

CHAPTER 5 MAINTENANCE

5-1 INTRODUCTION

Note: It is the responsibility of the system installer to review system operation and owner obligations, and to provide the owner's manual to the owner at the time of system installation.

This chapter contains the service and maintenance instructions for the Kidde® Wet Chemical System. These procedures must be performed regularly, and in accordance with all applicable regulations. If problems arise, corrective action must be taken.

5-2 INSPECTION AND MAINTENANCE PROCEDURES

Use Table 5-1 to identify preventative maintenance schedule of the Kidde Wet Chemical System.

Table 5-1. Preventative Maintenance Schedule

Schedule	Requirement	Paragraph
Monthly	Owner's Inspection	Paragraph 5-2.1
Semi-Annual	System Inspection by an Authorized Kidde Distributor	Paragraph 5-2.2
Every 12 Years	Detailed System Inspection by an Authorized Kidde Distributor	Paragraph 5-2.3

5-2.1 Monthly Inspection Procedure (by Owner)

Refer to the cylinder nameplate for the proper maintenance instructions. In accordance with NFPA 17A and NFPA 96, make frequent inspections to ascertain that the system is operable. Also, be sure that nothing has occurred which would compromise the effectiveness of the system.

The following procedure is to be performed by the Owner of the system.

Table 5-2. Owner’s Monthly Inspection

Checkbox	Procedure
<input type="checkbox"/>	Inspect all system components, agent distribution pipe, and conduit runs for physical damage and/or displacement.
<input type="checkbox"/>	Inspect all nozzles to see if protective caps (if applicable) are in place. Check for possible obstructions to the discharge of the wet chemical.
<input type="checkbox"/>	Inspect all detectors (Fusible-links and Thermo-bulbs) for contamination. If contamination is found, contact an authorized Kidde Pre-Engineered Distributor for service.
<input type="checkbox"/>	Inspect each Cylinder and Valve Assembly. The pointer on the pressure gauge should be in the “green” range. The cylinder should not show evidence of corrosion or damage.
<input type="checkbox"/>	Inspect manual pull stations are unobstructed and in clear view and labeled for intended use.
<input type="checkbox"/>	Inspect all tamper seals are intact and the system is in a ready condition.
<input type="checkbox"/>	Verify the inspection tag or certificate is in place and current.
<input type="checkbox"/>	A record of the monthly inspection is to be kept reflecting the date inspected, initials of the person performing the inspection, and any corrections required.
<input type="checkbox"/>	If wall mounted, the XV Control System must be tightly bolted to the wall. If cylinder mounted, the XV Control System must be tightly bolted to the SVA. The Cam/Flag on the XV Control System indicator should point to the ‘Set’ position. The safety pin and seal wire on the local manual release handle should be in place. If no Remote Manual Release (P/N 875572) is installed, the path to the local manual release on the cylinder should be clear and unobstructed and within reach.
<input type="checkbox"/>	If any discrepancies are noted while making this inspection, DO NOT CONTINUE OPERATING HAZARDOUS PROCESSES OR TURN ON PROTECTED EQUIPMENT. Immediately contact an authorized Kidde Distributor for service and/or repair.



No other action shall be taken by the system owner other than visual. If further maintenance is determined necessary as a result of owner inspection, contact an authorized Kidde Distributor.



Do not operate hazardous processes or turn on protected equipment until the required system alterations are complete.



Any unauthorized alterations to the protected area or equipment, or to the wet chemical system, can render the fire suppression system ineffective or non-operational. Contact an authorized distributor of Kidde Pre-Engineered wet chemical systems if any modifications are contemplated.

5-2.2 Semi-Annual Service Procedure (By Authorized Kidde Distributor Only)

All systems shall be inspected and serviced semi-annually by an authorized Kidde distributor. If using an XV Control System, start with Paragraph 5-2.2.1. If using the KRS-50 Control Box, start with Paragraph 5-2.2.8.

Refer to NFPA 17A and NFPA 96 for all Semi-Annual maintenance.

Table 5-3. Semi-Annual Service Procedure

Checkbox	Procedure	Section
<input type="checkbox"/>	Preparation for Servicing and Testing	Paragraph 5-2.2.1
Functional Testing of the XV Control System		
<input type="checkbox"/>	Test Mechanical Link Lines	Paragraph 5-2.2.6.1
<input type="checkbox"/>	Test Remote Manual Release	Paragraph 5-2.2.6.2
<input type="checkbox"/>	Test Solenoid (if applicable)	Paragraph 5-2.2.6.3
<input type="checkbox"/>	Inspection of High-Pressure Nitrogen Tubing	Paragraph 5-2.2.6.4
<input type="checkbox"/>	Perform Actuation Tests	Paragraph 5-2.2.7
<input type="checkbox"/>	Verify the Corner Pulleys and detector bracket conduit openings are free of grease	N/A
<input type="checkbox"/>	Check that the fan warning sign is legible and conspicuous (if not, replace)	N/A
<input type="checkbox"/>	Disposal of Cartridge	Paragraph 5-2.2.7.1
Functional Testing of the KRS-50 Control Box		
<input type="checkbox"/>	Test Mechanical Link Lines	Paragraph 5-2.2.10.1
<input type="checkbox"/>	Test Remote Manual Release	Paragraph 5-2.2.10.2
<input type="checkbox"/>	Test Microswitches (if applicable)	Paragraph 5-2.2.10.3
<input type="checkbox"/>	Inspect 1/4-inch O.D. (6 mm) Copper Tubing	Paragraph 5-2.2.10.4
<input type="checkbox"/>	Perform Actuation Tests	Paragraph 5-2.2.11
<input type="checkbox"/>	Verify the Corner Pulleys and detector bracket conduit openings are free of grease	N/A
<input type="checkbox"/>	Check that the fan warning sign is legible and conspicuous (if not, replace)	N/A
<input type="checkbox"/>	Disposal of Cartridge	Paragraph 5-2.2.11.1

5-2.2.1

PREPARATION FOR SERVICING AND TESTING THE XV CONTROL SYSTEM

1. Disconnect the high-pressure nitrogen tubing from the XV Control System (see Figure 5-1).

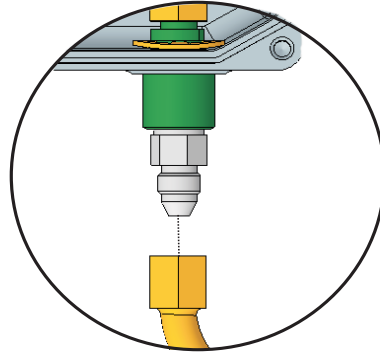


Figure 5-1. High-Pressure Nitrogen Tubing Location, Close Up

2. Verify that the system design and installation are adequate to protect the hazard area and that the installation conforms to the instructions in this manual. Some of the items to verify are:
 - a. All equipment requiring fire protection within the hazard area is protected.
 - b. There have been no unauthorized alterations to the protected area or equipment, or to the wet chemical system, that render the fire suppression system ineffective or non-operational.
 - c. All Cylinder Mounting Brackets are securely fastened to a wall or other structural member.
 - d. All nozzles are properly aimed, secured and located within the proper distance from the protected equipment. Each nozzle should be clean and equipped with a foil seal cap (if applicable).
 - e. The agent distribution piping is properly sized for the number and type of nozzles required.
 - f. All piping joints and pipe supports are securely fastened to prevent wet chemical leakage and hazardous movement during discharge.
 - g. The pipe lengths, sizes, fittings and material are as specified in this Manual.
 - h. The number, type, and placement of detectors are suitable for all hazards within the hazard area.
 - i. The Remote Manual Release, if used, is located in a path of exit or egress and is clearly identified.
 - j. Stainless steel control cable lengths and Corner Pulley counts are within listed limits. Conduit runs should be clean and secure.
 - k. All wiring is in compliance with local codes.
 - l. All field wiring is free of ground fault or short-circuit conditions.

- m. No branch circuits exist in the wiring to the detectors or to the Solenoid.
 - n. All auxiliary components such as Pressure Operated Releases are secure and show no evidence of physical damage.
 - o. All system components and installation material are as specified in this manual.
3. Remove the cover from the XV Control System. Install Keeper Pin (P/N 60-9197108-000). See Figure 5-2 for Keeper Pin location.

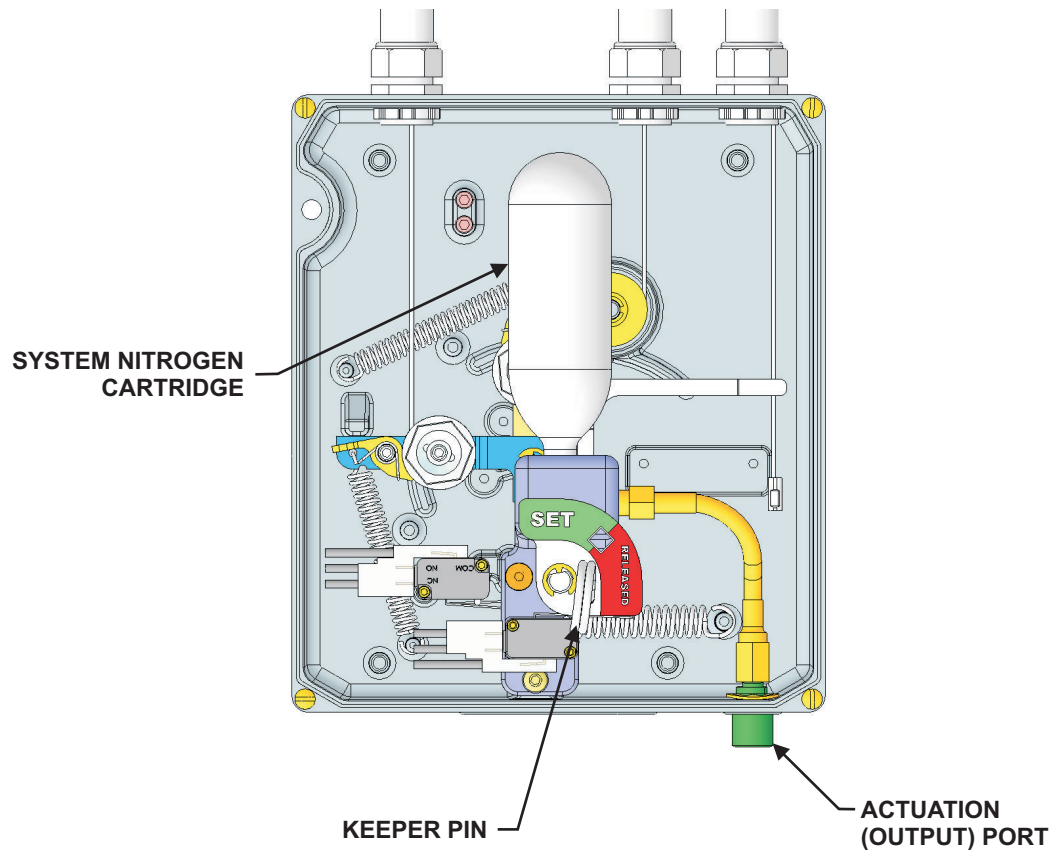


Figure 5-2. XV Control System, Internal View

4. Remove the System Nitrogen Cartridge (P/N 87-120043-001). Refer to Figure 5-2 for location in XV Control System.

5. Check flat gasket inside valve body. If damaged, replace (see Figure 5-3).

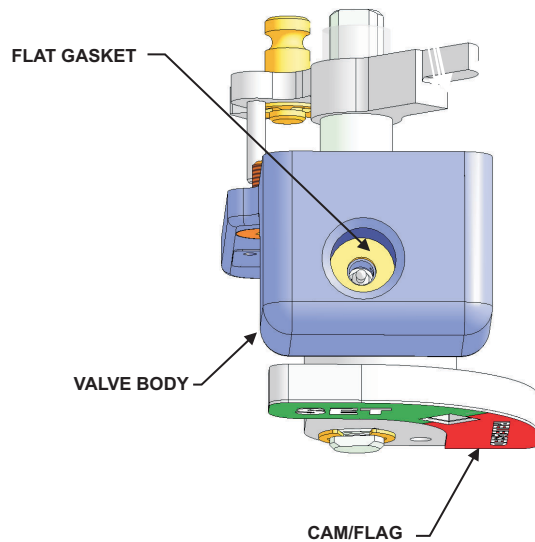


Figure 5-3. Valve Body and Flat Gasket Location

6. Verify installation of the lockout screws for appropriate usage (refer to Figure 5-2).
7. Remove the System Valve Actuators (SVAs) from all cylinders. See Figure 5-4 for location.

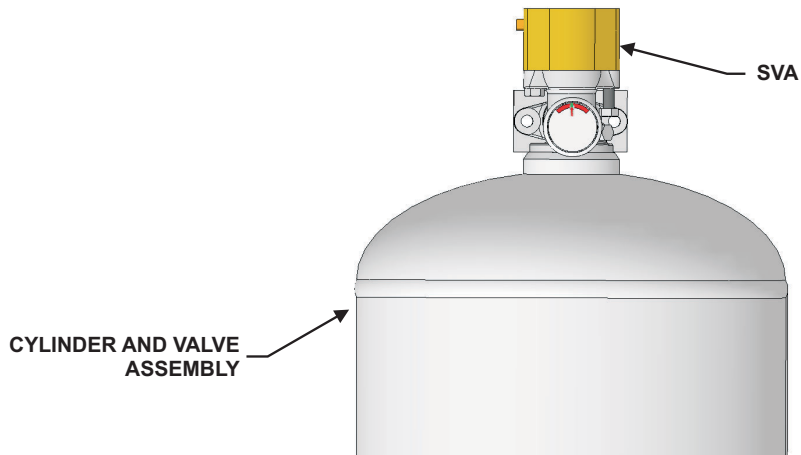


Figure 5-4. System Valve Actuators

8. Install cylinder valve protection plates.

9. Disconnect Discharge Adapter Kit (agent piping) from all cylinders (see Figure 5-5).

Note: Disconnecting the Discharge Adapter Kit typically involves removing cylinders.

