. 440737) is acceptable for support and separation between cables and the securing point. **Note: Cables should not be supported by hydraulic hoses.** See Figure 5-12.



Provide for vehicle modification

Your ANSUL Fire Suppression System was custom designed and installed on your vehicle to protect specific hazard areas from fire. Should you add accessory equipment to your vehicle at a later date, or make major mechanical modifications, you may be reducing the capabilities of the ANSUL Fire

Suppression System. When such modifications are made, contact your ANSUL distributor. He can reevaluate your ANSUL System to ensure it protects all hazard areas from fire.

Provide for periodic maintenance

Periodic maintenance is essential to ensure that your ANSUL Fire Suppression System is operational. Contact your ANSUL distributor for periodic follow-up, in-depth inspection and maintenance.

Protect against fires outside of the hazard area

Hand portable fire extinguishers are an effective way to suppress fires which may occur away from the vehicle, or in areas not protected by the ANSUL Fire Suppression System. Your ANSUL distributor can recommend the proper size, type and placement of hand portable extinguishers and train your personnel in their operation, inspection and maintenance.

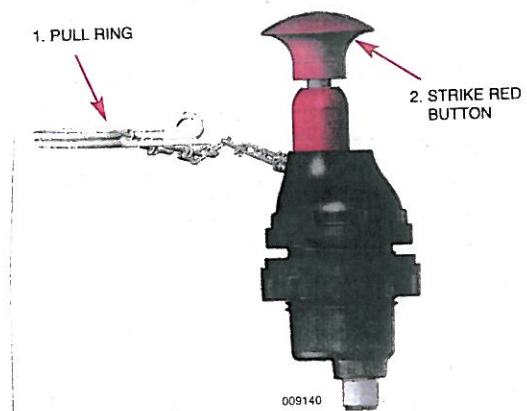
Should fire occur in an area not protected by the ANSUL Fire Suppression System, a hand portable fire extinguisher should be employed as follows:

1. Shut off the vehicle's engine and set brakes.
2. Evacuate the vehicle and secure a hand portable fire extinguisher.
3. Approach the fire from the upwind side.
4. Actuate the hand portable fire extinguisher per instructions printed on the extinguisher's nameplate.
5. Once the fire is extinguished, stand by in case the fire reflash.

In the event of a fire on your vehicle

To manually operate system:

-
- 1. Shut off the vehicle**
 - 2. Set the brakes**
 - 3. Pull the ring pin on manual actuator and strike the red button**
-



009140

000627

-
- 4. Evacuate the vehicle**
 - 5. Stand by with a fire extinguisher**
-

IN CASE OF FIRE

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

- When the detection circuit alarm sounds, bring the equipment to a safe controlled stop, shut off the engine, and exit.
Note: Equipment left running may add fuel to the fire or reignite the fire with heat or sparks.
- If possible, safely exit and move a safe distance from vehicle, and stand by with hand portable extinguisher.

WARNING

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

Automatic Detection and System Actuation

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

Manual System Operation

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

Perform one of the following to manually operate the system:

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

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

CAUTION

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

Automatic Equipment Shutdown

The fire suppression system may be equipped with a pressure switch. This switch operates when the fire suppression system expellant gas cartridge is released. If a shutdown device is connected to the pressure switch, make certain all responsible

personnel understand shutdown device operation, and when it will operate with reference to a release/discharge condition.

If the "DELAY/Reset/Silence" button (on the control module) is pushed and released **before the end of time delay cycle** (5 or 15 seconds), the time delay repeats the delay cycle, delaying eventual system discharge and pressure switch operation. This delay can be repeated (using the "DELAY/Reset/Silence" button) as many times as necessary to safely stop the vehicle before the system discharges and automatically shuts down the vehicle. **Note:** Press and hold will not pause the time delay.

WARNING

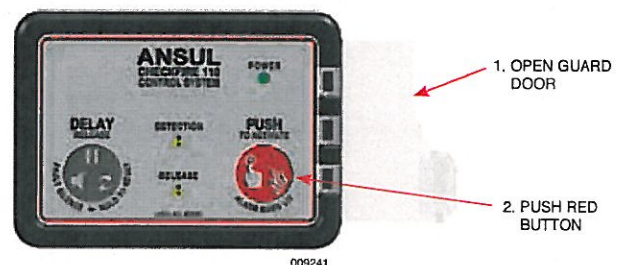
Delay of system operation may allow the fire to intensify, which could result in a more difficult fire to suppress.

