UNIVERSAL
ELECTRICALS & ELECTRONICS
An ISO 9001:2015 Certified

Safety Solutions for
Mining Industry

AUTO FIRE DETECTION & SUPPRESSION SYSTEM

"User Manual & Parts List"

UNIVERSAL FIRE SAFETY

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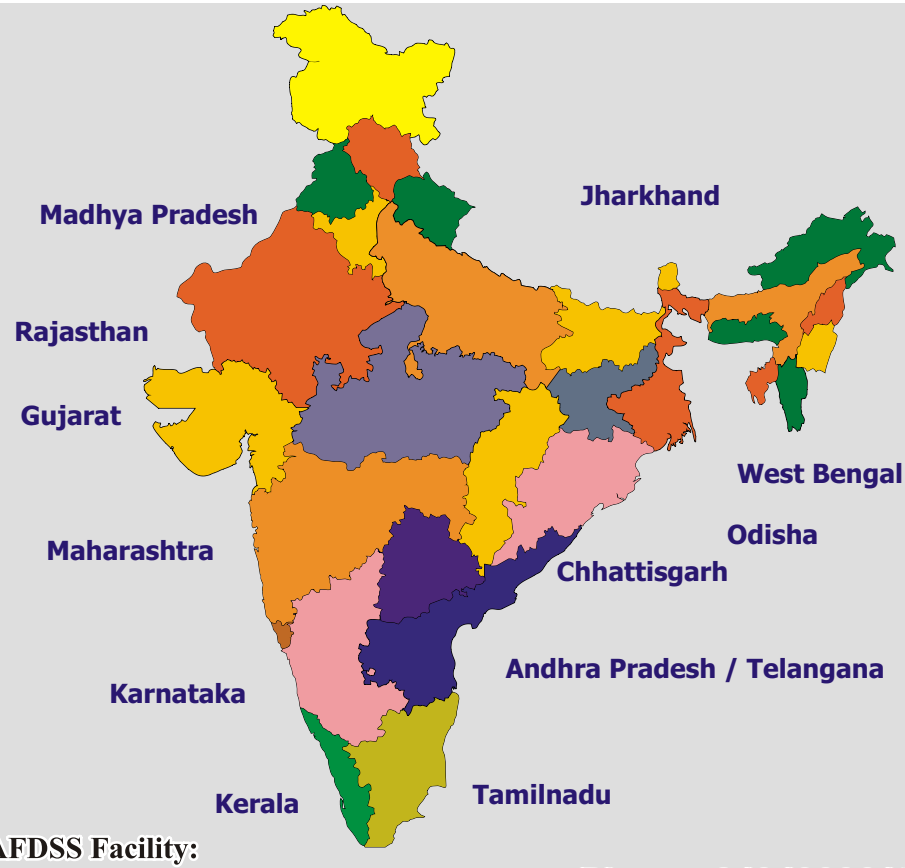

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28	UEE-MAB-0028	Manual Actuator Bracket	
29	UEE-MAB/P-0030	Manual Actuator Bracket Pad	
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43	UEE-MB50/25/16/P-0026	Dcp Cylinder Mounting Bracket Pads	
44	UEE-MB/C-0025/50/25/16	Mounting Bracket Clamp	
45	UEE-AAB-0027	Automatic Actuator Bracket	
46	UEE-AAB1/P-0029	Automatic Actuator Bracket Pad	
47	UEE-UEP-0031	Control Unit Pad	
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49	UEE-B-0034	Bolts for Cylinder Clamping	
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51	UEE-DC-0046	Decals Cabin	
52		Manual	

PARTS LIST

SL. No	Part No.	Description	Quantity
1	UEE-DCP/50-0004	DCP Cylinder & Main Valve - 50Lbs	
2	UEE-DCP/25-0003	Dcp Cylinder & Main Valve -25Lbs	
3	UEE-DCP/16-0072	Dcp Cylinder & Main Valve -16Lbs	
4	UEE-NC-0002	Nitrogen Cartridge (18 Cu. in)	
5	UEE-SP-0005	Sp Adaptor	
6	UEE-APL-0051	Adaptor 1/2"BSP(M) X 1/2"BSP(M) Long with Check-nut	
7	UEE-VPA-0007	Main Valve Pneumatic Actuator	
8	UEE-NRV-0008	Non Return Valve	
9	UEE-VC-0009	Vent Check	
10	UEE-MOA-OO1O	Manual Operate Actuator	
11	UEE-AMA-OO11	Automatic & Manual Actuator	
12	UEE-N12-0012	Nozzle 1/2	
13	UEE-N14-0070	Nozzle 1/4	
14	UEE-CU-0013	Control Unit	
15	UEE-HSA-0047	Harness of Sp Adaptor	
16	UEE-FSW-0014	Fire Sensor Wire per	
17	UEE-TEE-3/4-0050	Equal Tee 3/4"BSP(M)	
18	UEE-EL-34-0048	Elbow 3/4 BSP(M) X 3/4"BSP(M)	
19	UEE-ELF-34-0049	Elbow 3/4 BSP(M) X 1/2"BSP(F)	
20	UEE-AP-0051	Adaptor 1/2"BSP(M) X 1/2"BSP(M)	
21	UEE-EL-0052	Elbow 1/2"BSP(M) X 1/2"BSP(M)	
22	UEE-AP-14-0054	Adaptor 1/4"BSP(M) X 1/4"BSP(M)	
23	UEE-AP-14-0055	Adaptor 1/4"BSP(M) X 1/4'NPT(M)	
24	UEE-EL-14-0056	Elbow 1/4"BSP(M) X 1/4"BSP(M)	
25	UEE-ELF-14-0057	Elbow 1/4"BSP(M) X 1/4"BSP(F)	
26	UEE-TEE-12-0053	Equal Tee 1/2"BSP(M)	

