



A Tyco International Company

AUTOMATIC FIRE SUPPRESSION SYSTEM (AFSS)

Data/Specifications

FEATURES

- High-speed cylinder assemblies
- Field-proven fire suppression agent(s)
- Electronic Control Module (ECM) monitors, controls, and records system events
- LED system status indicators
- Lightweight
- Designed for harsh environments
- Temperature range: -60 °F to 180 °F (-51 °C to 82 °C)
- MIL-STD-810G for high temp, low temp, temp shock, humidity, vibration, shock, immersion, sand and dust, and salt fog
- MIL-STD-461E
- SAE J113-13 for electrostatic discharge
- RoHS compliant
- Manual-electric and automatic zone actuation
- Expandable up to 8 protected zones
- Detection options: Quad-IR Sensor, linear detection wire, and spot thermal detectors
- Automatic or manual cylinder assembly discharge
- Optional backup battery and remote discharge switch(es)
- Simple programming features and communication protocol allows for future expandability with ease
- Lightweight modular cable harness designed for quick installation and easy replacement

APPLICATION

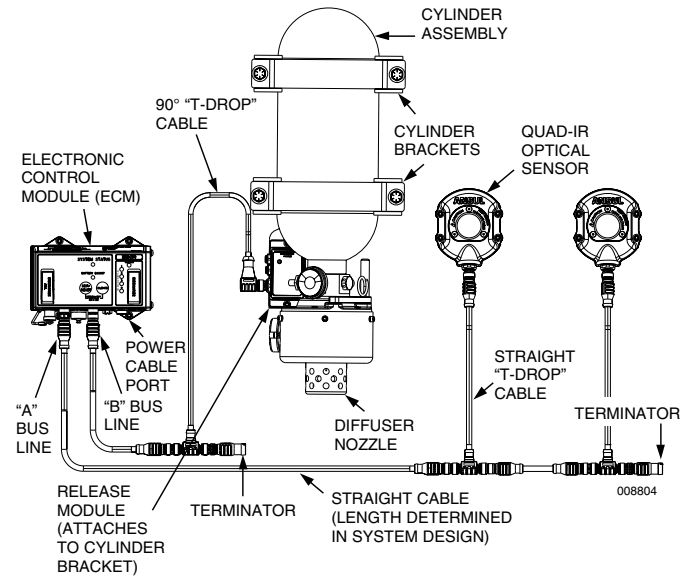
The ANSUL Automatic Fire Suppression System (AFSS) is an automatic or manual fire suppression system. Monitoring of the protected zone provides protection for personnel and equipment subjected to extreme environmental and physical conditions for vehicles used in forestry, mining, agriculture, construction, military, public transportation, public utilities, land fill, and waste disposal.

Vehicles with large volumes of petroleum, oil, and lubricant (POL) under pressure are in need of a fast response to the danger of a fire explosion with these easily ignitable and highly combustible fuels. The ANSUL AFSS is programmable to monitor and control specific zones such as engine, cargo, wheel wells and occupied areas. Agent will begin discharging in as little as 40 milliseconds when a hazardous fire signal is received, resulting in complete discharge of agent in less than 300 milliseconds.

DESCRIPTION

The ANSUL Automatic Fire Suppression System (AFSS) is a pre-engineered, fixed nozzle, total-flooding system for protection of off-highway type specialty vehicles, commercial vehicles, military vehicles, or industrial type applications. The ANSUL AFSS combines a variety of components to create a specific system matching the fire protection needs of the vehicle. If multiple fire scenarios are a concern, the system may be designed for multiple discharges.

Main components include cylinder assemblies, optical sensors, release module, detection module, Electronic Control Module (ECM), and a cable harness connecting all components. Options for expanding system capabilities include zone modules, remote discharge switches, backup battery, CanBUS connectivity, and auxiliary output cables. A personal computer may be used to access system programming and the history file.