Exit Vehicle and Move Safely Away

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

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

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



----- OR -----

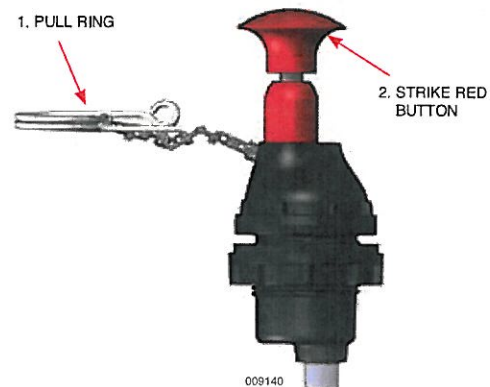


FIGURE 7-1
IMMEDIATE RELEASE OPTIONS

INSPECTION AND MAINTENANCE

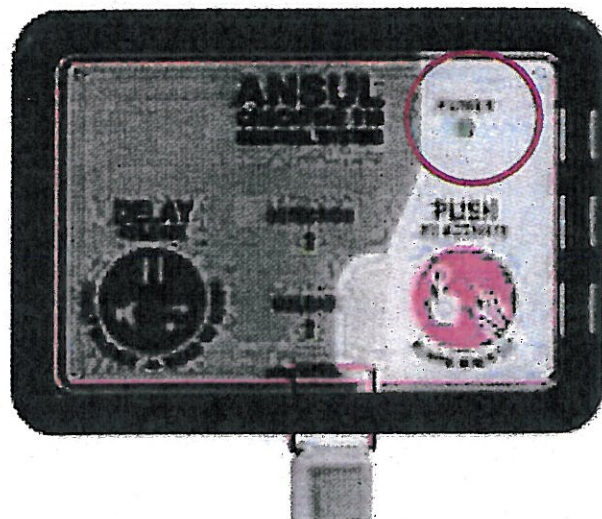
To help ensure the CHECKFIRE 110 Detection and Actuation System will operate as intended, proper inspection and maintenance procedures must be performed at the specified intervals.

DAILY INSPECTIONS

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

- Power LED is GREEN and steady-on, see Figure 8-5
- All other LEDs are off (not steady-on or pulsing)
- Sounder is silent

If any other conditions exist, contact the local Authorized ANSUL Distributor or a person who has been trained and authorized by Tyco Fire Protection Products to perform inspection and maintenance service on the CHECKFIRE 110 System.



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 Tyco Fire Protection Products to perform maintenance checks.

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

1. Check condition of the CHECKFIRE 110 Control Module.
 - a. Confirm securely mounted, either in the CHECKFIRE 110/210 Mounting Bracket or surface mounted. Verify all fasteners are tight and control module Enclosure Nut is hand-tight.
 - b. If secured in bracket, check bracket for damage or wear to ratchet teeth.
 - c. Check control module for damage or undue wear.

Inspection and Maintenance Record

Date	Authorized ANSUL Distributor	Recharge	Inspection	Action Taken

Your Authorized ANSUL Distributor

TROUBLESHOOTING

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

TABLE 9-1: POWER LED INDICATIONS

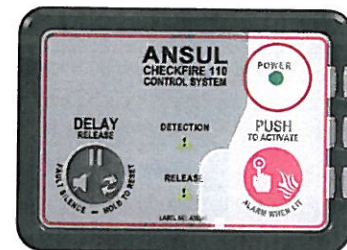
Normal Operating Condition

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

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

NORMAL
CONDITION

LED GREEN
STEADY-ON



009180

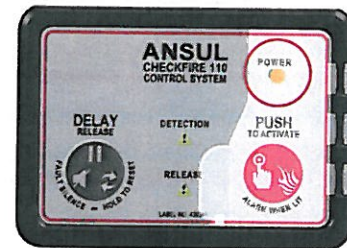
External Power Fault

Power LED pulsing AMBER with Sounder 1 x 30 seconds indicating External Power Circuit fault.

After 10 minutes Sounder auto-silences to conserve the internal power source.

EXTERNAL
POWER FAULT

PULSING
1 X 30 SECONDS



009180b

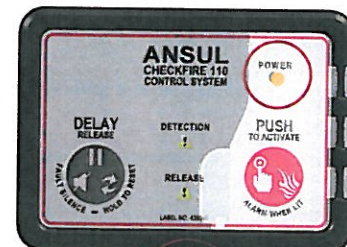
Power LED pulsing AMBER 1 x 30 seconds and Sounder is OFF (after 10 minutes to conserve power) indicating External Power Circuit fault.

The system continues to operate on internal reserve power to supervise the power, detection, and release circuits; remains ready to respond to a fault/fire condition.

