

Kidde Fire Protection

Natura™ (400 Series) Inert Gas

Fire Extinguishing System



Effective: March 2022
KDS 38-400000-000 Rev AA

Flexible. Efficient. Sustainable.

The Kidde Fire Protection Natura™ (400 Series) Inert Gas System (Natura IGS) is an environmentally safe, competitive, and cost-effective fire extinguishing system for protecting assets in commercial, light, and heavy industrial applications. With global approvals and a selection of agents and hardware profiles, Natura IGS can be the natural choice for inert gas fire suppression systems being safe for occupied areas where concentrations up to the LOAEL. (Lowest Observed Adverse Effects Level).

Environmentally safe

- Uses naturally occurring gases.
- Zero Global Warming Potential (GWP)
- Zero Ozone Depletion Potential (ODP)

Wide range of applications - broad opportunity

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

Choice of agents and hardware profile - to suit regional requirements and filling capabilities

- Tested and Approved to extinguish the following Classes of Fire
 - Class A Solid Organic Materials i.e. wood, textiles
 - Higher Hazard Class A (as defined by EN15004-1 2016 Edition section 7.5.1.3)
 - Class B Flammable Liquids or Liquifiable solids
- System pressures suitable for regional capabilities
 - 200 bar
 - 300 bar
- Container sizes to suit floor space
 - 80 Litre
 - 140 Litre
- Nozzle types add design & installation flexibility
 - 180° (Pendant or upright style)
 - 360° (Pendant or upright style)

In addition, silencers can be used with these nozzles to reduce decibel level during discharge within Data Centers, thus reducing risk of read/write capability of HDD's being affected.



Specify and ship worldwide with confidence, certified for:

- Transportation
 - TPED and/or UN/DOT
- Performance
 - Loss Prevention Certification Board, LPCB
 - UL Listed
 - FM Approved
- Materials
 - Construction Products Regulation, CPR
 - Nationally Recognized Test Labs (NRTL) in process

Superior valve design regulates mass flow, maintains pressure & shuts off at 70 bar (no flow condition) - enables lower cost installation

- Schedule 40 pipe now suitable vs. higher cost Sch 80 or 160 for unregulated systems.
- Regulated flow reduces pressure vent size and therefore cost.

Designed for quick and easy installation

- Pre-fabricated manifolds
- Quick connect actuation tube fittings
- Daisy chained pressure supervision via plug-in inter-connections

Wide operating temperature

- ISO 14520/EN 15004: -20° to 50°C (-4° to 122°F)
- FM Approved/UL Listed: -20° to 54°C (-4° to 130°F)*

*Unless superseded by local/national standards

Inert Gases

Natura IGS offers four inert gases for use in the fire suppression system. These gases are:

- IG-55: Argonite™ (Gaseous Mixture of 50% nitrogen and 50% Argon))
- IG-541: Gaseous mixture of 52% Nitrogen, 40% Argon, and 8% Carbon Dioxide
- IG-100: Pure Nitrogen
- IG-01: Pure Argon

Hazard Protection

The Natura IGS can be designed to cover a single hazard or multiple hazards from a common container bank. Kidde Fire Protection recommend wherever possible to have a fully connected reserve bank of containers 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 a single zone Natura IGS setup which protects one hazard.

