

Fire Suppression System using Fluoro-K™ Clean Agent

Effective: April 2023
K-45-001 Rev AA

Kidde Fire Systems' Fluoro-K™ based clean agent fire suppression systems are safe, competitive, and cost-effective fire suppression solutions for protecting assets in commercial, light, and heavy industrial applications. The Fluoro-K agent itself is colorless, with low odor and no particulate or oily residue allowing for minimal business disruption after a discharge. From an environmental standpoint, Fluoro-K has zero ozone depletion potential, and an atmospheric lifetime of less than five days. The associated ECS-500™ and ADS™ delivery platforms have global approvals and a selection of sizes and capacity profiles, making a Kidde Fluoro-K based clean agent system your fire suppression solution of choice.

Environmentally safe

- Zero Ozone Depletion Potential (ODP)
- Global Warming Potential (GWP) of less than 1

Wide range of applications - broad opportunity

- Data Centers
- Hospitals & Medical Facilities
- Libraries and Archives
- Museums & Cultural Heritage Buildings
- Petroleum, Oil & Gas Facilities
- Pharmaceutical Manufacturing
- Telecommunication Facilities
- Others

Choice of hardware profile - suits various application types

- Appropriateness for multiple fire types broadens application scope
 - Class A Surface fires (MDC:4.5)
 - Class B Hydrocarbon fires (n-Heptane MDC: 5.85)
 - Class C Electrical fires under 480V (MDC:4.52)
- Multiple system pressure platforms to drive agent for long distances
 - ECS-500™ with cylinders filled to 500 PSI
 - ADS™ with separate Nitrogen Drivers filled to 1800 PSI
- Cylinder capacities to suit floor space and agent need
 - ECS-500: 10, 20, 40, 70, 125, 200, 350, 450, 600, 900, and 1100 lb cylinders available
 - ADS: 200, 350, 450, 600, and 900 lb cylinders available
- Nozzles types add design & installation flexibility
 - 180° (Pendant or upright style)
 - 360° (Pendant or upright style)



Wide operating temperature

- Range of 32° to 130°F (0° to 54°C) allows from hot to cold application environments

Specify and ship worldwide with confidence globally certified by:

- Transportation
 - DOT
- Performance
 - UL Listed
 - FM Approved



ADS Cylinder and Driver

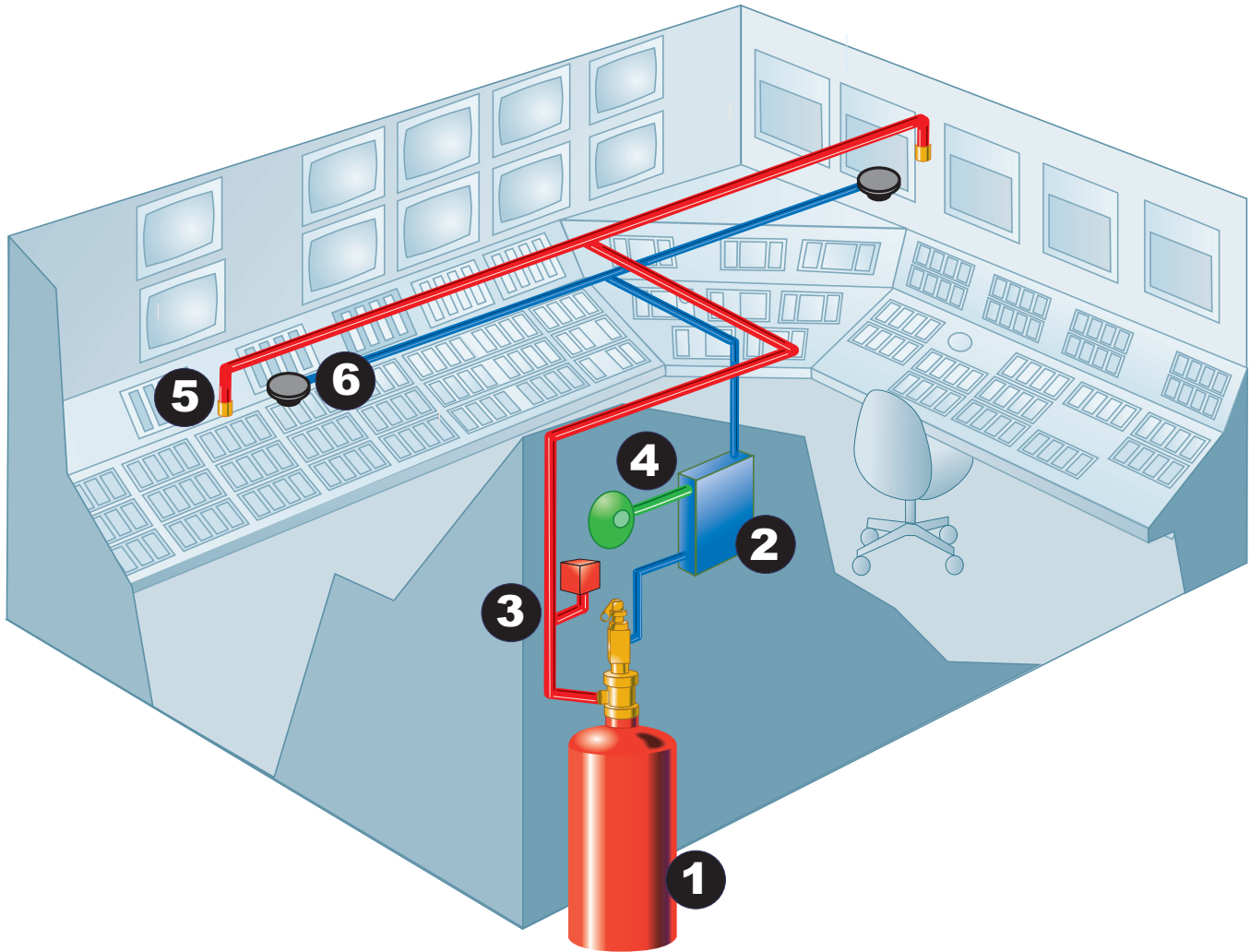
ECS-500 Cylinder

Hazard Protection

An ECS-500 or ADS system using Fluoro-K can be designed to cover a single hazard or multiple hazards from a common cylinder bank. Wherever possible, a fully connected reserve bank of cylinders is highly recommended to ensure your assets remain fully protected, even after a discharge of the main bank.

Single Zone System

The following figure depicts an example of an ECS-500 system using Fluoro-K Clean Agent configured to protect one hazard.



Key

- ① Kidde ECS-500™ Agent Storage Cylinder\Valve Assembly
- ② Kidde AEGIS™ 2.0, AIRIES-SLX, ARIES-MLX Fire Suppression Control Unit
- ③ Pressure Switch
- ④ Occupant Notification Appliance
- ⑤ Agent Discharge Nozzle
- ⑥ Ceiling mounted Photoelectric Smoke Detector

Multi Zone System

Multi zone systems can protect multiple hazards with one bank of cylinders. Multi zone systems require the use of one 2-way pneumatically operated selector valves for each zone protected. The following depicts an example of a multi-zone setup which protects 3 separate hazard zones. Pressure to operate the selector valves is provided by a Nitrogen pilot cylinder.

