



FK-5-1-12 FIRE SUPPRESSION SYSTEM

COMPONENTS MANUAL FOR PYRO-5112 SYSTEM



PYRO-5112

FK-5-1-12

Fire Suppression
System

Rev 0

First Listing Draft

02-20-2022

FOREWORD

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CHAPTER 1

COMPONENT DESCRIPTION

The PYRO-5112 gas system consists of field pipe work connected to a cylinder(s) through a manifold (if required), distribution pipe network and nozzles. At a reference temperature of 21°C, the PYRO-5112 is stored at 25 bar, 42 bar and 50 bar within each cylinder. The proprietary system components, from cylinders to nozzles, are delivered in loose kit form and the items are bolted to a wall or solid framework. Each system is designed specifically for the area which it is protecting. Gas discharge times and gas distribution is achieved by the correct sizing of the orifice holes at the nozzle with the size engraved on the body.

The PYRO-5112 system is operated by an electrical signal to a solenoid actuating device on the master or pilot cylinder. Operation of the said cylinder will pressurize the pneumatic actuating line which will operate the pneumatic release pistons on the slave cylinders causing these cylinders to discharge. The General Arrangement Drawings of piping runs can affect the final diameter of the orifices, therefore "as built" drawings must be done to enable all orifices to be calculated and drilled to suite.

1.1 PYRO-5112 CYLINDER ASSEMBLY (WELDED)

FK-5-1-12 fluid is stored in the cylinder as a liquid, super pressurized with nitrogen. In addition, all cylinders and valves are provided with a safety cap and a protection cap. This is a safety feature to prevent uncontrolled, accidental discharge. The cylinder is designed to operate at a temperature range of -10 °C to 60 °C. Cylinders sharing the same manifold must be in equal size with the same fill density. A label is pasted onto the cylinder to display the filling pressure, agent weight, tare weight, gross weight and charge date.

WARNING:

THE VALVE OUTLET CAP MUST ALWAYS BE FITTED ONTO THE CYLINDER, IRRESPECTIVE OF WHETHER THE CYLINDER IS FULL OR EMPTY, WHEN IT IS NOT CONNECTED TO THE PIPE NETWORK OR MANIFOLD.

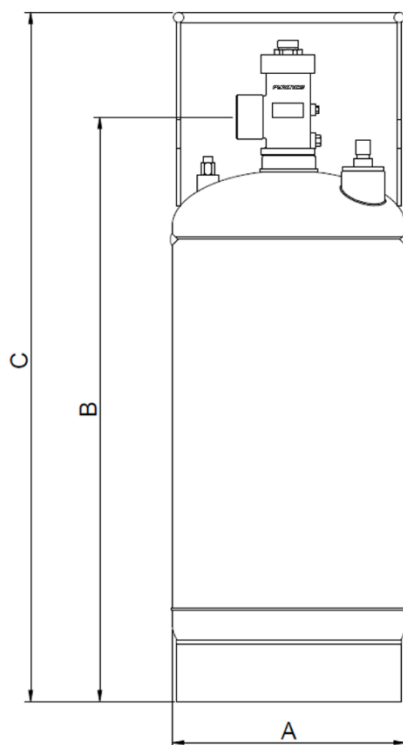


Figure 1-1: PYRO-5112 Cylinders (Welded)

| Specifications | |
|--|--------------------------------------|
| Materials | P355M, HP345 |
| Filling – General Cylinder | 0.5kg/L up to maximum of 1 kg/L |
| Filling – Cylinder with Liquid Level Indicator | 0.5kg/L up to maximum of 0.8kg/L |
| Filling Pressure | 25 bar or 42 bar @ 21°C |
| Test Pressure | 63 bar or 101 bar |
| Standard of Compliance | TPED Directive 2010/35/EU DOT-4BW |
| Color | Red |

1.1.1 TPED Cylinders

Table 1-1: Cylinder and Valve Assembly Dimensions for TPED Cylinders

| Part Number | Capacity (L) | Valve Outlet Size (in.) | A (mm) | B (mm) | C (mm) | Burst Disc's Burst Pressure |
|-------------------------|--------------|-------------------------|--------|--------|--------|-----------------------------|
| PYR-INT-FS-WCYL-16L | 16.6 | 1" | 228.6 | 578 | 761 | 55Bar |
| PYR-INT-FS-WCYL-32L | 32 | 1-1/2" | 324 | 584 | 730 | 55Bar |
| PYR-INT-FS-WCYL-52L | 52 | 1-1/2" | 324 | 844 | 990 | 55Bar |
| PYR-INT-FS-WCYL-100L | 100 | 1-1/2" | 406 | 1019 | 1187 | 55Bar |
| PYR-INT-FS-WCYL-120L | 120 | 2" | 406 | 1192 | 1350 | 55Bar |
| PYR-INT-FS-WCYL-150L | 150 | 2" | 406 | 1437 | 1596 | 55Bar |
| PYR-INT-FS-WCYL-180L | 180 | 2" | 462 | 1317 | 1493 | 55Bar |
| PYR-INT-FS-WCYL-200L | 200 | 2" | 462 | 1447 | 1623 | 55Bar |
| PYR-INT-FS-WCYL-240L-2V | 240 | 2" | 508 | 1468 | 1656 | 55Bar |
| PYR-INT-FS-WCYL-240L-3V | 240 | 3" | 508 | 1523 | 1656 | 55Bar |
| PYR-INT-FS-WCYL-300L | 300 | 3" | 610 | 1363 | 1506 | 55Bar |
| PYR-INT-FS-WCYL-369L | 369 | 3" | 610 | 1608 | 1751 | 55Bar |

Table 1-2: TPED Cylinders with Liquid Level Indicator

| Part Number | Capacity (L) | Valve Outlet Size (in.) | A (mm) | B (mm) | C (mm) | Liquid Level Inlet Size |
|-----------------------------|--------------|-------------------------|--------|--------|--------|-------------------------|
| PYR-INT-FS-WCYL-240L-LLI | 240 | 2" | 508 | 1468 | 1656 | 2" -11.5 NPSC |
| PYR-INT-FS-WCYL-240L-3V-LLI | 240 | 3" | 508 | 1523 | 1656 | 2" -11.5 NPSC |
| PYR-INT-FS-WCYL-300L-LLI | 300 | 3" | 610 | 1363 | 1506 | 2" -11.5 NPSC |
| PYR-INT-FS-WCYL-369L-LLI | 369 | 3" | 610 | 1608 | 1751 | 2" -11.5 NPSC |

1.1.2 DOT Cylinders

Table 1-3: Cylinder and Valve Assembly Dimensions for DOT Cylinders

| Part Number | Capacity (L) | Valve Outlet Size (in.) | A (mm) | B (mm) | C (mm) | Burst Disc's Burst Pressure |
|-----------------------|--------------|-------------------------|--------|--------|--------|-----------------------------|
| PYR-INT-FS-WCYL-D29L | 29 | 1-1/2" | 254 | 753 | 877 | 55Bar |
| PYR-INT-FS-WCYL-D52L | 52 | 1-1/2" | 406 | 600 | - | 55Bar |
| PYR-INT-FS-WCYL-D106L | 106 | 1-1/2" | 406 | 1035 | - | 55Bar |

| | | | | | | |
|-----------------------|-----|----|-----|------|---|-------|
| PYR-INT-FS-WCYL-D147L | 147 | 2" | 406 | 1377 | - | 55Bar |
| PYR-INT-FS-WCYL-D227L | 227 | 2" | 508 | 1408 | - | 55Bar |
| PYR-INT-FS-WCYL-D275L | 275 | 3" | 508 | 1666 | - | 55Bar |
| PYR-INT-FS-WCYL-D369L | 369 | 3" | 610 | 1572 | - | 55Bar |

Table 1-4: DOT Cylinders with Liquid Level Indicator

| Part Number | Capacity (L) | Valve Outlet Size (in.) | A (mm) | B (mm) | C (mm) | Liquid Level Inlet Size |
|---------------------------|--------------|-------------------------|--------|--------|--------|-------------------------|
| PYR-INT-FS-WCYL-D227L-LLI | 227 | 2" | 508 | 1408 | - | 2" -11.5 NPSC |
| PYR-INT-FS-WCYL-D275L-LLI | 275 | 3" | 508 | 1666 | - | 2" -11.5 NPSC |
| PYR-INT-FS-WCYL-D369L-LLI | 369 | 3" | 610 | 1572 | - | 2" -11.5 NPSC |

**Cylinder dimensions shown on all tables above have a tolerance of ± 15mm.*

1.2 PYRO-5112 CYLINDER ASSEMBLY (SEAMLESS)

FK-5-1-12 fluid is stored in the cylinder as a liquid, super pressurized with nitrogen. In addition, all cylinder and valve are provided with a safety cap and a protection cap. This is a safety feature to prevent uncontrolled, accidental discharge. The cylinder is designed to operate at a temperature range of -10 °C to 60 °C. Cylinders sharing the same manifold must be in equal size with the same fill density. A label is pasted onto the cylinder to display the filling pressure, agent weight, tare weight, gross weight and charge date.

WARNING:

THE VALVE OUTLET CAP MUST ALWAYS BE FITTED ONTO THE CYLINDER, IRRESPECTIVE OF WHETHER THE CYLINDER IS FULL OR EMPTY, WHEN IT IS NOT CONNECTED TO THE PIPE NETWORK OR MANIFOLD.

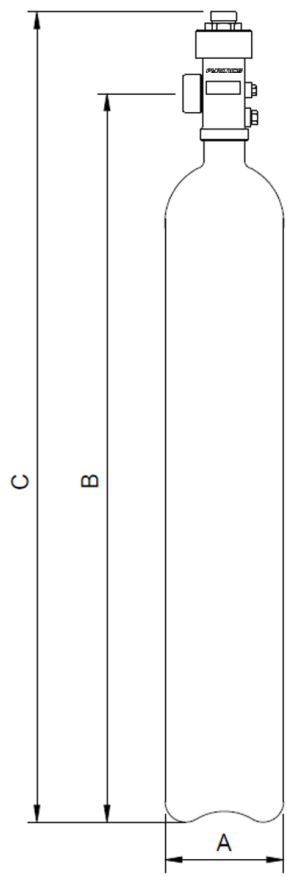


Figure 1-2: PYRO-5112 Cylinder (Seamless)

| Specifications | |
|------------------------|----------------------------------|
| Materials | Chromium Molybdenum Alloy Steel |
| Filling | 0.5kg /L up to maximum of 1 kg/L |
| Filling Pressure | 42bar and 50 bar @ 21°C |
| Test Pressure | 300 bar |
| Standard of Compliance | ISO 9809 – 1 |
| Color | Red |

1.2.1 TPEd Seamless Cylinders

Table 1-5: Seamless Cylinders and Valve Assembly Dimensions for Vertical Installation

| Part Number | Capacity (L) | Valve Outlet Size | A (mm) | B (mm) | C (mm) | Burst Disc's Burst Pressure |
|----------------------|--------------|-------------------|--------|--------|--------|-----------------------------|
| PYR-INT-FS-SCYL-50L | 50 | 1-1/2" | 229 | 1496 | 1609 | 90Bar |
| PYR-INT-FS-SCYL-80L | 80 | 1-1/2" | 360 | 1081 | 1194 | 90Bar |
| PYR-INT-FS-SCYL-100L | 100 | 1-1/2" | 360 | 1296 | 1409 | 90Bar |
| PYR-INT-FS-SCYL-140L | 140 | 2" | 406 | 1385 | 1515 | 90Bar |
| PYR-INT-FS-SCYL-180L | 180 | 2" | 406 | 1715 | 1845 | 90Bar |

**Cylinder dimensions shown on all tables above have a tolerance of ± 15mm.*

1.3 DISCHARGE VALVE ASSEMBLY SERIES 1", 1-1/2" and 2" TYPE

The discharge valve assembly is of a pressure differential type and is used for fixed installations, gas suppression system up to 50 Bar. The discharge valve can be actuated electrically, pneumatically and / or manually with approved valve actuation components. A plastic protection cap is mounted onto the top of the valve to prevent dirt or particles from entering the control valve bore which may cause a malfunction of the valve. It also prevents an accidental discharge of the cylinder.