PARTS LIST

SL.No	Part No.	Description	Quantity
1	UEE-HP34-1000	3/4" Hose Assy L - 1000	
2	UEE-HP34-1100	Hose Assy L- 1100	
3	UEE-HP34-1500	3/4''Hose Assy L- 1500	
4	UEE-HP34-2000	3/4"Hose Assy L - 2000	
5	UEE-HP34-2500	3/4"Hose Assy L- 2500	
6	UEE-HP34-2800	3/4"Hose Assy L- 2800	
7	UEE-HP34-3000	3/4" Hose Assy L- 3000	
8	UEE-HP34-3500	3/4" Hose Assy L -3500	
9	UEE-HP34-3800	3/4" Hose Assy L- 3800	
10	UEE-HP34-4000	3/4" Hose Assy L- 4000	
11	UEE-HP34-4500	3/4" Hose Assy L -4500	
12	UEE-HP12-0400	Hose Assy L -400	
13	UEE-HP12-0700	1/2" Hose Assy L- 700	
14	UEE-HP12-1000	1/2" Hose Assy L- 1000	
15	UEE-HP12-1100	1/2" Hose Assy L-1100	
16	UEE-HP12-1200	Hose Assy L- 1200	
17	UEE-HP12-1600	1/2" Hose Assy L- 1600	
18	UEE-HP12-1980	1/2" Hose Assy L- 1980	
19	UEE-HP12-2000	1/2" Hose Assy L- 2000	
20	UEE-HP12-2500	1/2" Hose Assy L- 2500	
21	UEE-HP12-3000	1/2" Hose Assy L- 3000	
22	UEE-HP12-4000	1/2" Hose Assy L -4000	
23	UEE-HP14-600	1/4" Hose Assy L - 600	
24	UEE-HP14-1000	1/4" Hose Assy L- 1000	
25	UEE-HP14-1200	1/4" Hose Assy L- 1200	
26	UEE-HP14-1600	1/4" Hose Assy L- 1600	
27	UEE-HP14-2000	1/4" Hose Assy L- 2000	
28	UEE-HP14-2500	1/4" Hose Assy L- 2500	
29	UEE-HP14-3000	1/4" Hose Assy L- 3000	
30	UEE-HP14-3500	1/4" Hose Assy L -3500	
31	UEE-HP14-4000	1/4" Hose Assy L -4000	
32	UEE-HP14-4500	1 /4" Hose Ass L - 4500	
33	UEE-HP14-5000	1 /4" Hose Assy L-5000	
34	UEE-HP14-6000	1/4" Hose Assy L - 6000	
35	UEE-HP14-6500	1/4"Hose Assy L - 6500	
36	UEE-HP14-10000	1/4"Hose Assy L - 10000	

INTRODUCTION

Fire systems in automotive mining vehicles are essential for safeguarding human lives in the event of a fire emergency.
Rapid response from these systems helps prevent the spread of fires, minimizing potential injuries and fatalities.
Protection of valuable mining equipment and materials is crucial, reducing financial losses associated with fire damage.
Compliance with industry regulations often mandates the inclusion of fire suppression systems in mining vehicles to ensure safety standards are met.

In the dynamic and demanding landscape of the mining industry, safety is paramount, and the threat of fire poses a significant risk to both personnel and valuable assets. The mining sector, with its intricate network of operations and heavy machinery, necessitates robust safety measures to mitigate the potential devastation caused by fires. Automatic Fire Detection and Suppression Systems emerge as indispensable guardians, providing a proactive and efficient response to fire incidents within the challenging confines of mining environments.

The unique challenges presented by mining operations, such as the presence of combustible materials, intricate machinery, and expansive facilities, demand specialized fire protection solutions. Automatic fire detection and suppression systems tailored for the mining industry are designed to promptly identify the early signs of a fire, triggering an instantaneous and targeted response.

This not only reduces the likelihood of fire escalation but also ensures the safety of personnel, the continuity of mining operations, and the preservation of critical infrastructure.

This introduction will navigate through the tailored features and strategic deployment of automatic fire detection and suppression systems in the mining industry. From cutting-edge sensors capable of detecting minute changes in the environment to the integration of suppression agents specifically tailored for mining-related fires, these systems serve as an integral part of a comprehensive safety strategy. As we delve into the intricacies of these systems, it becomes evident that their implementation is not just a technological advancement but a crucial commitment to safeguarding lives and securing the sustainable future of mining operations.

In summary, the uses of Universal AFDS System are diverse and multifaceted, encompassing prevention, protection, and preparedness measures to ensure the well-being of individuals and the preservation of property.

✸SECTION 1✸

DCP Vehicle Fire Suppression System

A Vehicle Fire Suppression System is a specialized safety mechanism designed to detect and rapidly suppress fires in various types of vehicles. These systems are particularly crucial in environments where the risk of fire is heightened, such as in commercial and industrial vehicles, including buses, trucks, mining equipment, and agricultural machinery. Here are key aspects and components of a typical vehicle fire suppression system:

Detection Sensors:
Vehicle fire suppression systems are equipped with advanced sensors designed to detect the early signs of a fire. These sensors may include heat detectors, flame detectors, and smoke detectors.
Early detection is crucial for initiating a swift response to contain the fire.

Automatic Activation:
Upon detecting a fire, the system is designed to automatically activate the fire suppression measures without the need for human intervention. This rapid response is critical to prevent the fire from spreading and causing extensive damage.

Suppression Agents:
The system dispenses fire suppression agents designed to extinguish the fire effectively. Common suppression agents include dry chemical powders, foam, or clean agents. The choice of suppression agent depends on the type of vehicle and the specific fire risks associated with its operation.

Nozzles and Distribution System:
Nozzles are strategically placed in key areas of the vehicle, such as the engine compartment or other high-risk zones. The distribution system ensures the even and effective dispersion of the suppression agent, covering the identified fire-prone areas.

Manual Activation:
In addition to automatic activation, vehicle fire suppression systems often come with a manual activation option. This allows occupants or operators to trigger the system if they observe a fire or suspect a potential hazard, providing an additional layer of control.

Alarms and Notifications:
Vehicle fire suppression systems may incorporate audible alarms and visual indicators to alert occupants of the vehicle about the activation of the system. Additionally, these systems can be integrated with vehicle monitoring systems to send alerts to a central control center or fleet manager which is optional.

Compatibility with Vehicle Systems:
These systems are designed to integrate seamlessly with the vehicle's existing systems.
This includes considerations for compatibility with the electrical system, engine management, and other onboard technologies.

Maintenance and Monitoring:
Regular maintenance and monitoring are essential to ensure the proper functioning of the vehicle fire suppression system. This includes periodic inspections, testing, and replacement of components as needed to maintain system effectiveness.

Adaptability to Various Vehicle Types:
Vehicle fire suppression systems are versatile and can be adapted to different types of vehicles, including those used in transportation, construction, agriculture, and mining. The system's design considers the unique challenges and fire risks associated with each vehicle category.
Implementing a vehicle fire suppression system is a proactive safety measure that not only protects the vehicle and its cargo but also enhances the safety of occupants and minimizes the risk of collateral damage in case of a fire incident.