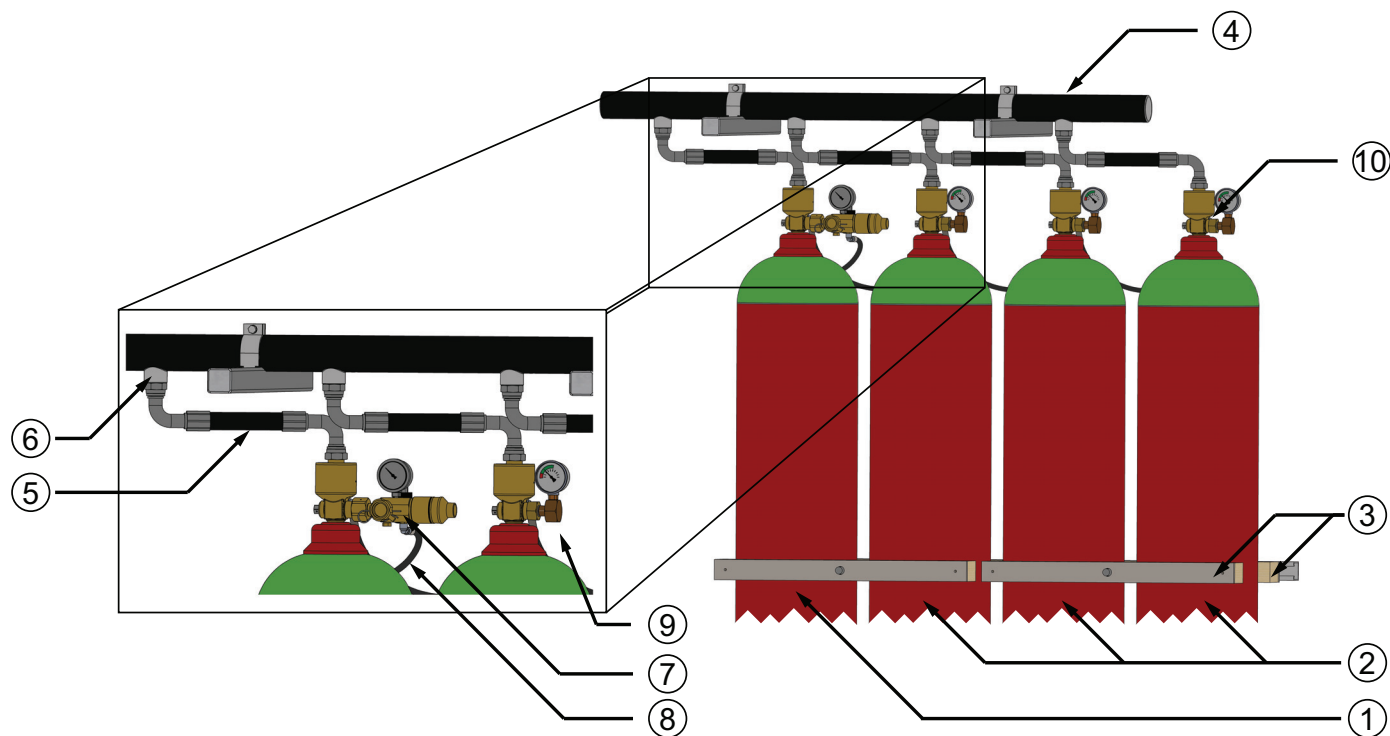


Figure 1. Single Area Container Bank Arrangement

Table 1: Single Area Container Bank Arrangement

Item	Description	Components	Item	Description
1	Primary Agent Storage Container and Valve Assembly	6	3/4 in. BSP Manifold Check Valve	
2	Secondary Agent Storage Container and Valve Assemblies	7	Release Unit	
3	Container Racking Components*	8	Pilot Line Actuation Hose	
4	Manifold	9	Secondary Container Gauge Assembly	
5	Discharge Hose	10	Pilot Line Bleed Valve (on back side)	

*This system is depicted with wooden racking components. For single row systems, an alternative option is to use the single container clamp (P/N 01-8131-0000 for 80L or 01-8131-1000 for 140L containers) for each container.

Multi Zone System

Multi zone systems can protect multiple hazards with one bank of containers. Multi zone systems require the use of one 2-way pneumatically operated selector valves for each of zone protected. The following depicts an example of a multi-zone Natura IGS setup which protects 3 separate hazard zones.