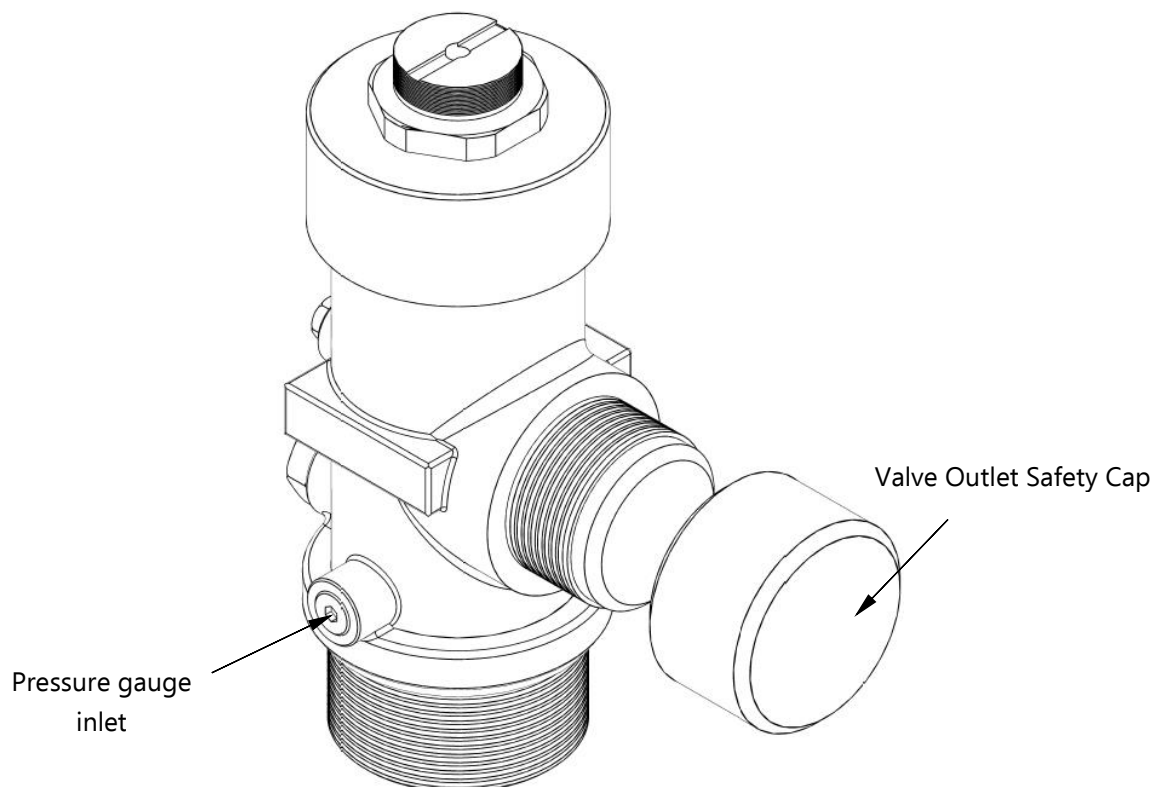


Figure 1-3: Discharge Valve

| Specifications | | | |
|---------------------------|-----------------|-------------------|-----------------|
| Part No. | PYR-INT-FS-DV-1 | PYR-INT-FS-DV-1.5 | PYR-INT-FS-DV-2 |
| Valve Size | 1" | 1-1/2" | 2" |
| Valve Body Material | Brass | Brass | Brass |
| Temperature Range | -10 °C to 60 °C | -10 °C to 60 °C | -10 °C to 60 °C |
| Actuator Connection | 1-1/4" X 18UNEF | 1-1/4" X 18UNEF | 1-1/4" X 18UNEF |
| Pilot Hose Connection | 1/8" NPT | 1/8" NPT | 1/8" NPT |
| Pressure Gauge Connection | 1/8" NPT | 1/8" NPT | 1/8" NPT |
| Valve Outlet Connection | 1-7/16" - 12 UN | 1-7/8" - 12 UN | 2-1/2" - 12 UN |
| Equivalent Length (m) | 9 | 12.5 | 13 |

Note: All equivalent lengths given in Schedule 40, black pipe.

1.4 PYRO-5112 VALVE ASSEMBLY SERIES 3" TYPE

The PYRO-5112 3" valve assembly is of a pressure differential type and is used for fixed installations, gas suppression system up to 25 Bar only. There are two different types of 3" valve available; Screw Type Valve and Flange Type Valve. The PYRO-5112 valve can be actuated electrically, pneumatically and / or manually with approved valve actuation components. A plastic protection cap is mounted onto the top of the valve to prevent dirt or particles from entering the control valve bore which may cause a malfunction of the valve. It also prevents an accidental discharge of the cylinder.

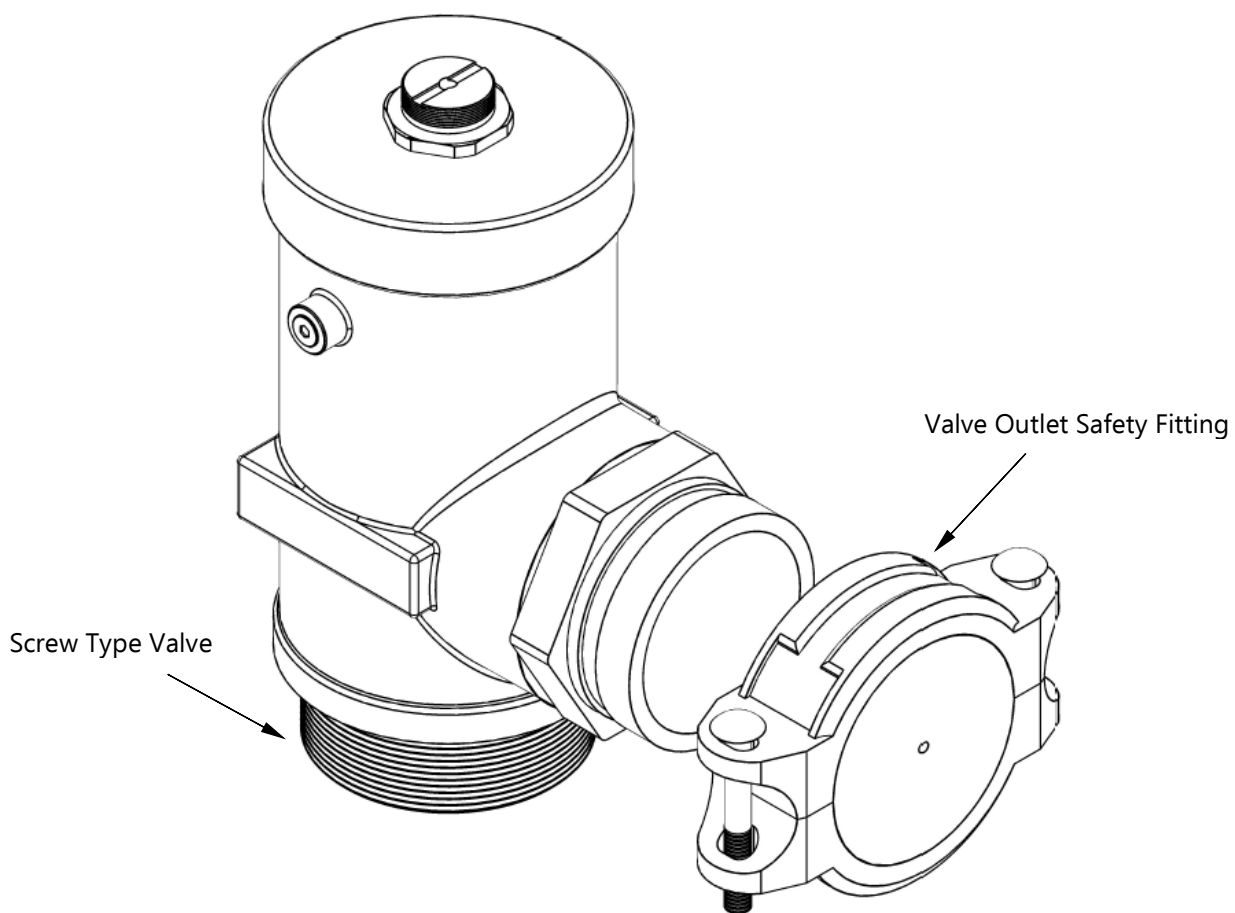


Figure 1-4: 3" Screw Type PYRO-5112 Valve

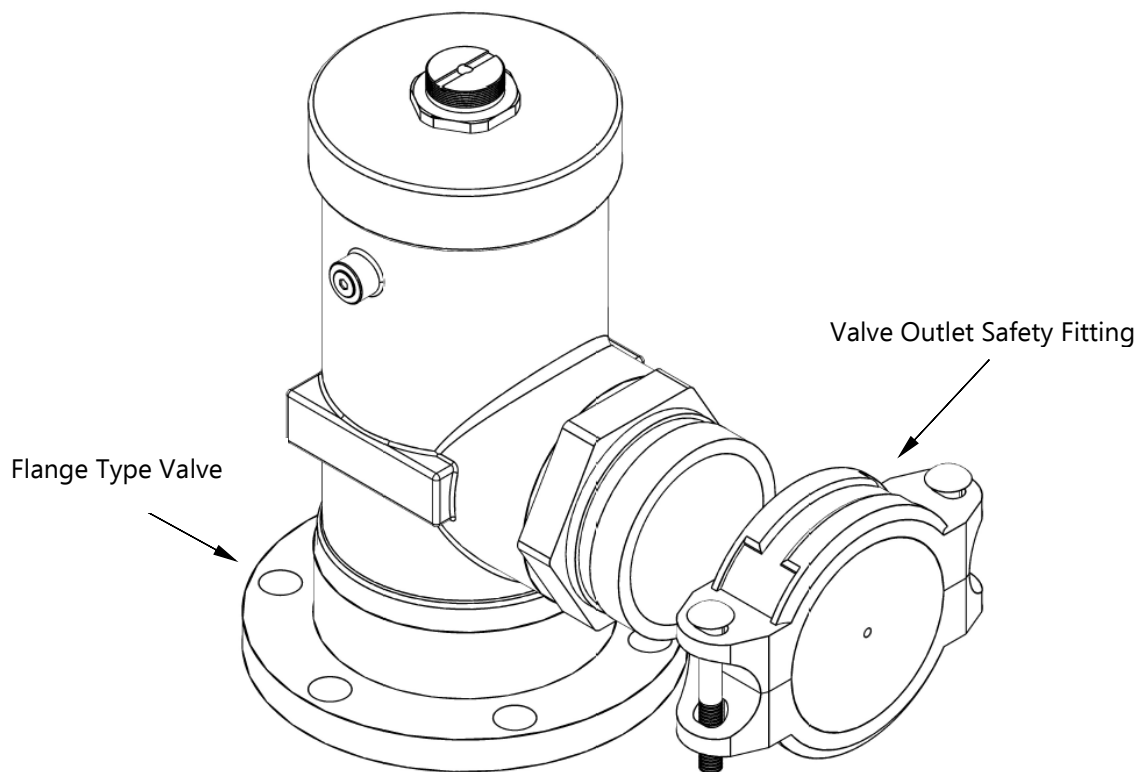


Figure 1-5: 3" Flange Type PYRO-5112 Valve

| PYRO-5112 Valve Assembly | |
|---------------------------|-----------------|
| Part No. | PYR-INT-FS-DV-3 |
| Valve Size and Type | 3" Screw Type |
| Valve Body Material | Brass |
| Temperature Range | -10 °C to 60 °C |
| Actuation Connection | 1-1/4" X 18UNEF |
| Pilot Hose Connection | 1/8" NPT |
| Pressure Gauge Connection | 1/8" NPT |
| Valve Outlet Connection | 3" Groove |
| Equivalent Length (m) | 14 |

Note: All equivalent lengths given in Schedule 40, black pipe.

| Flange | |
|------------------------|-------------------------------|
| Part No. | PYR-INT-FS-DVF-3 |
| Flange Material | Brass |
| Temperature Range | -10 °C to 60 °C |
| Connection to Valve | 4" x 12 UN |
| Connection to Cylinder | SS304 Cap Screw 5/8" x 1-1/2" |

1.5 VALVE OUTLET ADAPTOR

The valve outlet adaptor connects the cylinder valve outlet to the discharge piping when a flexible discharge hose is not used, for example, a single cylinder system.