★SECTION 2★
Component Description & Operating Details

PART NO.UEE-DCP/50-0004
PART NO.UEE-DCP/25-0003
PART NO.UEE-DCP/16-0002

2.A) INDIVIDUAL COMPONENTS

I) Agent Cylinder Assembly

The agent cylinder is available in two configurations. - V25 and V50 with multipurpose ABC dry chemical agent. All assemblies are stored pressure designs with an operating pressure of 350 psi (2413 kilopascal). The cylinders are constructed of welded steel DOT 4BW-360/BIS 3196 specifications. The V25 and V50 models are 9 inches (22.9 cm) in diameter. The Discharge valve, which is common to all agent cylinders, is of forged brass construction. The valve is equipped with a 350 psi (2413 kilopascal) pressure gauge protected by a forged brass gauge guard, a fusible element pressure relief plug and a refrigeration grade air valve and cap. The valve controls agent discharge via a spring loaded, internal sealing stem that most be depressed from the top 360 psi (24.8 Bars) at 21.1 C. Agent cylinders are shipped from the factory fully charged with a shipping plate installed on the top of the valve to help prevent accidental agent discharge and an anti recoil plate on the valve outlet to redirect chemical flow should accidental discharge occur. Both of these plates must be removed at installation.

ii) Agent Cylinder Mounting Brackets Part Nos., UEE-MB50-0023, UEE-MB25-0024 UEE-MB16-0073

They are constructed in 1/4 (6.4 mm) welded steel and painted to resist corrosion. All brackets are provided with stainless steel bolts and thick rubber pads to protect the agent cylinders

iii) Manual Operate Actuator UEE-MOA-0010

The Manual Operate Actuator is used for manually releasing Nitrogen gas pressure from the Nitrogen Cartridge to power the Pneumatic Actuator. The body of the actuator is made from brass (chrome plated) and contains a stainless steel puncture point that is connected to a palm button and locked in place by a stainless steel ring pin. The exposed shaft of the stem is shielded from the outside by a rubber dust boot.

To use the actuator, the operator pulls the ring pin and strikes down hard on the palm button. This strike pushes the puncture stern in to the rupture disc of the Nitrogen

Cylinder which is installed in to the actuator body through mating threads. The released gas enters the actuation lines through a 1/4 NPT exhaust port. The Manual Operate Actuator and Nitrogen Cartridge assembly are mounted to an actuator bracket by means of steel 1/4 screws. The Manual Operate Actuator may be installed inside or outside the vehicle in any orientation that facilitates easy access to the ring pin and palm button.

iv) Automatic & Manual Actuator

UEE-AMA-0011

Like the Automatic & Manual Actuator, is used to release Nitrogen pressure from the Nitrogen Cartridge to power the pneumatic control head.
The body is made from brass (chrome plated) and contains a stainless steel puncture point. However, its body also contains a stainless steel strike and return spring and a threaded port to accept an electrical "Sp Adaptor" catridge. The strike stem is connected to a palm button on one end of the actuator and locked in the safety position by a ring pin.

The puncture stem is free to travel against the return spring in to the rupture disc of the Nitrogen Cartridge which is installed at the other end.
To manually discharge the system, the operator pulls out the ring pin and strikes down hard on the palm button. The Automatic & Manual Actuator can also release the nitrogen gas in the event of automatic fire detection without manually pressing the palm button.
When a heat detection device detects a fire, it completes an electrical circuit sending an electrical charge to the Sp Adaptor.
The Sp Adaptor fires and the gases produced propel the puncture stem in to the rupture disc of the Nitrogen Cartridge, Thus releasing the Nitrogen gas.
The Automatic & Manual Actuator and the Nitrogen Cylinder are mounted on to an actuator bracket by means of 1/4 stainless steel screws.

v) Main Valve Pneumatic Actuator

UEE-VPA-0007

On installations where manual and/or automatic actuation is required, the Main Valve Pneumatic Actuator must be used. This device is constructed of brass and bots directly to the top of the Agent cylinder discharge valve. When supplied with actuation pressure, the piston inside the Pneumatic

Actuator extends to depress the stem of the Agent Cylinder valve releasing the extinguishing agent. Actuation pressure enters the Main Valve Pneumatic Actuator through 1/4threaded ports on either side.

vi) Vent check
UEE-VC-0009

The Vent check is a safety device that is installed in the Main Valve Pneumatic Actuator. Its functions to bleed any slowly accumulating pressure that could cause the Main Valve Pneumatic Actuator to open the Agent Cylinder Valve prematurely.
Examples of possible pressure sources include a slow leak in the rupture disc of the Nitrogen Cartridge or normal temperature induced expansion of the air and moisture trapped in the actuation lines.
A Vent Check must be used on all pneumatically actuated systems. The body of the Vent Check is made of machined brass and containsa spring loaded nylon ball.
Slowly accumulating gas can pass around the nylon ball and bleed to the atmosphere. However, the rapid accumulation of actuation pressure from the Nitrogen Cylinder causes the ball to compress the spring and seal on a tapered seat, blocking the bleed hole. Following an actuation, the Vent Check can be used to exhaust residual actuation pressure by unseating the nylon ball (by a tip end). In installations using multiple Agent Cylinders, the Vent Check is installed only in the Main Valve Pneumatic Actuator at the end of the actuation network.

vii) Nitrogen Cartridge
UEE-NC-0002

The Nitrogen Cartridge supplies Nitrogen gas pressure to the Main Valve Pneumatic Actuator through the actuation lines for opening the Agent Cylinder Valve. This cylinder is charged to 1800 psi (12410 kilopascal) at 70 F (21 C) and contains enough Nitrogen to actuate up to six Agent Cylinder Valves at a maximum distance of 70 ft (21.3 m) of the last Cylinder. Pressure is retained in the Nitrogen Cartridge by a gold plated rupture disc and proper charge is indicated by a pressure gauge located at the bottom of the cylinder and protected by an impact resistant plastic gauge guard. The Nitrogen Cartridge is supplied fully charged with a protective shipping cap installed on the outlet threads. This cap must be removed at the time of installation but must remain in place at all other times. Retain the shipping cap to reuse when recharging the cylinders. Construction of the cylinders is as per DOT 3E specifications. The cylinder is rechargeable by certified UEE installers.

ix) Control Unit Zone
UEE-CU-0013

SINGLE ZONE

An electronic Control Panel is provided for the fire suppression system installation equipped with automatic detection and actuation.

This control Panel.

Provides dash board monitoring of all automatic fire suppression system electrical circuits of the fire detection, Sp Adaptor firing and power supply. The enclosure for the Control Panel is watertight and shall be electrically non conductive. It requires 24 VDC for it's function.

