

# Kidde Fire Systems Nitrogen Fire Protection System



Effective: February 2020  
K-79-001 Rev AB

## System Description

### GENERAL INFORMATION

The Kidde Fire Systems Nitrogen Fire Protection System (Nitrogen system) is a clean agent, automatic extinguishing systems using Nitrogen (IG-100) and consisting of four basic components and their associated accessories:

- Nitrogen Cylinders and Components
- Completer Kits
- Control Panels
- Detection and Alarm Devices

### FEATURES

The fire extinguishing Nitrogen system uses pure Nitrogen. Nitrogen is naturally occurring and present in the atmosphere. Nitrogen is safe for use in occupied spaces and poses no threat to the environment.

- The Nitrogen Components consist of the agent cylinders, cylinder racking, and the agent discharge nozzles.
- The Completer Kits provide all the basic components necessary to operate the Nitrogen cylinders. The kits consist of hoses, connection fittings, pressure gauges, actuation devices required to operate the cylinder valve and warning signs to be displayed in the area(s) protected by a Nitrogen fire extinguishing system.
- The Control Panels vary in features and complexity but in all cases are used to monitor the detection, actuate the alarms, initiate the agent discharge and control auxiliary functions such as shut down of vital equipment and ventilation dampers.
- The Detection and Alarm devices provide fire detection by means of thermal or smoke detectors, and annunciation of the Nitrogen discharge.

### NITROGEN

#### AGENT DESCRIPTION

The Nitrogen systems contain only naturally occurring Nitrogen and as such, has no ozone depletion potential and no direct global warming risk.

Nitrogen extinguishes by means of reducing the oxygen content within a room to the point at which fire can no longer burn, but without compromising the safety of individuals present. There are no toxicological factors associated with the use of Nitrogen. Nitrogen will not decompose or produce any by-products when exposed to a flame from a fire condition.

Most Nitrogen systems are designed to extinguish fires with a minimum agent concentration of 36% within one minute. This results in extinguishment of the fire and an oxygen concentration of 13%.

Nitrogen is stored as a gas within the cylinder assembly. It is available at a storage pressure of 2900 psi (200 bar).

**Table 1: Usable Cylinder Capacity**

Cylinder	Area Coverage @ 36% Concentration/70°F
	2900 psi (200 bar)
80.0 L	1175 ft <sup>3</sup> (33.27 M <sup>3</sup> )

### EQUIPMENT DESCRIPTION

The Nitrogen systems can be released electrically, manually, or pneumatically. The following is a description of the various components associated with the systems.

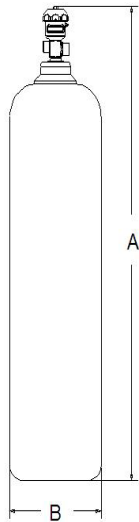
#### CYLINDER AND VALVE ASSEMBLY

Nitrogen cylinders are available in an 80 Liter capacity cylinder. The 200 bar cylinders are uniquely color coded to allow for quick and easy identification. The cylinders are red with yellow/green at the cylinder shoulder. Because Nitrogen is stored as a gas, the cylinders have no dip tube and can be mounted in either the vertical or horizontal position.

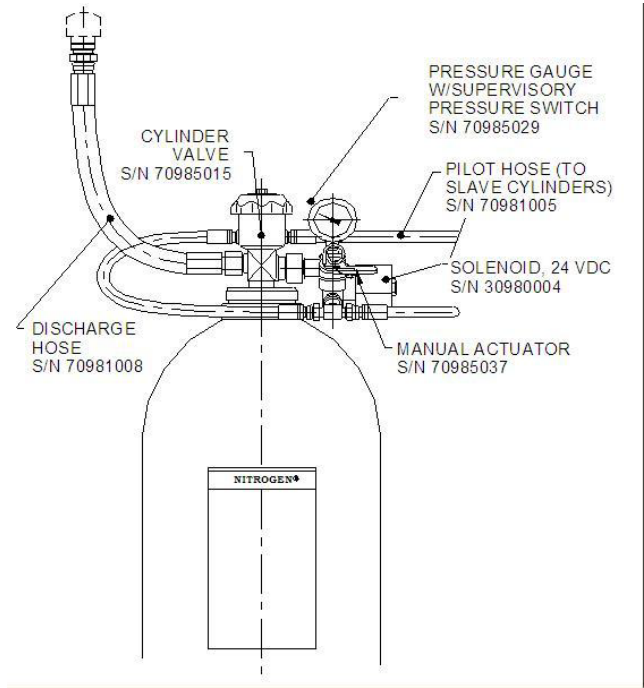
The cylinder valve, required for all system cylinders, allows for the connection of the cylinders into the system. The valve provides connections for electric, pneumatic, and manual release of the cylinder contents,. The valve also provides a discharge outlet, which can be connected by a discharge hose to the distribution piping.