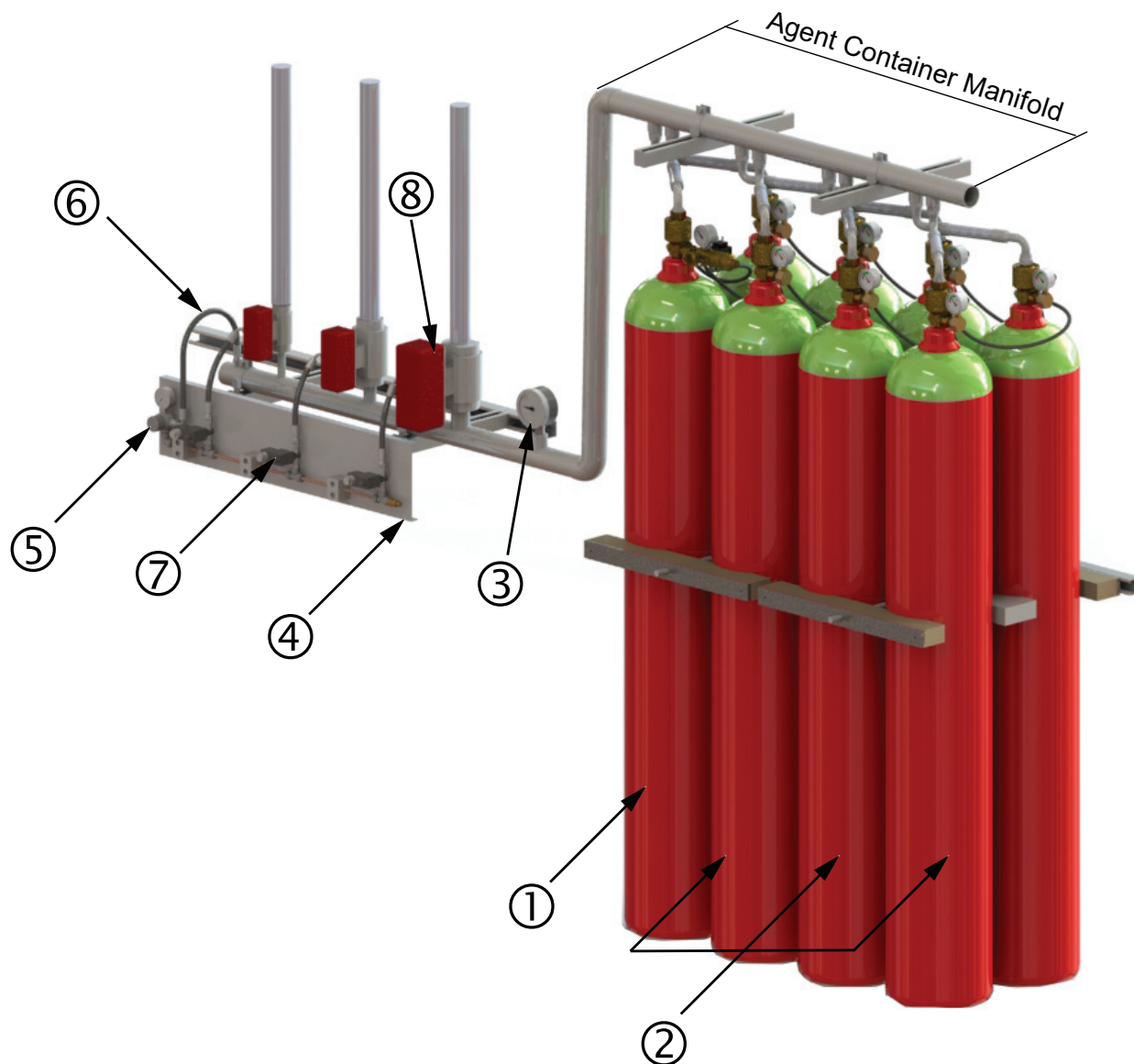


Figure 2. Multi-Hazard System Example

Table 2: Multi-Hazard System Example Component List

Item	Description	Item	Description
1	Primary Agent Storage Container and Valve Assembly	5	Back-Plate Manifold Pressure Regulator
2	Secondary Agent Storage Container and Valve Assemblies	6	Back-Plate Manifold Hose
3	Manifold Pressure Gauge (Optional)	7	Back-Plate Manifold Solenoid
4	Back-Plate Manifold	8	Selector Valve

Component Description

Container and Valve Assemblies

The Natura IGS uses seamless steel containers compliant with ISO 9809-2 and certified to TPED and/or UN/DOT. System activation and gas discharge is controlled via a pressure operated, mass flow regulated, and pressure controlling valve. The valve is equipped with a safety burst disc in compliance with DOT and TPED requirements and has connection ports for the release unit or secondary gauge assembly, pilot line actuation hoses, and an agent discharge port.

Containers are available in 80 litre at either 200 bar or 300 bar pressure and 140 litre at 300 bar pressure. All pressures are determined at a filling temperature of 15° C (59°F).