10. Install the Anti-Recoil Plate.

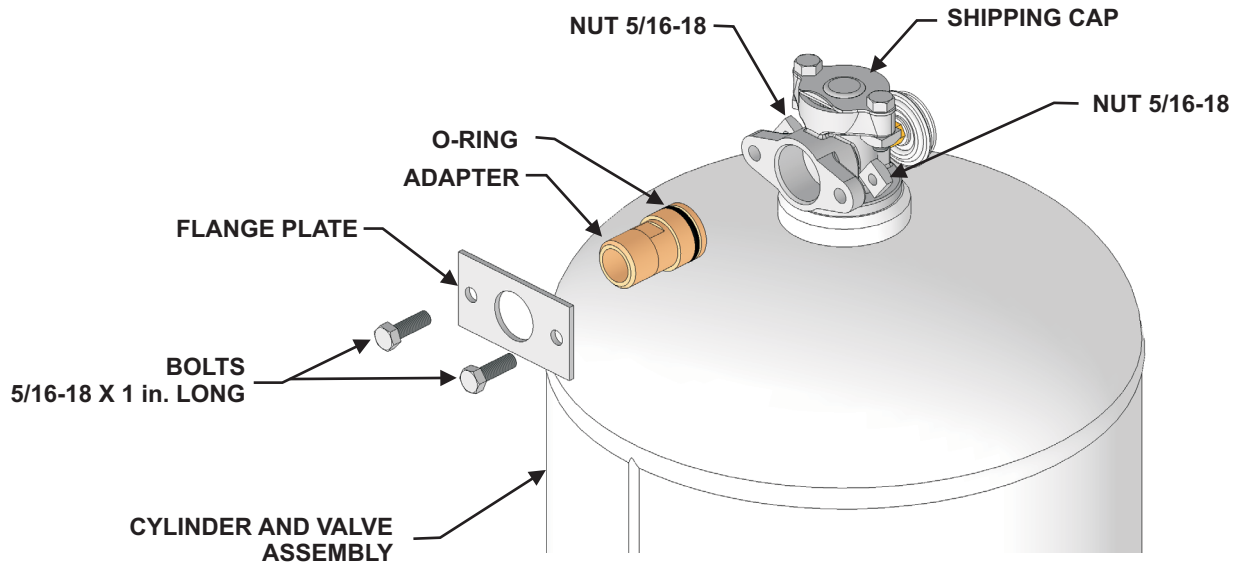


Figure 5-5. Removing Discharge Adapter Kit

5-2.2.2 ARMING THE XV CONTROL SYSTEM

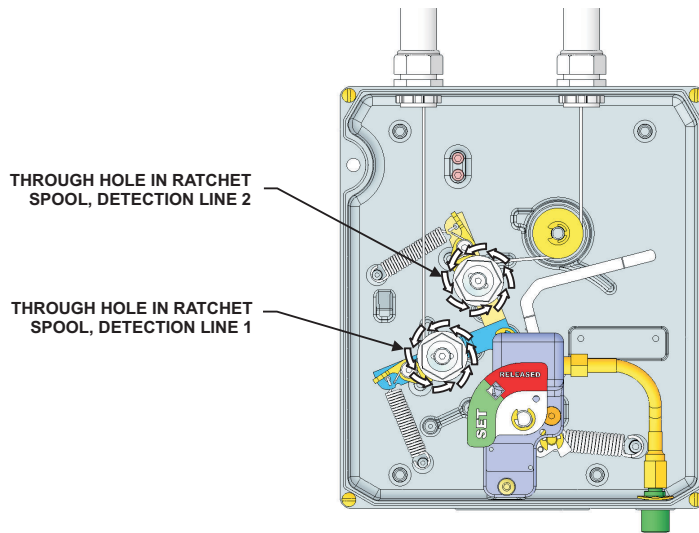
Set the detection beams by turning the ratchet spools counterclockwise (see Figure 5-6).

Tighten the line until the beam reaches the Stop. **Do not overtighten.**

Note: In long cable lines (over 125 ft. [38 m]) there will be stretch in the control cable and in the loops for the detectors. It is important to ensure the control cable is tight without over tightening.



The actuation latch must be in the horizontal position. If it is in any position other than horizontal, the system could malfunction.



DETECTION BEAMS IN RELEASED POSITION

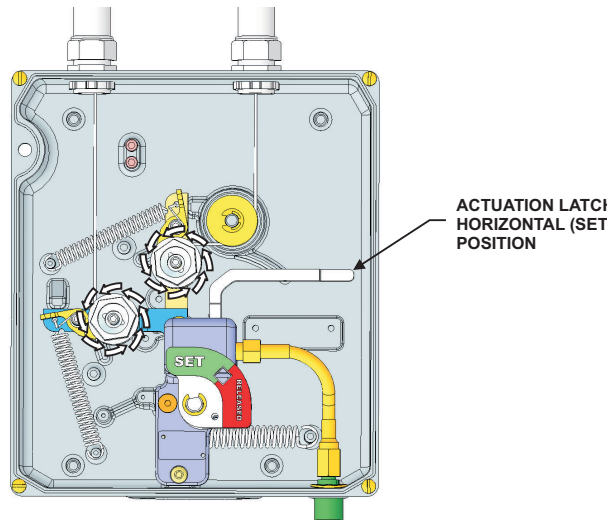


Figure 5-6. Setting the Detection Beams

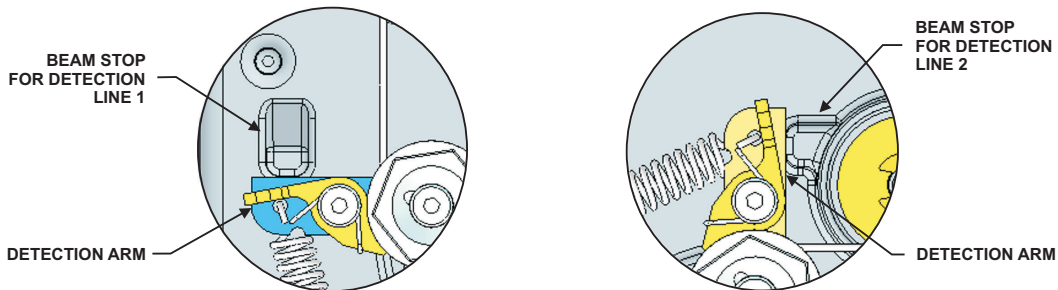


Figure 5-7. Detection Beam Stops



If the Remote Manual Release control cable is interfering with the free movement of the actuation latch, it might require re-cabling. If there is something else interfering with the free movement of the actuation latch, take appropriate corrective action. If it is determined that the interference is due to a mechanical fault of the XV Control System, it must be replaced and returned to the factory.

Be careful not to allow the control cable to become entangled with any other parts in the system. If it does, perform the following steps.

1. Using a 7/8-inch socket (or equivalent), slightly turn the ratchet spool counterclockwise. Do not turn so far that it will click into the next step. Using the thumb release on the pawl, release the ratchet and allow it to turn backwards. The beam will move back to the 'Released' position.

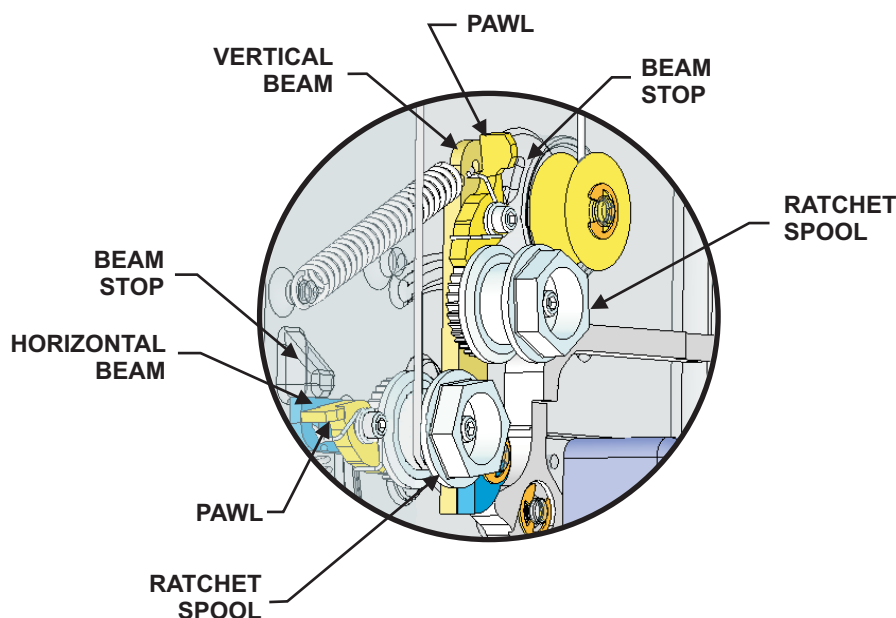


Figure 5-8. View of Ratchet Spool and Pawl

2. Untangle the control cable and guide it onto the spool while ratcheting. Once there is tension, there should be no more entanglement.
3. Using a 7/8-inch socket (or equivalent), carefully ratchet up the slack in the control cable lines (see Figure 5-9). Tighten the line until the beam reaches the stop. **Do not overtighten.**

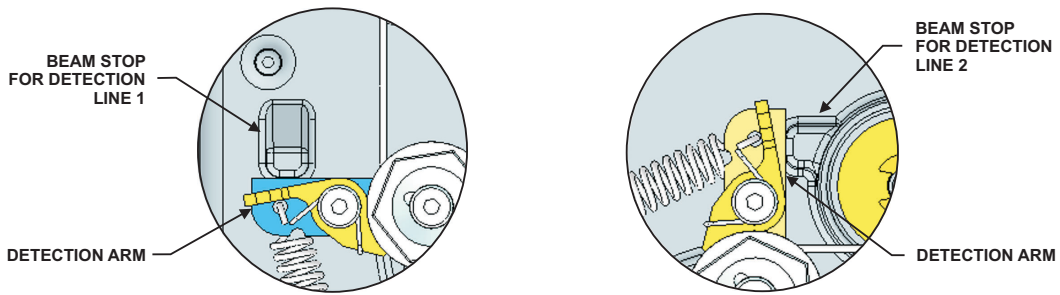


Figure 5-9. Detection Beam Stops

Note: The actuation latch should now be in the horizontal ('Set') position. If it is not, check to ensure the Remote Manual Release control cable is not interfering with the actuation latch and that the actuation latch swings freely.

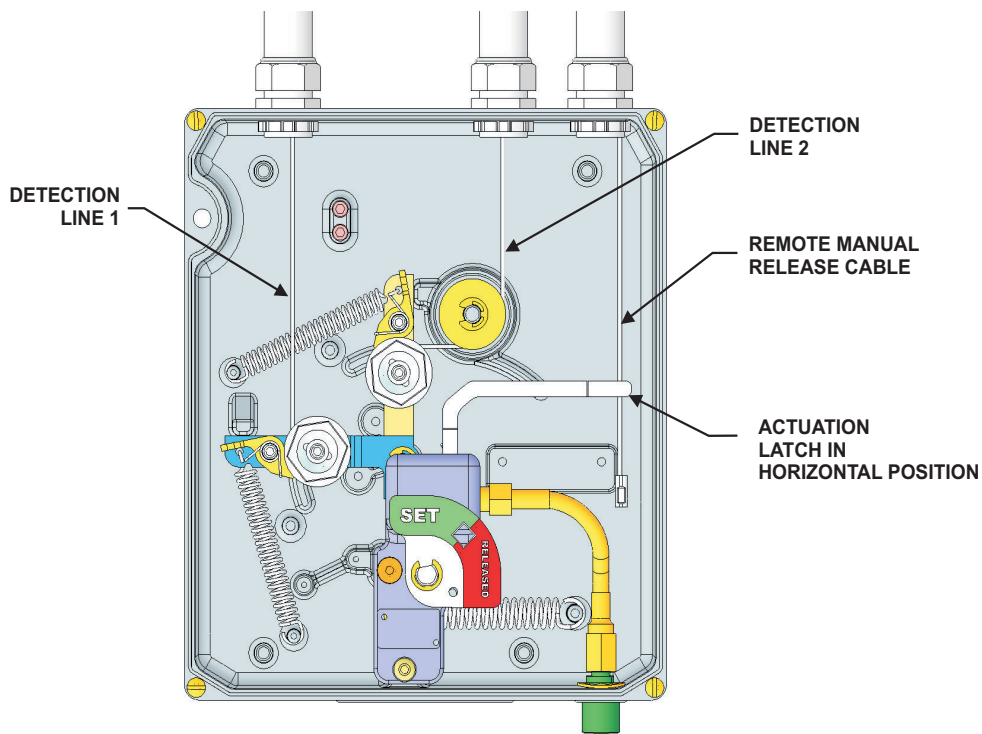


Figure 5-10. Position of Detection Beams in 'Set' Position

When the two tensioned lines are set, the actuation latch will automatically fall into a horizontal position.

