Australian Fire Technologies

Gaseous Fire Suppression Systems Inspection & Maintenance Overview

OVERVIEW

Design Standards:-

- Past – AS 4214-2002 (including amendments)
- Current – AS ISO 14520.1-2009 Gaseous Fire Extinguishing Systems. General Requirements

Maintenance Standards:-

- Current – AS1851-2012
- Fire Protection Industry (OGS & SGG) Board Code of Practice for the reduction of emissions of Ozone Depleting and Synthetic Greenhouse Gas Fire Extinguishing Agents

All Service Technicians must have the appropriate Industry Licensing and Training:-

- Queensland Building Services Authority (BSA)
- Local State / Industry requirements.

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Licencing and Training

All Service Technicians must have the appropriate Industry Training and Licensing:-

1. PRMPFES43A - Prevent ozone depleting substance and synthetic greenhouse gas emissions http://training.gov.au/Training/Details/PRMPFES43A
2. Extinguishing Agent Handling Licence (EAHL)

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Licencing and Training

All Service Technicians must have the appropriate Industry Training and Licensing:-

Fire protection and other technicians must be licensed, if they work with or handle scheduled (as listed in the Regulations) extinguishing agents, in situations where the potential to cause an emission of the agent exits.

Scheduled extinguishing agents are often referred to as ozone-depleting substances or synthetic greenhouse gases (ODS and SGG).

For further information Visit the FPA website:-
http://www.fpaa.com.au/ozone/licensing/licences.aspx

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Licencing and Training

Extinguishing Agent Handling Licence:-

Six types of licence exist for fire protection technicians working on gaseous fire suppression systems and portable fire extinguishers that use scheduled (listed in the Regulations) extinguishing agents.

They are:

1. Portable Fire Extinguisher Maintenance
2. Fixed System Installation and Decommissioning
3. Fixed System Testing and Maintenance
4. Recovery, Reclamation, Fill and Recycling
5. Warehouse Maintenance
6. Control Systems Installation, Commissioning and Decommissioning.

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Licencing and Training

Extinguishing Agent Handling Licence:-

Depending upon the type of installation work, maintenance and service activity being undertaken your fire protection technician may need to hold more than one type of licence.

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Agent Types

Types of Gaseous Fire Suppression Agents

Synthetic / Manufactured Agents:

- Halon 1301 & 1211
- NAFS111™
- FM200®
- FE13
- NOVEC 1230™





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Agent Types

Types of Gaseous Fire Suppression Agents

Natural occurring Agents:

- IG-55 (iFlow, Argonite, Proinert)
- IG-541 (iFlow, Inergen, Fire-Eater)
- CO_2 (High & Low Pressure)





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Agent Types

Gaseous Fire Suppression Equipment Suppliers in Australia

- **LPG Fire** – Inert Gases (iFlow IG-55 & Inergen® IG-541) FM200, NOVEC 1230, High Pressure CO_2
- **Kidde** – Inert Gases (Argonite IG-55) FM200, FE13, NOVEC 1230, High Pressure CO_2
- **Tyco** – Inert Gases (Inergen® IG-541) NAFS 111, FM200, NOVEC 1230, High & Low Pressure CO_2
- **Delta Fire** – Janus FM200 & NOVEC 1230
- **Pyrozone** – Modular Low Pressure CO_2
- **Fike** – Inert Gases (Proinert IG-55) FM200, NOVEC 1230, High Pressure CO_2

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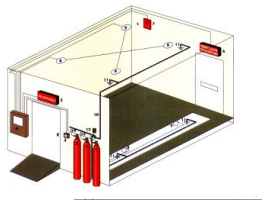
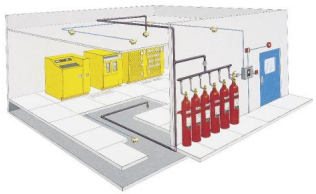
Agent Types

Types of Gaseous Fire Suppression Systems

Total Flooding:

- Risks within enclosures such as Computer Rooms, Switch rooms, Substations and Data Centres.

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Agent Types

Types of Gaseous Fire Suppression Systems

Local Application:

- Risks ***not contained*** within enclosures such as Printing Presses, Equipment within Machinery spaces, Dip Tanks.

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Actuator Types

SYSTEM ACTUATION DEVICES

Australian Fire Technologies

Actuator Types

Types of Gas Suppression Cylinder Actuators:-

- Electric – Solenoid
- Electric – Solenoid / Pneumatic
- Electric – Gas Cartridge Actuator (GCA)

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Actuator Types

Electric – Solenoid (Kidde FM200® & Carbon Dioxide)

Australian Fire Technologies

Actuator Types

Electric – Solenoid (Kidde Argonite ® IG-55)

Australian Fire Technologies

Actuator Types

Electric – Solenoid / Pneumatic (LPG iFlow® & FIKE Proinert)

LPG Actuator

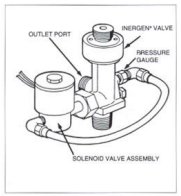
LPG Actuator with Cylinder bank

FIKE Actuator

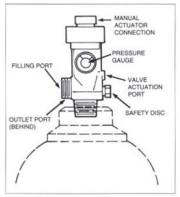
Australian Fire Technologies

Actuator Types

Electric – Solenoid / Pneumatic (150 bar INERGEN)



Electric Actuator



Valve

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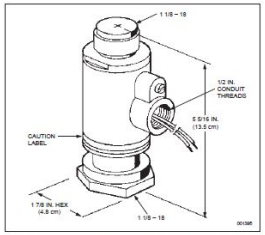
Actuator Types

CV 98 Electric Actuator (200 bar INERGEN) using METRON protractor



The METRON PROTRACTOR must be replaced after discharge of the INERGEN system.