- Check Power Circuit Cable and Fused Power Circuit Cable for proper connections
- Confirm fuse is good and installed correctly. (See Section 5 – Installation, page 5-14 for correct removal and replacement of fuse.)
- Check external power supply for proper voltage
- Replace cables if unable to clear fault indication

EXTERNAL POWER
FAULT,
SOUNDER OFF

PULSING
1 X 30 SECONDS



009180b

Loss of All Power

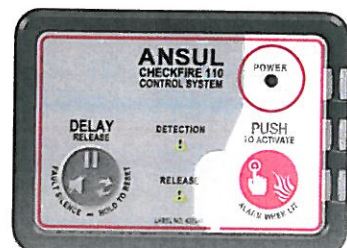
Power LED shows no indication for more than 30 seconds – CHECKFIRE 110 has lost all power.

CAUTION

System is not providing protection until power is restored.

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

LOSS OF ALL
POWER



009180

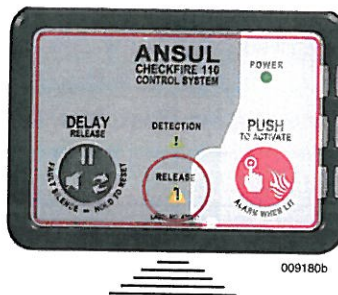
TABLE 9-2: RELEASE CIRCUIT FAULT

Release Circuit Fault

Release Circuit Fault 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
- Check for activated or missing PAD(s); replace as needed following Section 8 – Recharge instructions

RELEASE
CIRCUIT FAULT
PULSING
1 X 10 SECONDS



Post Discharge Mode/Release Circuit Fault

Release Circuit Fault LED, "PUSH to Activate / Alarm When Lit" LED and Sounder pulsing 1 x 10 seconds indicating Post Discharge Mode, and Release Circuit fault.

- Check for activated or missing PAD(s), replace as needed following Section 8 – Recharge instructions
- If fault does not clear, check Release Circuit Cables for an open circuit or a ground fault; replace cables as needed

POST
DISCHARGE
MODE
PULSING
1 X 10 SECONDS

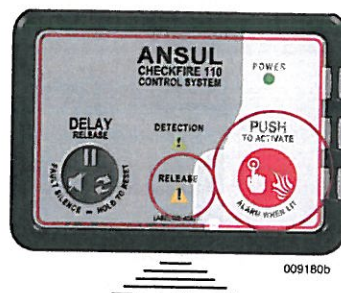


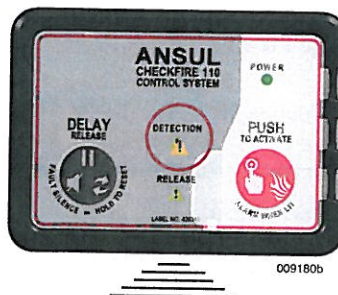
TABLE 9-3: DETECTION CIRCUIT FAULT

Detection Circuit Fault

Detection Circuit Fault LED and Sounder pulsing 1 x 10 seconds indicating Detection Circuit fault.

- Check connections
- 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
PULSING
1 X 10 SECONDS