The actuator operates on a 1 to 10 ratio requiring only 300 psi for the 200 bar system to operate the valve. The following are the connections provided on the valve.

Cylinder Size	Dimension A	Dimension B (Diameter)
80.0 L	68.81" (1748 mm)	11.25" (286 mm)



Additional features of the valve include a Burst Disk designed to rupture upon excessive internal pressure, and an external Bleeder Valve with indicator that allows bleed gas to vent to atmosphere.

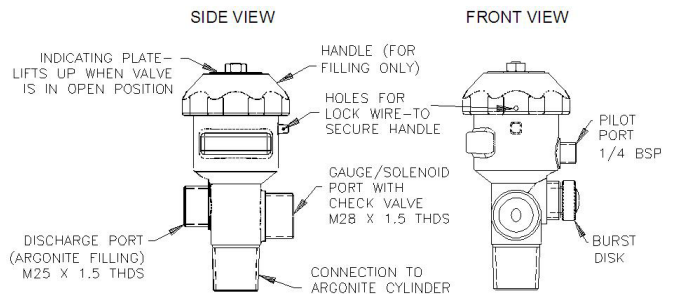


- Manual/Pneumatic Actuator Connection: Each cylinder valve must be fitted with either a Pilot or Slave type actuator.

The Pilot actuator provides a manual (pull pin - turn handle) actuator and connections from an electrical solenoid and pressure switch assembly. The pilot actuator also has connections to adjacent slave cylinder actuators to discharge entire groups of cylinders virtually simultaneously.

The Slave actuator is purely pneumatic - it receives pressure from the pilot actuator and opens its associated cylinder valve.

- Solenoid Valve, Pressure Gauge, and Supervisory Pressure Switch Connection: This is a threaded port that serves for the connection of one of the following:
  - Solenoid Valve, Pressure Gauge, and Supervisory Pressure Switch for pilot actuator connections.
  - Pressure Gauge and Supervisory Pressure Switch for slave actuator connections.
- Discharge Outlet: The cylinder valve outlet is connected to the distribution piping by a flexible hose with 1/2" steel fittings.



Nitrogen Cylinder Valve-S/N 70985015

**Table 2: 80.0 Liter Cylinder Assy (filled cylinder/valve)**

Filled Weight LBS (KSG)	Description	Stock #
324 (147.0)	DOT & TC Version	10980090

DOT = Department of Transportation (US)  
TC = Transportation Canada

## COMPLETER KIT COMPONENTS

Either a PILOT or a SLAVE completer kit is required to complete the installation of each Nitrogen cylinder.

Description	Completer Kits	
	Primary 20980002	Slave 20980003
	Quantity	Quantity
Solenoid valve, 24 VDC	1	0
Pressure gauge w/Supervisory pressure switch	1	1
Manual release	1	0
Pilot hose #1	1	0
Pilot hose #2	1	0
Pilot hose #3	0	1
Bleeder valve	1	0
Tee piece for hose connection	2	1
Discharge hose	1	1
Inlet stem assembly	1	1
Flex. Conduit Kit (pres. gauge)	1	1
Exit sign ("Warning, Leave area...")	1	0

The solenoid/pressure gauge assembly provides an electrical means (24VDC) of actuating the system as well as a visual means to determine the pressure within the pilot cylinder.