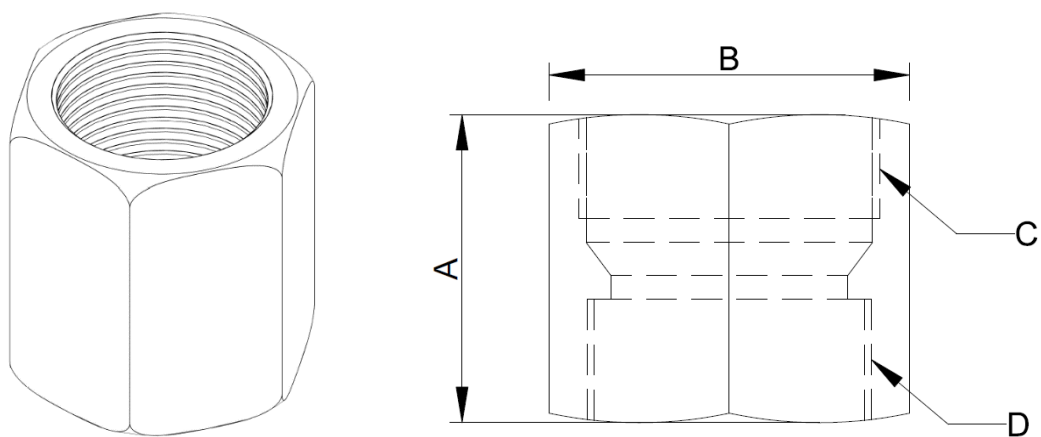


Figure 1-6: Valve Outlet Adaptor

| Part No. | Valve Size | A (mm) | B (mm) | C | D |
|---------------------|------------|-----------|-----------|------------------|------------------------|
| PYR-INT-FS-VOA-1V | 1" | 50 | 44.5 | 1-7/16" – 12 UNJ | 1" BSP x 11 TPI |
| PYR-INT-FS-VOA-1.5V | 1-1/2" | 58 | 60.5 | 1-7/8" – 12 UNJ | 1-1/2" BSP x 11 TPI |
| PYR-INT-FS-VOA-2V | 2" | 65 | 73.5 | 2-1/2" – 12 UNJ | 2" BSP x 11 TPI |

1.6 PYRO-5112 CYLINDER LABEL

The cylinder label shows the details regarding the weight of FK-5-1-12 gas, empty weight, gross weight, filling pressure and charge date.





| | | | |
|---|---|--|--|
| <p>FACTORY FILLED SPECIFICATIONS</p> <p>PART NUMBER <input type="text"/></p> <p>CYLINDER NUMBER <input type="text"/></p> <p>FILLING PRESSURE at 21 °C <input type="text"/></p> <p>MANUFACTURING YEAR <input type="text"/></p> <p>TARE WEIGHT <input type="text"/></p> <p>GROSS WEIGHT <input type="text"/></p> <p>AGENT WEIGHT <input type="text"/></p> <p>FILLING LOCATION <input type="text"/></p> <p>CHARGE DATE <input type="text"/></p> <p><small>Label Part no: PYR-INT-FS-FK-LABEL-XXXL</small></p> |  | | <p>RECYCLING PROTECTS THE ENVIRONMENT.</p> <p>Do not dispose, discharge only in case of fire. If container contents must be removed for service, maintenance or dismantling of the clean agent system, contact your local installer on handling equipment, reclaiming or recycling clean agent prior to any removal.</p> |
| | <p style="text-align: center;">INSPECTION & MAINTENANCE</p> <p style="text-align: center;">Check and inspect the cylinder semi annually.</p> <ol style="list-style-type: none"> Prior to installation, read and comply with all the PYRO-5112 Clean Agent Fire Suppression System’s Design, Installation and Maintenance Manual (part no: PYR-INT-FS-FK-MANUAL) System cylinders assembly is to be installed, tested, inspected and maintained in accordance with National Fire Protection Association Standard on Clean Agent Fire Extinguishing System, NFPA 2001. Check the agent weight and pressure every 6 months. Refill or replace the cylinder if there is a pressure loss of more than 10 % (adjusted to ambient temperature) from the filling pressure or if the agent weight shows a loss of more than 5 %. The cylinder can be stored and installed in a vertical position only. This cylinder shall be maintained and recharged by an authorized distributor only with agent specified by the manufacturer. | | <p>CONTENTS OF CYLINDER:</p> <p>FK-5-1-12, Fluorinated Ketone Suitable for use at temperature from -10 °C to 60 °C (14 °F to 140 °F)</p> <p>Cylinders factory tested to 1000 psi (DOT) or 300 bar (ISO). See stamped pressure for TPED</p> <p><small>MSDS Number: PYR-SDS-FK, HMIS: 1-0-0 Emergency Contact: +1 (650) 457 4580</small></p> |
| | <p style="text-align: center;">CAUTION</p> <p>Never handle or transport the cylinder without safety devices installed. Transport the cylinders in the vertical or horizontal position only. Improper valve operation might cause damages to the surroundings and severe injury to the bystanders. Do not fill the cylinder with any product other than FK-5-1-12 and Nitrogen.</p> | <p style="text-align: center;">WARNING</p> <p>The discharge of FK-5-1-12 gas upon a fire might be hazardous from the undecomposed agent and decomposition products from the fire. Direct contact with the vaporising fluid from the system nozzle can cause a chilling effect on objects and cause frostbites on the skin in severe cases. Unnecessary exposure of the agent should be avoided. All personnel should evacuate the protected areas upon operation of a system pre-discharge alarm.</p> | <p>CLEAN AGENT EXTINGUISHING SYSTEM UNIT</p> <div style="display: flex; justify-content: space-around;">   </div> |
| | <p>DO NOT DEFACE, REMOVE OR COVER THIS LABEL</p> | | <p style="text-align: center;"></p> <p style="text-align: center;"><small>Adkinns Inc.</small></p> <p style="text-align: center;"><small>5063 Commercial Circle, Concord, 94520 CA, USA</small></p> <p style="text-align: center;"><small>Tel: +1 (650) 457 4580 www.adkinns.com</small></p> |

Figure 1-7: PYRO-5112 Cylinder Label

| Specifications | |
|----------------|----------------------------------|
| Part Number | PYR-INT-FS-FK-LABEL-100L |
| Material | Polyethylene Terephthalate (PET) |
| Size | 297 mm x 210 mm |

| Specifications | |
|----------------|----------------------------------|
| Part Number | PYR-INT-FS-FK-LABEL-52L |
| Material | Polyethylene Terephthalate (PET) |
| Size | 237 mm x 168 mm |

1.7 ASSEMBLY PRESSURE GAUGE 25 BAR

The pressure gauge indicates the internal pressure of the PYRO-5112 cylinders. It is installed onto the valve. 25 bar pressure gauge will be used in 25 bar PYRO-5112 system cylinders.

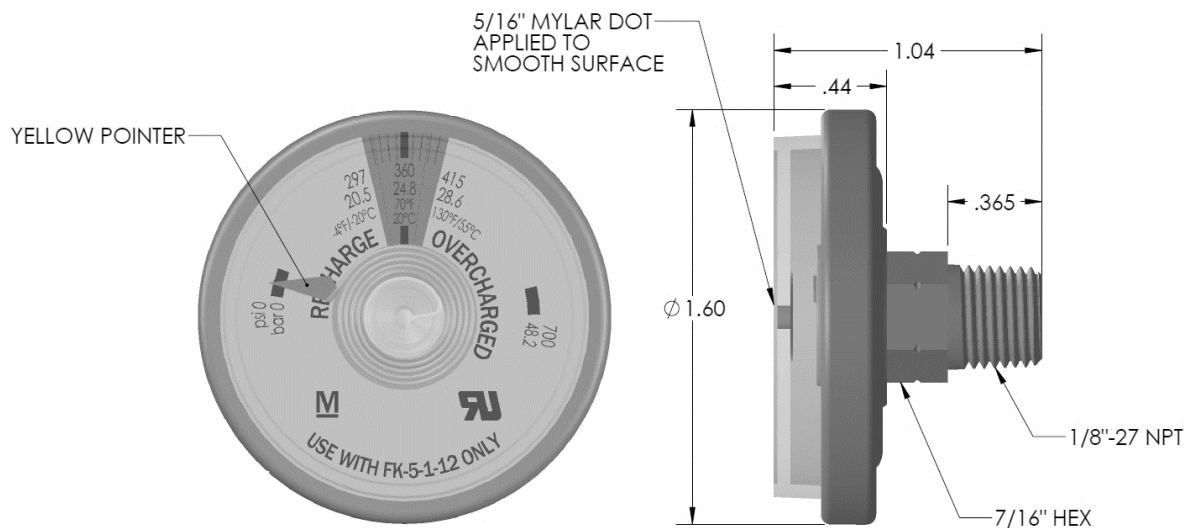


Figure 1-8: Pressure Gauge for 25 bar

| Specifications | |
|---------------------|-----------------------|
| Part Number | PYR-INT-FS-FK-PG-25B |
| Type | Spring Tube Manometer |
| Temperature Range | - 10 °C to 60 °C |
| Connection to Valve | 1/8" NPT |

1.8 ASSEMBLY PRESSURE GAUGE 42 BAR

The pressure gauge indicates the internal pressure of the PYRO-5112 cylinders. It is installed onto the valve. 42 bar pressure gauge will be used in 42 bar PYRO-5112 system cylinders.

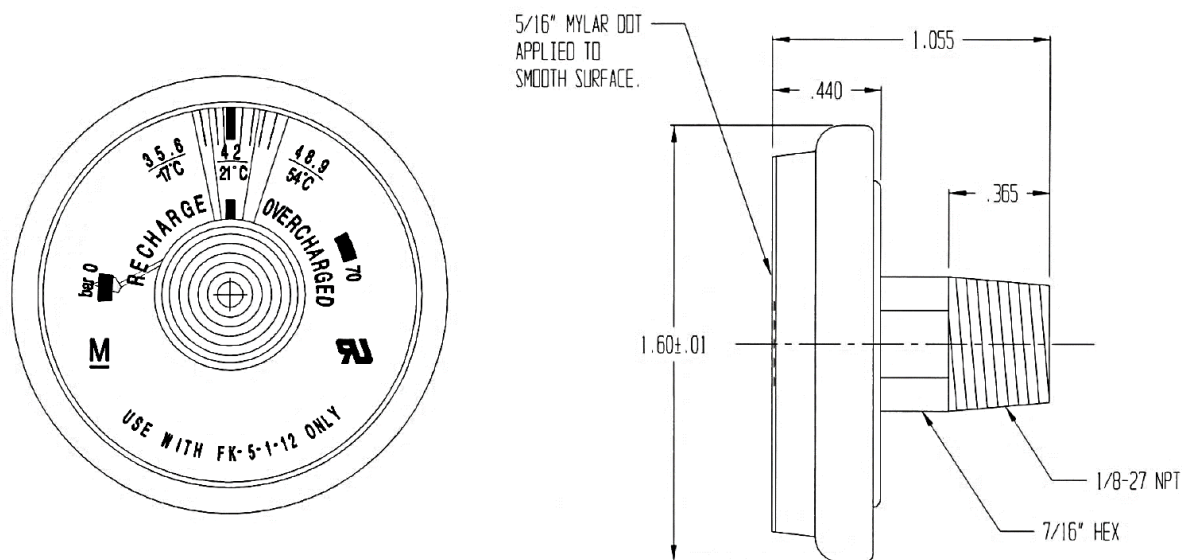


Figure 1-9: Pressure Gauge for 42 bar

| Specifications | |
|---------------------|-----------------------|
| Part Number | PYR-INT-FS-FK-PG-42B |
| Type | Spring Tube Manometer |
| Temperature Range | -10 °C to 60 °C |
| Connection to Valve | 1/8" NPT |

1.9 ASSEMBLY PRESSURE GAUGE 50 BAR

The pressure gauge indicates the internal pressure of the PYRO-5112 cylinders. It is installed onto the valve. 50 bar pressure gauge will be used in 50 bar PYRO-5112 system cylinders.