Twist the Cam/Flag 90° clockwise until it clicks into place. The actuation latch will move up, then reset into the horizontal position (see Figure 5-11). Install Keeper Pin (P/N 60-9197108-000) in the Cam/Flag.

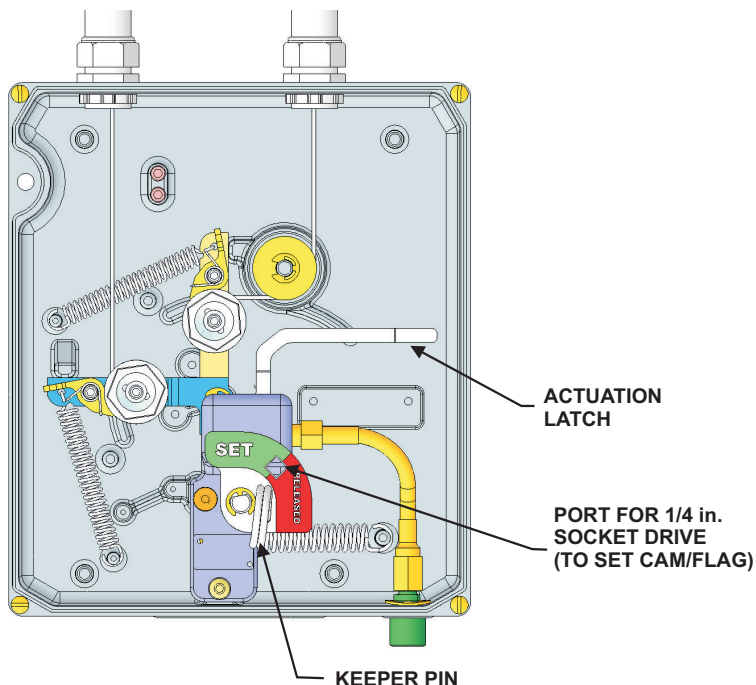


Figure 5-11. Latch Shown in "Set" Position

5-2.2.3 CHECKING MICROSWITCHES

Check to ensure that the microswitches are set. The Cam/Flag should hold down the High Mount Microswitch paddles. The trigger pin should hold up the Deep Mounted Microswitches. Gently push the microswitch paddles toward the body of the microswitches. If there is a "click," the microswitch is not adjusted properly in the XV Control System. Make appropriate adjustments.



The trigger pin on the Deep Mounted Microswitches must be underneath the paddle(s) of the microswitch. If the paddle is under the trigger pin, the microswitch will not change position upon actuation of the XV Control System and the paddle(s) might be bent or broken upon such actuation.

5-2.2.4

CHECKING SOLENOID

If applicable, ensure that the Solenoid (if installed) is in the de-energized state and the actuation latch is horizontal.

Manually test the Solenoid by pushing the Solenoid piston to engage the actuation latch. This allows the Cam/Flag to rotate to the 'Release' position.



While performing the manual test of the Solenoid, the rotation of the cam/flag could cause personal injury.

5-2.2.5

CHECKING GAS VALVE

When the Cam/Flag is in the 'Set' position, verify the gas valve is in the open position.

When the Cam/Flag is in the 'Release' position, verify the gas valve is in the closed position.

5-2.2.6 FUNCTIONAL TESTING OF THE XV CONTROL SYSTEM SYSTEM

Perform the Post-Installation Checkout procedures in Paragraph 4-5.

5-2.2.6.1 Test Mechanical Link Lines for the XV Control System (If Applicable)

To test the mechanical detector lines, perform the following steps.



The mechanical detector lines are under tension. Wearing safety glasses and gloves is required during this process.

Before cutting a detector, ensure the System Nitrogen Cartridge is not installed in the XV Control System and the Keeper Pin is in place in the Cam/Flag.

1. Remove the Keeper Pin (P/N 60-9197108-000) from the Cam/Flag.
2. Go to the far end of the detection line. Cut the detector.
3. Check to ensure the rotation of detection spool and beam assembly as intended.
4. Check to ensure the Cam/Flag has rotated to the 'Release' position.
5. Check the microswitches to ensure that they have changed phase as intended.
6. Check the gas valve line to ensure that it has moved freely and that the gas valve has closed. Verify that all gas fired appliances have shut down, including the pilot lights.
7. Check each detector and bracket to ensure the travel distance of the cable. Make sure the line has operated without interference at any place in the system.
8. Replace detector that was cut.
9. Reset detector line.
10. Check and ensure the actuation latch is reset back to the horizontal position. Reset the Cam/Flag.
11. Insert Keeper Pin into Cam/Flag.
12. Reset all electrical shut-offs.

Repeat steps 1 through 12 for second detection line, if applicable.

5-2.2.6.2 Test Remote Manual Release, P/N 875572 (If Applicable)



Before testing the Remote Manual Release, ensure the System Nitrogen Cartridge is not installed in the XV Control System and remove the Keeper Pin from the Cam/Flag.

1. Operate the Remote Manual Release by pulling the safety pin located on the release handle and then pulling on the handle.
2. Observe the length of control cable that comes out of the Remote Manual Release. It should be between 3 and 4 inches (76 and 102 mm).
3. Insert the release handle back into the Remote Manual Release.

It is important that the control cable slips easily through the hole in the end of the actuation latch. The actuation latch must be able to operate without interference from the control cable. Be sure to test the movement of the actuation latch assembly before completing the setting of the XV Control System. 1-1/4 inch (32 mm) to 1-1/2 inch (38 mm) of control cable (with crimp end not included) should be left under the actuation latch, when in the 'Released' position.

4. Go to the XV Control System and check to ensure the Crimp Sleeve is against the bottom of the actuation latch and the actuation latch is pulled up at approximately two o'clock position and Cam/Flag is in the 'Release' position.
5. Pull 1-1/2-inches of control cable back into the XV Control System.

5-2.2.6.3 Test Solenoid, P/N 83-100034-001 (If Applicable)



Before testing the Solenoid, ensure the System Nitrogen Cartridge is not installed in the XV Control System and that the Keeper Pin is in place in the Cam/Flag.

Note: If there is no Solenoid installed in the system, proceed to Paragraph 5-2.2.6.4.

The instructions for testing electrical releasing of the system will be found in the Design, Installation and Maintenance (DIOM) Manual for the fire control panel being used. A complete functional test shall be accomplished according to that manual and NFPA 72.

1. Remove Keeper Pin (P/N 60-9197108-000).
2. Following the instructions in the DIOM manual of the fire control panel, test the electrical operation of the XV Control System. It will be important to observe all time delays, alarm and releasing features.
3. Verify actuation of the XV Control System.
4. Check the microswitches to ensure that they have changed phase as intended.
5. Check the gas valve line to ensure that it has moved freely and that the gas valve has closed. Verify that all gas fired appliances have shut down, including the pilot lights.

6. Ensure that the fire control panel has been reset according to the DIOM Manual for the fire control panel being used. The Solenoid should be de-energized.
7. Check and ensure the actuation latch is reset back to the horizontal position. Reset the Cam/Flag.
8. Insert Keeper Pin into port on Cam/Flag.
9. Reset all electrical shut-offs.

5-2.2.6.4 Inspect High-Pressure Nitrogen Tubing

To perform an inspection of the High-Pressure Nitrogen Tubing, use the following steps.

1. Ensure Keeper Pin (P/N 60-9197108-000) is in the Cam/Flag.
2. Ensure that all fittings are tightly attached.



It is important to verify that the XV Control System is in the 'Set' position. The detection beams must be against their respective stops. The actuation latch must be in the horizontal position and the Cam/Flag in the 'Set' position. The Keeper Pin must be in place in the Cam/Flag.

3. Check all of the SVA pistons to ensure that they are in the set position.
4. The bottom surface of the piston must be in the body of the SVA. If it is in the released position, push the spring loaded plunger in while pushing the piston into the body of the SVA (see Figure 5-12).

Note: If the Authority Having Jurisdiction (AHJ) requires a full discharge test or an air/nitrogen test, Kidde recommends that the actuation testing take place before the full test.

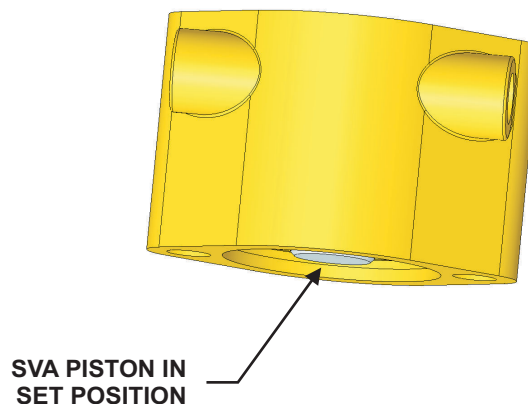


Figure 5-12. SVA in 'Set' Position

ACTUATION TEST FOR THE XV CONTROL SYSTEM

1. After ensuring that the system is in the 'Set' position and the Keeper Pin is in place, locate the Test Cartridge (P/N 87-120044-001). Carefully install the cartridge into the valve assembly of the XV Control System. Tighten until cartridge is snug (see Figure 5-13). It is permissible to perform this test with the System Cartridge.



Do not attempt to push the piercing pin down. Pushing the piercing pin too far can cause the O-ring to move out of the valve bore. This could cause the O-ring to chip or break upon actuation of the system. Inserting the System Nitrogen Cartridge will push the piercing pin down to the proper location in the valve bore.

Note: Do not use a wrench or other tool to tighten the cartridge. Hand tightening is sufficient. If leakage is observed, check the condition of the flat gasket in the valve bore.

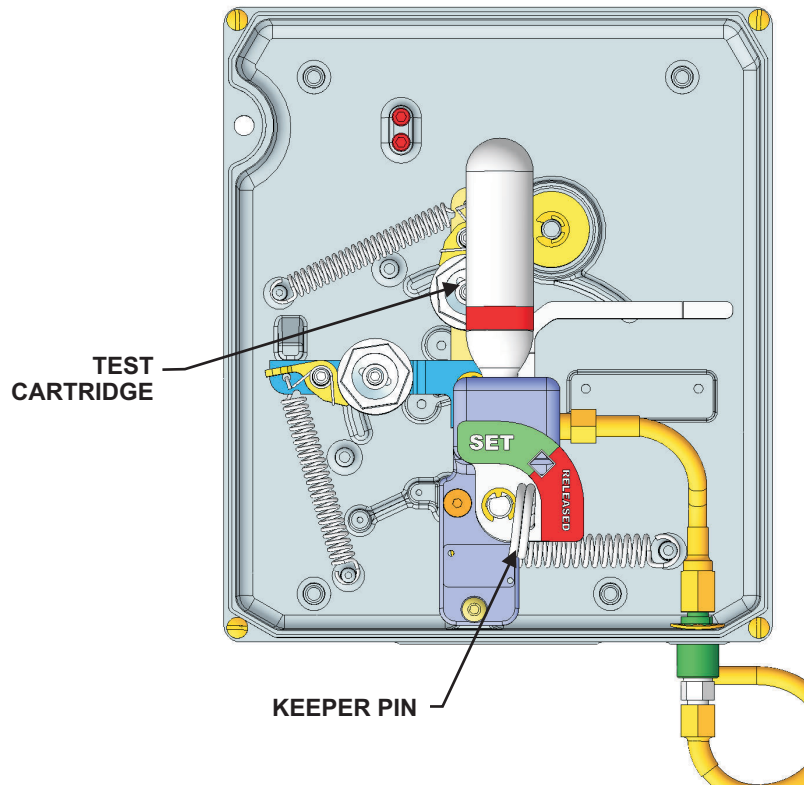


Figure 5-13. XV Control System, Test Cartridge Placement

2. Locate the cover of the XV Control System. Ensure that the local manual handle is set and that the Safety Pin is inserted (see Figure 5-14). The handle should be locked in the set position. If the handle can turn, adjust until the pin can be inserted all the way through the handle into the body of the cover.

Note: Installation of a tamper wire seal can prevent the pin from slipping out.