Battery Back Up

The Control Panel is equipped with an internal self recharging battery that automatically takes over the indications of the Control Panel in the event of loss of main power as supplied by the vehicle or equipment on which the system is installed.

This internal battery is capable or indicating the parameters of the suppression system for a period of 24 hours following main power loss but cannot take over the functioning of the AFP System in case of fire, A switch to internal battery power is indicated on Control enclosure front panel by a POWER Failure LED. Which indicated power failure through a glowing LED along with the alarm.

This is just to remind the operator regarding the power failure and is not suitable to operate the system electrically.

Internal Test Circuit

The Control Unit is equipped with a TEST button located on the Control enclosure front panel. A momentary Press of this button shall allow the operator to verify the operation of the LED indicators audible alarm.

Battery +ve 1
Squib 3
QR Switch 5
Sensor Wire 7
Sensor Wire 9
Batter-ve 2
Squib 4
QR Switch 6
Sensor Wire 8
Sensor Wire 10

TWO ZONES CONTROL UNIT

UEE-ZCU-0013

System Description:

The Automatic Fire Detection and Suppression System consists of following components.

- Two zone Control Unit.
- Sensor Cables-2 Nos (One for each Zone)
- Squibs and N2 Cylinders-2 Nos (for each Zone)
- DCP Cylinders-2 Nos (one for each zone)
- Hoses

The machine is divided into two zones, in cash zone sensor cable is routed all along the fire prone areas, (Two sensor cables are used for two zones).
In the event of any fire incident, the sensor of that particular zone senses the fire/Temperature at 180C.. Once the sensor senses the temperature, it will give a short circuit signal to the Control Panel gives power to the squib and activates the squib.
The Sp Adaptor activates and will open the rupture disc of the N2 Cylinder.
The high pressurized N2 gas from the N2 cartridge open the Valves of the DCP Cylinder.
ABC Dry Chemical Powder is discharged through the network (Hoses) at the nozzles which are fixed/fitted at fire prone areas.

Function of the Electronic Control Panel:

The control panel is housed in the operator's Cabin, which keeps monitoring the health status of the system.

There are LED indicators to indicate the particular fault in the system if any: Various LED indicators of the control panel:

1. SYS OK:
   This LED (Green) will be glowing continuously if all the electrical parameters of the system in working condition.
2. PWR Fail: This LED (Red) starts glowing, if the power supply to the control panel is not given.
3. SENSOR not Ok: This LED (RED) starts glowing, if there is any open circuit in the sensor cable.
4. SQUIB Not ok: This LED (RED) starts glowing, when the fuse of the squib in open or when the connector cable assembly is in open condition
5. ALARM: The LED (RED) starts glowing, when there in any fault/fire in the system along with alarm.
6. FIRE: This LED (RED) starts glowing, when the sensor fire /temperature.

xi) Fire Push Button:

Bottom View
In Single Zone Control Unit

Left View
In Dual Zone Control Unit

The fire push button unit can be used to manually trigger the squibs in case fire is not detected automatically by the control panel. There are two switches in the unit, which can be used to control the squib's output, independently. When switch of the override unit is pressed, the corresponding squib's output will be activated and the system will discharge the ABC Dry Chemical Powder

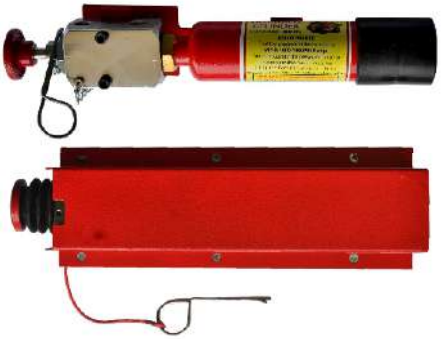
xii) Operation of Actuators

Manual operate Actuator: Mechanical actuator is fitted, such that it can be easily approachable to operate manually from the ground level. To operate Mechanical actuator, when in case of fire, the lock pin in to removed and the knob is pressed to puncture the rupture disc of the N2 cartridge (Cylinder). Once the knob is pressed the N2 gas from the N2 cylinder reaches the Pneumatic actuator fitted on the top of the Valve assembly of the ABC Cylinder. The Pneumatic actuator opens the valve of the ABC Cylinder and the ABC Dry Chemical powder will be discharged through the discharge network.

Automatic & Manual actuator:
The Electro/Mechanical actuator is fitted in the Cabin. Once the sensor Cable senses the fire, if gives fire signal to the control panel. After receiving the fire signal the control panel supplies power to the squib. Which is fitted to the electro/Mechanical actuator. After receiving the power the squib activate and puncture the reputed disc of the N2 cylinder automatically,
There by releasing the N2 gas. The N2 gas reaches Pneumatic actuator, which in turn opens the valve of the ABC Cylinder. In case there in delay / failure in sensing the fire automatically, operator can also manually operate the electro-Mechanical Actuator by pulling the lock pin and pressured the knob of the Electro-Mechanical Actuator.

xiii) Manual Actuator Brackets

UEE-MAB-0028



Outdoor Bracket

The Manual Actuator and Nitrogen Cartridge are mounted to the vehicle on an outdoor Actuator Bracket. Both brackets are constructed of steel and powder coated to prevent corrosion. The outdoor actuator bracket includes a steel guard to protect the actuator and Nitrogen Cartridge. 1/4 stainless steel cap screws are provided to mount the cover to the outdoor bracket.

xiv) Actuator bracket

UEE-AB-0027

The Actuator bracket are used to activate nitrogen cylinder in Automatic & manual system, which can be mounted inside or outside of the vehicle,along with the nitrogen cylinder, the brackets are made up of steel with powder coated to avoid corrosion.

xv) 1/2", Adapter long with checknut & 1/2" Elbow female X 3/4" Male

UEE-APL-0051

UEE-ELF-34-0049

It consists of a brass fitting with an "0" ring seal on one end 3/4 BSP male pipe threads on the other, and a stainless steel flange for locking the fitting in place. The flange is placed over the threaded end of the fitting before connection to a discharge hose.

xvi) Discharge Hoses

UEE-HP34

UEE-HP14

UEE-HP12

The function of the discharge hoses is to carry the dry chemical agent to the discharge nozzles. These hoses consist of 1/2 (12.7 mm) and 3/4 (19.1 mm), wire braided rubber hydraulic hose and corresponding fittings. Substitution of hoses by unapproved hoses or hoses of different size will adversely affect the system performance.