COMPONENT DESCRIPTION

Cylinder Assembly: The cylinder assemblies consist of an agent cylinder and the cylinder valve. Each cylinder is factory filled with HFC-227ea and 5-10% by weight of PLUS-FIFTY C (sodium bicarbonate). Agent fill weights may be specified in 0.25 lb (0.1 kg) increments. After filling, the cylinders are super-pressurized to 750 psi at 70 °F (51 bar at 21 °C) with nitrogen providing rapid agent release. The diffuser nozzles disperse agent with a mild discharge pressure of less than 20 psi at 5 in. (1.4 bar at 127 mm) away from the diffuser nozzle. Each cylinder is finished in red CARC paint. A nameplate is affixed to the exterior and contains information on recharge and maintenance.

The all aluminum high-speed valve includes the visual pressure gauge, fill valve, pressure transducer, anti-recoil cap, manual release lever, Protracting Actuation Device (PAD), and pressure relief device. Each assembly comes with two sturdy steel brackets with rubber pads to secure the cylinder assembly to any vertical surface that will support the weight of the cylinder assembly.



COMPONENT DESCRIPTION (Continued)

Cylinder Assembly (Continued): The volume of the area to be protected and space available to mount cylinder assemblies will determine the agent quantity, cylinder size and the number required.

Class	Part No.	Agent* lb (kg)	Maximum Filled	Height in. (mm)	Diameter in. (mm)
			Weight** lb (kg)		
I	437173	1.00 - 5.00 (0.5 - 2.3)	27.5 (12.5)	16.31 (414)	5.39 (137)
II	437178	5.25 - 7.00 (2.3 - 3.2)	31.6 (14.3)	19.18 (487)	5.39 (137)
III	437179	7.25 - 10.00 (3.3 - 4.5)	40.6 (18.4)	23.18 (589)	5.39 (137)

* HFC-227ea and 5-10% by weight PLUS-FIFTY C (sodium bicarbonate)
**with bracket and discharge pipe with diffuser

Note: Cylinder Volume:
Class I 144 in.³ (0.0024 m³)
Class II 204 in.³ (0.0033 m³)
Class III 288 in.³ (0.0047 m³)

Distribution Components: Three options for agent distribution from the high-speed cylinder valve are available. The standard diffuser nozzle connects directly to the outlet of the cylinder valve. The discharge pipe with diffuser includes a J-shaped discharge pipe supported by the cylinder brackets and raises the location of the diffuser nozzle to just above the cylinder assembly. A simple hose adapter provides connection to a 1/2 in. NPT hose line for agent release in areas where there is not room for a cylinder assembly (such as wheel wells and engine locations).

Detectors: Three types of detectors provide options for determining the presence of fire. The Quad-IR optical sensor (see photo) is a fire-spectrum-analyzing infrared flame detector designed to provide early fire detection with exceptional immunity to false alarms. The sensor utilizes four infrared (IR) detectors to determine when the unique signature of a hazardous flame is present. The small housing size allows easy installation in tight areas. The enclosure contains the printed circuit board (PCB), sapphire window, and M12 connector. The enclosure meets IP67 (minimum) dust tight and immersion specifications.



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The Linear Detection Cable consists of two spring steel conductors which are separated by a heat-sensitive insulator. At the temperature rating of the wire, the insulator melts allowing the two conductors to make contact and send a signal to the ECM. The linear detection wire is supplied in lengths specific to the application with connectors on each end, one for the detection module on one end, and the other for an End-of-Line (EOL) resistor. After an actuation event the linear detection cable must be replaced.

Spot thermal detectors are normally-open, mechanical contact closure switches designed to operate at a factory preset temperature. They are available in two preset temperatures (250 °F and 350 °F (121.1 °C and 176.6 °C)) which meet NFPA standards.

Electronic Control Module:

The ECM communicates through the cable harness to monitor and control the system using the custom ANSUL protocol. The base ECM monitors and controls up to four cylinder assemblies. Two toggle switches provide immediate manual-electric release of the fire suppression agent. LEDs indicate system status to the vehicle driver.