Shipping Assembly Part No.	Description
423684	CV-98 Electric Actuator
423958	Replaceable METRON PROTRACTOR
427354	Current Limiter Module

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Actuator Types

Electric – Solenoid / Booster Actuator (150 & 200 bar INERGEN)

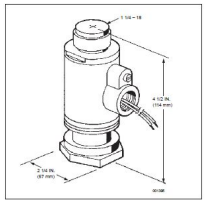
Listings and Approvals

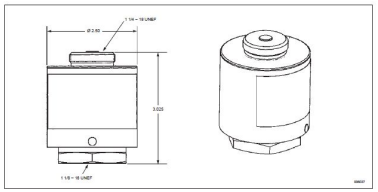
UL E91021
ULC 1165
FM 2T8A9.AF

Description

The Booster Actuator, Part No. 428949, is used when electric actuation is required on the 1 in. selector valve, 2 in. selector valve, or the CV-98 cylinder valve. The actuator mounts directly to the component and then a HF electric actuator mounts to the top of the booster actuator.

The Booster Actuator requires resetting after actuation. A Reset Tool, Part No. 429847, is available for this use.





Actuator booster is used on selector valves or CV-98 cylinder valve.
For CV90 valves use CV90 booster adaptor PN 432801
Note: Must use resetting tool PN 429847 to reset booster actuator and PN 75433 to reset HF actuator

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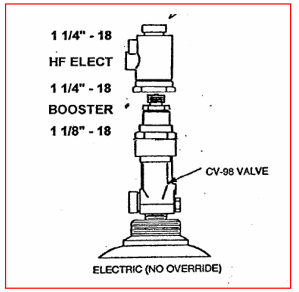
Actuator Types

Electric – Solenoid / Booster Actuator (150 & 200 bar INERGEN)



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Actuator Types

Electric – Gas Cartridge Actuator GCA (FIKE FM200®)

SHELF LIFE:
The G.C.A. is a sealed device utilizing a glass seal and epoxy plug on the wire end and a mylar seal on the discharge end. This extends the actuator's continuous service and shelf life to 10 years before it requires replacement.

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Actuator Types

Extract from *"Fire Protection Industry (OGS & SGG) Board Code of Practice for the reduction of Emissions of Ozone Depleting and Synthetic Greenhouse Gas Fire Extinguishing Agents":-*

7.3 Maintenance

All fixed fire suppression systems, containing ODS & SGG extinguishing agents shall be inspected, tested and maintained in accordance with AS 1851.

Before any maintenance is carried out, actuation devices must be removed from container valves or physically disconnected by the holder of an EAHL 2 or EAHL 3. Operation of an electrical isolation device or switch does not satisfy this requirement.

Prior to re-instating actuation devices an EAHL 2 or EAHL 3 holder shall reset each device in accordance with the manufacturer's requirements.

A person holding an EAHL 3 is permitted to undertake electrical and mechanical maintenance activities associated with fire protection systems containing ODS & SGG extinguishing agents.

A person holding an EAHL 6 is permitted to undertake electrical maintenance activities provided the actuating devices have been removed from the ODS & SGG extinguishing

Australian Fire Technologies

Actuator Types

Extract from AS 1851 – 2012 Section 11 *"Gaseous Fire Extinguishing Systems"*:-

11.2.3 System isolation

All gaseous storage container discharge valves shall be mechanically isolated prior to undertaking the tests referred to in Table 11.4.2. Electrical isolation does not satisfy this requirement.

Mechanically Isolated
=
Remove Actuator 1st

Australian Fire Technologies

System Isolation

EXAMPLE *iFlow*®
INERT GAS SYSTEM ISOLATION

Australian Fire Technologies

System Isolation

STEP 1:-

Unscrew the valve top cap from the Pilot Cylinder

? 🕮 ***NOTE: IMPORTANT: WHENEVER INSTALLATION, SERVICING OR MAINTENANCE WORKS ARE PERFORMED THE VALVE TOP CAP SHOULD BE TAKEN OFF THE VALVE FOR SAFETY.***

Australian Fire Technologies

System Isolation

STEP 2:-

Remove the Solenoid from the Pilot Cylinder

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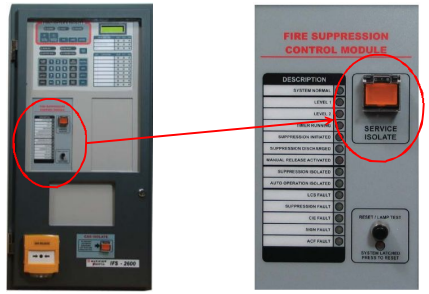
System Isolation

STEP 3:-

Proceed to the Gas Control Panel and locate the **"SERVICE ISOLATE"** switch detailed below.



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System Isolation

STEP 4:-

On the panel facia, depress the switch labelled **"SERVICE ISOLATE"** switch on the Fire Suppression Control Module.