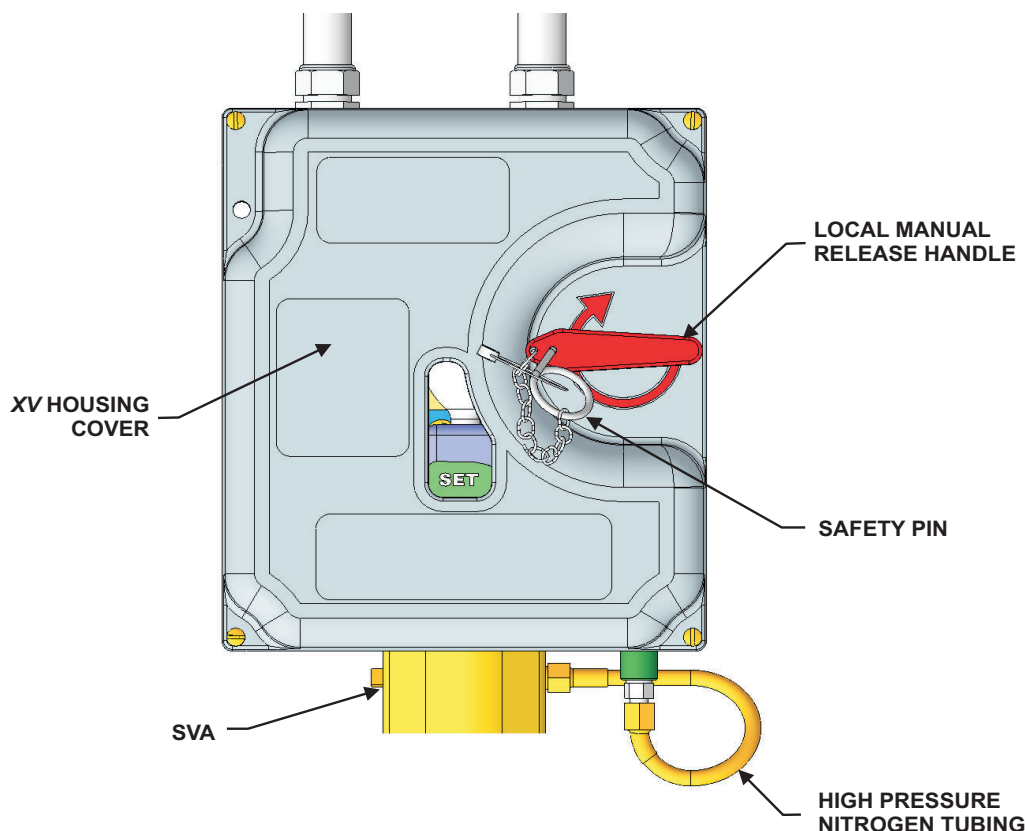


Figure 5-14. XV Control System, Cover Attached

3. Remove the Keeper Pin from the XV Control System Cam/Flag. Carefully install the cover onto the XV Control System enclosure. The cover has a tongue that fits into the groove of the XV Control System enclosure. Center the cover over the XV Control System enclosure and fit the tongue and groove together.



While the cover is resting on the XV Control System enclosure, moving it upward could engage the local manual release with the latch, causing the XV Control System to release. Keep the cover as centered as possible while performing this step.

4. Fasten the cover to the XV Control System enclosure with the captive screws. Turn the captive screws until snug.

Note: The Valve Protection Plates should remain on the top of the Cylinder and Valve Assemblies until directed to remove it.

5. Pull the safety pin and turn the handle in the direction of the arrow about 1/8-turn. The system will fire, pressurizing the actuating lines.

Note: Do not loosen any of the fittings on the actuating lines at this time.

6. Inspect the actuating lines and SVAs for leakage. Each SVA piston must be in the released position (down) and locked. Check each piston to ensure that it is fully extended and the spring-loaded plunger is extended.

Note: If any leakage is observed, appropriate steps must be taken to implement corrective action. However, pressure should be bled off before any action is implemented on the actuating lines.



The system uses high pressure. Safety goggles or glasses must be worn.

All pressure must be released from the actuation lines before resetting the Cam/Flag. Failure to do so will cause the head of the piercing pin to protrude out of the valve bore, exposing the O-ring. This could result in the O-ring being damaged, thereby causing malfunction or non-function of the system as designed. Always ensure that the pressure has been released before resetting the Cam/Flag.

7. After ensuring there is no leakage, loosen the swivel fitting located at the bottom right side of the XV Control System (see Figure 5-15). Allow the pressure to vent slowly. When the pressure is completely vented, disconnect the fitting and remove the cover.



To avoid accidental discharge later in the service sequence, it is important to completely disconnect the fitting outside the XV Control System.

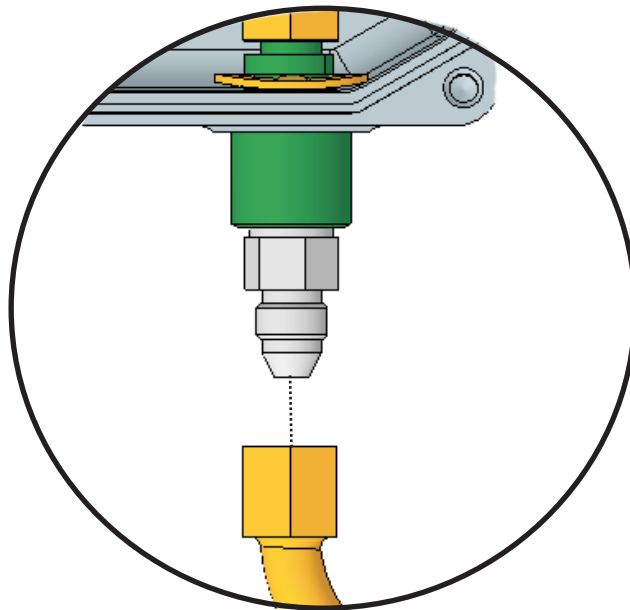


Figure 5-15. Fitting on Outside of XV Control System

8. Remove the spent cartridge used for the functional test.
9. Discard the spent cartridge in an appropriate manner. Check to ensure the detection lines are set. Refer to Paragraph 5-2.2.7.1.
10. Reset the Cam/Flag and reinstall the Keeper Pin into the Cam/Flag.

Note: Ensure the microswitches are setting properly. Check the Deep Mount Microswitches to ensure the trigger pin is under the paddles of the microswitches and is pushing them up. Check the High Mount Microswitches to ensure the Cam/Flag is pushing down on the paddles.

11. Install the Safety Pin into the local manual release handle of the cover assembly. Install a tamper indicator through the Safety Pin and around the handle.
12. Reset all of the SVAs. Push the spring-loaded plunger in while pushing the piston into the body of each SVA.
13. Carefully remove the Valve Protection Plate from the cylinder valves and install the SVA to each cylinder. Secure with the bolts included. Ensure that each SVA is securely tightened.



A System Nitrogen Cartridge is required for final system set up. Using any other cartridge could cause malfunction or non-function of the system.

Note: Check the condition of the flat gasket in the valve bore. Do not use a wrench or other tool to tighten the cartridge. Hand tightening is sufficient.

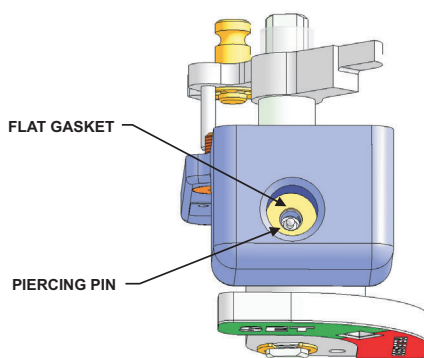


Figure 5-16. Valve Body with Flat Gasket

14. When all SVAs are secured, locate the System Nitrogen Cartridge (P/N 87-120043-001). In the area provided, write the date of installation of the cartridge. Carefully install the System Nitrogen Cartridge into the valve assembly of the XV Control System. Hand-tighten until it is snug.

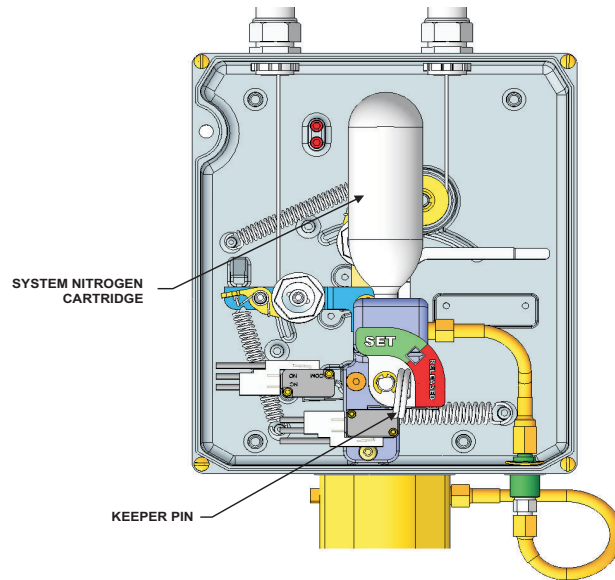


Figure 5-17. XV with System Nitrogen Cartridge Installed

15. Locate the cover of the assembly. Ensure the tamper seal remains intact in the safety pin.
16. Remove the Keeper Pin from the Cam/Flag.
17. Carefully install the cover onto the XV Control System enclosure. The cover has a tongue that fits into the groove of the XV Control System enclosure. Center the cover over the XV Control System enclosure and fit the tongue and groove together.



While the cover is resting on the XV Control System enclosure, moving it upward could engage the local manual release with the actuation latch, causing the XV Control System to release. Keep the cover as centered as possible while performing this step.

18. Fasten the cover to the XV Control System enclosure with the captive screws. Turn the captive screws until snug.



Securing the High Pressure Nitrogen Tubing onto the XV Control System will complete the setup of the Kidde System. System discharge could occur if the system has not been properly set.

19. Secure the High Pressure Nitrogen Tubing back onto the bottom of the XV Control System. Ensure that the fit is properly snug to prevent leakage. Refer to Figure 5-18.

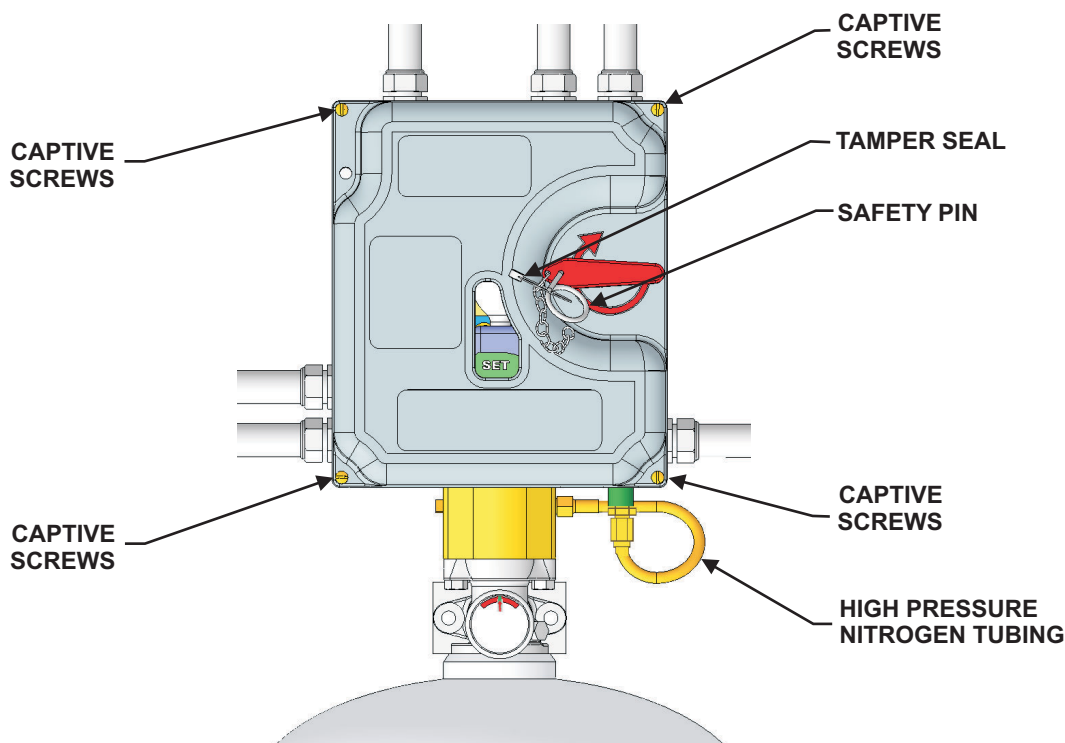


Figure 5-18. Cylinder Mounted XV Control System

5-2.2.7.1 Disposal of Cartridge

Following are the recommended instructions for disposal of spent cartridges.



Never dispose of a pressurized cartridge. Cartridges must be discharged before discarding. Filled gas cartridges may be dangerous if not handled properly. Do not heat cartridges above 120°F (49°C). Pressurized cartridges that become overheated can explode, and thereby cause property damage, severe personal injury, and possibly death.

Determine if gas is present in the cartridge. All puncturable type disposable cartridges are presumed to be fully charged unless the small puncturable end (opposite of the rounded bottom) is **clearly punctured**. If the puncture is not clear, the cartridge may be weighed using a scale capable of reading in grams accurate to 0.1 g. **The weight of the cartridge shall be less than the indicated weight imprinted on the side of the cartridge by the amount of the indicated charge.**

After using one of the methods described to determine that no gas is present in the cartridge, the cartridge may be placed with normal refuse, or may be placed with steel recycling materials. All of the steel cartridges are produced from a low carbon (14) steel product. Once empty, no residue remains. Cross cutting or sectioning is not required.