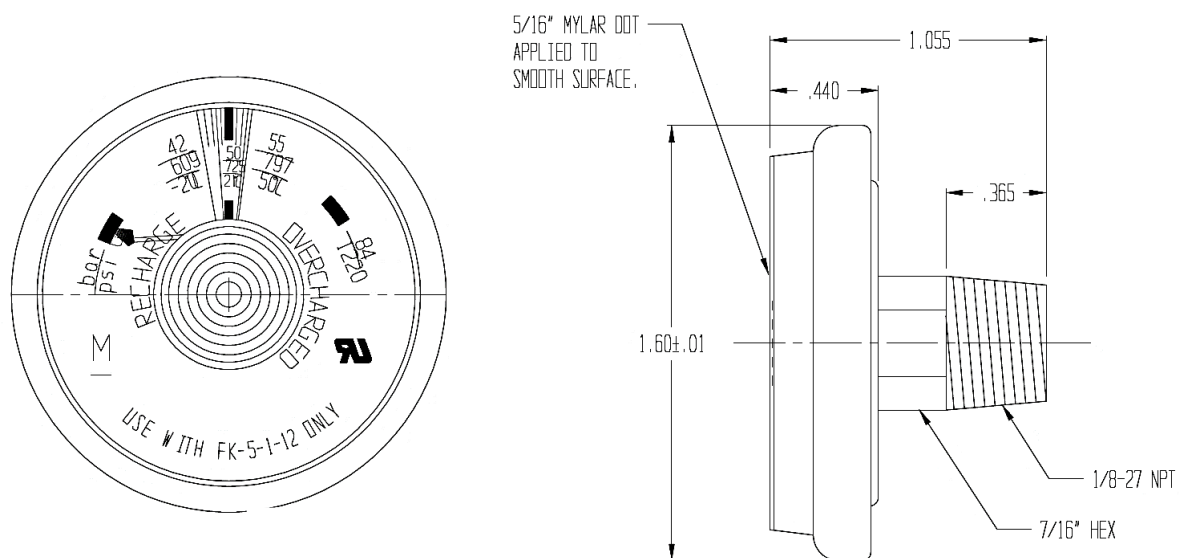


Figure 1-10: Pressure Gauge for 50 bar

| Specifications | |
|---------------------|-----------------------|
| Part Number | PYR-INT-FS-FK-PG-50B |
| Type | Spring Tube Manometer |
| Temperature Range | -10 °C to 60 °C |
| Connection to Valve | 1/8" NPT |

1.10 ASSEMBLY PRESSURE GAUGE 25 BAR WITH LOW PRESSURE SWITCH

The pressure gauge with low pressure switch indicates and monitor the internal pressure of the PYRO-5112 cylinders. It is installed onto the valve and connected electrically to the control panel. 25 bar pressure gauge with low pressure switch will be used in 25 bar PYRO-5112 system cylinders.

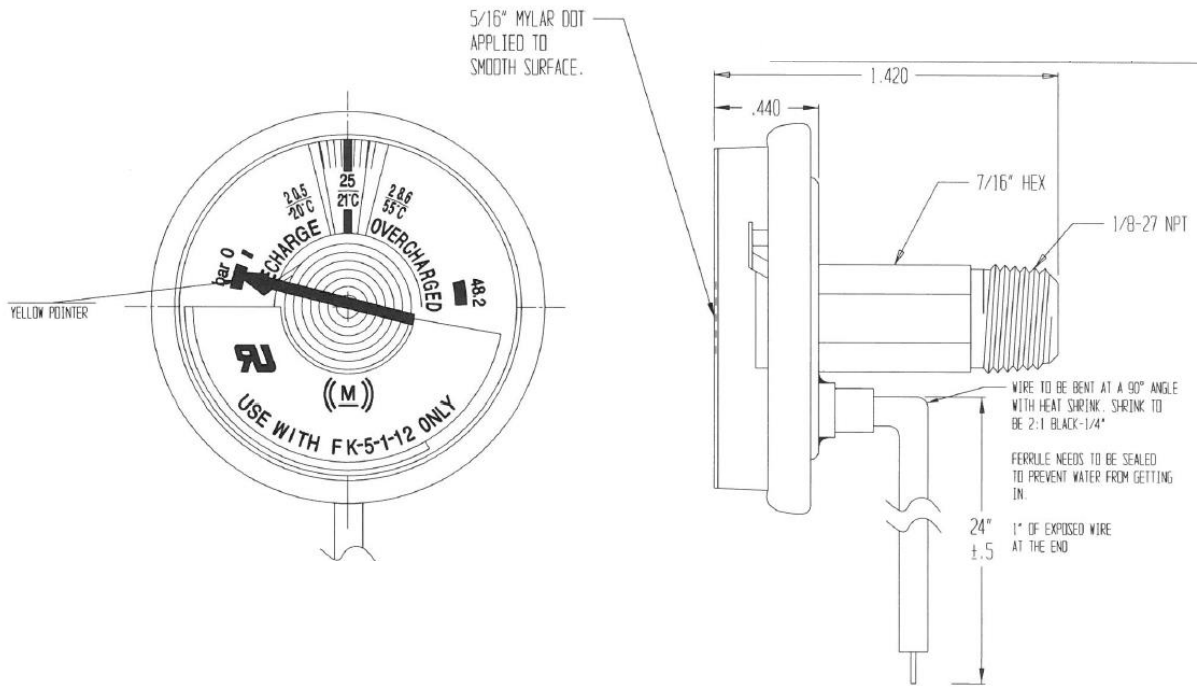


Figure 1-11: 25 bar Pressure Gauge with Low Pressure Switch

| Specifications | |
|---------------------|-----------------------|
| Part Number | PYR-INT-FS-FK-PGS-25B |
| Wire | 18 Gage SXL |
| Temperature Range | -10°C to 60°C |
| Connection to Valve | 1/8" NPT |

1.11 ASSEMBLY PRESSURE GAUGE 42 BAR WITH LOW PRESSURE SWITCH

The pressure gauge with low pressure switch indicates and monitor the internal pressure of the PYRO-5112 cylinders. It is installed onto the valve and connected electrically to the control panel. 42 bar pressure gauge with low pressure switch will be used in 42 bar PYRO-5112 system cylinders.

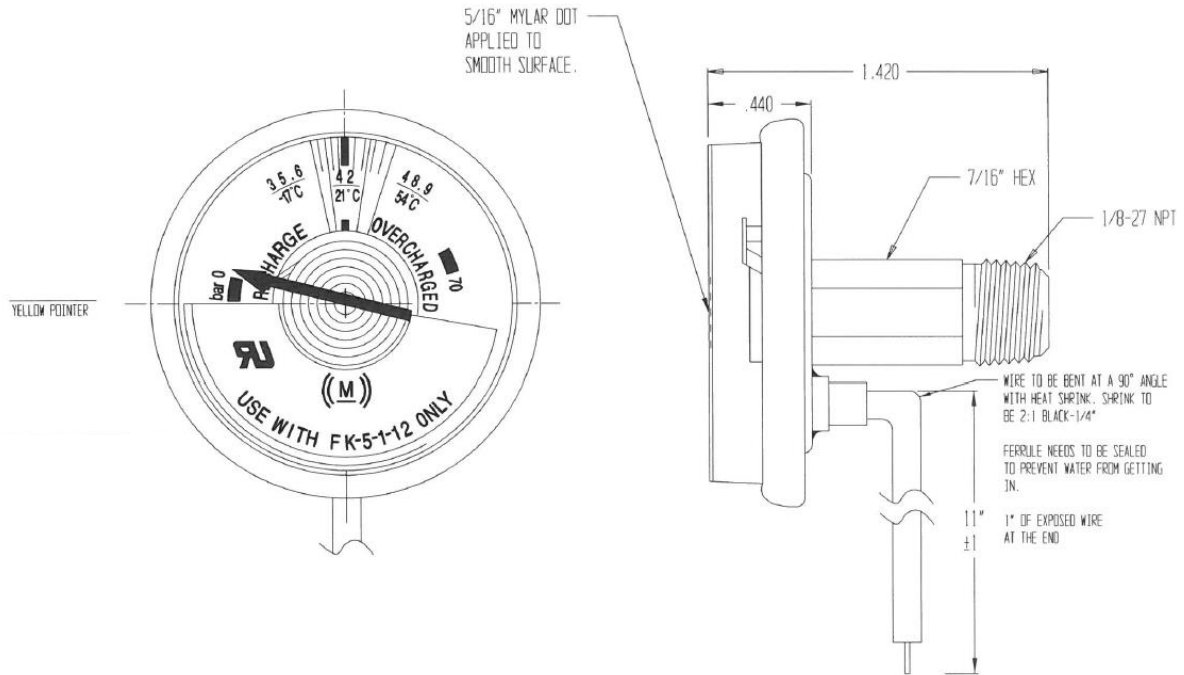


Figure 1-12: 42 bar Pressure Gauge with Low Pressure Switch

| Specifications | |
|---------------------|-----------------------|
| Part Number | PYR-INT-FS-FK-PGS-42B |
| Wire | 18 Gage SXL |
| Temperature Range | -10°C to 60°C |
| Connection to Valve | 1/8" NPT |

1.12 ASSEMBLY PRESSURE GAUGE 50 BAR WITH LOW PRESSURE SWITCH

The pressure gauge with low pressure switch indicates and monitor the internal pressure of the PYRO-5112 cylinders. It is installed onto the valve and connected electrically to the control panel. 50 bar pressure gauge with low pressure switch will be used in 50 bar PYRO-5112 system cylinders.

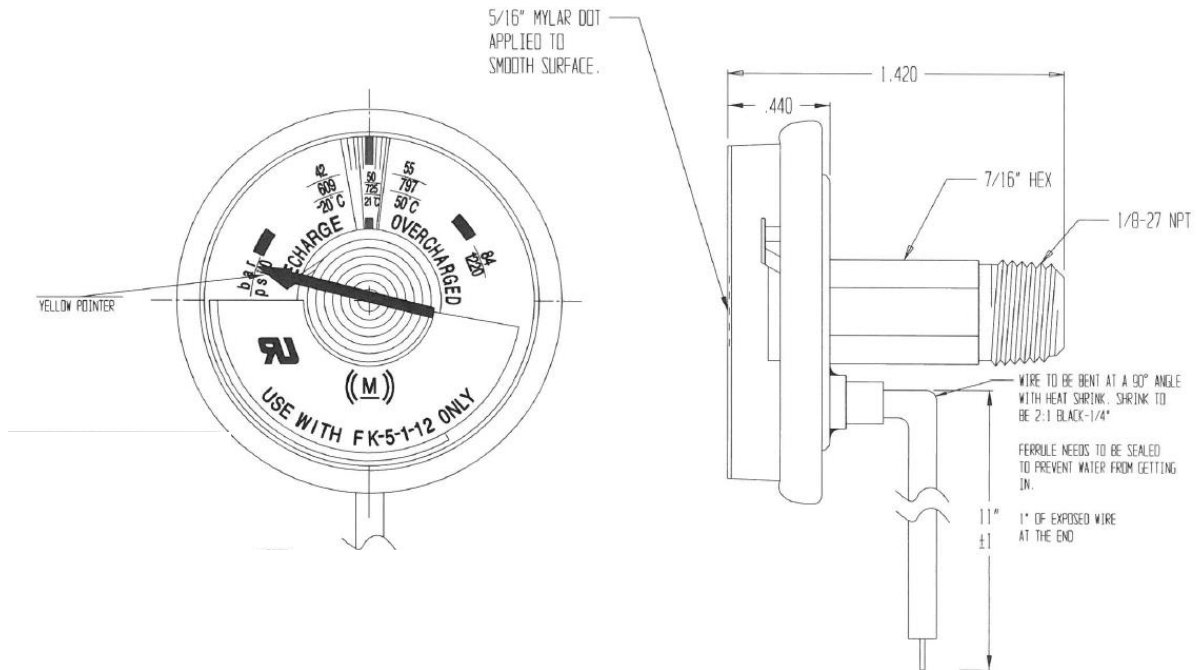


Figure 1-13: 50 bar Pressure Gauge with Low Pressure Switch

| Specifications | |
|---------------------|-----------------------|
| Part Number | PYR-INT-FS-FK-PGS-50B |
| Wire | 18 Gage SXL |
| Temperature Range | -10°C to 60°C |
| Connection to Valve | 1/8" NPT |

1.13 LIQUID LEVEL INDICATOR

The liquid level indicator is used to measure the liquid level of FK-5-1-12 for 100 L and 369L TPED cylinders. A measuring tape is placed inside the tube to the end. Pull the tape up to the maximum and then slowly lowering the tape until a magnetic interlock with the float is touched. The tape will remain above the neck ring to show the reading of the liquid level. The device is installed in an empty cylinder prior filling of FK-5-1-12. It is suitable only for cylinder filling density of 0.8 kg/l and below.