This switch will illuminate and the **"EXTINGUISHING SYSTEM INOPERATIVE"** illuminating signs will operate within the protected area. Depressing this switch isolates the Gas Firing release signal from the Gas Control Panel to the Solenoid on the Pilot Cylinder.

Australian Fire Technologies

System Isolation

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System De Isolation

EXAMPLE *iFlow*®
INERT GAS SYSTEM
DE - ISOLATION

Australian Fire Technologies

System De Isolation

STEP 1:-

Once works have been completed you will be required to carry out the following:

- Proceed to the Gas Control Panel.

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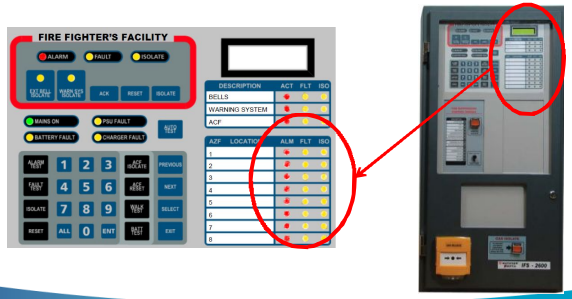
System De Isolation

STEP 2:-

Ensure that all of the Detection devices installed within the protected are clear and not in alarm.



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System De Isolation

STEP 3:-

If all alarms are clear on the Gas Control Panel, reinstall the Solenoid on the Pilot Cylinder.

NOTE:

ENSURE THAT THE SOLENOID COIL IS DE ENERGISED. DO NOT ATTEMPT TO INSTALL THIS SOLENIOD IF THE COIL IS ENERGISED, AS GAS WILL BE DISCHARGED.

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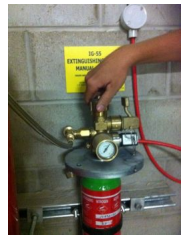
System De Isolation

STEP 4:-

1. Install the Solenoid Coil



2. Install the Valve Top Cap

WHEN WORKS ARE COMPLETE, DO NOT FORGET TO CHECK THAT HEAD CAP "O" RING IS MOUNTED CORRECTLY WITHIN IT AND THEN HAND TIGHTEN the VALVE TOP CAP BACK INTO POSITION ON THE VALVE.

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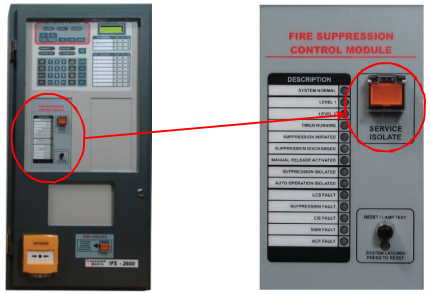
System De Isolation

STEP 5:-

On the panel facia, depress the switch labelled **"SERVICE ISOLATE"** switch on the Fire Suppression Control Module.



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System De Isolation

STEP 6:-

This switch will cease to illuminate and the **"EXTINGUISHING SYSTEM INOPERATIVE"** signs will cease to operate within the protected area.

Depressing this switch reinstates the Gas Firing release signal from the Gas Control Panel to the Solenoid on the Pilot Actuation Cylinder.

THE GAS SYSTEM IS NOW BACK ON-LINE FOR THE PROTECTED AREA.

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System De Isolation

Australian Fire Technologies

System Isolation

EXAMPLE FM200 SYSTEM ISOLATION

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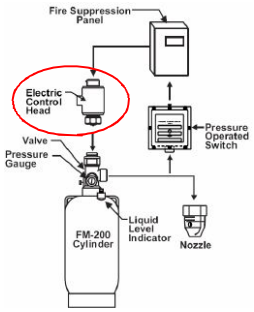
System Isolation

STEP 1:-

Remove the FM200® Cylinder Electric Control Head from the FM200® Cylinder



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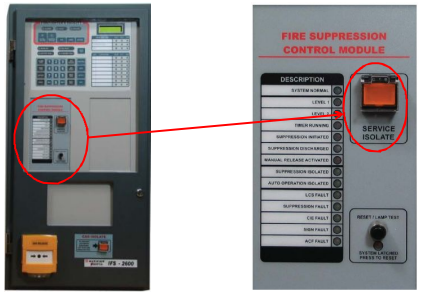
System Isolation

STEP 2:-

Proceed to the Gas Control Panel and locate the **"SERVICE ISOLATE"** switch detailed below.



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System Isolation

STEP 3:-

On the panel facia, depress the switch labelled **"SERVICE ISOLATE"** switch on the Fire Suppression Control Module.

This switch will illuminate and the **"EXTINGUISHING SYSTEM INOPERATIVE"** illuminating signs will operate within the protected area. Depressing this switch isolates the Gas Firing release signal from the Gas Control Panel to the FM200® Solenoid

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System De Isolation

EXAMPLE FM200 SYSTEM

DE - ISOLATION

Australian Fire Technologies

System De Isolation

STEP 1:-

Once works have been completed you will be required to carry out the following:

- Proceed to the Gas Control Panel.

Australian Fire Technologies

System De Isolation

STEP 2:-

Ensure that all of the Detection devices installed within the protected are clear and not in alarm.

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System De Isolation

STEP 3:-

If all alarms are clear on the Gas Control Panel, reinstall the FM200® Electric Control Head on the FM200® cylinder.