This unit includes an integral supervisory pressure switch and is supplied with a pilot flex hose #1. The supervisory pressure switch consists of one normally open (N.O.) contact that changes state upon loss of cylinder pressure.

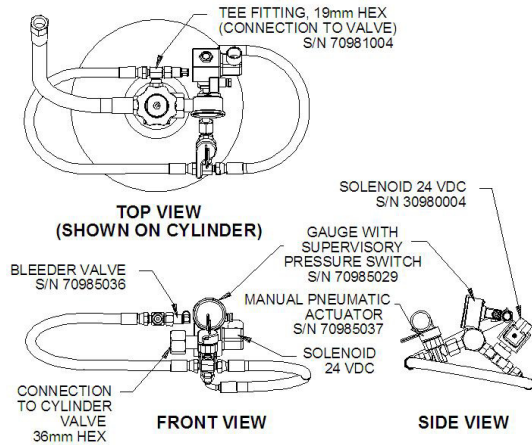
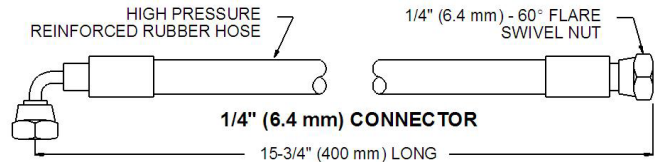
### PRESSURE GAUGE ASSEMBLY WITH SUPERVISORY PRESSURE SWITCH (S/N 70985029)

This unit is required for the slave cylinders to provide a local visual means to determine the pressure within the slave cylinder.

The pressure gauge assembly includes an integral supervisory pressure switch, consisting of one N.O. contact that changes state upon loss of cylinder pressure.

### PILOT FLEX HOSE #1 (S/N 70981007)

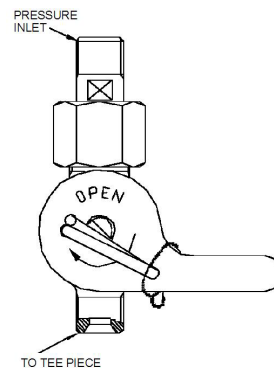
This 1/4" ID reinforced rubber flex hose has threaded connections to allow interface between the pilot cylinder solenoid/pressure gauge assembly and pilot manual/pneumatic actuator. It is supplied with the pilot solenoid assembly.



Solenoid and Pressure Gauge Assembly with Supervisory Pressure Switch

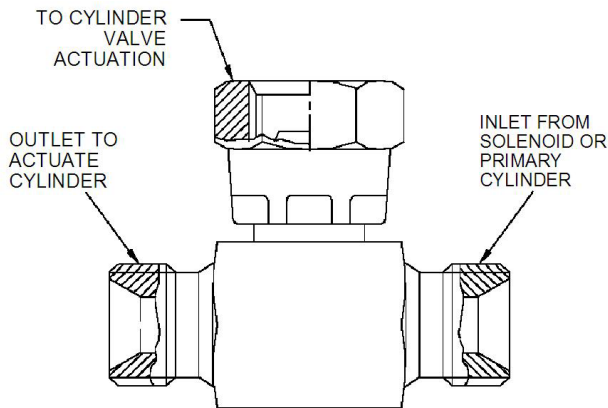
### MANUAL/PNEUMATIC ACTUATOR (S/N 70985037)

The manual/pneumatic actuator supplied with the pilot completer kit is required on the pilot cylinder to manually actuate the cylinder valve as well as to supply pressure to actuate any slave cylinders. Interconnection between cylinders is by means of high-pressure flex hoses.



## TEE PIECE FOR HOSE CONNECTIONS (S/N 70981004)

The tee piece is supplied with each of the completer kits. It provides the interface with the pilot assembly (through a high-pressure flex hose) to simultaneously operate the slave cylinder pneumatically.