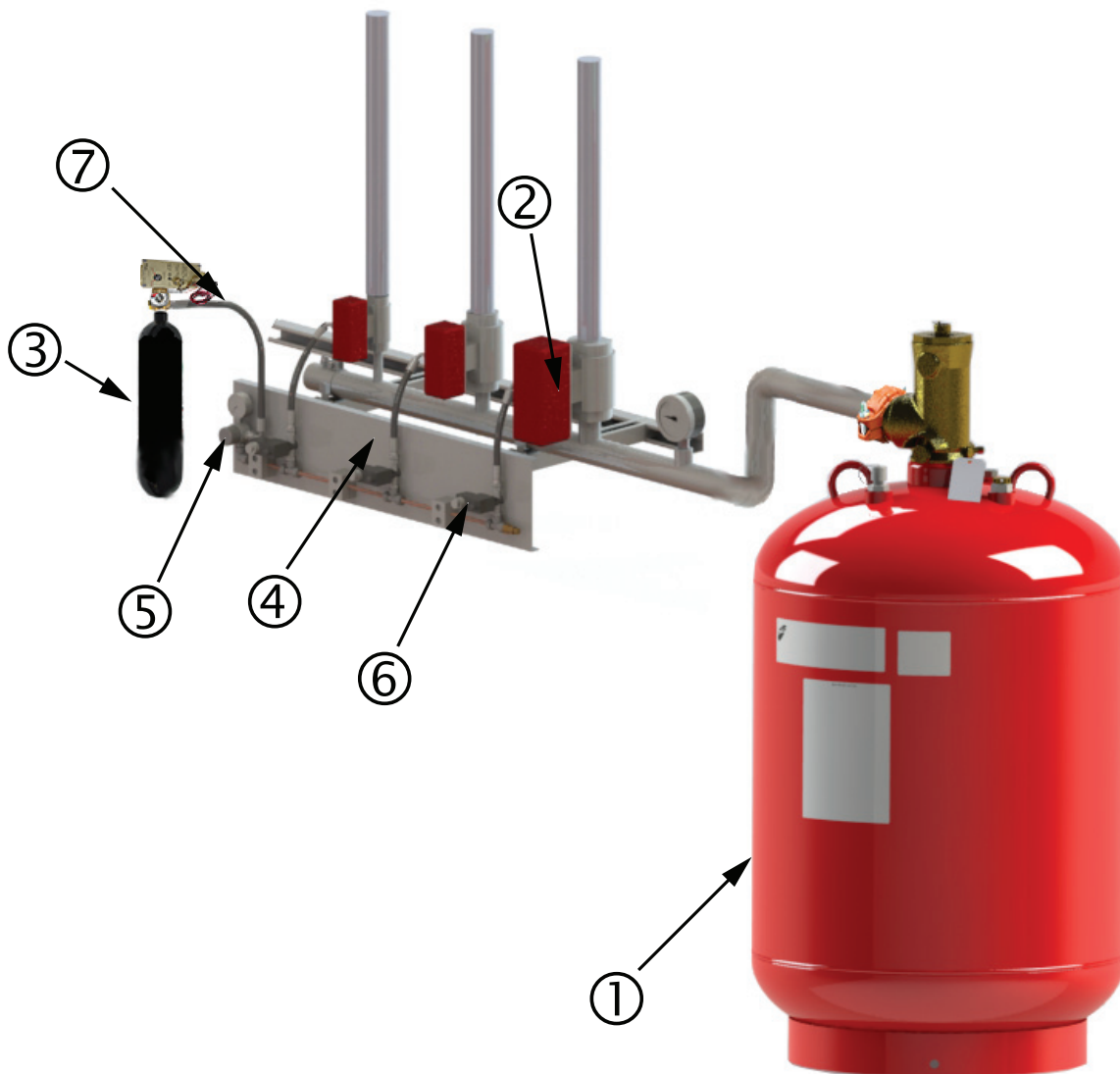


Figure 1. Multi-Hazard System Example

Table 1: Multi-Hazard System Example Component List

Item	Description	Item	Description
1	Agent Storage Cylinder/Valve Assembly	4	Back-Plate Manifold which includes the following:
2	Selector Valve	5	Back-Plate Manifold Pressure Regulator
3	108 cu. in. Nitrogen Pilot Cylinder	6	Back-Plate Manifold Solenoid
		7	Back-Plate Manifold Hose (Order 1 additional hose per hazard.)

Component Description

Cylinder and Valve Assemblies

The Fluoro-K clean agent in the ECS-500 or ADS systems is stored in welded steel cylinders compliant with ISO 9809-2 and certified to DOT. System activation and gas discharge is controlled via a pressure controlling valve. The cylinder or valve is equipped with a safety burst disc in compliance with DOT requirements. Cylinder sizes are available to suit floor space and agent quantity needs.

- ECS-500: 10, 20, 40, 70, 125, 200, 350, 450, 600, 900, and 1100 lb
- ADS: 200, 350, 450, 600, and 900 lb

Cylinder shells are painted red for easy identification and include agency markings where applicable.

When shipped, cylinder-valve assemblies include an anti-recoil cap and a Safety Transport cap as a safety feature designed to prevent uncontrolled, accidental discharge.



Figure 2. Cylinder/Valve Assemblies

Note: All cylinders in a system must be of equal size and pressure.

Cylinder Mounting Straps

Use the Cylinder Mounting straps to mount the cylinders in a vertical position. Cylinder straps are available for all size cylinders.



Figure 3. Cylinder Mounting Strap

Note: For the 450 lb cylinders and for all Marine applications, 2 straps are required.