NOTE:

ENSURE THAT THE PIN INSTALLED INSIDE THE SOLENOID DEVICE IS IN THE RETRACTED POSITION. DO NOT ATTEMPT TO INSTALL THIS SOLENIOD IF THE PIN IS NOT RETRACTED, AS FM200® GAS WILL BE DISCHARGED.

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System De Isolation

STEP 3:- Continued

IMPORTANT
UNDER NO CIRCUMSTANCES SHOULD THE FM200® CYLINDER SOLENOID-RELEASING DEVICE BE INSTALLED WHIST THE SYSTEM IS STILL IN ALARM.
FAILURE TO RESET THE ALARMS OR RESET THE MANUAL RELEASING DEVICE PRIOR TO RECONNECTING THE FM200® CYLINDER SOLENOID WILL RESULT IN FM200® GAS BEING RELEASED INTO THE PROTECTED AREA.

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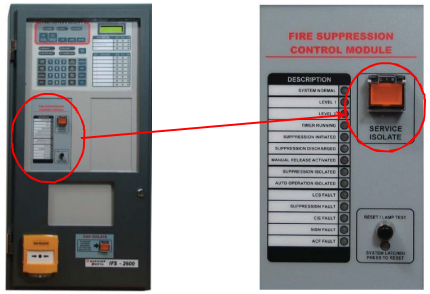
System De Isolation

STEP 4:-

On the panel facia, depress the switch labelled **"SERVICE ISOLATE"** switch on the Fire Suppression Control Module.



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System De Isolation

STEP 5:-

This switch will cease to illuminate and the **"EXTINGUISHING SYSTEM INOPERATIVE"** signs will cease to operate within the protected area.

Depressing this switch reinstates the Gas Firing release signal from the Gas Control Panel to the Solenoid on the FM200® cylinder.

THE FM200® GAS SYSTEM IS NOW BACK ON-LINE FOR THE PROTECTED AREA.

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System Isolation

EXAMPLE HIGH PRESSURE CARBON DIOXIDE (CO_2) SYSTEM ISOLATION

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System Isolation

STEP 1:-

Remove the Electric Control Head from the Master Carbon Dioxide Cylinder

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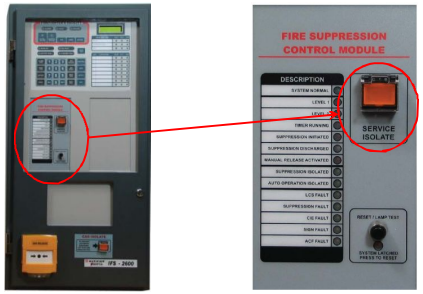
System Isolation

STEP 2:-

Proceed to the Gas Control Panel and locate the **"SERVICE ISOLATE"** switch detailed below.



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System Isolation

STEP 3:-

On the panel facia, depress the switch labelled **"SERVICE ISOLATE"** switch on the Fire Suppression Control Module.

This switch will illuminate and the **"EXTINGUISHING SYSTEM INOPERATIVE"** illuminating signs will operate within the protected area. Depressing this switch isolates the Gas Firing release signal from the Gas Control Panel to the Electric Control Head on the Master Carbon Dioxide Cylinder .

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System De Isolation

EXAMPLE HIGH PRESSURE CARBON DIOXIDE (CO_2) SYSTEM DE-ISOLATION

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System De Isolation

STEP 1:-

Once works have been completed you will be required to carry out the following:

- Proceed to the Gas Control Panel.

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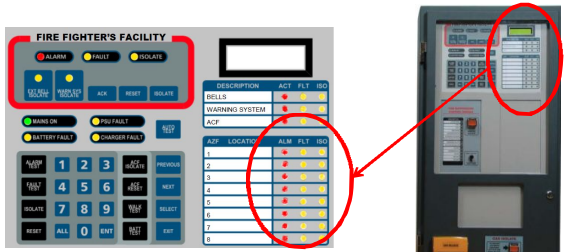
System De Isolation

STEP 2:-

Ensure that all of the Detection devices installed within the protected are clear and not in alarm.



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System De Isolation

STEP 3:-

Once works have been completed you will be required to carry out the following:

- If all alarms are clear on the Gas Control Panel, reinstall the electric control head back onto the Master Carbon Dioxide Cylinder .

NOTE:

ENSURE THAT THE PIN INSTALLED INSIDE THE ELECTRIC CONTROL HEAD IS IN THE RETRACTED POSITION. DO NOT ATTEMPT TO INSTALL THE ELECTRIC CONTROL HEAD IF THE PIN IS NOT RETRACTED, AS HIGH PRESSURE CARBON DIOXIDE GAS WILL BE DISCHARGED IMMEDIATELY.

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System De Isolation

STEP 3:- Continued

Indicator on Electric Control Head showing SET or RELEASED position

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System De Isolation

STEP 4:-

On the panel facia, depress the switch labelled **"SERVICE ISOLATE"** switch on the Fire Suppression Control Module.

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System De Isolation

STEP 5:-

This switch will cease to illuminate and the **"EXTINGUISHING SYSTEM INOPERATIVE"** signs will cease to operate within the protected area.

Depressing this switch reinstates the Gas Firing release signal from the Gas Control Panel to the Electric Control Head on the Master Carbon Dioxide cylinder.