xvii) Distributor

UEE-12D-0069

UEE-34D-0021

The Distributor is of steel construction and is used as a manifold for discharge hoses. It is coated with Zinc passivation to avoid corrosion. A single 3/4 NPT inlet connects internally to four 1/2 NPT outlets.

xviii) Cone Nozzle with Cap

UEE-N14-0070

UEE-N12-0012

It is constructed of brass and distributes dry chemical agent in a cone shaped pattern. It is machined with a 1/2 NPT pipe thread for assembly in to 1/2 distribution hoses. It is supplied complete with a heat and weather resistant rubber blow off cap that prevents debris from lodging in the nozzle outlet. The blow off cap is moved with a retaining loop that assembles over the 1/22 pipe threads before the nozzle is installed. In this way, when the blow off cap is displaced from the nozzle tip by the chemical discharge pressure, it will not drop into the fire

xix) Bracket Nozzle 90

UEE-BN14-0071

UEE-BN12-0022

It is constructed of a 1/2 steel pipe coupling welded to a angled steel bracket.
The bracket is plated to avoid corrosion. After welding or bolting the bracket to the vehicle, a 1/2 ID distribution hose is plumbed to one end of the coupling.
The other end of the coupling can accept the discharge nozzle directly

xx) Sp Adaptor

UEE-SP-0005

The Sp Adaptor is an electrically detonated, *gas generating pyrotechnic* device used in the Automatic & Manual Actuator to initiate the release of Nitrogen Pressurized gas in case of automatic fire detection. One Sp Adaptor of the Squib is threaded to fit in to the Automatic & Manual Actuator body and is provided with an "0" ring for sealing.
The other end is threaded to mate with the modular sp Adaptor connector Cable.
The Sp Adaptor is shipped with a ground or shunt wire surrounding the electrical pins on the connector end.
This shunt wire should never be removed until the Sp Adaptor is ready to be mated with the connector lead.

xxi) Harness of Sp Adaptor

UEE-HSA-0047

The Sp Adaptor Harness of Sp Adaptor is used on automatic detection and actuation installations to carry electrical current to the Squib device. This assembly consists of a high temperature cable attached on one end to a keyed Bendix connector which mates with the threaded pin socket on the squib and a quick lock connector on the other end which mates with the locking provision of the control Unit.

xxii) Main Harness (Power Supply)

UEE-MH-0048

It is used to bring electrical power from the vehicle battery to the Control panel this assembly is constructed of 14 gauge, two conductor, abrasion resistant jacketed wire, assembled to a fuse holder and terminated with two 3/8 (9.5 mm) ID round eye battery connection terminals on one end. The other end has a quick lock connector that mates with the mating connector on the Control Unit.

The fuse holder is of a weather proof rubber construction and is equipped with a rubber retaining loop. A 10 amp, type AGC, fast acting fuse is provided in the fuse holder for protection of the Control Panel and the related circuits.

xxiii) Fire Sensor Wire

UEE-FSW-0014

It is a specially constructed linear heat and fire detector. it is sensitive to heat and when the sensor cable is exposed to a temperature of 350 F (180 C) the wires in the sensor exhibit direct short circuit. This happens because the wires are coated with a special heat sensitive material which undergoes a change of state at a specified temperature. This cable is routed all along the fire hazard locations of the vehicle In the event of a fire, the cable immediately senses and provides a short circuit signal to the Control Unit.

✸SECTION 2-(2B)✸

How the system works -A typical scenario

The following is a typical fire scenario for an installation utilizing manual only fire detection and remote suppression system actuation.

1) A fire starts in a protected area

2) 2) Equipment operator pulls the ring pin (1) and strikes the palm button (2) on the Manual Operate Actuator, releasing nitrogen gas in to the actuation lines leading to the Main Valve Pneumatic Actuator on top of the Agent Cylinder Valve.

3) The nitrogen pressure entering the Main Valve Pneumatic Actuator opens the agent Cylinder Valve allowing pressurized dry chemical to flow in to the distribution hoses leading to the discharge nozzles. The pressure of the entering dry chemical causes protective dust caps located on the nozzles to be blown off.

4) Dry chemical extinguishing agent discharges through fixed nozzles in to the protected areas,suppressing the fire.

The following is a typical fire scenario for an installation utilizing full automatic fire detection /system actuation, and post actuation vehicle shut down.

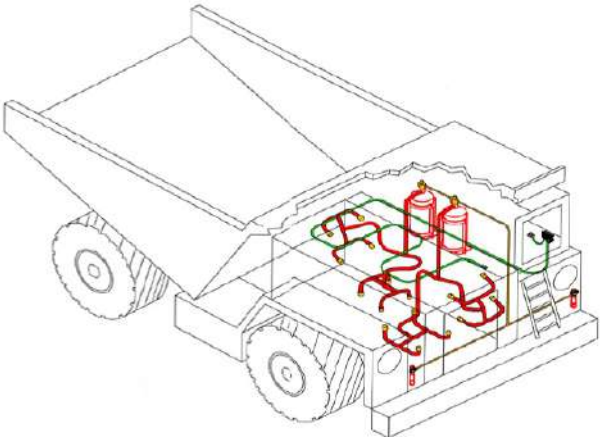
1) A fire starts in a protected area

2) Heat and flames cause the temperature to rise to the set point of the sensor / thermostat. Upon reaching temperature, the contacts of the thermostat close, there by completing an electrical circuit from the vehicle battery to the squib located in the Automatic & Manual Actuator

3) The completed circuit causes the squib to detonate, releasing nitrogen gas into the Main Valve Pneumatic Actuator on top of the Agent Cylinder Valve.

4) The nitrogen pressure entering the Pneumatic Actuator opens the Agent Cylinder Valve allowing the pressurized dry chemical to flow in to the distribution hoses leading to the discharge nozzles. The pressure of entering dry chemical causes he protective dust caps located on the nozzles to be blown off.

5) Dry chemical extinguishing agent discharges through fixed nozzles in to the protected areas, to suppress the fire.



★SECTION 3★

Technical Standards

The indigenous system is manufactured and assembled conforming to the following standards:

ISO 900022: 1987 EN290002: 1987
BS 5750 part 2:1987
ANSI/ASQC Q92 1987

1. Fire suppressant Cylinders

AFPS Cylinders are stored pressure designs (50 and 25 lbs) and constructed by welded steel. They confirm to DOT 4BW - 360 /BIS 3196 specifications.