Cylinder Supervisory Pressure Switch

Cylinder supervisory pressure switches are intended to detect a fall in pressure in a clean agent or Nitrogen filled driver cylinder. The cylinder supervisory pressure switch can be wired for either normally open or normally closed operation, depending on installation requirements.



ECS-500 Agent Supervisory Pressure Switch



Nitrogen Pilot/Driver Supervisory Pressure Switch



ECS 360 Agent Supervisory Pressure Switch

Figure 4. Cylinder Supervisory Pressure Switch

Liquid Level Indicator

The Liquid Level Indicator (LLI) consists of a hollow stainless steel tube inserted into a special fitting in the top of the 125, 200, 350, 450, 600, 900 or 1100 lb (57, 91, 159, 205, 272, 408, or 499 kg) agent cylinder. The LLI is provided with a graduated flexible tape that senses the position of a toroidal magnet encased within an internal float riding on the liquid surface. The graduations on the tape indicate the liquid level within the cylinder.

Control Heads

Control heads provide various means of actuation for the agent or driver/pilot cylinder. A variety of control heads are available including:

- Electric
- Electric/Cable
- Pressure
- Lever
- Cable



Figure 5. Electric Control Head



Figure 6. Lever or Pressure Operated Control Head

Manifold EI-Check Valves

Manifold EI-Checks valves are installed at the discharge manifold in a multiple cylinder arrangement to allow removal of an agent cylinder from the manifold while still retaining a closed system. EI-Check valves are available in 1-1/2, 2, and 3 in. sizes.

Note: EI-Checks are to be installed at system manifold in vertical direction.



Figure 7. Manifold EI-Check Valve

Discharge Hoses and Valve Outlet Adapters

Use the Flexible Discharge hose to connect the agent cylinder to the discharge piping.

While the 1-1/2 and 2 in. hoses are rubber covered with wire braided reinforcements, the 3 in. discharge hose has a stainless steel braid and roll-groove fittings.



Figure 8. 2 in. Flexible Discharge Hose

As an alternative to the Flexible Discharge hose, Valve Outlet adapters are available in 1-1/2, 2, and 3 in. sizes.

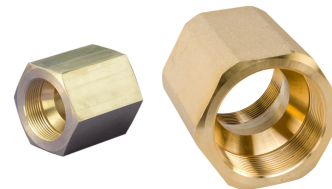


Figure 9. 1-1/2 and 2 in. Valve Outlet Adapters



Figure 10. 3 in. Discharge Outlet Adapter

Selector Valves

In multi-hazard applications, selector valves route agent from a central cylinder bank to the specific hazard where fire has been detected. Selector valve actuators operate pneumatically using agent pressure routed from the manifold via a pressure regulator on the back-plate manifold and the respective back-plate solenoid valve.



Figure 11. Selector Valve

For NEMA 4 rated selector valves, solenoids can be ordered pre-installed on a back plate for two through five hazards. The solenoids are mounted on the back plate with tamper proof screws and cannot be removed. (See Figure 1.)

Lockout Valve

A lockout valve is a manually operated valve installed between the agent manifold and the discharge pipe network leading to the protected area. Lockout valves should be locked in the closed position to prevent agent from discharging into the protected area when the system or the protected space are being maintained..

Lockout valves can be installed at the end of the manifold or, if a common manifold protects multiple hazards, downstream of each selector valve. Lockout valves include a limit switch. The limit switch must be wired to the control panel to indicate a trouble if the valve is closed.



Figure 12. Lockout Valve

Agent Discharge Nozzles

The ECS-500 and ADS hardware includes nozzles with 360° and 180° discharge patterns which can be mounted in either upright or pendant style. The number and size of the orifice on each nozzle is custom calculated using the Flow Calculation Software Suite version 4.0 and higher.



Figure 13. ECS-500 Nozzles (Brass or Stainless Steel)



360° Nozzle 180° Nozzle
Figure 14. ADS Nozzles (Stainless Steel only)

Accessories

Safety Outlets

Safety Outlets are designed to protect against over-pressurization in closed sections of discharge pipework, i.e., manifolds. The hardware offer includes a Safety Outlet rated for agent pressures and one rated for Nitrogen pilot line pressures.