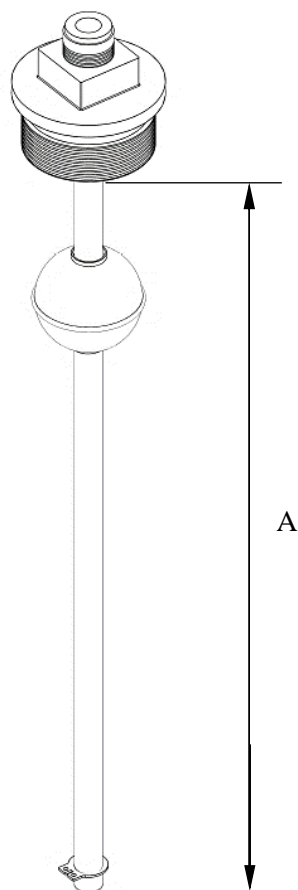


Figure 1-14: Liquid Level Indicator

| Specifications | |
|----------------------|-------------------------------|
| Part Number | PYR-INT-FS-LLI |
| Cylinder Size | 100L to 369 L |
| Neck Ring Inlet Size | 2"-11.5 NPSC |
| A (mm) | Varied according to cylinders |

**Liquid level indicator subject to cylinder selection*

1.14 ELECTRICAL ACTUATOR WITH MANUAL CONTROL

The Electrical Actuator is used to actuate the system electrically. The actuator is installed on top of the master cylinder valve without any power supply until an event of emergency. A manual actuator can be installed as a backup or alternative solution on both the electrical actuator to discharge the FK-5-1-12 gas from the cylinder.

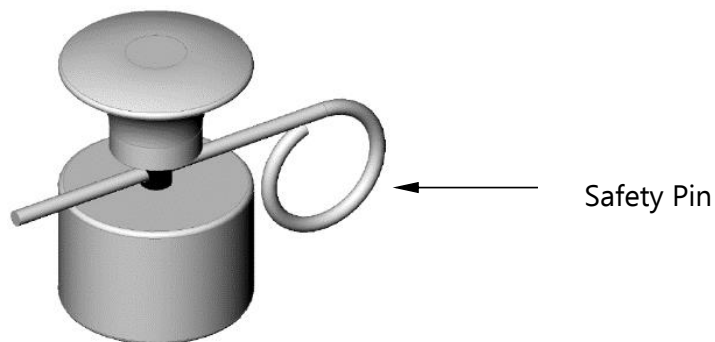


Figure 1-15: Manual Actuator

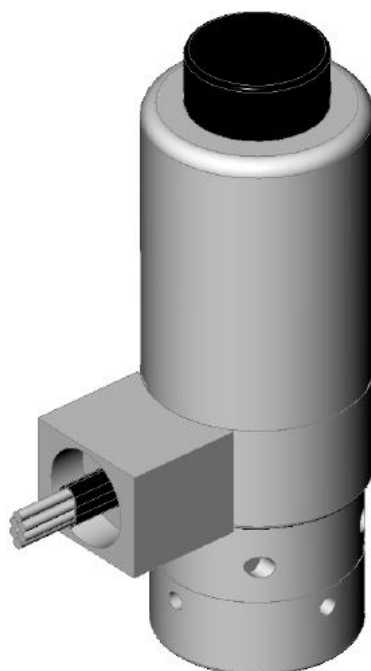


Figure 1-16: Electrical Actuators

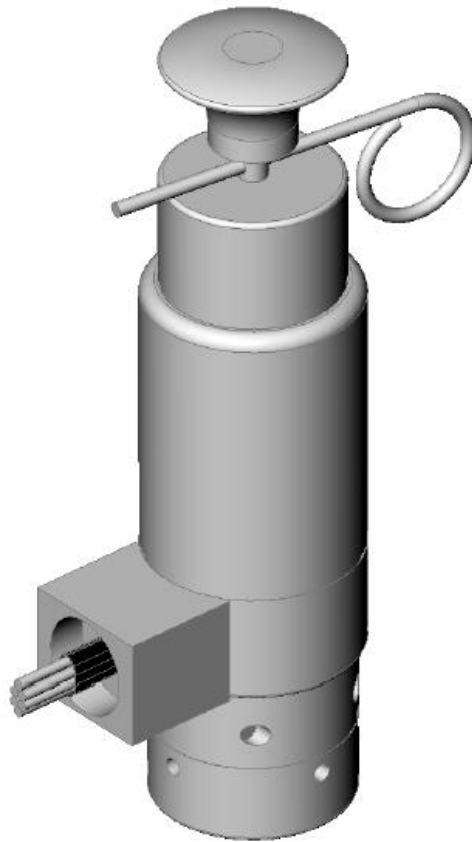


Figure 1-17: Electrical Actuator with Manual Actuator

Specifications (Manual Actuator)

| | |
|-----------------|-------------------------|
| Part Number | PYR-INT-FS-MA |
| Material | Brass & Stainless Steel |
| Actuating Force | 12 – 40 lbs |
| Connection | 1-1/8" x 18 UNEF |

Specifications (Electrical Actuator)

| | |
|-------------------|-------------------------|
| Part Number | PYR-INT-FS-EMA |
| Material | Brass & Stainless Steel |
| Actuating Force | 12 – 40 lbs |
| Connection | 1-1/4" x 18 UNEF |
| Supply Voltage | 24 VDC |
| Firing Current | 0.5 Amp |
| Temperature Range | -10°C to 60°C |

1.15 PNEUMATIC ACTUATOR

The pneumatic actuator(s) are installed in all the other slave cylinders. At first, the electrical actuator will open the primary cylinder. After that, in rapid occurring sequence, the pneumatic release device will open all the other cylinders.

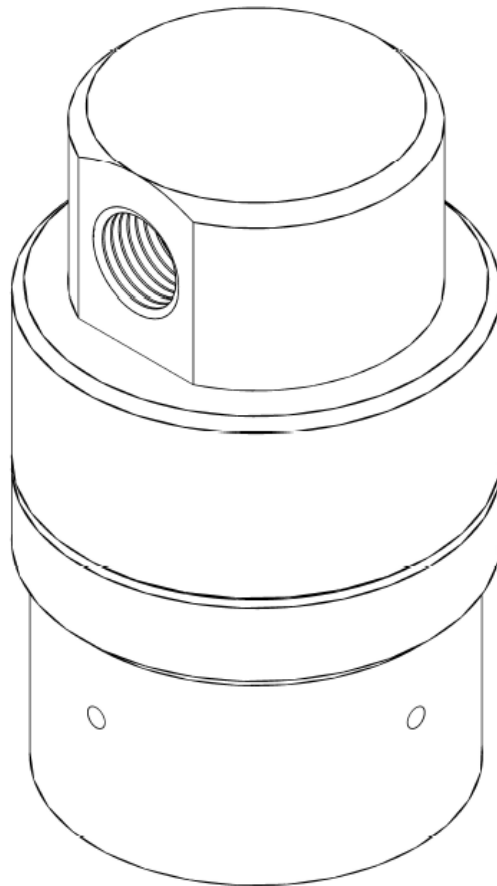


Figure 1-18: Pneumatic Actuator

| Specifications | |
|-----------------------|------------------|
| Part Number | PYR-INT-FS-PA |
| Material | Brass |
| Connection | 1-1/4" x 18 UNEF |
| Pilot Hose Connection | 1/8" NPT |

1.16 DISCHARGE HOSE

The discharge hose type DN38 is used for the valve assembly type DN38 for connection to the check valve DN50 where multiple cylinders are connected to a common manifold assembly. The discharge hose type DN50 is used for the valve assembly type DN50 for connection to the check valve DN65 where multiple cylinders are connected to a common manifold assembly.

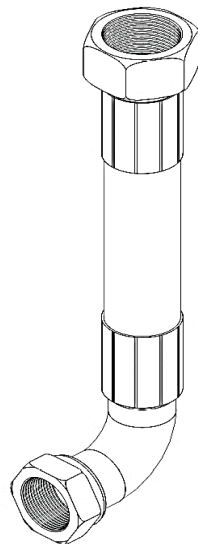


Figure 1-19: Discharge Hose

| Specifications | | | | |
|-------------------------|---|--|--|--|
| Part Number | PYR-INT-FS-DH-25B-1.5V | PYR-INT-FS-DH-45B-1.5V | PYR-INT-FS-DH-25B-2V | PYR-INT-FS-DH-45B-2V |
| Name | DN38 | | DN50 | |
| Material | Synthetic Rubber Hose with high tensile steel wire single braid reinforcement | Synthetic Rubber Hose with high tensile steel wire double braids reinforcement | Synthetic Rubber Hose with high tensile steel wire single braids reinforcement | Synthetic Rubber Hose with high tensile steel wire double braids reinforcement |
| Max. Working Pressure | 50 bar | 90 bar | 40 bar | 80 bar |
| Temperature Range | -10 °C to 60 °C | -10 °C to 60 °C | -10 °C to 60 °C | -10 °C to 60 °C |
| Length from Elbow Inlet | 465 mm | 465 mm | 520 mm | 520 mm |
| Elbow Inlet | 1-7/8" – 12 UNJ | 1-7/8" – 12 UNJ | 2-1/2" – 12 UNJ | 2-1/2" – 12 UNJ |
| Outlet | 2" BSP | 2" BSP | 2-1/2" BSP | 2-1/2" BSP |
| Equivalent Length (m) | 4.0 | 4.0 | 4.4 | 4.4 |

Note: All equivalent lengths given in Schedule 40, black pipe.

1.17 DISCHARGE HOSE WITH EXTENDED ELBOW

The extended elbow discharge hose is only available for DN50 valve with 25 bar system. This extended elbow enables the connection for a cylinder with a protective shroud to provide better flexibility during installation.

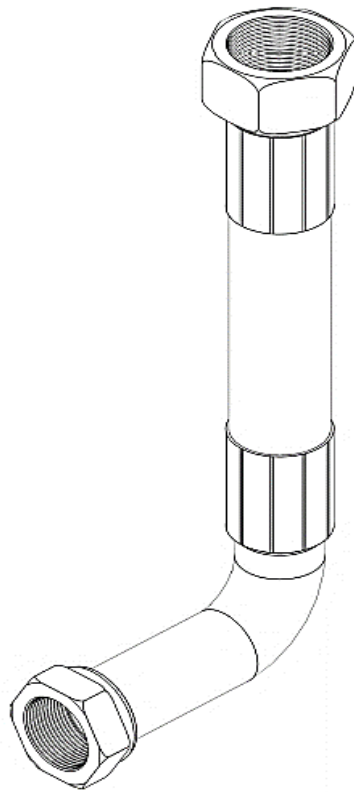


Figure 1-20: Extended Elbow Discharge Hose

| Specifications | |
|-------------------------|--|
| Part Number | PYR-INT-FS-EEDH-25B-2V |
| Name | DN50 |
| Material | Synthetic Rubber Hose with high tensile steel wire single braids reinforcement |
| Max. Working Pressure | 40 bar |
| Temperature Range | -10 °C to 60 °C |
| Length from Elbow Inlet | 520 mm |
| Elbow Inlet | 2-1/2" – 12 UNJ |
| Outlet | 2-1/2" BSP |
| Equivalent Length (m) | 4.4 |

Note: All equivalent lengths given in Schedule 40, black pipe.

1.18 DISCHARGE HOSE FOR 3" VALVE

Discharge hose with configuration as figure below is only available for DN80 valve assembly. This discharge hose consists of 3" stainless steel hose, 90 degree grooved elbow and three 3" groove coupling. One side of the 90 degree grooved elbow is connected to the outlet of 3" valve by a 3" groove coupling. The other side will be connected to the stainless steel hose also by a 3" groove coupling. The other end of the stainless steel hose will then be connected to the check valve.