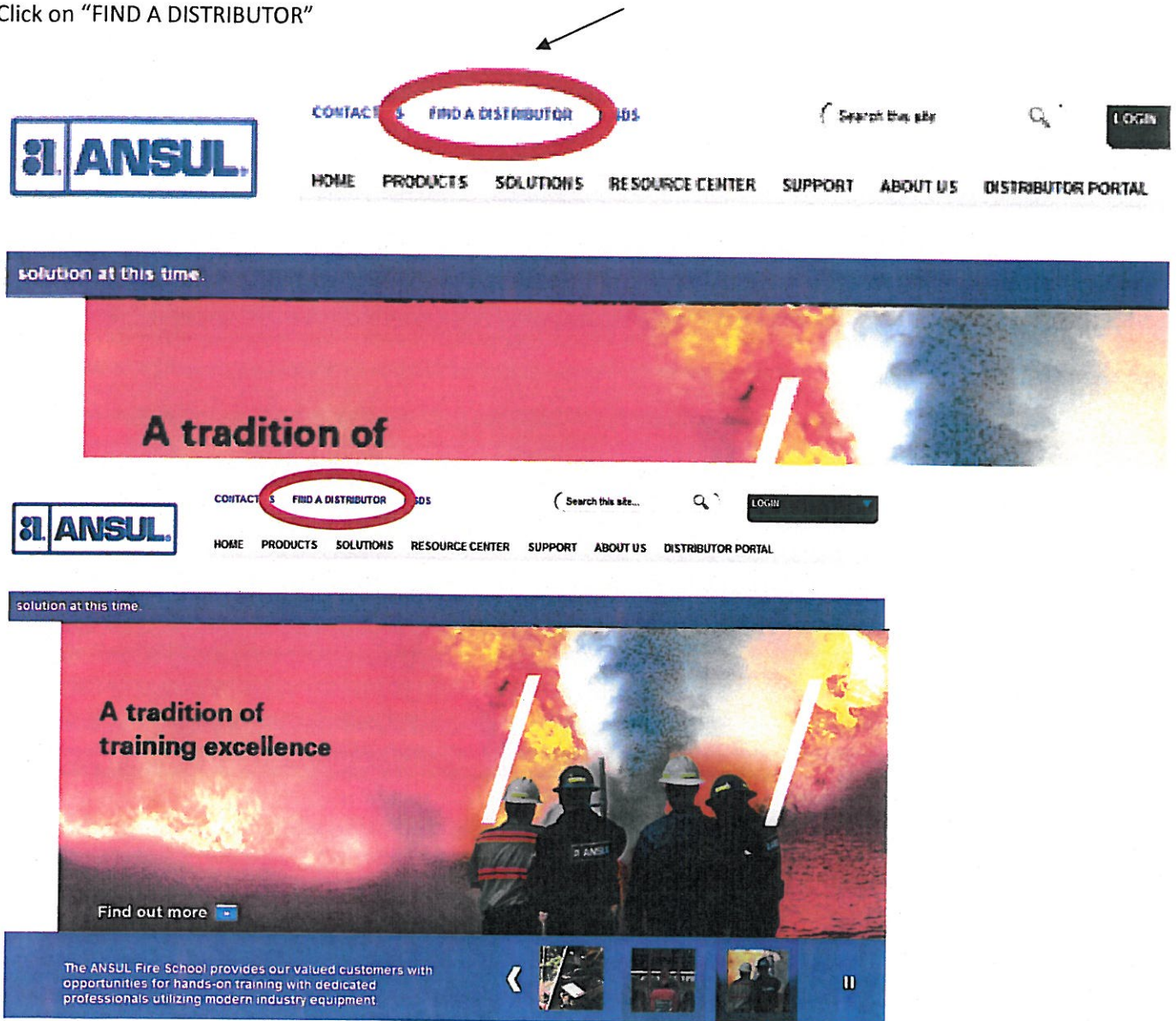


Instructions on locating an Ansul Authorized Distributor – Worldwide

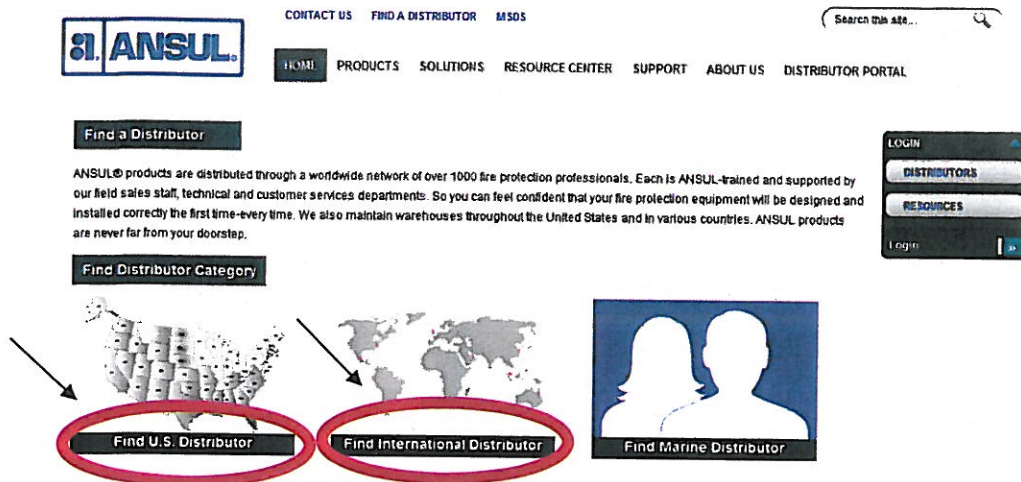
On your internet browser – type in the following address:

www.ansul.com

Click on “FIND A DISTRIBUTOR”