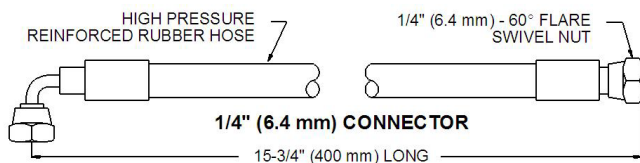
## BLEEDER VALVE FOR ACTUATOR (S/N 70985036)

A bleeder valve is included with the Pilot Completer Kit to prevent an accidental accumulation of pressure within the pilot lines, which, if not bled to atmosphere, could cause a false discharge. Connection requires a copper gasket (S/N 70981013) between the bleeder valve and pneumatic actuator.

## PILOT FLEX HOSES

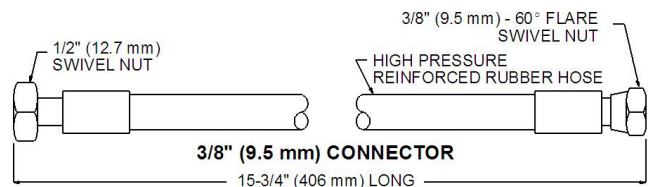
This 1/4" ID reinforced rubber flex hose has threaded connections to allow interface between components.

S/N	Description	Length
70981015	Pilot hose #2 between actuator and cylinder valve	17-3/4" (450 mm)
70981005	Pilot hose #3 between cylinder actuation pieces	10-5/8" (270 mm)
70981006	Pilot Hose #4 between cylinder rows	19.7" (500 mm)



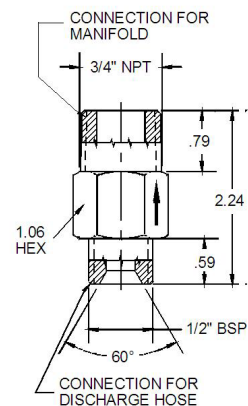
## DISCHARGE FLEX HOSE (S/N 70981008)

This flex hose has 1/2" threaded connections to allow interface between the cylinder valves and the discharge manifold (if applicable). Where more than one cylinder is connected to a common manifold, check valves are required at the end of each discharge flex hose.



## CHECK VALVE ASSEMBLY

To prevent accidental discharge of the Nitrogen into unintended areas, a check valve is required for each discharge hose in all multi-cylinder systems. All Kidde Fire system manifolds are constructed of threaded pipe with welded check valve connections and include preinstalled check valves. All customer connections are via threaded pipe.



**NOTE:** For single cylinder systems, a 1/2" BSP x 1/2" FNPT adapter (S/N 70982128) is required to connect the discharge hose (BSP) to the Schedule 160 pipe (NPT).

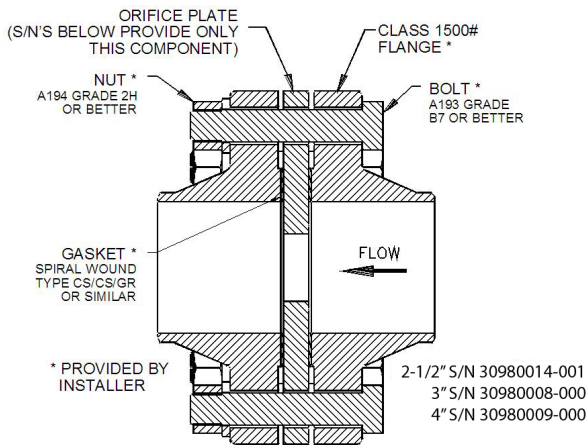
## FLOW RESTRICTOR

The restrictor assembly reduces the initial Nitrogen pressure from the discharge manifold to approximately half (1500psi) before entering the discharge piping. The size of the orifice within the restrictor is determined through calculations based upon the required flow and discharge time.

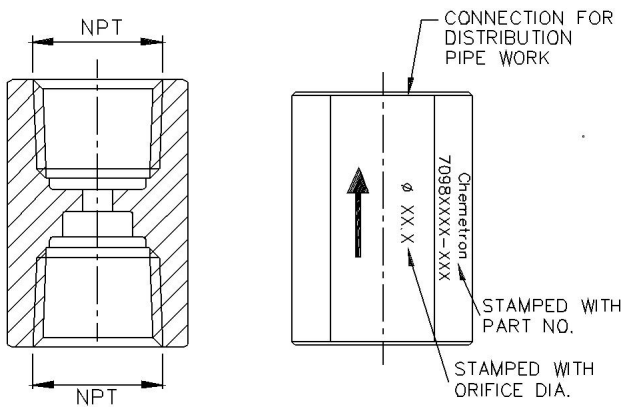
Larger diameter restrictors, up to 4" (102 mm) connection, are available for very large system requirements. An orifice plate is custom drilled to the specific requirements of the project as determined by computerized flow calculations.