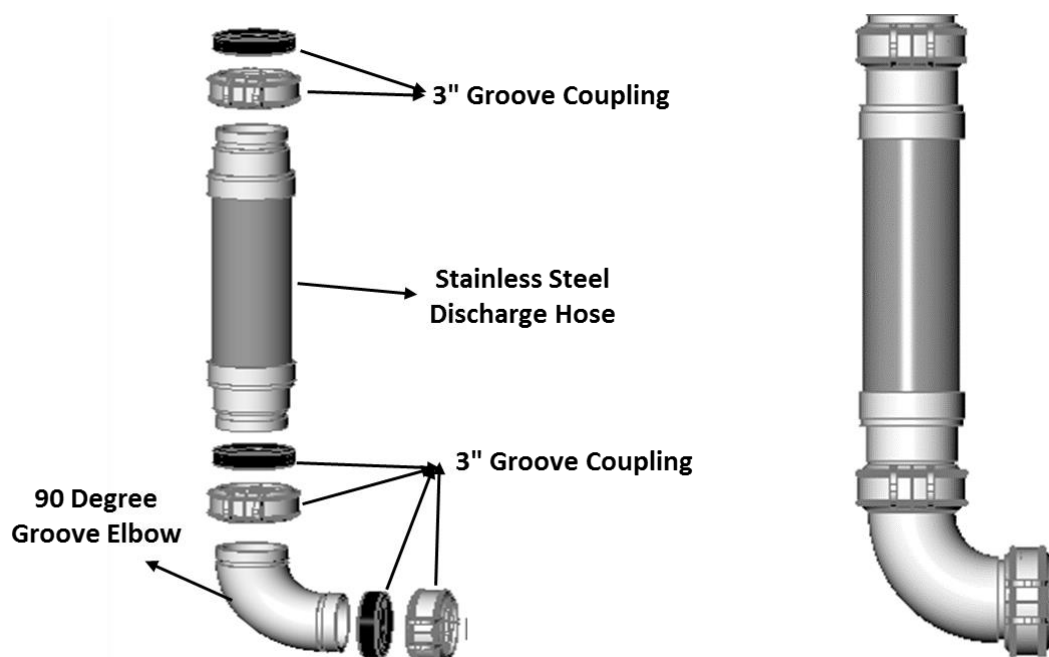


Figure 1-21: Arrangement for 3" Discharge Hose

1.18.1 3" STAINLESS STEEL HOSE



Figure 1-22: 3" Stainless Steel Hose

| Specifications | |
|-----------------------|----------------------|
| Part Number | PYR-INT-FS-DH-25B-3V |
| Material | Stainless Steel |
| Operating Pressure | 28 bar |
| Temperature Range | -10 °C to 60 °C |
| Length | 475 mm |
| Connection | 3" Groove Connection |
| Equivalent Length (m) | 4.7 |
| Bend Limit | 10° |

Note: All equivalent lengths given in Schedule 40, black pipe.

1.18.2 3" GROOVE COUPLING

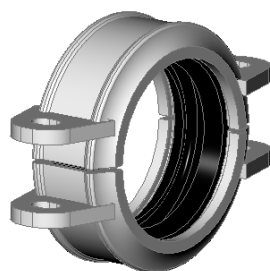


Figure 1-23: 3" Groove Coupling

| Specifications | |
|----------------|-----------------|
| Part Number | PYR-INT-FS-GC-3 |
| Material | Ductile Iron |

1.18.3 3" 90 DEGREE GROOVED ELBOW

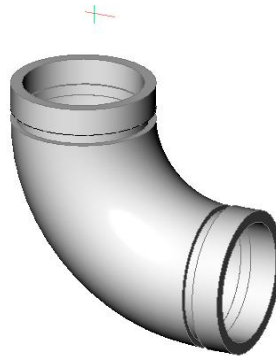


Figure 1-24: 3" 90 Degree Grooved Elbow

| Specifications | |
|----------------|----------------------|
| Part Number | PYR-INT-FS-90GE-3 |
| Material | Ductile Iron |
| Connection | 3" Groove Connection |

1.19 PILOT LINE HOSE

The PYRO-5112 pilot line hose is used to connect the pneumatic actuators from the master cylinder to slave cylinder(s). Each hose is fitted with a galvanized steel male connection fitting. A 1/8" nipple is used for connection to the master cylinder.

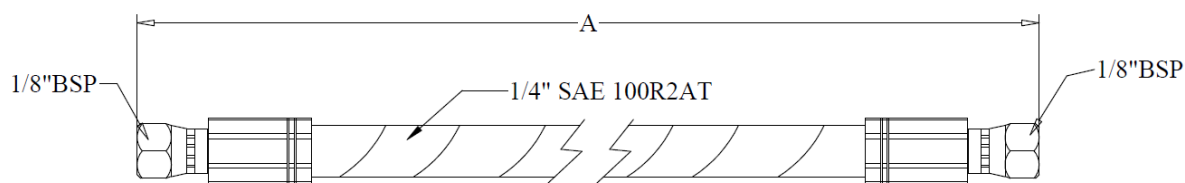


Figure 1-25: Pilot Line Hose

| Specifications | | |
|------------------------|---|---|
| Part Number | PYR-INT-FS-PH-560 | PYR-INT-FS-PH-760 |
| Overall Length, A (mm) | 560 | 760 |
| Material | Synthetic Rubber Hose with 2 high tensile steel wire braids reinforcement | Synthetic Rubber Hose with 2 high tensile steel wire braids reinforcement |
| Max. Working Pressure | 275 bar | 275 bar |
| Temperature Range | -10 °C to 60 °C | -10 °C to 60 °C |
| Hose Connections | 1/8" BSP | 1/8" BSP |
| Fitting Connections | 1/8" BSP | 1/8" BSP |

1.20 CHECK VALVE

The manifold check valve is fitted on the manifold and is used to prevent loss of agent should the system discharge while any cylinder is removed for maintenance.

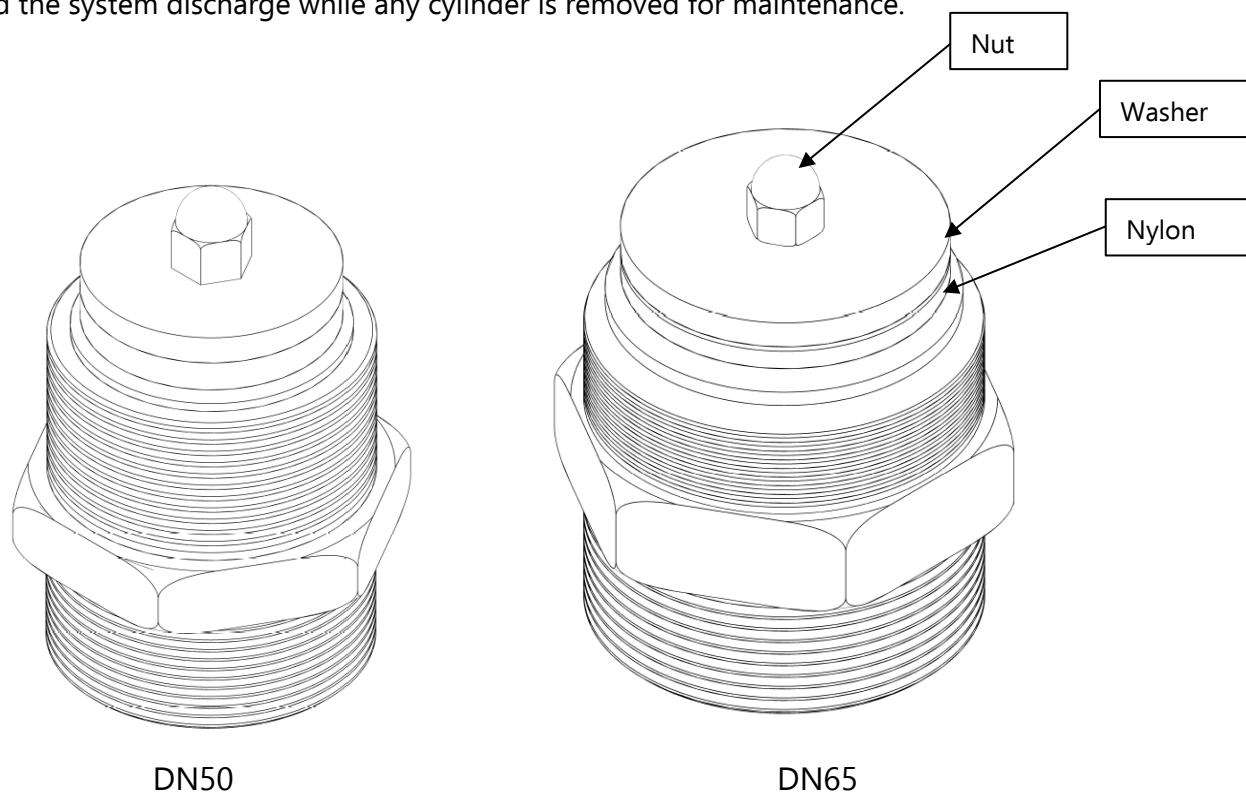


Figure 1-26: Check Valve

| Specifications | | |
|------------------------------|------------------------|------------------------|
| Part Number | PYR-INT-FS-CV-1.5 | PYR-INT-FS-CV-2 |
| Name | DN50 | DN65 |
| Overall Length (mm) | 100 | 100 |
| Material | Gun Metal | Gun Metal |
| Seat | Nylon | Nylon |
| Washer | Zinc Plated Mild Steel | Zinc Plated Mild Steel |
| Nut | Stainless Steel | Stainless Steel |
| Spline | Stainless Steel | Stainless Steel |
| Temperature Range | -10 °C to 60 °C | -10 °C to 60 °C |
| Inlet and Outlet Connections | 2" BSP | 2-1/2" BSP |
| Equivalent Length (m) | 36.3 | 17.1 |

Note: All equivalent lengths given in Schedule 40, black pipe.

1.21 3" CHECK VALVE

The 3" check valve is only available for DN80 valve assembly. It is also used to prevent the loss of agent should the system discharge while any cylinder is removed for maintenance. The 3" check valve consists of a few components; check valve body, grooved reducer and two 6" groove coupling. The bottom part of the check valve body is connected to the grooved reducer by a 6" groove coupling and the top part of the check valve is connected to the manifold also by a 6" groove coupling. The arrangement can be seen in the figure below:

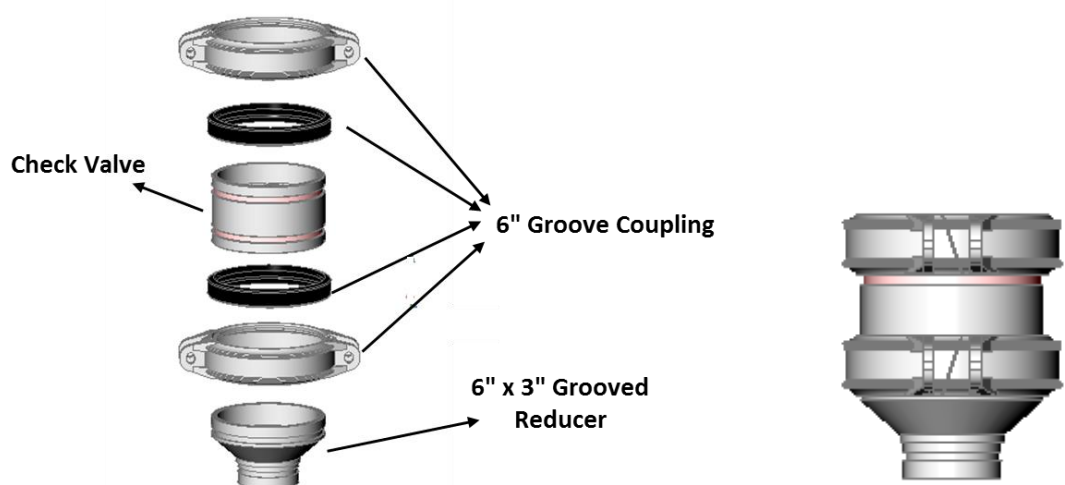


Figure 1-27: Arrangement of 3" Check Valve

1.21.13" CHECK VALVE BODY

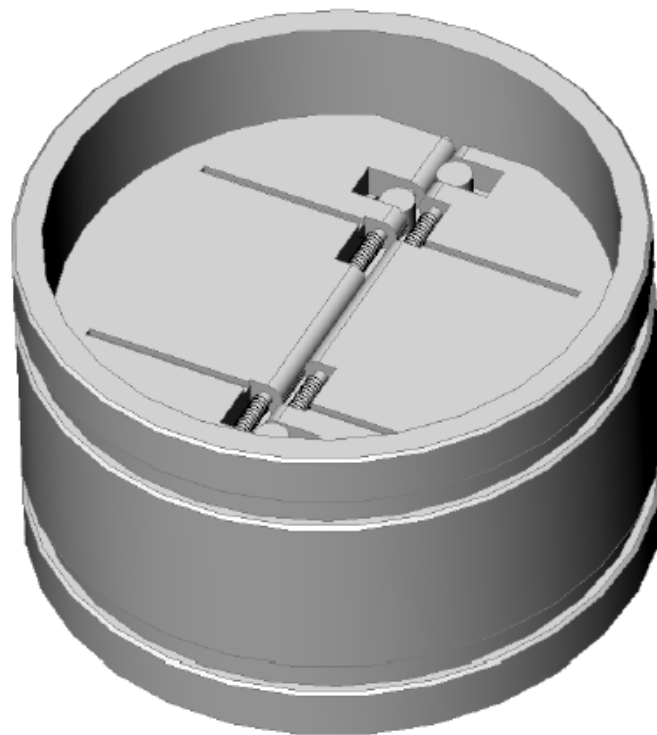


Figure 1-28: 3" Check Valve

| Specifications | |
|-----------------------|---------------------------|
| Part Number | PYR-INT-FS-CV-3 |
| Body Material | Steel, Zinc-Nickel Plated |
| Clapper Material | Brass |
| Temperature Range | - 10 °C to 60 °C |
| Height | 100 mm |
| Diameter | 165mm |
| Connection | 6" Groove Connection |
| Equivalent Length (m) | 14 |

Note: All equivalent lengths given in Schedule 40, black pipe.