THE CARBON DIOXIDE GAS SYSTEM IS NOW BACK ON-LINE FOR THE PROTECTED AREA.

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Kidde CO_2 Discharge Heads

VISUAL INSPECTIONS:-
PLAIN NUT & GROOVED NUT DISCHARGE HEADS

IMPORTANT:-

PLAIN NUT & GROOVED NUT DISCHARGE HEADS ENSURE THAT THE FOLLOWING INSPECTION IS CARRIED OUT:

1. Grooved nut discharge heads (P/N 872442) are only used for single cylinder main and reserve systems.
2. Plain nut discharge heads (P/N872450) are used on each cylinder in multiple cylinder systems.

VISUALLY INSPECT THE "O" RINGS FITTED INSIDE EACH GROOVED NUT AND PLAIN NUT DISCHARGE HEADS FOR DAMAGE. REPLACE AS REQUIRED

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Kidde CO_2 Discharge Heads

VISUAL INSPECTIONS:-
PLAIN NUT & GROOVED NUT DISCHARGE HEADS

GROOVED NUT DISCHARGE HEAD FITTED WITH ELECTRIC CONTROL HEAD TO MASTER / PILOT CYLINDER ON SINGLE CYLINDER SYSTEM

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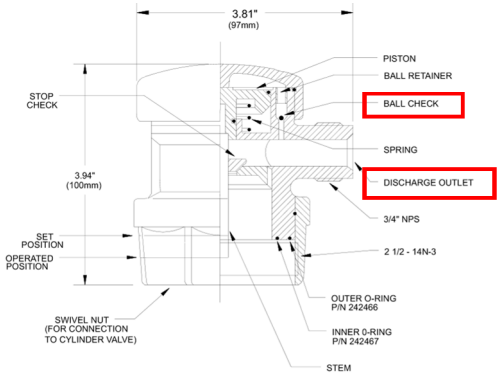
Kidde CO_2 Discharge Heads

VISUAL INSPECTIONS:- PLAIN NUT DISCHARGE HEAD



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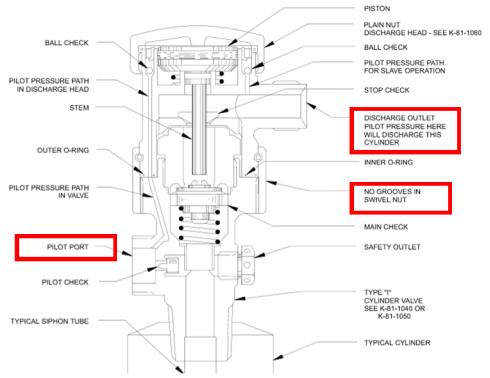
Kidde CO_2 Discharge Heads

VISUAL INSPECTIONS:- PLAIN NUT DISCHARGE HEAD



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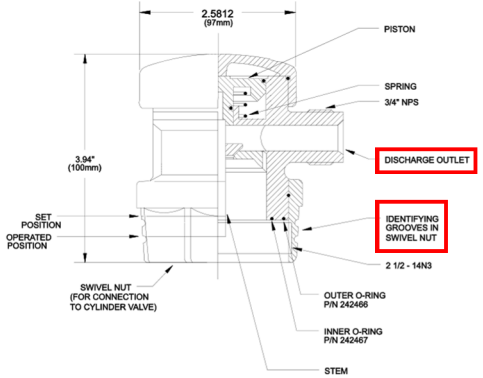
Kidde CO_2 Discharge Heads

VISUAL INSPECTIONS:- GROOVED NUT DISCHARGE HEAD



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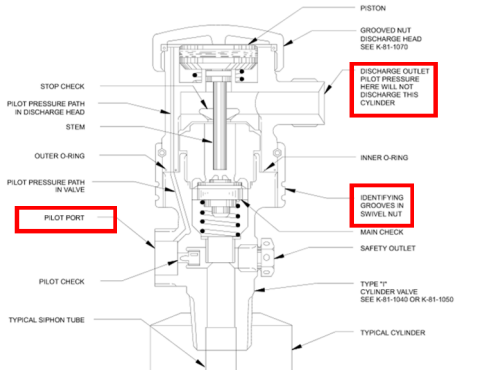
Kidde CO_2 Discharge Heads

VISUAL INSPECTIONS:- GROOVED NUT DISCHARGE HEAD



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System Isolation

INERGEN 150 BAR SYSTEM

SOLENIOD REMOVAL

Australian Fire Technologies

System Isolation

150 bar INERGEN Solenoid Valve Electric Actuator Removal.

Inergen

REV. 7

Solenoid Valve Electric Actuator

Description

Electrical actuation of an INERGEN® system CV-90 pilot cylinder valve is accomplished by a solenoid valve electric actuator interfaced through an AUTOPULSE® Control System. This actuator can be used in hazardous environments where the ambient temperature range is between 32 °F to 130 °F (0 °C to 54 °C). The solenoid actuator meets the explosion-proof requirement of N.E.C. Class I, Groups C and D and Class II, Groups E, F, G. A maximum of one solenoid valve electric actuator can be used on a single AUTOPULSE release circuit.