Figure 15. Safety Outlet

Pressure Switch

The pressure operated switch uses the pressure of the discharging agent for activation and must be connected to the distribution piping. The agent actuates a pressure operated stem which toggles the electrical switch. Each switch can also be operated manually by pulling up on the stem. These switches are used to annunciate alarms, shut down ventilation, and turn on electrical automatic dampers or other electrical equipment. Each pressure switch must be manually reset, by pushing down on the stem to return the switch to the set position. The minimum operating pressure required is 50 PSI. The toggle on the pressure switch can be set to either N.O. to close or N.C. to open contact transfer upon operation.



Figure 16. Pressure Switch

Pressure Operated Trip

The pressure operated trip, is connected to the distribution piping and utilizes agent pressure for actuation. The agent pressure displaces a spring-loaded piston to disengage a holding ring from the stem connected to the piston.



Figure 17. Pressure Operated Trip

Main & Reserve Systems

ECS-500 and ADS platform configurations support a 'reserve' bank of cylinders, equal in quantity and size to the main bank. A reserve system can minimize downtime and prevent service interruption in case of a discharge. A reserve system is also recommended when using selector valves and when downtime cannot be tolerated.

The system with main and reserve cylinders are connected to Suppression Control Panel through a Main/Reserve Transfer Switch.

Main & Reserve Transfer Switch:

The main & reserve transfer switch, is installed on systems having main and reserve cylinders. Placing the switch in either the "main" or "reserve" position provides uninterrupted fire protection capability during system maintenance or in the event of a system discharge.



Figure 18. Main and Reserve Transfer Switch

Control Panel

For systems covering a single zone, an AEGIS™ 2.0 control unit is typically ideal. Multi zone systems using selector valves require an addressable control unit such as the ARIES-SLX single loop or ARIES-MLX multi-loop.

Note: The use of a control unit that lacks compatibility listing by Kidde Fire Systems and relevant listing/approval agencies, voids all warranties whether expressed or implied. Refer the Terms & Conditions of Sale document.

Flow Calculation Software Version 4.0

Using the parameters listed below the Flow Software calculates pressure drops, pipe sizes, orifice sizes and vent area requirements:

- Agent selection
- Platform (ECS-500 or ADS) selection
- Cylinder Size
- Nozzle Selection 180°/360°
- Single Zone/Multi Zone Systems through 2 Way Selector valves

Parts List

Description	Part Number
Kidde Fire Systems DOT Approved ECS-500 Cylinder and Valve Assemblies filled with Fluoro-K Fire Suppression Clean Agent	
Cylinder, 500 psi, 10 lb. (4.5 kg), 1.5 in. Valve, No LLI	45-550010-901
Cylinder, 500 psi, 20 lb. (9 kg), 1.5 in. Valve, No LLI	45-550020-901
Cylinder, 500 psi, 40 lb. (18 kg), 1.5 in. Valve, No LLI	45-550040-901
Cylinder, 500 psi, 70 lb. (32 kg), 1.5 in. Valve, No LLI	45-550070-901
Cylinder, 500 psi, 125 lb. (57 kg), 1.5 in. Valve, with LLI	45-550121-901
Cylinder, 500 psi, 200 lb. (91 kg), 2 in. Valve, with LLI	45-550201-901
Cylinder, 500 psi, 350 lb. (159 kg), 2 in. Valve, with LLI	45-550351-901
Cylinder, 500 psi, 450 lb. (205 kg), 2 in. Valve, with LLI	45-550451-901
Cylinder, 500 psi, 600 lb. (272 kg), 3 in. Valve, with LLI	45-550601-901
Cylinder, 500 psi, 900 lb. (408 kg), 3 in. Valve, with LLI	45-550901-901
Cylinder, 500 psi, 1100 lb. (499 kg), 3 in. Valve, with LLI	45-551101-901
Kidde Fire Systems DOT Approved ADS System Cylinder and Valve Assemblies filled with Fluoro-K Fire Suppression Clean Agent	
200 lb. Capacity Cylinder and Valve Assembly, 2 in. Valve, with LLI	45-500201-901
350 lb. Capacity Cylinder and Valve Assembly, 2 in. Valve, with LLI	45-500351-901
450 lb. Capacity Cylinder and Valve Assembly, 2 in. Valve, with LLI	45-500451-901
600 lb. Capacity Cylinder and Valve Assembly, 3 in. Valve, with LLI	45-500601-901
900 lb. Capacity Cylinder and Valve Assembly, 3 in. Valve, with LLI	45-500901-901
Cylinder Supervisory Pressure Switches	
Agent Cylinder Supervisory Pressure Switch	06-118262-001
Agent Cylinder ATEX Supervisory Pressure Switch	06-118537-001
Nitrogen Driver and Pilot Cylinder Supervisory Pressure Switch	85-111540-001
Nitrogen Driver and Pilot Cylinder ATEX Supervisory Pressure Switch	85-111540-100
Control Heads	
Electric Control Head Kit, Includes: - Control Head Monitor, P/N 85-100000-100 - Electrical Control Head, 24 VDC, P/N WK-890181-200	85-890181-200
Stackable Electric Control Head Kit, Includes: - Control Head Monitor, P/N 85-100000-100 - Lever Operated Control Head (with Black Lever), P/N WK-870652-000 - Electrical Control Head, 24 VDC, Stackable, (Ex. Proof), P/N: 82-486500-010	85-486500-010
Electric and Cable Operated Control Head (Explosion Proof) Kit, Includes: - Control Head Monitor, P/N 85-100000-100 - Electrical and Cable Operated Control Head, 24 VDC, (Ex. Proof), P/N WK-897494-000	85-897494-000