## SELECTOR VALVES/DIRECTIONAL VALVES

Nitrogen systems are particularly suited to the use of selector valves, where one central storage of agent is used to provide protection to two or more hazard areas. Selector valves are available in six sizes and are pneumatically operated. One common pressure regulator assembly is also required to reduce the actuation pressure to each set of selector valves.



Flanged Restrictor Assembly for large system requirements. Only Orifice Plate provided.



Restrictor Female NPT/Female NPT = Sizes 1/2" to 2"

### Flow Restrictor FNPT x FNPT

Pipe Diameter (NPT)	S/N
1/2" (15 mm) Brass, Code 3.5 to 7.5	70984053
1" (25 mm) Brass, Code 5.0 to 13.0	70984054
1-1/2" (40 mm) Brass, Code 8.5 to 22.0	70984055
2" (50 mm) Stainless Steel, Code 11.5 to 27.0	70984056

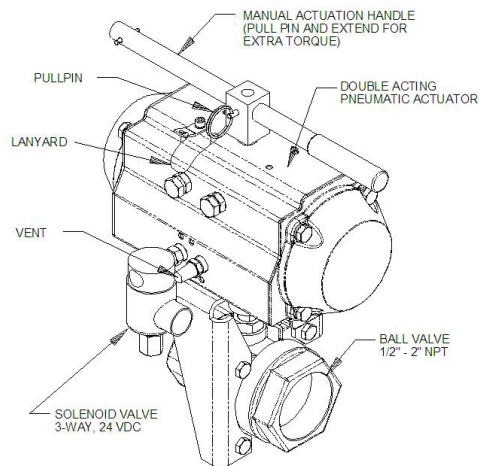
When ordering, specify an 11 digit number, S/N plus the appropriate 3 digit orifice code, i.e., 70984054-050

### Selector Valve Assemblies

Assembly includes: selector valve w/actuator & reset handle, 24 VDC 3-way solenoid valve, operation nameplate, and pipe nipple connector (between solenoid and selector valve)

Description	Stock Number
1/2" (15 mm) pipe dia.	20980096
3/4" (20 mm) pipe dia.	20980097
1" (25 mm) pipe dia.	20980098
1-1/4" (32mm) pipe dia.	20980099
1-1/2" (40 mm) pipe dia.	20980100
2" (50 mm) pipe dia.	20980101
Pressure Regulator Kit (see note)	20980095

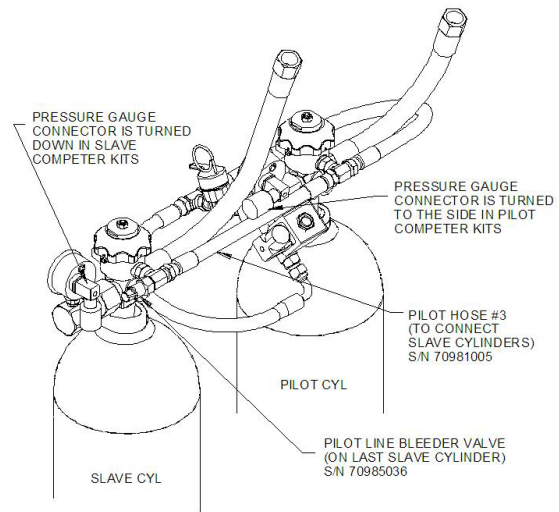
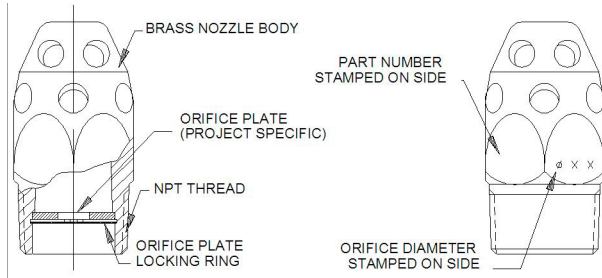
**Note:** Kit includes regulator (120 psi preset) w/gauge & relief, 3/4" pressure relief (4350 psi), 1/4" NPT vented elbow, gauge adapter, gasket for adapter.