The actuator specifications are:

Normal Voltage	Rated Voltage	
	Minimum	Maximum
24 VDC @ 0.857 amps	20.4 VDC	28.4 VDC

Nominal Coil Resistance – 28 Ω

In auxiliary or manual ge... can be installed ... the safety ...

The ... standard 1/2 in. threaded ... conduit hookup.

Shipping Part No.	Description
73111	Solenoid valve electric actuator

DELETED

The Solenoid Valve Actuator Assembly, Part No. 873111, consists of:

① Solenoid Valve Assembly, Part No. 416701
② Male Elbow, Part No. 32334
③ Adaptor, Part No. 73236
④ S.S. Braided Hose, Part No. 31809
⑤ Adaptor Elbow, Part No. 31810 swivel
⑥ Gasket, Part No. 70386 (inside swivel nut)

Australian Fire Technologies

System Isolation

150 bar INERGEN Solenoid Valve Electric Actuator Removal.

Master Inergen® 150 Bar Cylinder fitted with the Blue Solenoid Actuation Valve

We have experienced difficulties on site when removing the obsolete "blue" Honeywell Inergen solenoid valve from full and partially full 150 bar master Inergen cylinders.

Full or partially full Inergen cylinders cannot be safely moved with the solenoid valve connected, and inorder to safely remove this solenoid on site the following procedures must be followed:-

Do Not Remove From Full Or Partially Full Cylinders

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System Isolation

150 bar INERGEN Solenoid Valve Electric Actuator Removal.

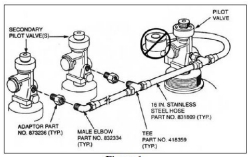


Figure 1

1) **Site Bleed-Down of Master Inergen® Cylinders fitted with Solenoid Actuators should only be carried out by certified Wormald Special Hazard Fitters.**

a) Ensure the Fire Alarm panel has been isolated.

b) Remove the flexible discharge bends (loops) from the **Master cylinders** on the same manifold. (usually 2 per system).

c) Remove the ¼" stainless steel actuation hoses from the **Master cylinders and Pilot cylinder**(s) if fitted (refer to fig 2) and fit an actuation port plug in both the **Master** and **Pilot cylinder**(s), from where these hoses were removed.

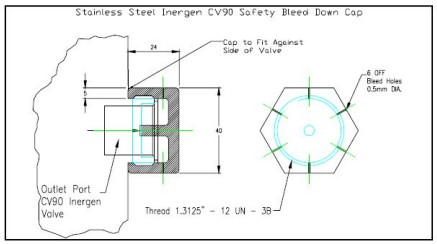
d) Ensure cylinder transport caps are fitted to all the cylinders, except the **master cylinders** fitted with a solenoid actuator

Australian Fire Technologies

System Isolation

150 bar INERGEN Solenoid Valve Electric Actuator Removal.

e) Hand fit an "Inergen® CV90 Safety Bleed-Down Cap" onto the discharge port (behind pressure gauge) of the first Master Cylinder, and lightly tighten with an shifting spanner.(Refer to fig 3). Ensure the cylinder is secured in the cylinder brackets.



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System Isolation

150 bar INERGEN Solenoid Valve Electric Actuator Removal.

f) Advise the client and all personnel in the immediate area that cylinders are being slowly bled down and there will be a slight noise associated with this operation .

g) Open all doors into the cylinder storage area to ensure adequate ventilation.

h) Fit a Lever Release Actuator onto the Master Cylinder fitted with the CV90 Safety Bleed-Down Cap.

i) Ensure the operator is wearing –ear muffs or ear plugs, safety goggles and gloves and that the **actuation port plug has been fitted** before releasing the cylinder by pulling the Lever Release Actuator.

j) When the cylinder has completely emptied (stopped hissing) remove the Inergen® CV90 Safety Bleed-Down Cap from the discharge port of the valve with a shifting spanner. **Ensure the operator is wearing gloves as the cap will be cold**.

k) Remove the Solenoid Actuator from the now **empty** Inergen® master cylinder, and fit a Cylinder Transport Cap.

l) Repeat steps e) to k) for the remaining Master Cylinder(s).

m) Loosen the cylinder brackets and remove the empty Inergen® master cylinders.

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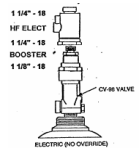
System De Isolation

150 bar INERGEN Solenoid Valve Electric Actuator Removal.

n) Replace the empty **master cylinders** with full cylinders and fit the HF electric actuators P/N73327 and the Booster Actuator P/N428949 and refit the flexible discharge bends. Refit the actuation hoses to all **pilot cylinders** (if fitted).

o) The HF Actuator P/N 73327 and Booster Actuator P/N 428949 is removed for testing, and then reset with the appropriate reset tool.

p) Reset the Fire Alarm Panel and reinstall the HF and Booster Actuators onto the master cylinder(s)



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Inspection & Testing

AS 1851 Maintenance Record and Report:-

Use MRR 07 Gaseous Fire Extinguishing Systems

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Inspection & Testing

MONTHLY INSPECTION & TEST

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MONTHLY INSPECTIONS:-

1. The gauge on the cylinders is to be checked for the correct pressure once a month.
2. Inspect all Gaseous Fire Extinguishing System components, nozzles, distribution piping and conduit runs for physical damage and/or displacement.
3. Inspect all detectors and control panels for evidence of damage or missing components. Have damaged or missing parts replaced immediately
4. Inspect each Gaseous Fire Extinguishing System cylinder. Cylinders(s) must not show evidence of corrosion or damage.
5. Inspect remote manual release. For electric manual release devices, check visually to ensure device is in the normal or ready position. The path to the remote release must be clear and unobstructed