Description	Part Number
Control Heads (continued)	
Electric and Cable Operated Control Head Kit, Includes: - Control Head Monitor, P/N 85-100000-100 - Electrical and Cable Operated Control Head, 24 VDC, P/N: 81-895630-200	85-895630-200
Control Head Monitor	85-100000-100
Cable Operated Control Head	81-979469-000
Lever Operated Control Head (with Black Lever)	WK-870652-000
Lever/Pressure Operated Control Head (with Black Lever)	82-878751-000
Pressure Operated Control Head	82-878737-000
Pressure Operated Control Head, Stackable	82-878750-000
Discharge Accessories	
Flexible Discharge Hose, 1-1/2 in. dia., 24 in. length, for use with 10 to 125 lb (4.5 kg to 57 kg) Cylinders	WK-283898-000
Flexible Discharge Hose, 2 in. dia., 31 in. length, for use with 200 to 350 lb (91 kg to 159 kg) Cylinders	WK-283899-000
Flexible Discharge Hose, 3 in. dia., 54 in. length, for use with 600, 900, and 1100 lb (243, 408, and 499 kg) Cylinders	06-118225-001
Valve Outlet Adapter, 1-1/2 in. (38 mm), 10 to 125 lb (4.5 kg to 57 kg) Cylinders	WK-283904-000
Valve Outlet Adapter, 2 in. (51 mm), 200 to 350 lb (91 kg to 159 kg) Cylinders	WK-283905-000
Valve Outlet Adapter, 3 in. (76 mm) Grove to NPT Thread Adapter, 600, 900 lb and 1100 lb (243, 368 and 499 kg) Cylinders	70400133
Manifold EI-Check, 1-1/2 in. (38 mm)	WK-877690-150
Manifold EI-Check, 2 in. (51 mm)	WK-877690-200
Manifold EI-Check, 3 in. (76 mm)	WK-877690-300
Safety Outlet, Agent	82-844346-000
Safety Outlet, Nitrogen	81-803242-000
Pressure Operated Switch	81-486536-000
Pressure Operated Switch, Explosion Proof	81-981332-000
Pressure Operated Siren	90-981574-001
Nitrogen Time Delay for use with 108 cu. in. Pilot Cylinder (nominal 34 sec. delay)	81-871072-001
Nitrogen Time Delay for use with 108 cu. in. Pilot Cylinder (nominal 61 sec. delay)	81-871072-002
Nitrogen Time Delay for use with 1040 cu. in. Pilot Cylinder (nominal 35 sec. delay)	81-871072-003
Nitrogen Time Delay for use with 1040 cu. in. Pilot Cylinder (nominal 68 sec. delay)	81-871072-004
Pressure Operated Trip	81-874290-000
Discharge Indicator, 1/2 in. NPT (Aluminum)	81-875553-000
Discharge Indicator, 3/4 in. NPT (Brass)	81-967082-000
Main-to-Reserve Transfer Switch	85-802398-001