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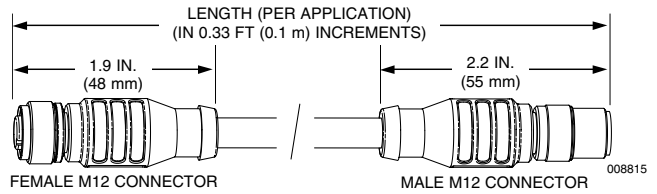
System designs for larger vehicles or multiple protected zones are easily managed by adding one or more zone modules to the right hand side of the ECM (limit 7 zone modules).

Zone Module: The zone module interfaces to the right side of the ECM and expands the ECM capabilities to monitor and control up to seven additional protected zones. Each zone module monitors up-to four additional cylinder assemblies for normal, alarm, and fault conditions providing a maximum of 32 cylinder assemblies per system. A single toggle switch provides immediate manual-electric release of the fire suppression agent into a specific protected zone. LEDs provide system status notifications to the vehicle driver.



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Cable Harness: The modular cable harness connects the system components with simple threaded male and female connectors. Components are attached to the main cable using shielded connectors with cable drops. Keyed connectors allow for user-friendly installation. Lightweight modular cable harnesses are designed for quick installation and easy replacement. Installation of the Terminator for each line completes the electrical loop allowing the ECM to “talk” with all components on the line.



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Backup Battery: The backup battery is installed between the vehicle battery connection and the ECM power port. Upon loss of vehicle power, the backup battery provides power to the AFSS system. The module is recharged by the vehicle alternator. A maintenance switch deactivates all system power for routine maintenance.



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Remote Discharge Switch: The remote discharge switch provides a manual-electric means of actuating the fire suppression system. Each switch can be programmed to discharge a single zone or multiple zones in the system.

Remote discharge switches are only connected to the “B” bus. The enclosure is made of a light weight alloy designed to provide structural integrity and versatility within the smallest foot print possible. Integral mounting tabs are provided to facilitate mounting to any flat surface. Design parameters for the enclosure follow minimum IP67 ratings for dust tight and immersion specifications.



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SYSTEM SPECIFICATIONS

Operating Voltage: 12-32 VDC
ECM Power Consumption: Normal 300 mA
Current limiting to 3A

Approval Standards:

MIL-STD-461E
MIL-STD-1275D for Electrostatic Discharge
SAE J1113-13 for Electrostatic Discharge
RoHS compliant

Operating Temperature Range: -60 °F to 180 °F (-51 °C to 82 °C)

ORDERING INFORMATION

<u>Part No.</u>	<u>Shipping Assembly</u>
437173	Cylinder Assembly, Class I
437178	Cylinder Assembly, Class II
437179	Cylinder Assembly, Class III
437302	Release Module
438129	Shielded PAD Cable
438130	Shielded Pressure Transducer Cable
438181	Bracket
437528	Valve Rebuild Kit
437088	Diffuser Nozzle
438197	Discharge pipe with Diffuser, Class I
438198	Discharge pipe with Diffuser, Class II
438199	Discharge pipe with Diffuser, Class III
437531	Discharge Hose Adaptor
438890	Distribution Hose Nozzle
437014	Electronic Control Module
437133	Computer Interface Cable
437470	Zone Module
437303	Remote Discharge Switch
437304	Backup Battery
438121	Shielded Bus Cable
438112	Shielded "T" Connector
438113	Shielded Straight "Drop" Cable
438114	Shielded 90° "Drop" Cable
437131	Vehicle Power Cable
438183	Shielded Power Adaptor Cable
437132	Bulkhead Feedthrough
	Cable Connections (order per design specifications)
437128	Terminator
436973	Quad-IR Optical Sensor
437506	Molded Liner Detection Cable (order per length)
437478	End-of-Line (EOL)
438280	Spot Thermal Detector (250 °F (121.1 °C))
438281	Spot Thermal Detector (350 °F (176.6 °C))
437301	Detection Module
437951	Male Field Wireable Connector
437952	Female Field Wireable Connector

Note: For non-shielded cable components, contact Tyco Fire Protection Products, Technical Services

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