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SIX MONTHLY

INSPECTION & TEST

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SIX MONTHLY INSPECTIONS:-

1. Perform all Monthly Inspections.
2. The pipe work and nozzles are to be inspected every 6 months for corrosion and damage.
3. The Fire alarm system is to be checked as per the Australian Standard 1851.
4. The actuator is to be removed from the cylinder and checked every 6 months.
5. Verify cylinders charged with the correct quantity of extinguishing agent (weight or liquid level test)
6. Verify that all openings, penetrations are sealed and that all door closure devices, air-conditioning dampers are sealed and in good operating condition.

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YEARLY INSPECTION & TEST

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YEARLY INSPECTIONS:-

1. Perform all Monthly and Six Monthly Inspections .
2. The NET volume of the risk is to be checked against the design criteria for the Gaseous Fire Extinguishing System every 12 months.
3. The Fire alarm system is to be checked as per the Australian Standard 1851
4. Verify that all dampers are sealed and in good operating condition.
5. Test Gas Extraction system (if installed).
6. Conduct Room Fan Integrity Test.
7. Verify Pressure Relief Vent operation.

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YEARLY SURVEY

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YEARLY SURVEY:-

1. The NET volume of the risk is to be checked against the design criteria for the Gaseous Fire Extinguishing System every 12 months.
2. Leakage of Agent from the protected area.
3. Maintenance logbooks are to be kept on site at all times.

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Inspection & Testing

ROOM FAN INTEGRITY TESTING

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Room Fan Integrity Test

- Room fan integrity testing is mandatory under AS ISO 14520.1-2009 as part of the commissioning process of a gaseous fire suppression system installation.
- To ensure correct ongoing system functionality, AS 1851-2012 requires a room fan integrity test be performed as part of the annual servicing of a gaseous fire suppression system, with results recorded and equivalent leakage areas noted.
- LPG Fire can provide you with certified door fan testers to perform room fan integrity tests on your behalf whether you are commissioning a new system or meeting your annual maintenance obligations.

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Room Fan Integrity Test.

What is a Door Fan Test?

The door fan itself merely measures the enclosure leakage area and the pressures that may exist across it.

The computer software in conjunction with the DG-700 Hand Held digital pressure / flow gauge does the rest of the simulation and comes up with the prediction.

The Retrotec software walks the user through all the steps in a controlled way to ensure each step is done in accordance with the applicable NFPA or AS ISO 15420 standards.

The few steps that need to be verified are contained in the next sides.

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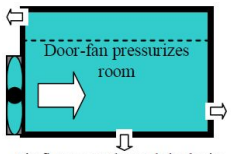
Inspection & Testing

Measuring Room Leakage Areas

The Minneapolis Fan Test Unit is temporarily installed in a doorway leading from the protected space to a large open area or outdoors. The fan speed is adjusted to obtain a pressure between the test room and the volume surrounding the test room. This pressure (usually 10 to 15 Pa or 0.04" to 0.06" W.C.) is similar to the steady state pressure (column pressure) exerted by the gaseous extinguishing agent at floor level at the start of a typical 10 minute retention period.



Air flows out through leaks in floors, walls and ceiling

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Inspection & Testing

Measuring Room Leakage Areas

The pressure created by the Minneapolis Fan Test Unit causes air to move through leaks at a detectable rate. This makes it very easy to pinpoint exactly where leakage occurs using a chemical smoke.

By measuring the airflow rate and the pressure created, the computer software calculates the Equivalent Leakage Area (ELA), or the total area of all the cracks, gaps, and holes in the test room. The flow pressure across the blower inlet is converted into flow by the computer software.

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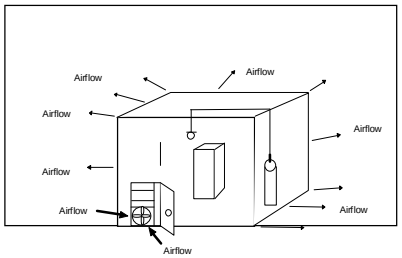
Measuring Room Leakage Areas



The door fan pressurizes the enclosure to the same pressure exerted by the agent on the floor after discharge. The flow needed to create this pressure is used to calculate the leakage area of the enclosure.

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Inspection & Testing

Measuring Room Leakage Areas

The measurement is done by first blowing air out of the room (**depressurization**) and then into the room (**pressurization**). The two readings are then averaged to reduce errors due to:-

- HVAC operation-major problem can produce 30% errors
- Other static pressures. Wind occasionally can produce errors if the room gauge is fluctuating. 5Pa of fluctuation will produce a 30% error.
- One-way leaks-almost never a factor

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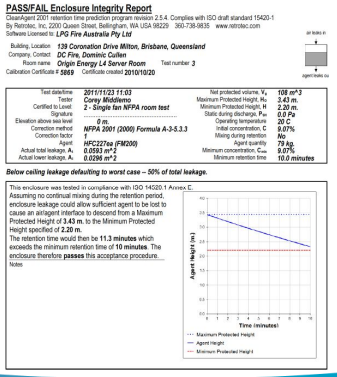
Inspection & Testing