1. Disconnect the 1/4-inch O.D. (6 mm) copper tubing from the SVA.

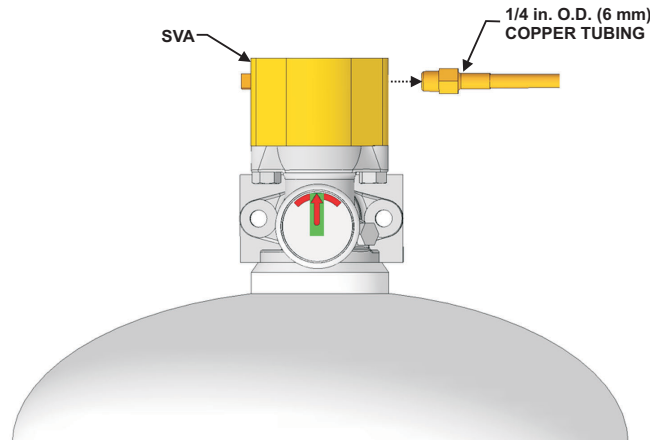


Figure 5-19. Disconnect 1/4-inch O.D. (6 mm) Copper Tubing

2. Verify that the system design and installation are adequate to protect the hazard area and that the installation conforms to the instructions in this manual. Some of the items to verify are:
 - a. All equipment requiring fire protection within the hazard area is protected.
 - b. There have been no unauthorized alterations to the protected area or equipment, or to the wet chemical system, that render the fire suppression system ineffective or non-operational.
 - c. All Cylinder Mounting Brackets are securely fastened to a wall or other structural member.
 - d. All nozzles are properly aimed, secured and located within the proper distance from the protected equipment. Each nozzle should be clean and equipped with a foil seal cap.
 - e. The agent distribution piping is properly sized for the number and type of nozzles required.
 - f. All piping joints and pipe supports are securely fastened to prevent wet chemical leakage and hazardous movement during discharge.
 - g. The pipe lengths, sizes, fittings and material are as specified in this Manual.
 - h. The number, type, and placement of detectors are suitable for all hazards within the hazard area.
 - i. The Remote Manual Release, if used, is located in a path of exit or egress and is clearly identified.
 - j. Stainless steel control cable lengths and Corner Pulley counts are within listed limits. Conduit runs should be clean and secure.
 - k. All wiring is in compliance with local codes.
 - l. All field wiring is free of ground fault or short-circuit conditions.
 - m. No branch circuits exist in the wiring to the detectors.
 - n. All auxiliary components such as Pressure Operated Release are secure and show no evidence of physical damage.
 - o. All system components and installation material are as specified in this manual.

3. Remove the KRS-50 Control Box cover.
4. Remove the CO₂ cartridge from the KRS-50 Control Box and dispose of it properly.

Note: CO₂ cartridge can be used to test the system before discarding. Do not reuse the CO₂ cartridge.



Never dispose of a pressurized cartridge. Cartridges must be discharged before discarding. Filled gas cartridges may be dangerous if not handled properly. Do not heat cartridges above 120°F (49°C). Pressurized cartridges that become overheated can explode, and thereby cause property damage, severe personal injury, and possibly death.

5. Remove the System Valve Actuators from all cylinders. See Figure 5-20 for location.

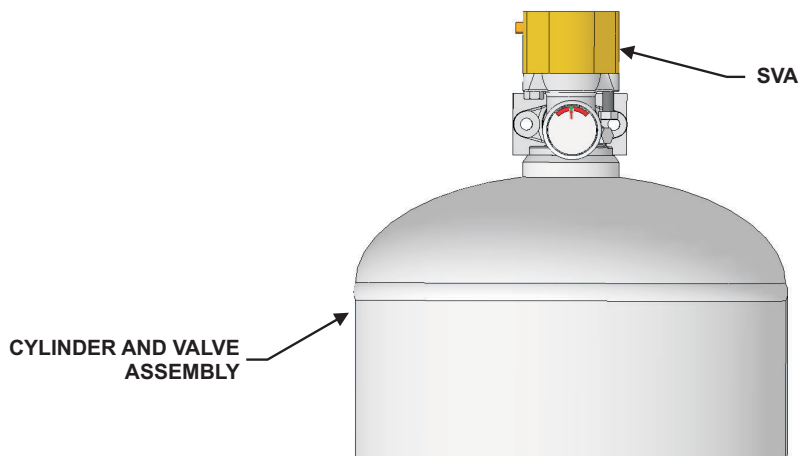


Figure 5-20. System Valve Actuators

6. Install cylinder valve protection plates.
7. Disconnect Discharge Adapter Kit (agent piping) from all cylinders (see Figure 5-21).

Note: Disconnecting the Discharge Adapter Kit typically involves removing cylinders.

8. Install the Anti-Recoil Plate.

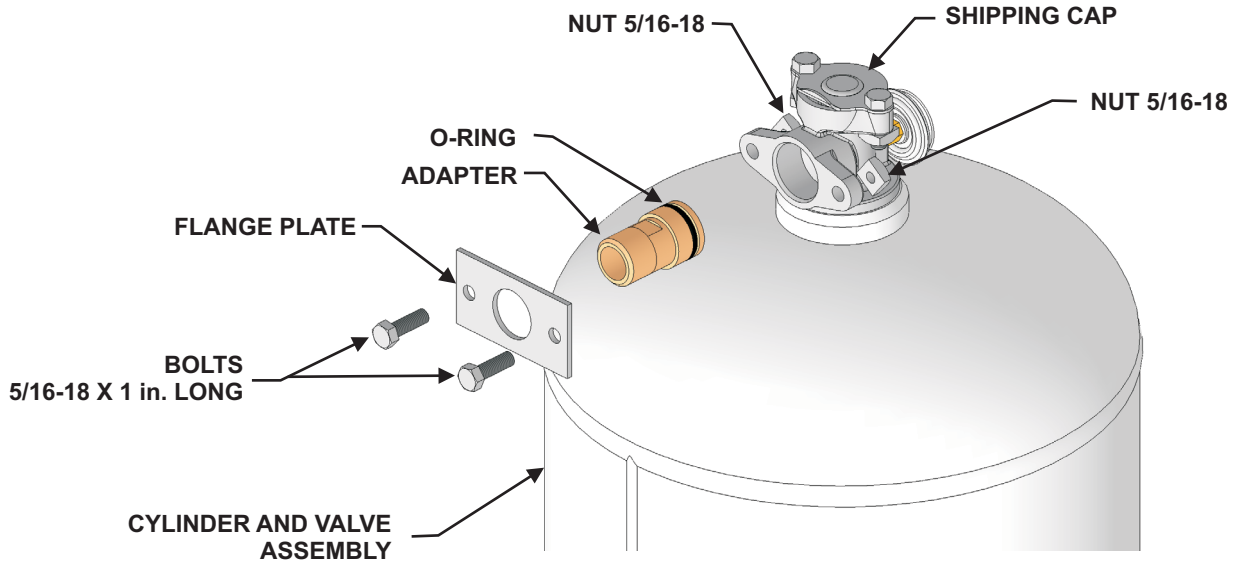


Figure 5-21. Removing Discharge Adapter Kit

5-2.2.9

ARMING THE KRS-50 CONTROL BOX

1. Allow about 18 inches (452 mm) of cable to extend into the box for connection to the valve body lever.
2. Locate the slot in the back panel located behind the valve body lever. Place the tip of a screwdriver in the slot.
3. Pull down on the screwdriver causing the spring to stretch until the tensioning tool holes in the valve body and lever are lined up.
4. Install the Keeper Pin (P/N 60-9197108-000). The KRS-50 Control Box is now held in the "SET" position (see Figure 5-22).

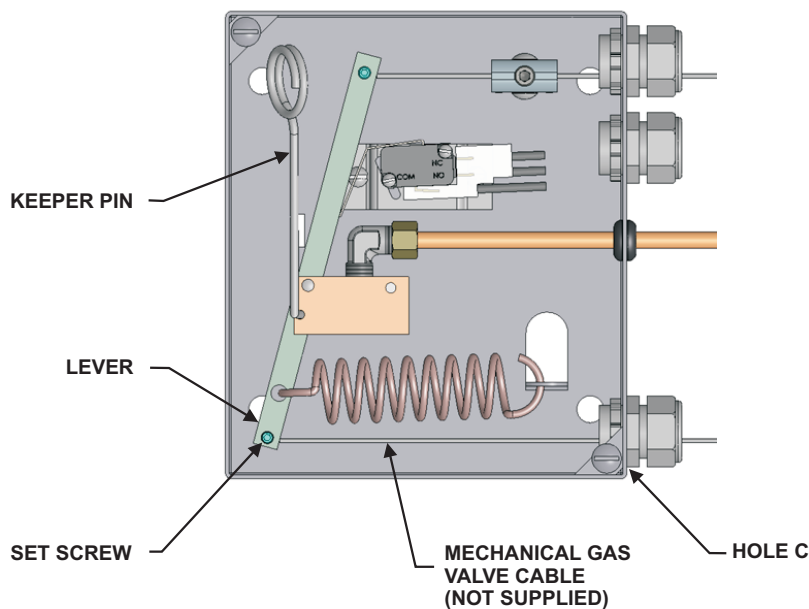


Figure 5-22. KRS-50 Control Box in "SET" Position

5. Locate the Cable Tension Block Assembly. With the screw threaded out on the Cable Tension Block Assembly, thread the detection cable through the cable tension block (see Figure 5-23).

Note: It is necessary for you to have already cut and crimped the detection line cable and installed the "S" hooks and fusible links prior to the step of removing the cable slack and making the final adjustments.

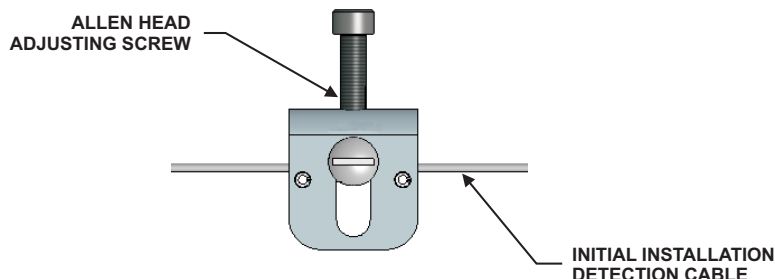


Figure 5-23. Cable Tension Block Assembly

6. Thread the end of the detection cable through the hole in the valve body lever.
7. Thread detection cable through hole in the top of the KRS-50 Control Box.
8. Fasten vise grips to the end of the detection cable. Pull on the detection cable and make sure to remove most of the cable slack.
9. Tighten the lever set screw onto the cable.
10. Tighten the adjustment screw on the Cable Tension Block Assembly until the tension on the cable is balanced and allows the Keeper Pin to easily slide out of the valve body. Leave the Keeper Pin in place until after the CO₂ cartridge is installed. This will prevent accidental discharge.

If the Keeper Pin does not slide out easily, not enough cable slack was removed when the cable was pulled through the valve body lever. Loosen the adjusting screw in the Cable Tension Block Assembly and then repeat steps above.

Note: It is recommended that you cut the detection cable close to the lever.

After completing the tensioning of the detection system, make sure that each detector has the required 3 inches (76 mm) minimum spacing, in the direction of cable travel, between the cable clamp or block and the end of the conduit fitting in the detector bracket.

5-2.2.9.1 Checking Microswitches

Check to ensure that the microswitches are set. Adjust the microswitch toward the lever until the paddle on the microswitch just touches the top corner of the microswitch body. The microswitch is now in the 'Set' position.

5-2.2.9.2 Checking Gas Valve

When the lever is in the 'Set' position, verify the gas valve is in the open position.

When the lever is in the 'Released' position, verify the gas valve is in the open position.

5-2.2.10 FUNCTIONAL TESTING OF THE KRS-50 CONTROL BOX

Perform the Post Installation Checkout in Paragraph 4-5.

- 5-2.2.10.1 Test Mechanical Link Lines for the KRS-50 Control Box (If Applicable)
To test the mechanical detector lines, perform the following steps.



The mechanical detector lines are under tension. Wearing safety glasses and gloves is required during this process.

Before cutting a detector, ensure the CO₂ Cartridge is not installed in the KRS-50 Control Box and the Keeper Pin is in place in the valve body.

1. Remove the Keeper Pin (P/N 60-9197108-000) from the valve body.
2. Go to the far end of the detection line. Cut the detector.
3. Check to ensure the rotation of detection spool and beam assembly as intended.
4. Check to ensure the lever has rotated to the 'Released' position.
5. Check the microswitches to ensure that they have changed phase as intended.
6. Check the gas valve line to ensure that it has moved freely and that the gas valve has closed. Verify that all gas fired appliances have shut down, including the pilot lights.
7. Check each detector and bracket to ensure the travel distance of the cable. Make sure the line has operated without interference at any place in the system.
8. Replace detector that was cut.
9. Reset detector line.
10. Check and ensure the lever is reset back to the 'Set' position.
11. Insert Keeper Pin into valve body.
12. Reset all electrical shut-offs.

5-2.2.10.2 Test Remote Manual Release, P/N 875572 (if applicable)



Before testing the Remote Manual Release, ensure the CO₂ Cartridge is not installed in the KRS-50 Control Box and remove the Keeper Pin from the valve body.

1. Operate the Remote Manual Release by pulling the safety pin located on the release handle and then pulling on the handle.
2. Observe the length of control cable that comes out of the Remote Manual Release. It should be between 3 and 4 inches (76 and 102 mm).
3. Insert the release handle back into the Remote Manual Release.
4. Go to the KRS-50 Control Box and check to ensure the lever is in the 'Released' position.

5-2.2.10.3 Testing Microswitches (If Applicable)



Before testing the microswitches, ensure the CO₂ Cartridge is not installed in the KRS-50 Control System and that the Keeper Pin is in place in the valve body.

Note: If there is no microswitches installed in the system, proceed to Paragraph 5-2.2.10.4.

The instructions for testing electrical releasing of the system will be found in the Design, Installation and Maintenance (DIOM) Manual for the fire control panel being used. A complete functional test shall be accomplished according to that manual and NFPA 72.