Container shells are painted red with green shoulder for easy identification and include agency markings where applicable.

When shipped, container-valve assemblies include an anti-recoil cap and a Safety Transport cap as a safety feature designed to prevent uncontrolled, accidental discharge and damage during transport. The outlet cap can be used to perform the system pilot line commissioning test/discharge test without discharging agent from the Natura IGS container.

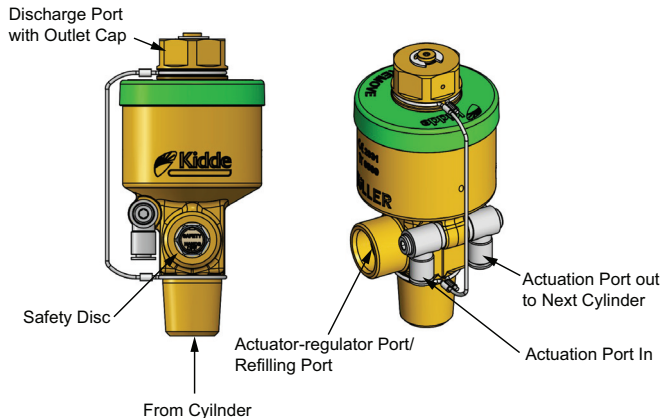


Figure 3. Valve Components

The Natura IGS valve assembly has a 3/4 in. (20mm) discharge port with BSP male threads.

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

Release Unit

Release units connect to the gauge port of the primary container and activate the Container-Valve to release agent into the system piping. Release units can either be electric operated or a combination manual & electric setup.

Release units have an integral pressure gauge that can be ordered with contacts that are normally open or normally closed under pressure, dependent on jurisdictional requirements.

Release units that include manual operation have a tamper proof seal on the operation pin.

Solenoid Specifications

- Operating Voltage: 24 VDC
- Current Draw: 0.75 Amps

To comply with FM & UL requirements, the solenoid in the Release unit assembly is fixed with an anti-tamper nut, which cannot be removed. However, the Release unit assembly can be detached from the valve. For code compliance, such detachment should cause a supervisory signal at the extinguishing control panel.

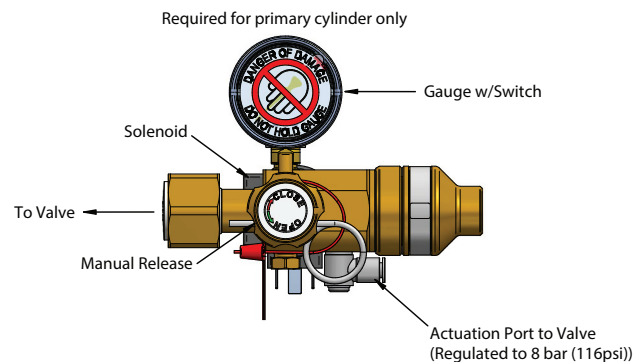


Figure 4. Release Unit

Slave Container Pressure Gauge Assembly

Installing a Pressure Gauge Assembly on each Slave Container valve enables monitoring of the pressure within all containers in the system. The Secondary Container Gauges assemblies are connected to the Container-Valve gauge port and can have contacts that are either normally open or normally closed under pressure. One gauge is required for each secondary container.



Figure 5. Secondary Container Gauge

Actuation Hoses

1/4 in. (6 mm) diameter Actuation hoses are used to provide pressure to the valve to actuate the system. The Actuation hoses are also used in multi-cylinder systems to convey pilot pressure at 8 bar (116 psig) from the upstream container-valve to the next container-valve. The hoses include quick connect couplings which allows ease of installation and maintenance.

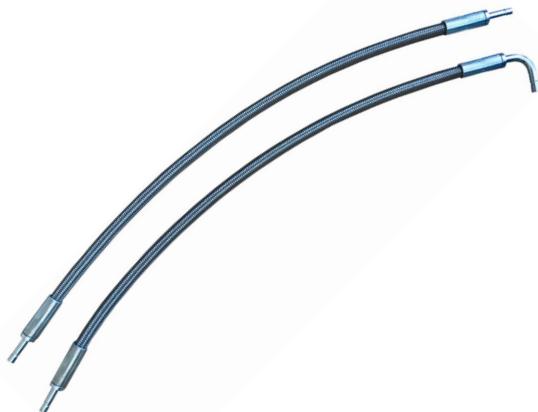


Figure 6. Actuation Hose

Discharge Hoses

3/4 in. (20 mm) diameter Discharge hoses route the agent from the container-valve assemblies to the system piping. Hoses connect to the discharge outlet of the agent container-valve and terminate at the system piping or discharge manifold.