Room Fan Integrity Test



PASS/FAIL Enclosure Integrity Report

CleanAgent 2001 retention time prediction program revision 2.5.4. Complies with ISO draft standard 15420-1
By Retrotec, Inc. 2200 Queen Street, Bellingham, WA USA 98229 360-738-9835 www.retrotec.com
Software Licensed to: *LPG Fire Australia Pty Ltd*

Building, Location	*139 Coronation Drive Milton, Brisbane, Queensland*
Company, Contact	*DC Fire, Dominic Cullen*
Room name	*Origin Energy L4 Server Room* Test number 3
Calibration Certificate #	*5869* Certificate created *2010/10/20*

Test date/time	*2011/11/23 11:03*	Net protected volume, V_n	*108 m^3*
Tester	*Corey Middlemo*	Maximum Protected Height, H_m	*3.43 m.*
Certified to Level	*2 - Single fan NFPA room test*	Minimum Protected Height, H	*2.20 m.*
Signature		Static during discharge, P_{as}	*0.0 Pa*
Elevation above sea level	*0 m.*	Operating temperature	*20 C*
Correction method	*NFPA 2001 (2000) Formula A-3-5.3.3*	Initial concentration, C	*9.07%*
Correction factor	*1*	Mixing during retention	*No*
Agent	*HFC227ea (FM200)*	Agent quantity	*79 kg.*
Actual total leakage, A_t	*0.0593 m^2*	Minimum concentration, C_{min}	*9.07%*
Actual lower leakage, A_l	*0.0296 m^2*	Minimum retention time	*10.0 minutes*

Below ceiling leakage defaulting to worst case -- 50% of total leakage.

This enclosure was tested in compliance with ISO 14520-1 Annex C.
Assuming no continual mixing during the retention period, enclosure leakage could allow sufficient agent to be lost to cause an airtagent interface to descend from a Maximum Protected Height of **3.43 m.** to the Minimum Protected Height specified of **2.20 m.**
The retention time would then be **11.3 minutes** which exceeds the minimum retention time of **10 minutes**. The enclosure therefore **passes** this acceptance procedure.
Notes

Agent Height (m.)
Time (minutes)
Maximum Protected Height
Agent Height
Minimum Protected Height

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PRESSURE RELIEF VENTING

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Pressure Relief Venting

- It is necessary to verify the operation of any over / under pressurisation vents installed within the hazard area during the Room Fan Integrity Test procedure.
- It is the responsibility of the building owner to advise the original installation contractor of the strength of the protected enclosure.

STRENGTH AND ALLOWABLE PRESSURE FOR AVERAGE ENCLOSURES		
Construction Type	Typical Structures	Allowable over-pressure, Pa
Light	Lightweight partitions including glazing	250
Normal	Brick	500
Vault	Reinforced Concrete	1000

Notes:-

- The above table has been sourced from the previous Australian Standard AS 4214 – 2002, The University of Manchester and the UK Building Code.
- With large fires, the negative pressure resulting from the discharge of halocarbon / synthetic agents should also be considered.

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Pressure Relief Venting

- For Inert Gases positive pressure relief venting shall be considered
- For Synthetic Gases both positive and negative relief venting shall be considered

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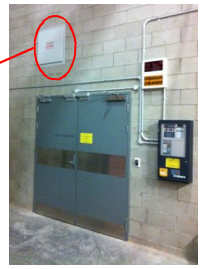
Inspection & Testing

Pressure Relief Venting



Installed Pressure Relief Vent – Inert Gas System

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Pressure Relief Venting – Inert Gas System Operation

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Inspection & Testing

Pressure Relief Venting – Synthetic Gas Positive / Negative Operation

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Inspection & Testing

No installed Pressure Relief Vent - Inert Gas System

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Inspection & Testing

No installed Over / Under Pressure Relief Vent - FM200 System

Australian Fire Technologies

Inspection & Testing

No installed Over / Under Pressure Relief Vent - FM200 System

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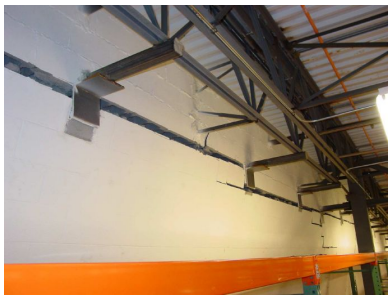
Inspection & Testing

No installed Over / Under Pressure Relief Vent - FM200 System



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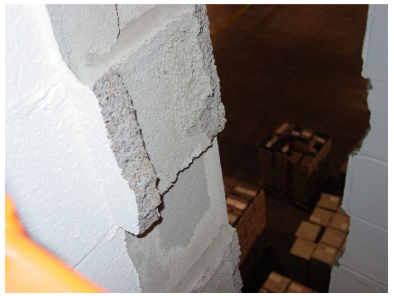
No installed Over / Under Pressure Relief Vent - FM200 System



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No installed Over / Under Pressure Relief Vent - FM200 System

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Installed Over / Under Pressure Relief Vent - FM200 System

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Installed Over / Under Pressure Relief Vent - FM200 System

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Inspection & Testing

Installed Over / Under Pressure Relief Vent - FM200 System

Australian Fire Technologies

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Introduction

Questions ?