Description	Part Number
2-Way NEMA 4 Rated Selector Valves	
1 in. Selector valve, NPT, 116-145 psi Actuator, NEMA 4 Rated Solenoid	85-100025-100
1 1/2 in. Selector valve, NPT, 116-145 psi Actuator, NEMA 4 Rated Solenoid	85-150025-150
2 in. Selector valve, NPT, 116-145 psi Actuator, NEMA 4 Rated Solenoid	85-200025-200
3 in. Selector valve, Grooved, 116-145 psi Actuator, NEMA 4 Rated Solenoid	85-300025-300
4 in. Selector valve, Grooved, 116-145 psi Actuator, NEMA 4 Rated Solenoid	85-400025-400
2-Way NEMA 7 Rated Selector Valves	
1 in. Selector valve, NPT, 116-145 psi Actuator, NEMA 7 Rated Solenoid	85-100724-100
1 1/2 in. Selector valve, NPT, 116-145 psi Actuator, NEMA 7 Rated Solenoid	85-150724-150
2 in. Selector valve, NPT, 116-145 psi Actuator, NEMA 7 Rated Solenoid	85-200724-200
3 in. Selector valve, Grooved, 116-145 psi Actuator, NEMA 7 Rated Solenoid	85-300724-300
4 in. Selector valve, Grooved, 116-145 psi Actuator, NEMA 7 Rated Solenoid	85-400724-400
2-Way Directional Valve Accessories	
Back-Plate Manifold with Solenoids - 2 Area, Selector Valve Control, 116 psi	01-3508-0002
Back-Plate Manifold with Solenoids - 3 Area, Selector Valve Control, 116 psi	01-3508-0003
Back-Plate Manifold with Solenoids - 4 Area, Selector Valve Control, 116 psi	01-3508-0004
Back-Plate Manifold with Solenoids - 5 Area, Selector Valve Control, 116 psi	01-3508-0005
Back-Plate Manifold Hose	01-3273-1200
1/8 in. NPT Male to 1/4 in. Male BSPP Adapter	85-025125-000
1 in. BSPT (M) to NPT (F) Adapter (2 required per valve, entry/exit)	01-3711-3000
1 1/2 in. BSPT (M) to NPT (F) Adapter (2 required per valve, entry/exit)	01-3711-4000
2 in. BSPT (M) to NPT (F) Adapter (2 required per valve, entry/exit)	01-3711-5000
Hose Adapter for For 1, 1-1/2 and 2 in. Selector Valves, Nipple 1/4 in. BSPP 60° x 1/4 in. BSPT M/M	15-8662-0042
Hose Adapter for For 3 and 4 in. Selector Valves, Nipple 1/4 in. BSPP 60° x 1/8 in. BSPT M/M	15-8662-0041
Pressure Regulator - 4351 psi to 116 psi	01-6017-0000

Description	Part Number
NEMA 4 Rated Lockout Valves	
1 in. Lockout Valve, NPT, NEMA 4 Rated Switch	85-100210-101
1 1/2 in. Lockout Valve, NPT, NEMA 4 Rated Switch	85-150210-151
2 in. Lockout Valve, NPT, NEMA 4 Rated Switch	85-200210-201
3 in. Lockout Valve, Grooved, NEMA 4 Rated Switch	85-300210-301
4 in. Lockout Valve, Grooved, NEMA 4 Rated Switch	85-400210-401
NEMA 7 Rated Lockout Valves	
1 in. Lockout Valve, NPT, NEMA 7 Rated Switch	85-100120-101
1 1/2 in. Lockout Valve, NPT, NEMA 7 Rated Switch	85-150120-151
2 in. Lockout Valve, NPT, NEMA 7 Rated Switch	85-200120-201
3 in. Lockout Valve, Grooved, NEMA 7 Rated Switch	85-300120-301
4 in. Lockout Valve, Grooved, NEMA 7 Rated Switch	85-400120-401
Spare Liquid Level Indicators	
Liquid level indicator for use on 125 lb (57 kg) agent cylinders.	85-235000-025
Liquid level indicator for use on 200, 350, 600, and 1100 lb (81, 142, 243, and 499 kg) agent cylinders.	85-235000-037
Liquid level indicator for use on 450 and 900 lb (182 and 408 kg) agent cylinders.	85-235000-042

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