Selector Valve

## NOZZLES

The brass discharge nozzles are available in four basic sizes - 1/2", 3/4", 1" and 1-1/2". Each is fitted with a drilled orifice to assure proper flow rates, agent quality and proper discharge timing as determined by flow calculations. Maximum nozzle spacing for room mounted nozzles should not exceed 35' 5" (10.8 M) square. Nozzle height should not exceed 16 feet (4.9 M) from a single layer of nozzles.

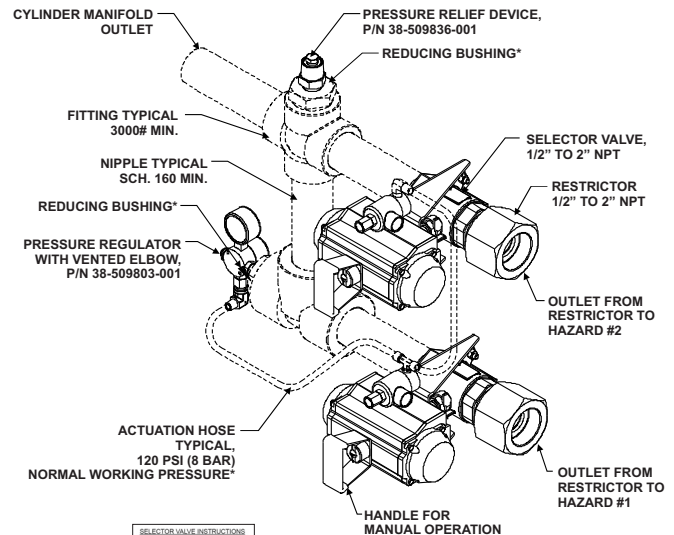


Nitrogen Slave Completer Kit 20980003

### Nitrogen Discharge Nozzle

Size (R) NPT	Orifice Dia. (1)	Height (H)	Width (W)	Stock Number
1/2" (15 mm)	03-10 mm	1-9/16" (39 mm)	7/8" (22 mm)	70984041
3/4" (20 mm)	04-13.5 mm	1-7/8" (48 mm)	1-1/8" (28 mm)	70984042
1" (25 mm)	05-17 mm	2-3/8" (60 mm)	1-7/16" (36 mm)	70984043
1-1/2" (40mm)	08-26 mm	3-3/16" (81 mm)	2" (50 mm)	70984044

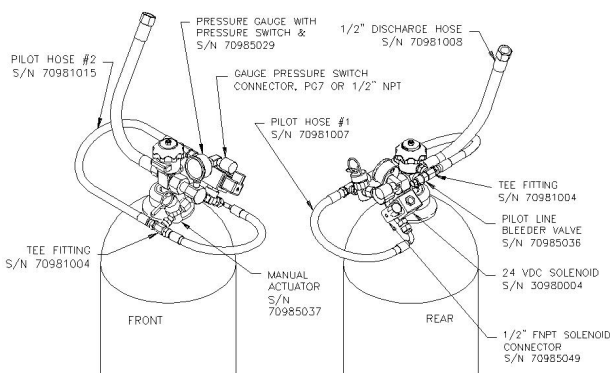
(1) An orifice plate within the nozzle is custom drilled to the specific requirements of the project as determined by computerized flow calculations.



OPERATION NAMEPLATE,  
P/N 38-509858-001

\*NOTE: ALL FITTINGS, NIPPLES AND HOSES ARE PROVIDED BY INSTALLER

Typical Selector Valve System Arrangement



Nitrogen Primary Completer Kit 20980002

### EXPORT INFORMATION (USA)

Jurisdiction: EAR  
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