Hoses with 90° to 90° couplings are typically used in conjunction with manifolds to allow for easy installation and adjustments.



Figure 7. Discharge Hoses

Manifold Check Valve

Manifold Check Valve are required to be installed where the discharge hose connects with a manifold. Manifold check valves have 3/4 in. (20 mm) BSP male thread for connecting a discharge hose and are marked with the direction of agent flow.

The pre-built Natura IGS manifolds are shipped with Manifold Check Valves pre-installed, one per stub.

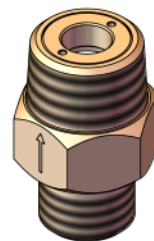


Figure 8. Manifold Check Valve

Manifolds

2 in. (50 mm) diameter Manifolds of varying lengths in single or double row configuration are available for the Natura IGS. The Manifolds are available for 80 and 140 Liter containers.

Manifolds includes a 3/4 in. Manifold Check valve at each inlet port (stub). Manifolds can be coupled together using a 2 in. BSPT Manifold Coupling and capped off using a 2 in. BSPT Manifold End-cap.



Figure 9. Single Row Manifold



Figure 10. Double Row Manifold

Selector Valves

Selector valves route agent from a central container bank to the specific hazard where fire has been detected.

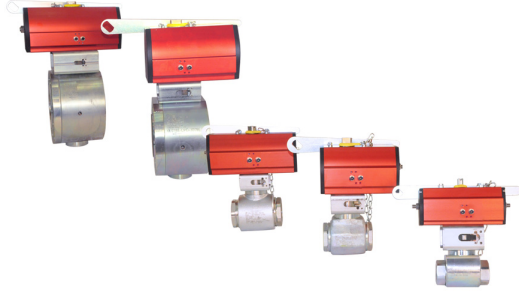


Figure 11. Selector Valve

Selector valves are 2-way ball valves with full bore. Selector valves of 1 in., 1 1/2 in., and 2 in. have BSP threaded connections. 3 in. and 4 in. Selector valves use DIN 2638 flanges for this connection.

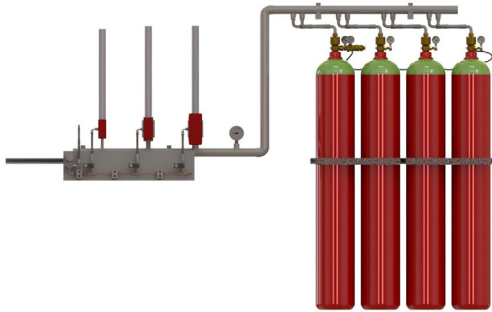


Figure 12. Selector Valve Setup

Pilot Line Non-Return Valve*

Use the pilot line non-return valve in the pilot lines (6mm Quick Connect) of systems protecting multiple hazards to isolate sections of the containers. Releasing containers downstream of the pilot line non-return valve will not activate containers upstream, preventing excess agent from being discharged into a hazard.

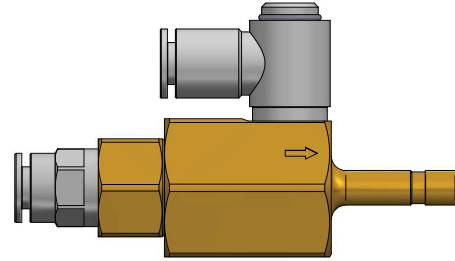


Figure 13. Pilot Line Non-Return Check Valve

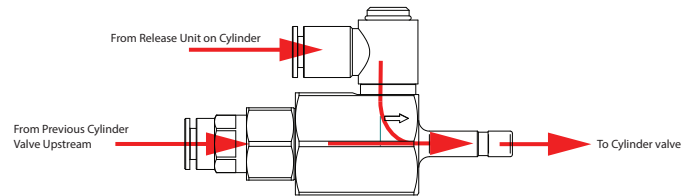


Figure 14. Pilot Line Non-Return Check Valve Direction of Flow

* Not for use in FM Approved or UL Listed systems

Agent Discharge Nozzles

The Natura IGS offers nozzles with 360° and 180° discharge patterns which can be mounted in either upright or pendant style. The size of the orifice on each nozzle is custom calculated using the Flow Calculation Software.