1. Remove Keeper Pin (P/N 60-9197108-000).
2. Following the instructions in the DIOM manual of the fire control panel, test the electrical operation of the XV Control System. It will be important to observe all time delays, alarm and releasing features.
3. Verify actuation of the KRS-50 Control System.
4. Check the microswitches to ensure that they have changed phase as intended.
5. Check the gas valve line to ensure that it has moved freely and that the gas valve has closed. Verify that all gas fired appliances have shut down, including the pilot lights.
6. Ensure that the fire control panel has been reset according to the DIOM Manual for the fire control panel being used.
7. Check and ensure the lever is reset back to the 'Set' position.
8. Insert Keeper Pin into port on valve body.
9. Reset all electrical shut-offs.

5-2.2.10.4 Inspect 1/4 in. O.D. Copper Tubing

To perform an inspection of the 1/4 in. O.D. copper tubing, use the following steps.

1. Ensure Keeper Pin (P/N 60-9197108-000) is in the valve body.
2. Ensure that all fittings are tightly attached.



It is important to verify that the lever is in the 'Set' position and the Keeper Pin must be in place in the valve body.

3. Check all of the SVA pistons to ensure that they are in the set position.

The bottom surface of the piston must be in the body of the SVA. If it is in the released position, push the spring loaded plunger in while pushing the piston into the body of the SVA (see Figure 5-24).

Note: If the Authority Having Jurisdiction (AHJ) requires a full discharge test or an air/nitrogen test, Kidde recommends that the actuation testing take place before the full test.

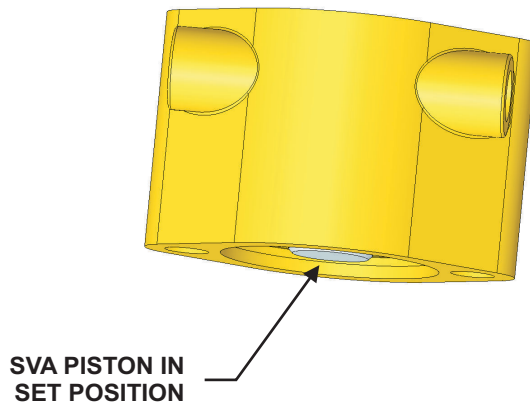


Figure 5-24. SVA in 'Set' Position

5-2.2.10.5 Installing the CO₂ Gas Cartridge in the KRS-50 Valve Body

After the gas valve connection has been made and the optional microswitch(es) installed, the CO₂ cartridge must be installed.

1. In the area provided, write the date of installation of the CO₂ cartridge. Carefully install the CO₂ cartridge into the valve body of the KRS-50. Hand-tighten until it is snug.



If the CO₂ cartridge is not sealed against the valve gasket, or the valve gasket is missing, the system will not function properly. Verify correct installation.

2. Remove Keeper Pin.



Be sure to remove the Keeper Pin. Failure to remove the Keeper Pin will result in an inoperative system.

After initial installation, perform the actuation test described in Paragraph 5-2.2.11.

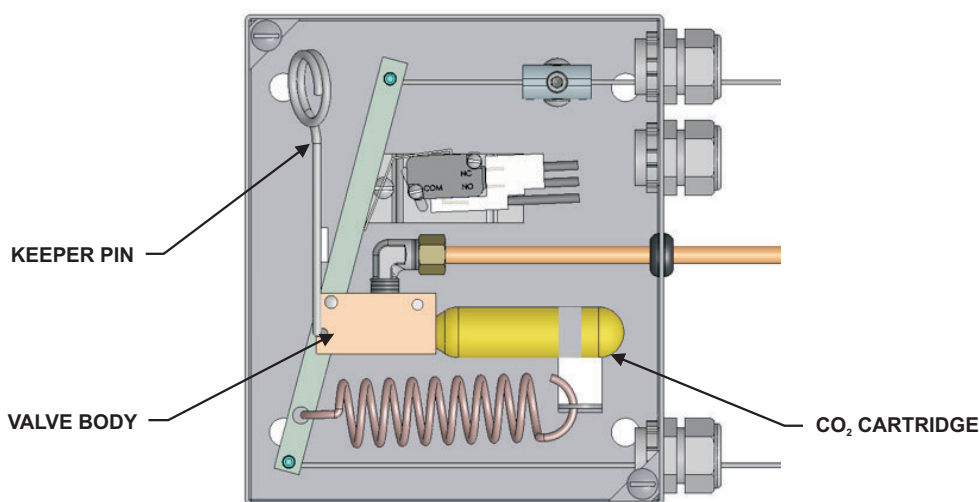


Figure 5-25. Installing CO₂ Gas Cartridge



The mechanical detector lines are under tension. Wearing safety glasses and gloves is required during this process.

1. Remove the System Valve Actuator (SVA) from each Kidde valve and cylinder assembly. Leave the 1/4-inch (6 mm) O.D. tubing connected to the SVAs.
2. Go to the far end of the detection line. Cut the detector.
3. Check the CO₂ cartridge to ensure it has discharged.
4. Check the microswitches to ensure that they have changed phase as intended.
5. Check the gas valve line to ensure that it has moved freely and that the gas valve has closed. Verify that all gas fired appliances have shut down, including the pilot lights.
6. Check each detector and bracket to ensure the travel distance of the cable. Make sure the line has operated without interference at any place in the system.
7. Reset all electrical shut-offs.



This step must be done before the KRS-50 Control Box is reset, otherwise the valve body O-ring could be damaged.

8. Carefully release residual pressure in the 1/4-inch O.D. tubing line by slightly loosening a tubing nut.
9. Retighten the tubing nut after all the residual pressure is released.
10. Reset all of the SVAs. Push the spring-loaded plunger in while pushing the piston into the body of the SVA.
11. Reset the KRS-50 Control Box by installing the Keeper Pin as previously stated.
12. Remove and discard the used CO₂ cartridge. Refer to Paragraph 5-2.2.11.1.
13. In the area provided, write the date of installation of the cartridge.
14. Carefully install the CO₂ cartridge into the valve body of the KRS-50 Control Box. Hand-tighten in until it is snug.



If the CO₂ cartridge is not sealed against the gasket or the gasket is missing, the system may not function properly.

15. Remove Keeper Pin.

16. Secure the cover to KRS-50 Control Box, making sure that the lever is visible in the window of the cover.



Be sure to remove the Keeper Pin. Failure to remove the Keeper Pin will result in an inoperative system.

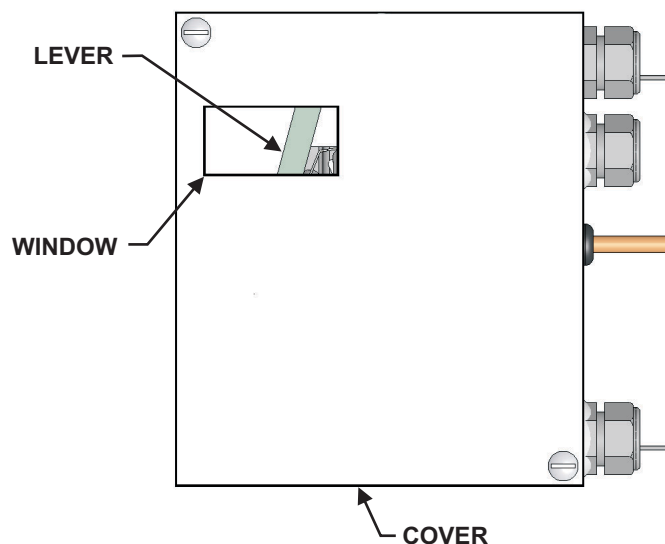


Figure 5-26. KRS-50 with Cover Installed

5-2.2.11.1 Disposal of Cartridge

Following are the recommended instructions for disposal of spent cartridges.



Never dispose of a pressurized cartridge. Cartridges must be discharged before discarding. Filled gas cartridges may be dangerous if not handled properly. Do not heat cartridges above 120°F (49°C). Pressurized cartridges that become overheated can explode, and thereby cause property damage, severe personal injury, and possibly death.

Determine if gas is present in the cartridge. All puncturable type disposable cartridges are presumed to be fully charged unless the small puncturable end (opposite of the rounded bottom) is **clearly punctured**. If the puncture is not clear, the cartridge may be weighed using a scale capable of reading in grams accurate to 0.1 g. **The weight of the cartridge shall be less than the indicated weight imprinted on the side of the cartridge by the amount of the indicated charge.**

After using one of the methods described to determine that no gas is present in the cartridge, the cartridge may be placed with normal refuse, or may be placed with steel recycling materials. All of the steel cartridges are produced from a low carbon (14) steel product. Once empty, no residue remains. Cross cutting or sectioning is not required.

This completes the Semi-Annual Service of the Kidde Wet Chemical System.

5-2.3 Twelve-Year Maintenance

The 12-year maintenance is typically done in conjunction with the semi-annual maintenance. These procedures shall be performed **in addition** to the tests conducted at Semi-Annual intervals (Paragraph 5-2.2), and the monthly inspections (Paragraph 5-2.1).

Refer to NFPA 17A, NFPA 96 and DOT requirements for all 12-year maintenance and hydrostatic testing.

5-2.3.1 WET CHEMICAL CYLINDERS

The Kidde Wet Chemical System must be examined at least every six years. Kidde recommends that a complete internal inspection be done in accordance with this schedule.

Table 5-4. Wet Chemical Cylinder Inspection

Checkbox	Procedure	Section
<input type="checkbox"/>	Determine date of cylinder manufacture. See CGA pamphlet C-1 for hydrostatic test requirements.	Paragraph 5-2.3.2
<input type="checkbox"/>	Depressurize the Cylinder and Valve Assembly.	Paragraph 5-2.3.3.2
<input type="checkbox"/>	Remove the valve and siphon tube.	Paragraph 5-2.3.3.3
<input type="checkbox"/>	Remove and discard the wet chemical from the cylinder.	Paragraph 5-2.3.3.3
<input type="checkbox"/>	Visually inspect the entire inside surface of the cylinder, per CGA pamphlet C-6.	
<input type="checkbox"/>	Hydrostatically test the cylinder.	Paragraph 5-2.3.2
<input type="checkbox"/>	Rebuild valve with new stem/O-ring and new valve/cylinder O-ring (Cylinder Rebuild Kit P/N 87-120067-00).	Paragraph 5-2.3.3.4
<input type="checkbox"/>	Recharge the cylinder.	Paragraph 5-2.3.3.5

5-2.3.2 HYDROSTATIC TESTING

Refer to Title 49 of the Code of Federal Regulations Paragraph 180, and CGA pamphlets C-1 and C-6.

Hydrostatic testing is to be performed on the Kidde cylinder in compliance with the appropriate DOT requirements. EU cylinders are hydrostatically tested to 25.8 bar (375 psi).

The wet chemical is to be discarded when performing the hydrostatic test.

Note: Do not reuse the wet chemical per NFPA-17A.

To protect the hazard during this testing period, a substitute cylinder is to be used, one of equal to the unit under test. An alternate protection method may be used so long as it is acceptable to the Authority Having Jurisdiction (AHJ).

This is only an example; failure to properly identify and test the cylinder to appropriate DOT requirements may result in damage to cylinder.

No leakage, rupture, or expansion greater than 10% shall be allowed. Internal or external corrosion, denting, bulging, or evidence of rough usage that would be likely to weaken the cylinder should cause the cylinder to be condemned and replaced.



Cylinders are to be either hydrostatically tested or volumetric-expansion tested to **TWO TIMES** the standard rating. A cylinder's standard rating is stamped on the crown or footing of the cylinder. For example:

MARKINGS:	DOT 4BW-250
RATING:	250 PSI
TEST PRESSURE:	500 PSI

When cylinders have been hydrostatically tested, recharge according to Paragraph 5-2.3.3.5.

5-2.3.3 RECHARGE INSTRUCTIONS

5-2.3.3.1 General Information

The aqueous potassium carbonate (APC) base wet chemical used in extinguishing a fire is not harmful, but if the chemical comes in contact with food, it will cause the food to become unpalatable.

It is best to clean the area immediately after fire extinguishment. After the appliances have completely cooled, the residue from the discharge may be cleaned up using a wet cloth or sponge. Wear rubber gloves while cleaning. If skin or eyes come in contact with the agent, flush thoroughly with water.

The Pressure Operated Release must be disassembled and cleaned of wet chemical. The Pressure Operated Release's stem and piston preformed packing must be lubricated with silicone grease. In addition, the two-way check tee (if used) is to be blown clean with nitrogen to remove all wet chemical.

5-2.3.3.2 Depressurize Cylinder and Valve Assembly

Note: Before beginning, refer to Paragraph 5-2.3.3.5 for preparation before recharging.

Protective eyewear must always be worn when working with pressurized cylinders. Never service a Cylinder and Valve Assembly unless the Anti-Recoil Plate (P/N 255681) and Protection Cap (P/N 255096) are installed.

Do not use water or oxygen to blow out agent distribution piping. Moisture will cause blockage. The use of oxygen is very dangerous as the possible presence of even a minute quantity of oil may cause an explosion, thereby causing death, serious injury and/or property damage.



1. Ensure all pressure is vented by slowly loosening the High-Pressure Nitrogen Tubing at the bottom of the XV Control System, or by loosening the 1/4 in. O.D. cooper tubing from the valve body of the KRS-50 Control Box.
2. Check each pressure gauge to ensure that all cylinders are empty.
3. Unbolt the Discharge Adapters and the SVAs from all discharged cylinders.
4. Loosen the Mounting Bracket retaining strap(s) and install the Anti-Recoil plate(s) and the Protection Cap(s).
5. Remove all discharged cylinder(s).

Note: All cylinders shall be recharged as described Paragraph 5-2.3.3.5.