1.21.2 GROOVED REDUCER

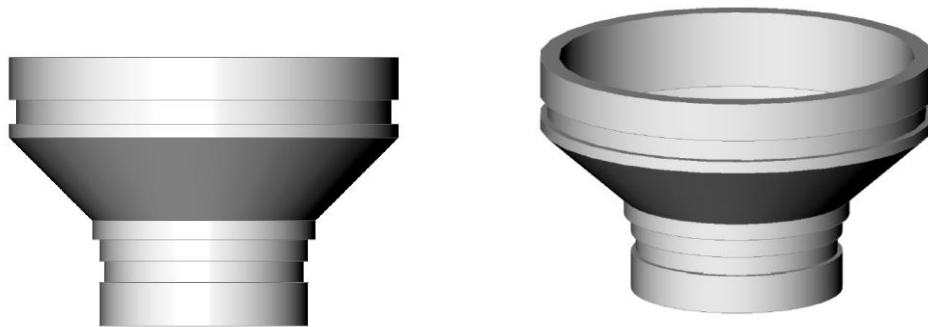


Figure 1-29: 6" x 3" Grooved Reducer

| Specifications | |
|-------------------|----------------------|
| Part Number | PYR-INT-FS-GR-63 |
| Material | Ductile Iron |
| Top Connection | 6" Groove Connection |
| Bottom Connection | 3" Groove Connection |

1.21.3 6" GROOVE COUPLING



Figure 1-30: 6" Groove Coupling

| Specifications | |
|----------------|-----------------|
| Part Number | PYR-INT-FS-GC-6 |
| Material | Ductile Iron |

1.22 NOZZLE

There is one type of nozzle available in the PYRO-5112 system, which is 360° discharge nozzle with 16 holes respectively. The orifice sizes of the nozzle are based on calculation done in the Jensen-Hughes software. The ports are drilled in 0.1 mm increments to the specified system design. The connection is BSP thread for all the nozzle.

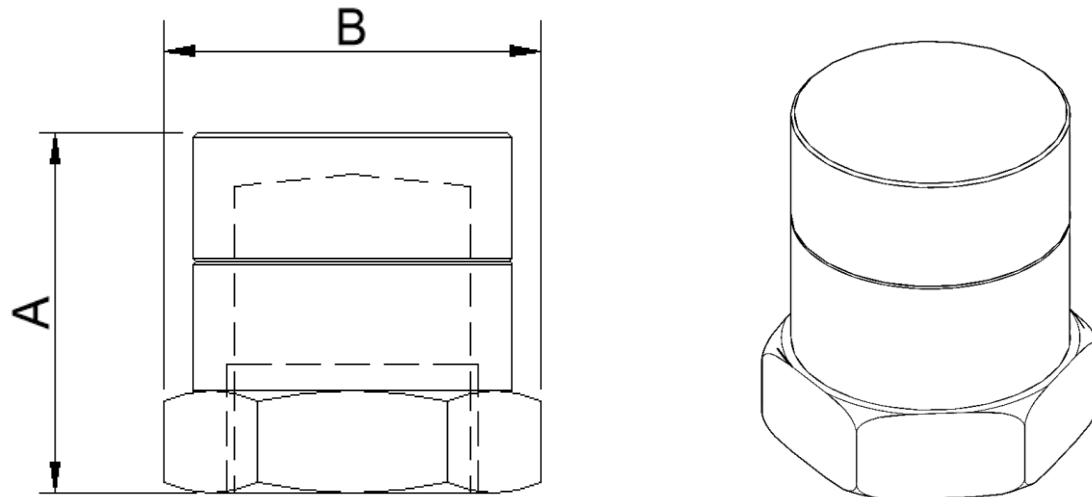


Figure 1-31: Nozzle

Table 1-6: Dimensions 360° discharge nozzles

| Part No. | Material | Sizes (inches) | A (mm) | B (mm) | Allowable Orifice Size, mm |
|------------------------|----------|----------------|--------|--------|----------------------------|
| PYR-INT-FS-FK-DN-1.2 | Brass | 1/2" | 45 | 31.75 | 1.6 – 3.5 |
| PYR-INT-FS-FK-DN-3.4 | | 3/4" | 45 | 38.10 | 2.4 – 4.6 |
| PYR-INT-FS-FK-DN-1 | | 1" | 56 | 44.45 | 3.0 – 5.9 |
| PYR-INT-FS-FK-DN-1-1.4 | | 1-1/4" | 65 | 50.80 | 4.0 – 7.8 |
| PYR-INT-FS-FK-DN-1-1.2 | | 1-1/2" | 70 | 63.50 | 4.6 – 9.1 |
| PYR-INT-FS-FK-DN-2 | | 2" | 88 | 76.20 | 5.9 – 11.7 |

**Allowable orifice size subject to design calculation*

1.23 CYLINDER MOUNTING EQUIPMENT

The steel bracket and strap are used to mount the cylinder in vertical position.

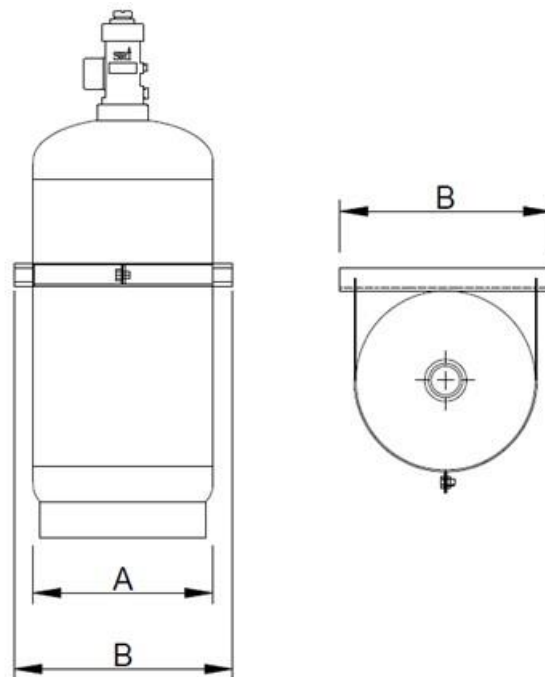


Figure 1-32: Cylinder mounting equipment

Table 1-7: Dimensions for cylinder mounting part

| Part No. | Cylinder Outer Diameter, mm | A (mm) | B (mm) |
|--------------------------|-----------------------------|--------|--------|
| PYR-INT-FS-SCMS-10L | 140mm | 140 | 300 |
| PYR-INT-FS-SCMS-20.30L | 204mm | 204 | 300 |
| PYR-INT-FS-SCMS-50L | 228.6mm, 229mm, 232mm | 229 | 300 |
| PYR-INT-FS-WCMS-29L | 254mm | 254 | 300 |
| PYR-INT-FS-WCMS-9.16L | 267mm, 273mm | 273 | 350 |
| PYR-INT-FS-WCMS-32.52L | 325mm | 325 | 400 |
| PYR-INT-FS-SCMS-80.140L | 356mm, 350mm, 360mm | 360 | 450 |
| PYR-INT-FS-WCMS-52.150L | 400mm, 406mm | 406 | 500 |
| PYR-INT-FS-WCMS-180.200L | 462mm | 462 | 550 |
| PYR-INT-FS-WCMS-300L | 508mm | 508 | 600 |
| PYR-INT-FS-WCMS-369L | 610mm | 610 | 700 |

**Dimension for bracket has a tolerance of ± 15mm*

1.24 SLAVE ARRANGEMENT COMPONENTS

For slave containers, the pneumatic connection is made using flexible pilot hose. To install the pilot hose, remove the pilot pressure port plug from the master container valve assembly and connect the male adaptor. After that, connect one end of the pilot hose to the pneumatic actuator. The maximum number of slave actuated cylinders is 5 containers (6 containers in total). After every 6 containers, another master container must be installed with an electrical actuator. All the electrical actuators must operate at the same time to ensure simultaneous discharge from all the cylinders used. Refer to Figure 1-35 and Figure 1-36 for more details regarding the arrangement for master-slave cylinders for welded cylinders and seamless cylinders respectively.

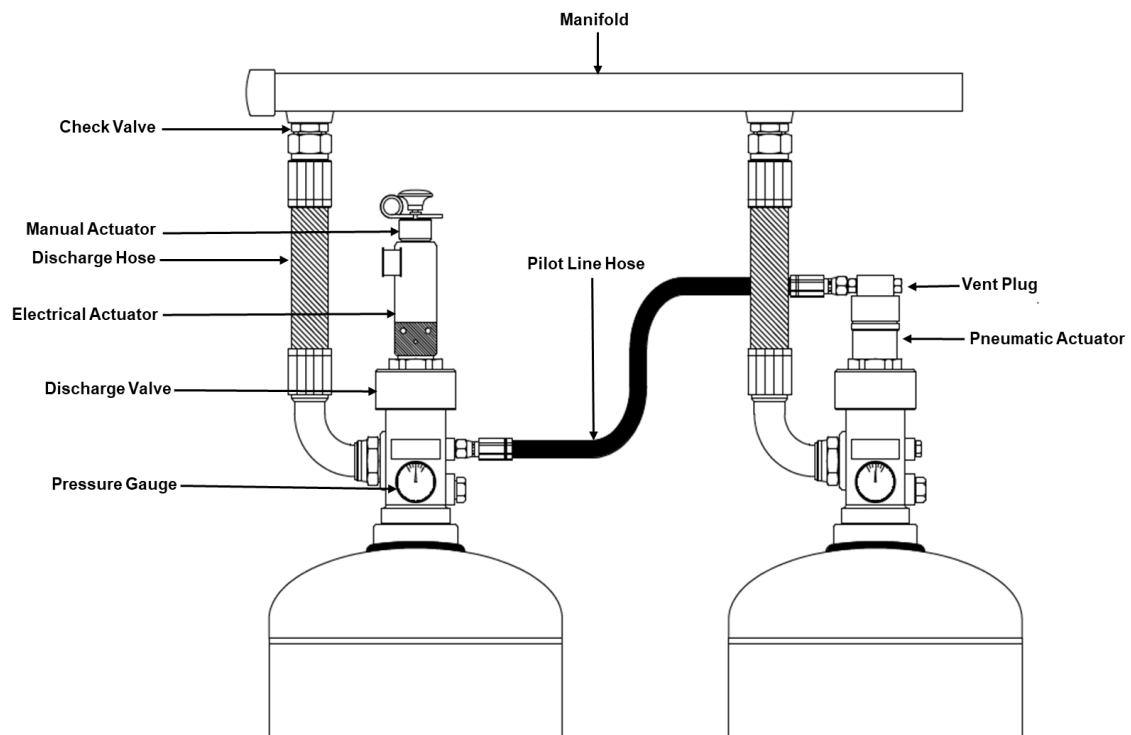


Figure 1-33: Master and Slave(s) Cylinder Arrangement

1.25 ARRANGEMENT FOR 3" VALVE SYSTEM

The master and slave arrangement for a 3" valve system is generally the same as the other system (Refer to Figure 1-33). The only difference is the type of discharge hose and check valve used in the 3" valve system compares to the other system. The assembled discharge hose is connected to the check valve by a 3" groove coupling. The check valve will then be connected to the manifold by a 6" groove coupling.