Figure 15. Nozzles

Cylinder Racking

The racking system for the Natura IGS is modular and can be adjusted to fit any number of containers in a variety of row combinations.

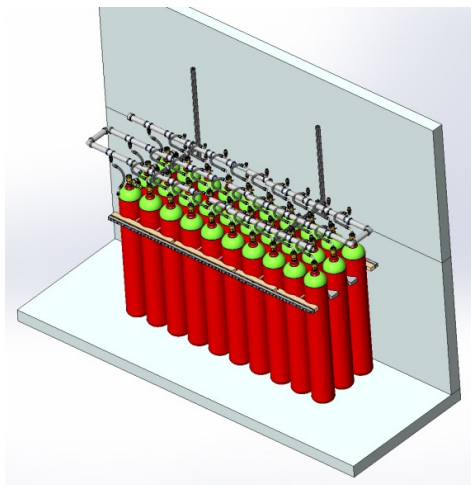


Figure 16. Racking Example

Quick Connect Cables

Quick Connect cables provide an expedient method of wiring the pressure gauges of the Release Unit and Secondary Container Gauge Assemblies. The open contacts of the supervisory pressure switch are connected in parallel through Quick Connect cables in a daisy chain form.



Figure 17. Quick Connect Cables

Accessories

Bleeder Valve

A Bleeder Valve should be installed on a Pilot Line in the unused actuation hose connection in the last container of a container bank. The end-of-line leak/vent valve prevents a possible gradual pressure build-up in the pilot line should the solenoid release unit develop a leak, thus preventing an unintended system discharge. The bleed valve includes a Quick Connect fitting for ease of installation and maintenance.



Figure 18. Bleeder Valve

Manifold Safety Device

The manifold safety device consists of a safety disc housed in a threaded body. The safety disc is designed to burst at a pressure of 90-100 bar (1305-1450 psi). Manifold safety devices have an NPT fitting on the side that connects to the manifold and a BSPT threading on the side that would connect to the venting pipe if applicable.

The Manifold Safety Device should be used on manifolds with selector valves and lockout valves where the design of the system creates a closed section of piping. The safety outlet is installed in the piping upstream of the valve(s) to prevent over pressurization in the event of entrapment of Agent in the closed pipe segment. The outlet on the safety device may also be piped to vent directly to atmosphere or to vent to the pipe network downstream of any selector valve.

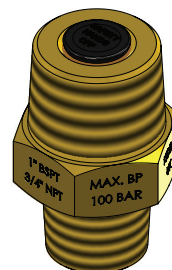


Figure 19. Manifold Safety Device

Discharge Pressure Switch:

The pressure operated switch uses the pressure of the discharging agent for activation and should be connected to the distribution piping. The agent actuates a pressure operated stem which toggles the switch. This can also be operated manually by pulling up on the stem. These switches are predominantly used to indicate at the control panel that the agent has been discharged hence commonly known as "Gas Gone" switch. Reset by pushing down on the stem to return the switch to the set position. The minimum operating pressure required is 3.5 bar (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 20. Pressure Switch

Main & Reserve Systems

The Natura IGS supports a 'Reserve' bank of containers, equal in quantity and size to the main bank. A reserve system can minimize downtime prevent service interruption in case of a discharge. A reserve system is also recommended when using selector valves and when downtime cannot be tolerated should a discharge occur.

The system with main and reserve containers 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 containers. 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 21. Main and Reserve Transfer Switch

* Not for use in FM Approved or UL Listed systems

Extinguishing Control Panel (Supplied by others)

Multi zone systems using selector valves require an addressable control panel.

Note: The release units of the Natura system must be listed with the suppression control panel.

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:

- Inert agent selection
- System Pressure 200 Bar/300 Bar
- Container size 80 L/140 L
- Discharge time 60 Sec./120 Sec.
- Nozzle Selection 180°/360°
- Single Zone/Multi Zone Systems

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