- 5-2.3.3.3 Disassemble the Cylinder Valve
1. Remove the valve and siphon tube assembly from the discharged cylinder.
 2. Invert the cylinder and tap the threaded neck end on a wooden block to remove any residual wet chemical.
 3. Blow any wet chemical residual from the valve, siphon tube and cylinder threads.
 4. Visually inspect the entire inside and outside surface of the cylinder per CGA Pamphlet C-6.

5-2.3.3.4 Rebuilding Cylinder Valve

When rebuilding the cylinder valve, use the Cylinder Rebuild Kit, P/N 87-120067-001. This kit includes:

- Valve stem,
- Valve spring,
- Spring retainer,
- Cylinder O-ring,
- Retaining ring, and
- Valve stem O-ring.

Use the following procedures to rebuild the cylinder valve.

1. Remove siphon tube from the cylinder valve.
2. Secure valve body. Place valve body over a short piece of 3/4-inch pipe (or equivalent) to prevent the valve stem from falling out.
3. Remove the following from the valve body:
 - Retaining ring
 - Spring retainer
 - Valve spring
 - Valve stem
 - Cylinder valve O-ring

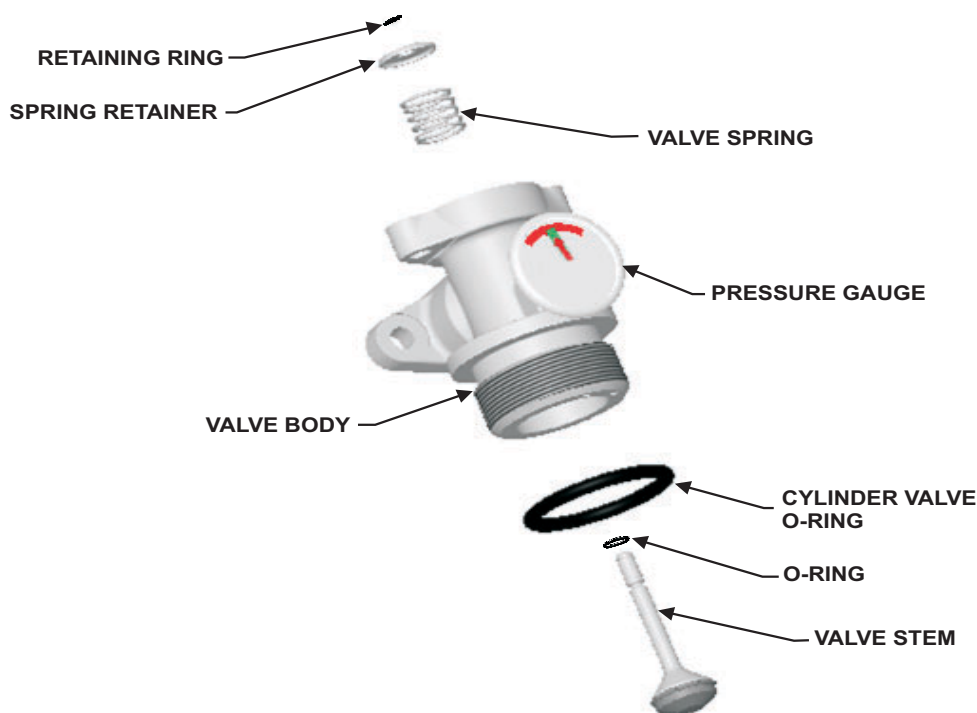


Figure 5-27. Valve Assembly

4. Put a light coating of lubricant (supplied in the Valve Rebuild Kit) on the valve stem O-ring. Do not grease the bonded seal on valve check (see Figure 5-27).
5. Install the valve stem.
6. Install valve spring.
7. Install spring retainer.
8. Push down on the valve spring and spring retainer. Install the retaining ring.
9. When installing the retaining ring, it is recommended that you use a box wrench to push the valve spring down and to maintain pressure while encompassing the retaining ring in place.
10. Put a light coating of lubricant (supplied in the Valve Rebuild Kit) on the cylinder valve O-ring.
11. Install valve to cylinder O-ring.
12. Reinstall siphon tube to cylinder valve.



Under no circumstances while performing cylinder recharge should a charged cylinder be allowed to “free stand” without either the charging apparatus attached or the anti-recoil plate installed. Whenever these devices are not installed, a charged cylinder must be securely clamped to a rigid structure capable of withstanding the full thrust that would result should the valve inadvertently open. Refer to the Safety Summary for more information regarding pressurized cylinders.



Do not attempt to recharge any cylinder without first checking for last hydrostatic test date. The U.S. Department of Transportation (DOT) has ruled that any pressurized container of the type used in wet chemical systems shall not be recharged or transported with out first being inspected internally and externally and hydrostatically tested if more than twelve years have elapsed since the date of the last hydrostatic test. Regardless of previous inspection dates, it is illegal to refill any pressurized container that leaks, which bulges, has defective safety devices, bears evidence of physical abuse, fire or heat damage, or detrimental rusting or corrosion, until it is properly repaired and requalified as specified in DOT regulations.

1. Fill the cylinder with the appropriate weight of the APC agent as indicated on the cylinder nameplate. Use the following Kidde P/Ns:
 - WHDR-125 — 87-120030-001
 - WHDR-260 — 87-120031-001
 - WHDR-400S — 87-120032-001
 - WHDR-400M — 87-120032-001
 - WHDR-600 — 87-120033-001
 - WHDR-5EU — 87-120030-001
 - WHDR-10EU — 87-120031-001
 - WHDR-S15EU — 87-120032-001
 - WHDR-M15EU — 87-120032-001
 - WHDR-23EU — 87-120033-001
2. Reinstall the siphon tube and valve and ensure it is tight.
3. Unbolt the Anti-Recoil Plate and bolt the charging adapter to the outlet port of the valve. Securely clamp the cylinder to a rigid structure.
4. Use dry nitrogen to pressurize the cylinder to 175 PSI (12.1 bar) at 70°F (21°C). Use a calibrated gauge.

Note: Do not rely on the pressure regulator or the cylinder pressure gauge to determine the container pressure (see Figure 5-32 for a suggested recharging arrangement).

5. Remove the charging adapter and check for leakage using a soap solution.
6. Bolt the Anti-Recoil Plate to the valve outlet. Leave the protection plates in place until the cylinder is ready to be reinstalled.

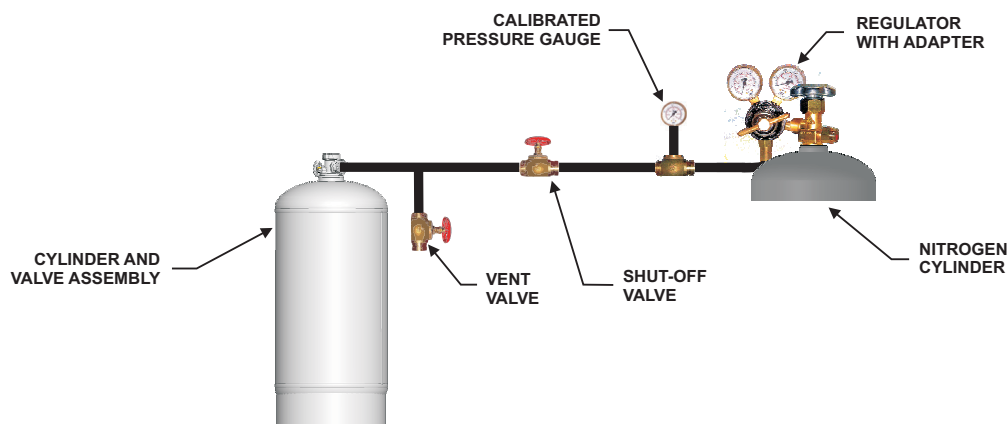


Figure 5-28. Recharge Hookup

After the inspections and procedures described previously in this section, and after having recharged all wet chemical cylinders, the fire suppression system is ready to be fully checked out before installation of the recharged wet chemical cylinders. Perform the steps outlined in Paragraph 5-2.2.6, Functional Testing of the System.

5-2.3.3.6 Cylinder Leak Test

1. Remove the spare discharge adapter and check for leakage using a soap solution.
2. Bolt the anti-recoil plate, P/N 255681, to the valve outlet. Leave the protection plates in place until the cylinder is ready to be reinstalled.

5-2.3.4 XV CONTROL SYSTEM COMPONENT MAINTENANCE

The System Nitrogen Cartridge (P/N 87-120043-001) requires replacement at intervals of twelve years. Check the date that was written on the cartridge at the time of installation.

At the time of replacement, the old System Nitrogen Cartridge may be used for the functional tests.

5-2.3.4.1 Rebuild the XV Control System Valve

The XV Pin/Gasket Rebuild Kit (P/N 87-120046-001) includes the following:

- Valve Gasket
- Piercing Pin
- O-ring
- Retaining Ring
- Pin/Gasket Service Label

Refer to Figure 5-29 when performing the service operation.

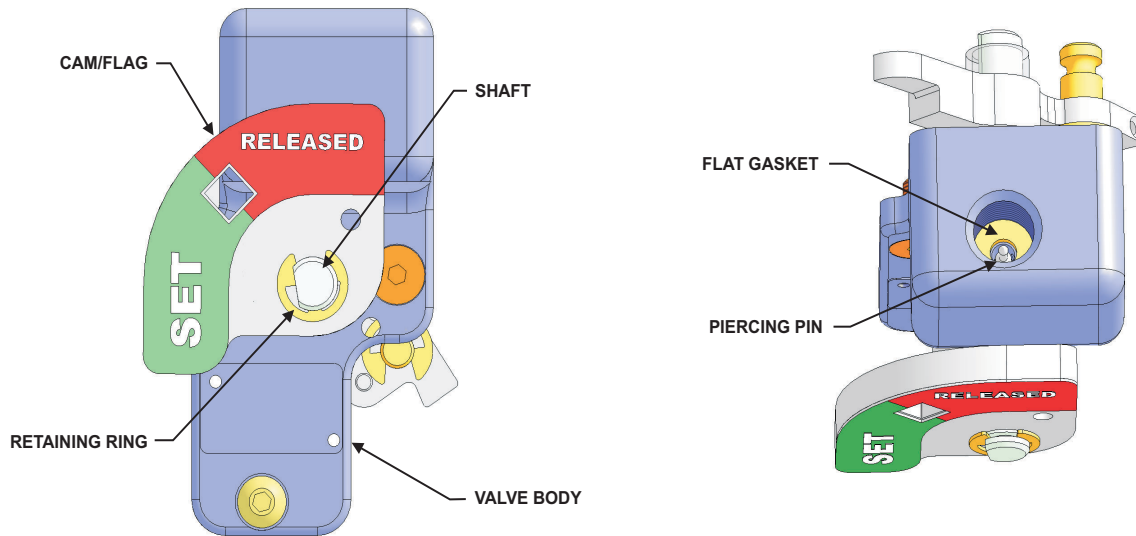


Figure 5-29. Valve Body with Piercing Pin Shown

1. Ensure that the Cam/Flag is in the Released position.
2. Remove the System Nitrogen Cartridge.
3. Carefully remove the retaining ring and set in a safe place. Refer to Figure 5-29 for location.
4. Slide the Cam/Flag off the shaft.



The point on the piercing pin is extremely sharp. Handle with care. It is important to discard the piercing pin that is removed from the XV Control System at the 12-year cycle. It must never be used again.

5. Using a small screwdriver or other tool, push the Piercing Pin (P/N 60-9197212-000) out of the port, in the direction of the shaft. Discard the Piercing Pin.
6. Remove and discard the Flat Gasket (P/N 06-236204-001) located inside the gas cartridge inlet.



Use care not to damage the threads in the gas cartridge inlet.

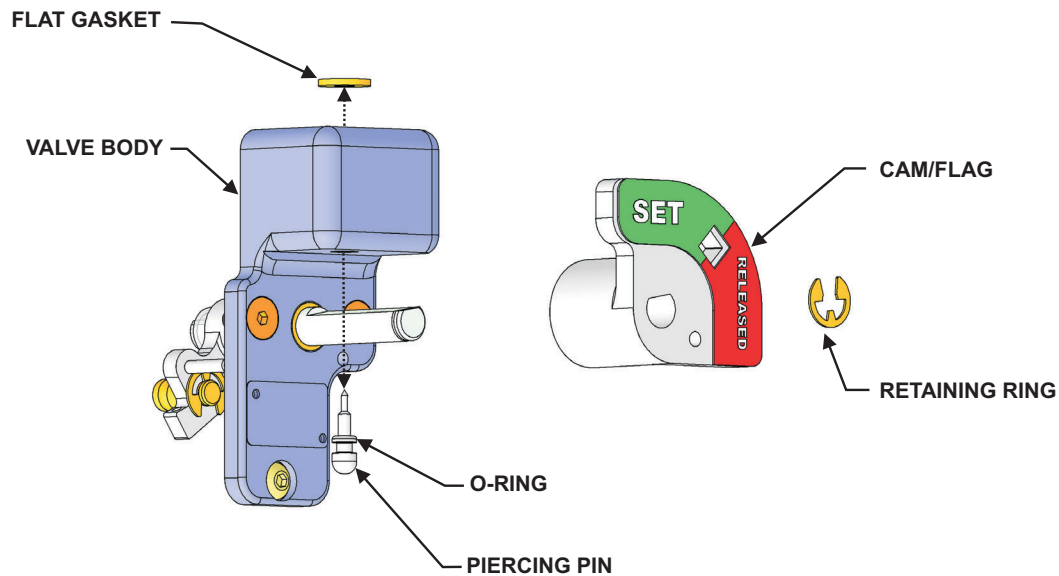


Figure 5-30. Removal of Piercing Pin and Flat Gasket

7. Insert a new Flat Gasket (Use only P/N 06-236204-001). Ensure that the gasket is seated firmly inside the gas cartridge inlet.
8. With the sharp end of the Piercing Pin pointed into the port, push the Piercing Pin into the port until the O-ring is inside the valve body.
9. Reinstall Cam/Flag.