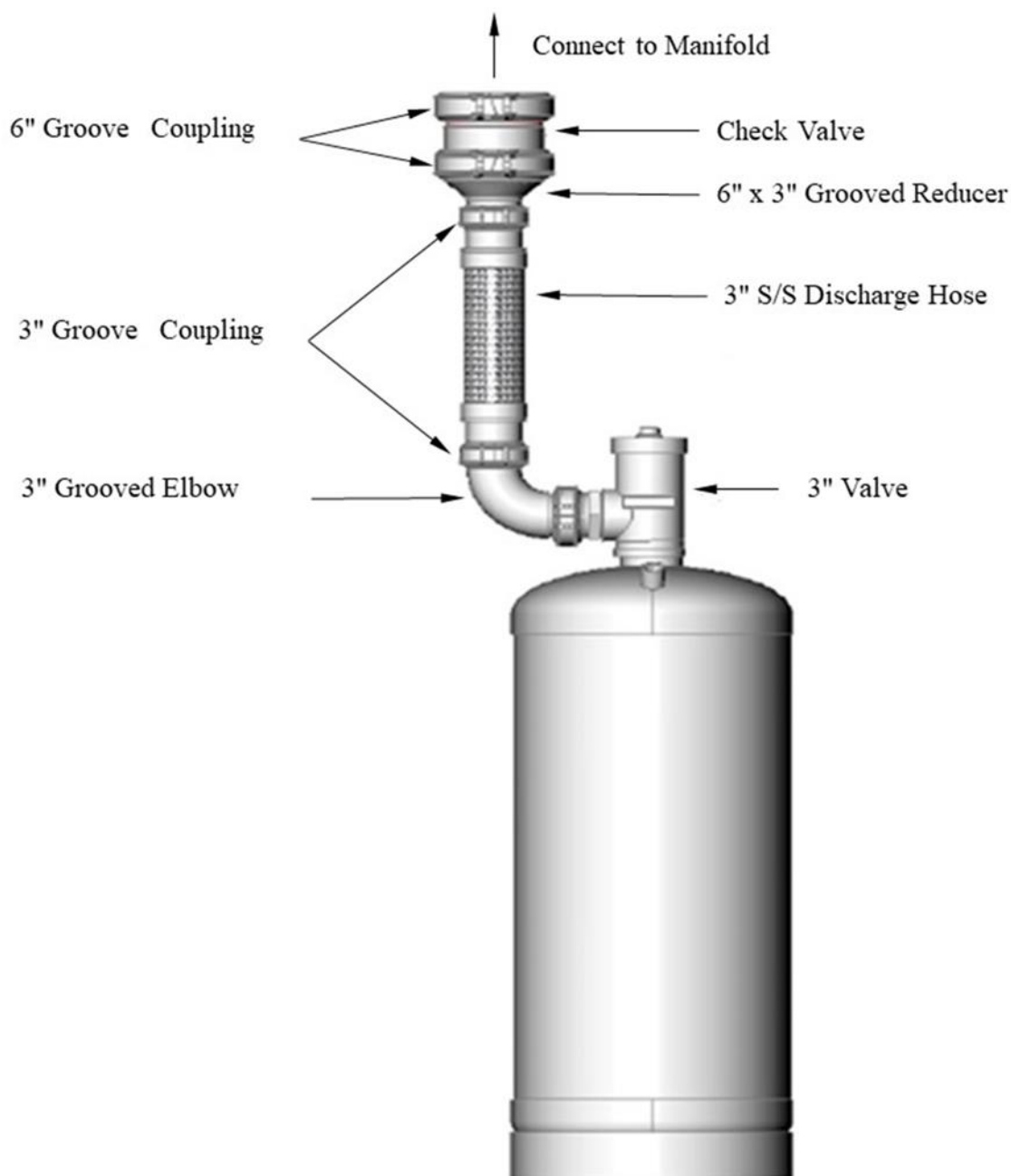
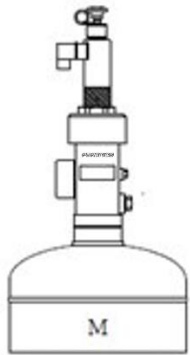


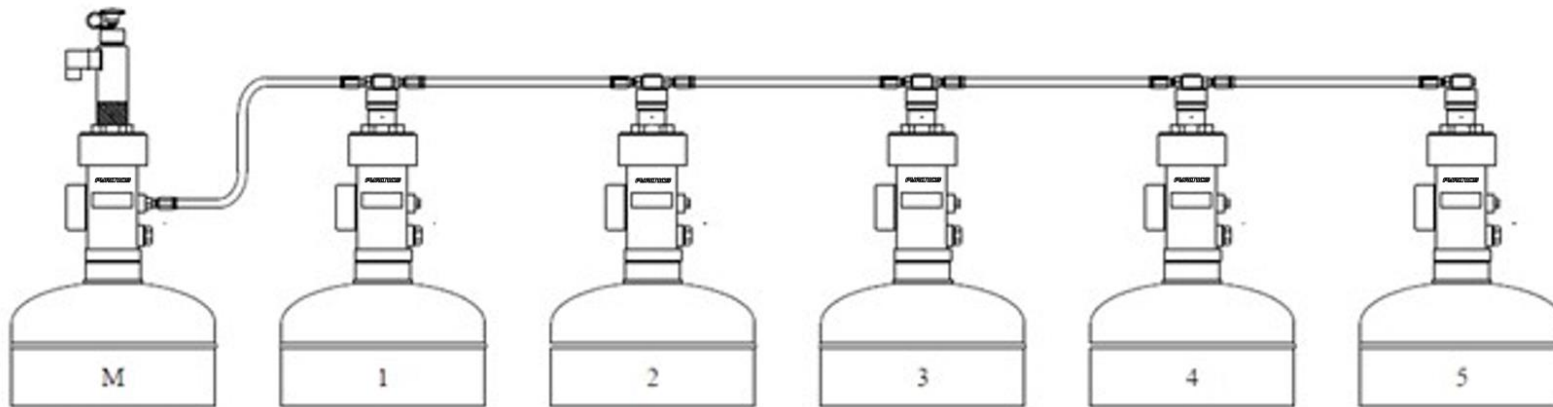
Figure 1-34: Arrangement for 3" Valve System

Component Description

1.26 SLAVE ARRANGEMENT COMPONENTS (WELDED CYLINDERS)

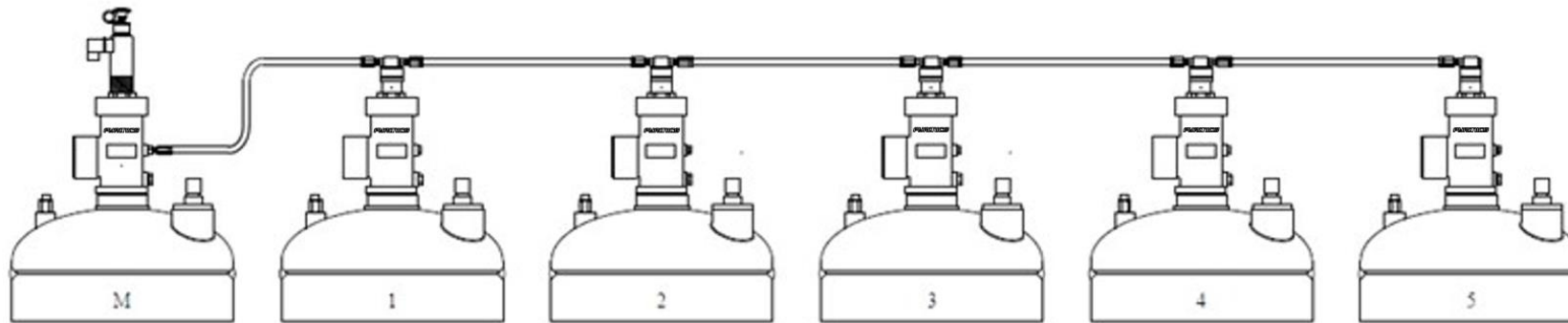


9 L to 32 L Master Cylinder – Maximum of one, 1" Valve cylinders can be used

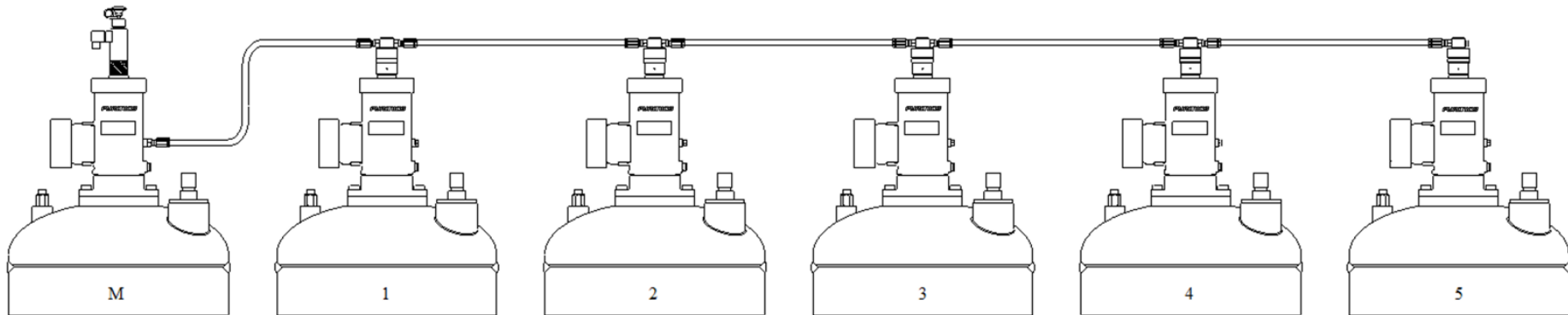


52 L to 100 L Master Cylinder – Maximum of six, 1-1/2" Valve cylinders can be used

Component Description



150 L to 200 L Master Cylinder – Maximum of six, 2" Valve cylinders can be used

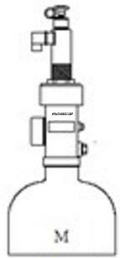


240 L to 369 L Master Cylinder – Maximum of six, 3" Valve cylinders can be used

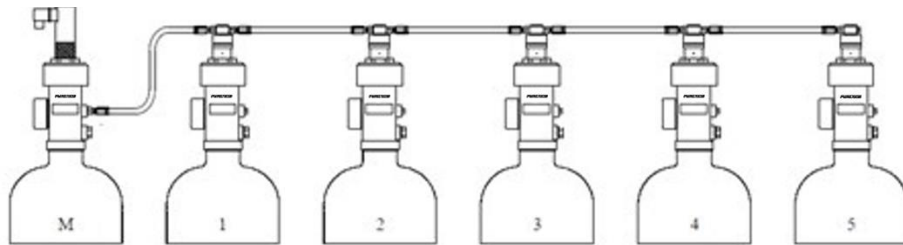
Figure 1-35: Maximum Number of Pneumatic Actuator for Welded Cylinders

Component Description

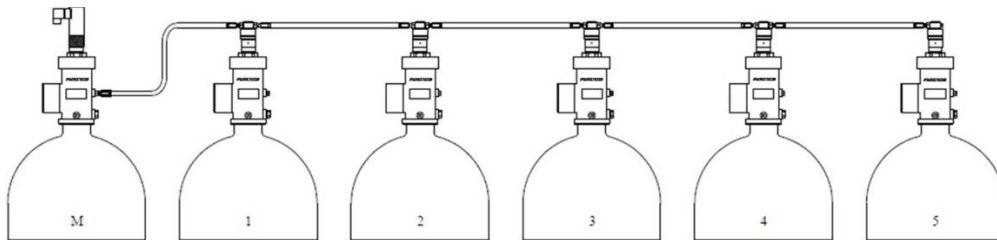
1.27 SLAVE ARRANGEMENT COMPONENTS (SEAMLESS CYLINDERS)



10 L to 30 L Master Cylinder – Maximum of one, 1" Valve cylinders can be used



50 L to 100 L Master Cylinder – Maximum of six, 1-1/2" Valve cylinders can be used



140 L Master Cylinder – Maximum of six, 2" Valve cylinders can be used

Figure 1-36: Maximum Number of Pneumatic Actuator for Seamless Cylinders