2. Hoses and Couplings

The flexible hoses used in the discharge and actuation networks must meet or exceed either SAE 10 R5 or SAE 100 RI specifications. Further details may be obtained from the following tandards:

SAE Hydraulic Hose Fitting Standard	J516A
SAE Hydraulic Hose Standard	JS17A
SAE Standard	J343

Fittings such as elbows and tees used to connecting coupled hose assemblies must be galvanized malleable or ductile iron, stainless steel, copper or brass. No cast iron fittings will be used. Fittings used to connect discharge hoses shall be rated for use at 6000 WOG (41.4 bars) Fittings used to connect actuation hoses shall be rated for use at 1800 psi (124 bars) minimum.

3. Nozzles

AFP Systems have 4, 8, 12 and 14 nozzles depending upon the requirement. The nozzles are of two types - Cone type and Tank side type for total flooding of the fire suppressant chemical and elimination of oxygen.

4. Dry Chemical Powder - ABC Type

The ABC type powder is a unique product manufactured from a mixture of Mono Ammonium Phosphates and Ammonium Sulphates. It is flow promotive and moisture repellant additives on Silicone basis results in best formulations.
This powder is suitable for extinguishing all the three categories of fires. It is suitable for fires on wood, textiles, rubber, etc. (Class A) flammable liquids like petroleum, gasoline, oil, etc, gases burning under pressure like methane, propane, domestic gas, etc. (Class B) and for fires in dry electrical installations (Class C) Dry propelling agents like compressed air, nitrogen and carbon dioxide can be used. This powder can be stored safely without affecting its efficiency for a least five years if kept in original packages. There is no toxicity under normal conditions and is non corrosive and non-abrasive.

The powder conforms to the requirements or

Indian Standard IS: 4308
International Standards ISO: 7202
US Federal Specifications OD-1308
British Standard BS: 6535 Part 3
European Standard EN 615 and EN 3
Underwriters Lab UL 711

★SECTION 4★

Inspection

Daily Inspection It is recommended that at the beginning of each operator shift change, the following should be checked. Agent Cylinder's operating pressure Nitrogen Cartridge pressure gauge for proper operating pressure

If the system has power.
Monthly Inspection
The following should be checked:
Whether all components are in place
Physical damage to components
Nozzles for blow-off caps and aiming
Whether all components are securely mounted
Whether all wiring are secure
All labels are intact, clean and secure

✸SECTION 5✸
Maintenance

The following maintenance schedule is to be followed on semi-annual basis:

i) Check that the hazards have not changed and compare with the original Vehicle hazard Analysis

ii) Check for physical damage on all components

iii) Verify that the actuation and discharge network hoses are not obstructed

iv) Check that all components are present in their original and proper location and that the access to all actuators has not been obstructed by vehicle modification or clutter.

v)Check for all operating instruction labels - to the clean and legible

vi) Service the Agent Cylinders - check for damage, corrosion, abrasion, dents or weld damage. When in doubt, hydrostatically test to factory test pressure (700 psi, 4827 kilopascal) with Hydro test Adapter, using the Proof Pressure Method.

vii) Service the Discharge Valve. Check for corrosion on parts, spring tension, etc. Depressurize cylinder and rebuild valve if defects are found.

viii) Check the pressure gauge on discharge valve for damage, leaks and proper operating pressure. A Gauge Tester may be used to check for the integrity of the gauge. Verify contents of Agent Cylinder. On a yearly basis weight the cylinder and compare with the standard weight. Also, the dry chemical in stored pressure systems must be examined every 3 years to confirm that the chemicals free flowing. The cylinder must be hydrostatically tested every 12 years to the test pressure.

ix) Service the discharge networks: Check and clean (or replace) all nozzles, caps, hoses, discharge outlet and charge fitting O-ring.

x) Service the Manual Operate Actuator: Clean and check for free movement and full travel of the pin. Also check for corrosion.

xi) Service the pneumatic actuator: Check for retaining ring and its groove, the body and the Vent Check for damage and corrosion

xii) Services the Automatic & Manual Actuator: Remove Nitrogen Cartridge and check for free movement and full travel of the palm button. Also check for corrosion, Check for the Nitrogen Cartridge rubber sealing gasket in the button of each actuator and replace if worn or cracked.

xiii) Pressure test the actuation network using test adaptor and a regulated air source to the adaptor ONLY after removing the Main Valve Pneumatic Actuator from the Agent Cylinder discharge Valve.

xiv) Service the Nitrogen Cartridge to remove dirt, grease, damage and corrosion.
Check the pressure gauge and the rupture disc. Check the detection network for dirt, grease and foreign material. Check for tightness of connections and fatigue of wiring.

xv) Test the detection network by using the Squib Simulator Module.

xvi) Test the function and the age of the backup battery.

✸SECTION-6✸

Single Zone Control Panel Specification

Features:

- 24VDC Input (12-24Vin Range)
- Reverse Polarity Protection
- Front Panel On/OFF Switch & LED Indicators
  10V VSB / 70mA Standby Power
- Customization for different vehicles / Equipments.
- 1 Year Warranty*.

INPUT SPECIFICATION:	
Input Voltage Range	12-24VDC
Input Current	700mA at 12V, 350mA at 24V
Polarity Protection	Reverse Input Shall not Damage the device
Under Voltage Protection	6V-9V Recover at 10.6V

GENERAL SPECIFICATION:	
Operating Temp	0°C to 60°C (Full Load)
Storage Temp	-40°C to 70°C
Operating Humidity	10% to 95%RH (Non Condensing)
Cooling	Internal Aluminium Heat sink
Vibration	5-9Hz,3.5mm 9-200Hz:1g.(3 Axis 5 times)
Impact	11mS/5g; 6 Directions; (3 times Each)
MTBF	>25k hours at 25°C / Full Load

OUTPUT SPECIFICATION:	
O/P Voltage(SP Adaptor)	0.1% Drop Of I/P
Turn on Delay	0 Sec
Ripple noise	<200mV
Output Current	Max 10 Amp (at SP Adaptor turn On)
Short Circuit Protection	<0.5 ohm (Current Limit to 5sec)

STATUS / CONTROL:
Power Status Amber LED (on when input power connected)
Sensor Open Status: Amber LED (on when open sensor detected)
SP Open Status: Amber LED (on when SP Adaptor Not detected)
Battery Low: Amber LED (on when Internal Battery Low Only for Selected Devices)
Manual Operation: Push Button Provided
Mute Button:It Will Mute Buzzers
Fire Buzzer: on whenever Fire Occurs

Other Salient Features:

- Detect fire automatically in a given Zone and Suppress within 5 sec of Detection.
- Manual operation is Provided in case of Fire occurs.