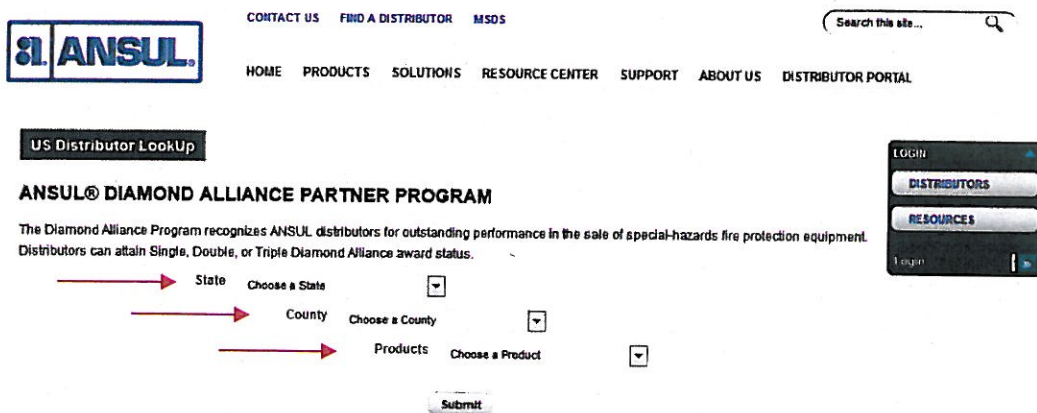
Click on either “Find U.S. Distributor” or “Find International Distributor”



For a U.S. Distributor, use drop downs and chose a State, County and on Products, chose:

“CHECKFIRE 110/210 Vehicle Detection”

Click on Submit



A list will then be displayed with all Authorized Ansul Distributors for Checkfire 110/210 Detection in the area selected.

US Distributor Lookup

ANSUL® DIAMOND ALLIANCE PARTNER PROGRAM

The Diamond Alliance Program recognizes ANSUL distributors for outstanding performance in the sale of special-hazards fire protection equipment. Distributors can attain Single, Double, or Triple Diamond Alliance award status.

State Wisconsin
County Brown
Products CHECKFIRE 110/210 Vehicle D

Submit



Distributors for CHECKFIRE 110/210 Vehicle Detection/Actuation in Brown County, Wisconsin

Van's Fire & Safety, Inc. ▼

757 Polts Avenue (54304)

P O Box 12055

Green Bay, WI 54307-2055

Phone: 920 494-3345

Fax Number: 920 494-2224

Web: www.vansfire.com

Product Lines Carried:

SENTRY / CLEANGUARD / K-GUARD Extinguishers, REG LINE Cartridge-Operated Extinguishers, High Pressure CO2, R-102 Restaurant Pre-Engineered Systems, Industrial Pre-Engineered Systems, Vehicle Pre-Engineered Systems, Foam Agents, Foam Hardware, INERGEN Hardware and Agents, Low Pressure CO2, PIRANHA Restaurant Systems, Marine High Pressure CO2, Marine Low Pressure CO2, Marine Foam Systems, Marine INERGEN Systems, Detection and Control / Pre-Engineered, Detection and Control / Engineered, SAPPHIRE Clean Agent Systems, VESDA Detection and Control Systems, Marine SAPPHIRE, Marine Restaurant Gasley Systems, I-101 Industrial Fire Suppression Systems, Marine Detection_Control, Large Dry Chemical / Twin-Agent, FiveStar Restaurant Service Program, CHECKFIRE 110/210 Vehicle Detection/Actuation

For an International Distributor, chose a Country, and on Products, chose:

“CHECKFIRE 110/210 Vehicle Detection”



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International Distributor Lookup

ANSUL® DIAMOND ALLIANCE PARTNER PROGRAM

The Diamond Alliance Program recognizes ANSUL distributors for outstanding performance in the sale of special-hazards fire protection equipment. Distributors can attain Single, Double, or Triple Diamond Alliance award status.

Country: Choose a Country
Products: Choose a Product

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A list will then be displayed with all Authorized Ansul Distributors for Checkfire 110/210 Detection in the area selected.

International Distributor Lookup

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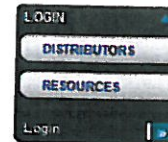
Country: CANADA



Products: CHECKFIRE 110/210 Vehicle D



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Distributors for CHECKFIRE 110/210 Vehicle Detection/Actuation in CANADA

- Century Vallen
- 4810 - 92 Avenue (T6B 2X4)
- P O Box 1218
- Edmonton, AB T5J 2M6
- Phone: 780 468-3366
- Fax Number: 780 490-2895
- Web: www.centuryvallen.com

Product Lines Carried:

- SENTRY / CLEAN GUARD / K-GUARD Extinguishers, RED LINE Cartridge-Operated Extinguishers, Vehicle Pre-Engineered Systems, Foam Agents, Foam Hardware, Spill Control Products, INERGEN Hardware and Agents, Detection and Control / Pre-Engineered, Detection and Control / Engineered, Canadian Products (MarComm Use), Large Dry Chemical / Twin-Agent, CHECKFIRE 110/210 Vehicle Detection/Actuation