Note: Ensure there is no interference with the Piercing Pin. If there is interference, push the pin further into the body. While sliding the Cam/Flag over the shaft, ensure that the paddles for the microswitches also do not interfere.

10. Install the retaining ring into the groove on the top of the shaft.

Note: The Cam/Flag may seem slightly loose on the shaft. It will turn slightly. This is acceptable. There will be further tests to ensure the fit is proper.

11. Turn the Cam/Flag to check engagement with the microswitch paddles.

12. Write the date on the Pin/Gasket Service Date label in the space provided. Attach the Pin/Gasket Service Date label.

Note: Do not install the label onto the local manual release handle. Attach it to another part of the system where it will not interfere with system operation.



Only System Nitrogen Cartridge shall be used for final system set up. Using any other cartridge could cause malfunction or non-function of the system in an emergency situation.

13. Once these steps have been performed, proceed with all Functional and Actuation Tests according to Paragraph 5-2.2.7. At the completion of the Actuation Test, install a **new** System Nitrogen Cartridge. In the space provided, write in the date the cartridge is being installed. Carefully install the System Nitrogen Cartridge into the valve assembly of the XV Control System. Hand tighten until it is snug.

Note: Do not use a wrench or other tool to tighten the cartridge. Hand tightening is sufficient. If leakage is observed, check the condition of the cam and flat gasket/piercing pin in the valve bore.

14. Verify that the system Owner's Manual is in place.

15. Review system operation with the owner or other responsible persons.

16. Dispose of cartridge according to the instructions in Paragraph 5-2.2.7.1.

5-3 POST-DISCHARGE MAINTENANCE

5-3.1 General Information

The aqueous potassium carbonate (APC) base wet chemical used in extinguishing a fire is not harmful. However, it is best to clean the area immediately after fire extinguishment. Prolonged exposure of equipment to wet chemical can result in localized corrosion due to moisture in the air.

The pressure-operated trip must be disassembled and cleaned of wet chemical. The pressure-operated trip's stem and piston preformed packing must be lubricated with silicone grease. In addition, the two-way check tee (if used) is to be blown clean with dry nitrogen to remove all wet chemical.

5-3.2 Cylinder and Valve Assembly

Check each pressure gauge to ensure that all cylinders are empty. Unbolt the discharge adapters and SVA(s) from all discharged cylinders. Loosen the mounting bracket retaining straps and install the anti-recoil plates and the shipping caps. Remove all discharged cylinders. Bolt a test fixture to each SVA.

All cylinders shall be recharged as described in Paragraph 5-2.3.3.5, Recharging Cylinders.

5-3.2.1 VALVE DISASSEMBLY - See Paragraph 5-2.3.3.3, Disassemble the Cylinder Valve.



Protective eyewear must always be worn when working with pressurized cylinders. Never service a cylinder-and-valve assembly unless the Anti-Recoil Plate (P/N 255681) and Shipping Cap (P/N 255096) are installed.

5-3.3 Resetting the Mechanical System

1. Replace all detectors with new detectors having the same temperature and load rating as the original detectors.

Note: Any detectors exposed to heat will no longer provide reliable protection and must be replaced.

2. After replacing the detectors, remove the front cover from each XV Control System or KRS-50 Control Box. Reset each XV Control System or KRS-50 Control Boxes described in Chapter 4.

5-3.4 Resetting the Electrical System

1. Inspect and test all thermostats. Replace any thermostats that have obviously been damaged by exposure to excessive heat. Check the actuation set point of the remaining thermostats by heating the thermostats and recording the actuation temperature. If the actuation temperature of any thermostat is more than 10° F higher than its original setting, the thermostat should be replaced. Hot oil and a high-temperature thermometer can be used to check the temperature. Heating should be done slowly.
2. After replacing any damaged thermostats, remove the front cover from each XV Control System or KRS-50 Control Box. Reset each XV Control System or KRS-50 Control Box as described in Chapter 4.

5-3.5 Clean Distribution System and Nozzles

1. Remove all nozzles from the system and inspect each nozzle filter for debris. Remove any debris. Clean nozzle filter under running water to remove foreign matter that might impede flow through the nozzle. Also, run water through the nozzle tip to insure the orifice is not clogged. Thoroughly dry nozzles with dry air or nitrogen and reassemble.
2. Before attach nozzles, flush out the system with warm water as suggested in . Re-install the nozzles on the distribution pipe and replace all nozzle foil seal caps.
3. Inspect the system piping and fittings and replace any pipe or fittings subjected to direct flame or excessive heating.
4. Blow out the distribution pipe with dry air or nitrogen. One possible procedure for accomplishing this is to use a test cylinder-and-valve assembly, without any wet chemical, pressurized with nitrogen to 100 psig. Verify with suitable discharge indicators that proper flow through all nozzles. Remove all nozzles from the system and inspect for debris. Remove any debris. Re-install the nozzles on the distribution pipe and replace all nozzle disc caps.



Do not use water or oxygen to blow out piping. Moisture will cause blockage. The use of oxygen is very dangerous as the possible presence of even a minute quantity of oil may cause an explosion.

5-3.6 Recharge Cylinders - See Paragraph 5-2.3.3.5, Recharging Cylinders.



Do not attempt to recharge any cylinder without first checking for last hydrostatic test date. The U.S. Department of Transportation (DOT) has ruled that any pressurized container of the type used in Wet Chemical systems shall not be recharged or transported with out first being inspected internally and externally and hydrostatically tested if more than twelve years have elapsed since the date of the last hydrostatic test. Regardless of previous inspection dates, it is illegal to refill any pressurized container that leaks, which bulges, has defective safety devices, bears evidence of physical abuse, fire or heat damage, or detrimental rusting or corrosion, until it is properly repaired and requalified as specified in DOT regulations.

5-3.7 Cylinder and Valve Reassembly

1. Replace the Valve-to-Cylinder O-Ring, P/N 5661-0327.
2. Fill the cylinder with the appropriate weight of the APC agent as indicated on the cylinder nameplate. Use the following Kidde P/Ns:
 - WHDR-125 — 87-120030-001
 - WHDR-260 — 87-120031-001
 - WHDR-400S — 87-120032-001
 - WHDR-400M — 87-120032-001
 - WHDR-600 — 87-120033-001
 - WHDR-5EU — 87-120030-001
 - WHDR-10EU — 87-120031-001
 - WHDR-S15EU — 87-120032-001
 - WHDR-M15EU — 87-120032-001
 - WHDR-23EU — 87-120033-001
3. Reinstall the siphon tube and valve and ensure it is tight.

4. Install O-Ring (P/N 1080-1900) on a spare discharge adapter (P/N 844908).
5. Unbolt the anti-recoil plate and bolt the spare discharge adapter to the outlet port of the valve. Securely clamp the cylinder to a rigid structure.



Under no circumstances while performing cylinder recharge should a charged cylinder be allowed to "free stand" without either the charging apparatus attached or the anti-recoil plate installed. Whenever these devices are not installed, a charged cylinder must be securely clamped to a rigid structure capable of withstanding the full thrust that would result should the valve inadvertently open.

6. Use nitrogen to pressurize the cylinder to 175 PSI (12.1 bar) at 70°F (21°C). Use a calibrated gauge.

Note: Do not rely on the pressure regulator or the cylinder pressure gauge to determine the container pressure. Refer to Figure 5-32 for a suggested recharging arrangement.

5-3.8 Flushing Procedure

Each Kidde system must have all discharge piping (or discharge tubing) flushed out with water after each discharge (see). A procedure for flushing is given below:

1. Remove nozzles, disassemble and remove strainer screen only. Flush nozzle parts and strainer thoroughly with fresh water and reassemble nozzle(s).
2. Disconnect cylinder(s) from 1/2-inch (13 mm) union and install inlet flushing adapter (97086). Connect one end of a garden hose to water tap and the other end to inlet flushing adapter. An alternate source of water is to use a cylinder of the same size as installed in the system filled with water and pressurized to 175 psig (1205 kPa).
 - a. On multiple cylinder systems, plug all 1/2-inch (13 mm) cylinder unions not connected to the flushing adapter (or water filled cylinder). After flushing through the first cylinder union, unplug and flush successive cylinder unions.
3. Attach outlet flushing adapter to each nozzle position.
4. Attach garden hose to each adapter.
5. Place discharge end of each hose in sink, bucket, or other point of disposal, or collect water in a properly attached bag or bucket.
6. Turn on fresh water and flush thoroughly, or discharge manually with water-filled cylinder.
7. Blow air through discharge piping to remove all excess water.
8. Install cleaned nozzles in their proper positions with a new seal on each.

9. Install charged cylinder(s).

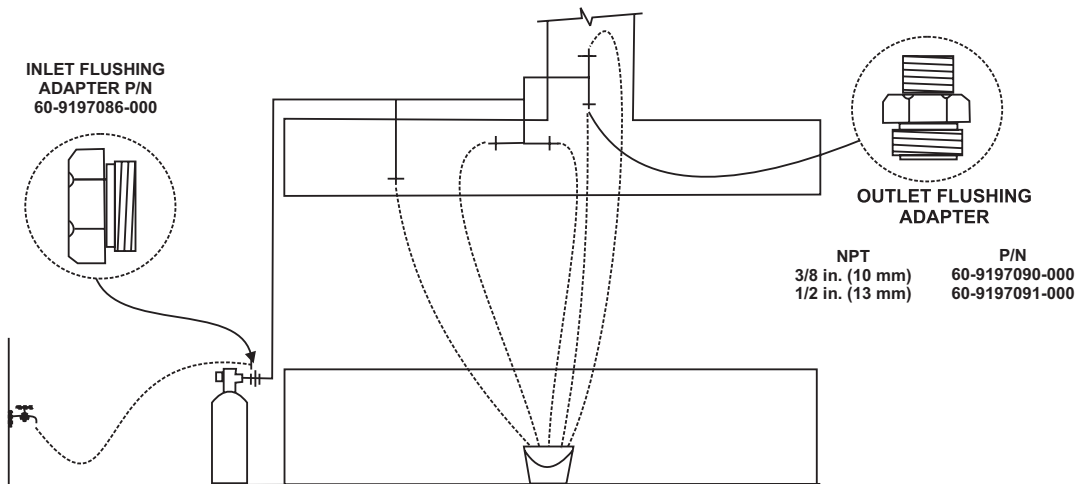


Figure 5-31. Diagram for Flushing the Kidde System

5-3.9 Cylinder Leak Test

1. Remove the spare discharge adapter and check for leakage using a soap solution.
2. Bolt the anti-recoil plate, P/N 255681, to the valve outlet. Leave the protection plates in place until the cylinder is ready to be reinstalled.

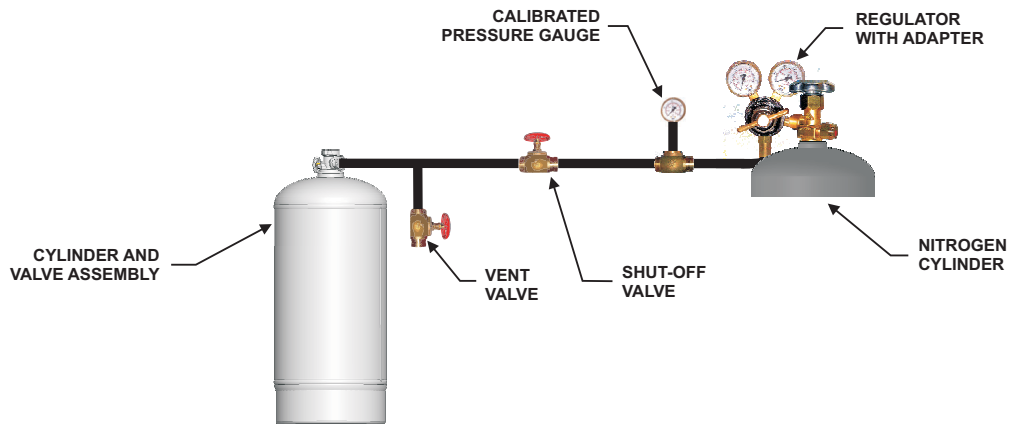


Figure 5-32. Recharge Hookup

5-3.10 Rechecking the System

After the inspections and procedures described previously in this section, and after having recharged all wet chemical cylinders, the fire-suppression system is ready to be fully checked out before installation of the recharged wet chemical cylinders.

1. Follow the system checkout and test procedures outlined in Chapter 4. Follow the procedures for XV Control System or KRS-50 Control Box mechanical and/or electrical devices as appropriate.
2. Be sure to check the system for all three modes of operation (automatic, local-manual, and remote-manual actuation).
3. After the system has been satisfactorily checked out, follow the-steps under Paragraph 4-6 "Commissioning the System."
4. After completing the "Commissioning the System" procedure, the system will be online and ready to protect the process, equipment, or combustibles. As with any equipment, periodic maintenance must be performed as indicated in Table 5-1.