Dual Zone Control Panel Specification

Features:

- 24VDC Input (12-24Vin Range)
- Reverse Polarity Protection
- Front Panel On/OFF Switch & LED Indicators
  10V VSB / 70mA Standby Power
- Customization for different vehicles / Equipments.
- 1 Year Warranty*.

INPUT SPECIFICATION:	
Input Voltage Range	12-24VDC
Input Current	700mA at 12V, 350mA at 24V
Polarity Protection	Reverse Input Shall not Damage the device
Under Voltage Protection	6V-9V
	Recover at 10.6V

GENERAL SPECIFICATION:	
Operating Temp	0°C to 60°C (Full Load)
Storage Temp	-40°C to 70°C
Operating Humidity	10% to 95%RH (Non Condensing)
Cooling	Internal Aluminium Heat sink
Vibration	5-9Hz,3.5mm 9-200Hz:1g.(3 Axis 5 times)
Impact	11mS/5g; 6 Directions; (3 times Each)
MTBF	>25k hours at 25°C / Full Load

OUTPUT SPECIFICATION:	
O/P Voltage(SP Adaptor)	0.1% Drop Of I/P
Turn on Delay	0 Sec
Ripple noise	<200mV
Output Current	Max 10 Amp (at SP Adaptor turn On)
Short Circuit Protection	<0.5 ohm (Current Limit to 5sec)

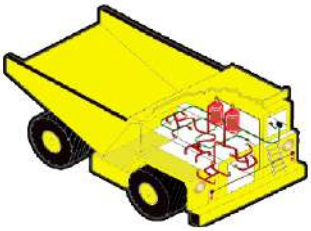
STATUS / CONTROL ZONE 1:	
Power Status	Amber LED (on when input power connected)
Sensor Open Status: Amber LED	(on when open sensor detected)
SP Open Status: Amber LED	(on when SP Adaptor Not detected)
Battery Low: Amber LED	(on when Internal Battery Low Only for Selected Devices)
Manual Operation: Push Button Provided	
Mute Button:It Will Mute Buzzers	
Fire Buzzer: on whenever Fire Occurs	

Other Salient Features:
Detect fire automatically in a given Zone and Suppress within 5 sec of Detection.
Manual operation is Provided in case of Fire occurs.

STATUS / CONTROL ZONE 2:	
Power Status	Amber LED (on when input power connected)
Sensor Open Status: Amber LED	(on when open sensor detected)
SP Open Status: Amber LED	(on when SP Adaptor Not detected)
Battery Low: Amber LED	(on when Internal Battery Low Only for Selected Devices)
Manual Operation: Push Button Provided	
Mute Button:It Will Mute Buzzers	
Fire Buzzer: on whenever Fire Occurs	

How the system Work (Illustration)

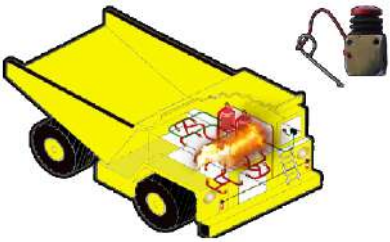
Detection Mechanism:
Auto fire detection and suppression systems typically incorporate advanced sensors or detectors to identify the presence of a fire.
We have used heat sensitive Sensor cable detector.
These sensors continuously monitor the environment for signs of a fire.



INcase of Manual System operator need to pull the, safety pin, and Strike the Actuator.

Alarm Activation:
When the detection system identifies a potential fire hazard, it activates an alarm to alert occupants and relevant authorities.

Suppression System Activation:
Upon confirming the presence of a fire, the suppression system is automatically triggered to deploy firefighting agents.



Fire Containment and Extinguishment:
The activated suppression system works to contain and extinguish the fire. The goal is to swiftly control the fire and prevent its spread, minimizing damage and protecting lives.

Area Coverage Info Table

Technical Specification						
Sl.No.	Description	UEE Part No	Auto	Manual	Effective coverage	
			Actuator	Actuator	V P*	A P**
01	4 Nozzle Manual	Uee/AFDSS 1004/M/1	X	✓	976 Cu.ft 27.6 Cu.m	3600 Sq.in. 2.4 Sq.m.
02	4 Nozzle Auto	Uee/AFDSS 1004/A/1	✓	X	976 Cu.ft 27.6 Cu.m	3600 Sq.in. 2.4 Sq.m.
03	6 Nozzle Auto	Uee/AFDSS 1006/A/1	✓	X	1464 Cu.ft 41.4 Cu.m	5400 Sq.in. 3.4 Sq.m.
04	6 Nozzle Manual	Uee/AFDSS 1006/M/1	X	✓	1464 Cu.ft 41.1 Cu.m	5400 Sq.in. 3.4 Sq.m.
05	8 Nozzle Manual	Uee/AFDSS 1008/M/1	X	✓	1952 Cu.ft. 27.6 Cu.m	7200 Sq.in. 4.8 Sq.m.
06	8 Nozzle Auto	Uee/AFDSS 1008/A/1	✓	X	1952 Cu.ft 55.2 Cu.m	7200 Sq.in. 4.8 Sq.m.
07	10 Nozzle Auto	Uee/AFDSS 1010/A/1	✓	X	2196 Cu.ft. 62.1 Cu.m.	8100 Sq.in. 5.4 Sq.m.
08	10 Nozzle Manual	Uee/AFDSS 1010/M/1	✓	X	2196 Cu.ft. 62.1 Cu.m.	8100 Sq.in. 5.4 Sq.m.
09	12 Nozzle Manual	Uee/AFDSS 1012/M/1	X	✓	2928 Cu.ft. 82.8 Cu.m.	10800 Sq.in. 7.2 Sq.m.
10	12 Nozzle Auto	Uee/AFDSS 1012/A/1	✓	X	2928 Cu.ft. 82.8 Cu.m.	10800 Sq.in. 7.2 Sq.m.
11	16 Nozzle Manual	Uee/AFDSS 1016/M/1	X	✓	3416. Cu.ft 96.6 Cu.m.	12600 Sq.in. 8.4 Sq.m.
12	16 Nozzle Auto	Uee/AFDSS 1016/A/1	✓	X	3416. Cu.ft 96.6 Cu.m.	12600 Sq.in. 8.4 Sq.m.
13	18 Nozzle Manual	Uee/AFDSS 1004/M/1	X	✓	4392 Cu.ft. 124.2 Cu.m.	16200 Sq.in. 10.8 Sq.m.
14	18 Nozzle Auto	Uee/AFDSS 1018/A/1	✓	X	4392 Cu.ft. 124.2 Cu.m.	16200 Sq.in. 10.8 Sq.m.
VP*= Total Flooding Volume of Protection						
AP*=Total Over head local application area of Protection						

✸SECTION 7✸

Manual / Semi-Automatic
fire Detection & Suppresssion System

ABC DRY POWDER

VARIANTS

4 Nozzles	6 Nozzles	8 Nozzles
16lbs	25lbs	50lbs

NOTE:
Actual Nozzles & Pounds may Vary From vehicle to vehicle Depending upon Customization Requirements and Vehicle Size,Usage of Vehicle environment.

Technical Data

Serial no	Description	Uee Part No	Actuation Mode	Area Coverage	Volume of Protection
1	4 Nozzle	UEE/AFDSS/004/M	MANUAL	3600 Sq.in	976 Cu.ft
2	6 Nozzle	UEE/AFDSS/006/M	MANUAL	5400 Sq.in	1464 Cu.ft
3	8 Nozzle	UEE/AFDSS/008/M	MANUAL	7200 Sq.in	1952 Cu.ft

SPECIFICATION

Type	Semi Automatic Fire detection and Suppression system
Usage/Application	Off Road Vehicles/HEMM
Capacity	As per requirement
Operating Temperature	-30 DegreeC to +55 DegreeC
Extinguisher type	Stored Pressure
Fire Extinguisher Type	DCP Powder suppression system
Extinguishing Medium	Dry Powder IS 4308 /14069
Brand	UEE
Material	Carbon Steel
Fire Rating	13 B
Environment Temp	100
Fire Type	A, B, C
Fire Suppression Type	Pipeline, Fire Extinguisher, Cylinder
Certification	ISO Certified

ADVANTAGES

- **Life protection:** Uee's fire detection and suppression systems are designed first and foremost to protect human life. They are so designed and installed that a fire is suppressed well before it reaches the operator.
- **Reduce Damage and Down Time:** Our automatic systems detect and suppress the fire in its earliest stages, before it spreads to highly combustible areas. Thus damage is limited and equipment down time held to a minimum.
- **Reduce Insurance Cost:** By lowering your fire risk, Uee's suppression system helps to reduce your insurance premiums.
- **After a Fire:** Uee's systems can be recharged by properly trained people on the spot without special tools or equipments. This is important when the systems are frequently used and/or are on equipment in remote locations.

Why to choose us!

- With our wealth of experience, we can protect your equipment from fire with a suppression system designed specifically or you. We will satisfy your total fire protection needs from hazard analysis through specifications, installation, testing and servicing.

Where to use!

- Fixed nozzle system can be used where a fire hazard is either obstructed or inaccessible.
- Uee's systems are engineered to eliminate human error and delay.
  The systems are recommended when involvement of the entire hazard area is likely upon fire ignition and immediate suppression of the fire is critical.
- Uee's systems can greatly increase the extinguishing effectiveness of limited firefighting man power and reduce the need for high level firefighting techniques.

SECTION 8
Parts Identification

UEE-MB16-0073

UEE-MB25-0024

UEE-MB50-0023

UEE-MAB-0028

UEE-DCP/16-0072

UEE-DCP/25-0003

UEE-DCP/50-0004

UEE-NC-0002

UEE-VPA-0007

UEE-MV-0015

UEE-NRV-0008

UEE-VC-0009

UEE-ELF-34-0049

UEE-APL-0051

UEE-BN14-0071

UEE-BN12-0022

UEE-N12-0012

UEE-N14-0070

UEE-12D-0069

UEE-34D-0021

UEE-EL-34-0049

UEE-EL-0050

UEE-EL-14-0056

UEE-ELF-0057

UEE-AP-14-0054

UEE-AP-NPT-0009

UEE-AP-14-0055

UEE-AP-0051

UEE-AMA-0011

UEE-MOA-0010

UEE-TEE-14-0058

UEE-TEE-34-0050

UEE-TEE-12-0053

UEE-1/2/C-0042

UEE-1/4/C-0044

UEE-FSW-0039

UEE-34/c-0040

UEE-ZCU-0013

UEE-CU-0013

UEE-MH-0048

UEE-ZHSA-0047

UEE-HSA-0047

UEE-FSW-0014

UEE-SP-005

UEE-HU-0001

UNIVERSAL VEHICLE FIRE SUPPRESSION SYSTEM

✸ WARRANTY REGISTRATION FORM ✸

In order that we may fulfill obligations of the warranty on this Universal Vehicle Fire Suppression System, please complete the information requested below and return within 5 days of installation of the system per instructions on the reverse side of this form.

VEHICLE OWNER INFORMATION:

Name : .....
Company : .....
Address : .....
Phone : .....

VEHICLE OWNER INFORMATION:

Name : .....
Company : .....
Address : .....
Phone : .....

Date of Installation: .....

Vehicle Description: Make/Model.....Year:.....
Vehicle Identification Number (VIN No.): .....

SYSTEM DESCRIPTION:

Agent Cylinder: Model..... Serial No. .....
Number of Nozzle this agent Cylinder: .....
Number of Manual Actuators used: .....
Electrical/Manual Actuators used: Yes.....No.....
Circuit Monitor or Control Panel Used (List Part No.) .....
Shutdown Installed: Yes .....No.....

Installer Signature **Owner Signature**

Our Other Products

- Rearview camera system (CE, ARAI, IP69K approved)
- Audio visual alarm (as per DGMS circular)
- Wireless single and double antenna rear vision system
- Forklift rear vision system
- Body lifting alarm
- Seat belt and reminder (human voice)
- Auto dipper system (ARAI, NRDC approved)
- Driver fatigue monitoring and alert system
- Trimming alarm
- Pre-start alarm for v cone crusher screener etc.,
- Flasher LED light (heavy-duty)
- Proximity warning device (RADAR)
- Proximity warning device (Ultrasonic)
- Automatic fire detection and suppression system
- The battery cut off switch
- Solar power tire pressure monitoring system
- GPRS vehicle tracking system
- Load indicator and trip recording system
- Industrial instruments automation, electronics R & D works.

AFDSS Facility:
No 35 Singapura Garden, neelasri nilaya Bangalore-560015.

Admin Office:
No 15,16, 1st Floor, Girija Arcade, Abbigere Lakshmipura main road Bangalore-560090.

DEALER/AUTHORISED DISTRIBUTOR

Areas we Serveed