



Compact Filter

Operators Manual



shall not in any event be liable for consequential or incidental damages and this agreement provides purchaser's sole and exclusive remedy. Any actions for breach of this agreement or warranty must be commenced within one year after the cause of action has occurred.

When you purchased your new Kice equipment, you bought a dependable and quality-built product. The range of equipment manufactured by Kice should satisfy nearly every conceivable industrial air-handling need.

We are proud of our products and the people at Kice who build them. At Kice, we start in our own foundry and follow the design and manufacturing standards that have proven superior for more than 75 years.

This owner's manual is intended as a guide for proper installation, operation and maintenance to keep your Kice equipment operating safely and efficiently on the job. Service and factory reconditioning information is also included for your benefit.

Sincerely,

Drew Kice
President
Kice Industries, Inc.

Warranty

The Company (Kice Industries, Inc.) warrants the equipment manufactured by the Company to be free of defects in material and workmanship for a period of one year from the date of shipment. Company agrees to repair or replace, at its option, any parts found to be defective in the opinion of the Company. Company is not liable for any costs in connection with the removal, shipment or reinstallation of said parts. This warranty does not apply to abrasion, corrosion, or erosion.

Purchaser agrees to look to the warranty, if any, of the manufacturer or supplier of equipment manufactured by others and supplied to the Company for any alleged defects in such equipment and for any damages or injuries caused thereby or as a result thereof.

PURCHASER SHALL BE RESPONSIBLE FOR COMPLIANCE WITH ELECTRICAL COMPONENT MANUFACTURER'S RECOMMENDATIONS, UNDERWRITERS CODE AND ALL SAFETY PRECAUTIONS.

The only warranty extended under this agreement is the above express warranty and there are no other warranties, express or implied, including warranties of merchantability, fitness for a particular purpose or otherwise which extends beyond the face hereof. The Company and its dealers

2. IMPORTANT INFORMATION

Write down the MODEL and SERIAL NUMBER of the Kice equipment along with the same information for the auxiliary equipment. (Airlock valves, fans, speed reducers, motors, and sheaves size, type and any special modifications to standard).

For additional information, application assistance or special service, please contact us by phone at 316-744-7151 or email at sales@kice.com. We'll need to know the MODEL and SERIAL NUMBER of your Kice equipment. For ready reference, please record this information and the date of delivery or installation on the lines below. See the General Information section for the location of model and serial number.

Model _____

Serial Number _____

Date of Delivery or Installation _____

Additional Notes:

[illegible]

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3. GENERAL INFORMATION

To The Owner

The purpose of this manual is to assist owners and operators in maintaining and operating the Kice equipment. Please read it carefully; information and instructions furnished can help you achieve years of dependable performance. If the manual is not included in your owner's packet, please contact our Customer Service Department.

Using This Manual

General operation and maintenance guidelines are outlined for owners and operators of Kice equipment. Operating conditions vary considerably and cannot be addressed individually. Through experience however, operators should have no difficulty in developing good operating, safety and monitoring skills.

The terms “**disconnect and lockout**” or “**lockout/tagout**” as used in this manual means that power to the equipment has been disconnected through the use of a padlockable,

manual power cutoff or power lockout switch pursuant to 29 CFR 1910.147.

Photographs and illustrations were current at the time of printing but subsequent production changes may cause your equipment to vary slightly in detail. Kice Industries, Inc. reserves the right to redesign and change equipment as deemed necessary, without notification. If a change has been made to your equipment that is not reflected in this owner's manual or the Illustrated Parts Lists, write or call Kice Industries, Inc. for current information and parts.

Equipment Parts and Service

For service or assistance ordering parts, contact the Customer Service Department or Quick Ship Department.

Kice Industries, Inc.
5500 Mill Heights Drive
Wichita, Kansas 67219-2358
Toll Free: (877) 289-5423
Main Phone: (316) 744-7151
Fax: (316) 744-7355

IMPORTANT: Any unauthorized modification, alteration or use of non-approved attachments or drive units voids the warranty and releases Kice Industries, Inc. from any liability arising from subsequent use of this equipment. All Kice equipment is configured to be used in specific situations, handling particular types of material. Using equipment for any purpose other than that for which it was designed could result in personal injury as well as product or property damage.

NOTICE: Kice Industries, Inc. is the only authorized rebuilder of Kice equipment.

Kice equipment is designed and built to provide years of operation. As with any equipment, the following rules are essential for trouble-free operation:

- Proper installation.
- Regular maintenance.
- Correct operation within original design parameters.
- Proper application within a process.

Failure to properly install, maintain or operate Kice equipment can result in a variety of problems, including but not limited to: poor equipment performance, decreased equipment life, equipment failure, or dangerous operating conditions.

Purchased items (such as speed reducers, motors, and positive pressure pumps) are covered by the manufacturer's warranty. If there is a problem with a purchased item, check with the local supplier or service representative.

Model and Serial Number

The equipment model and serial number can be found near the top of the filter next to the pulse valve.

KICE Industries, Inc.
5500 N. Mill Heights Drive
Wichita, KS 67219
USA

P: (316) 744-7151
www.kice.com

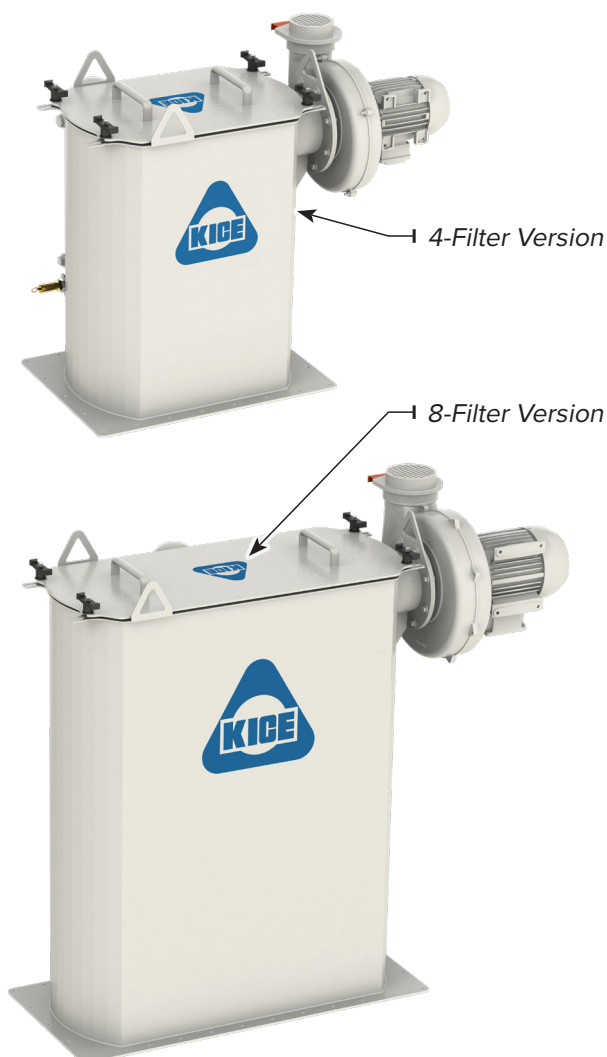
MODEL:

SERIAL:

DATE:

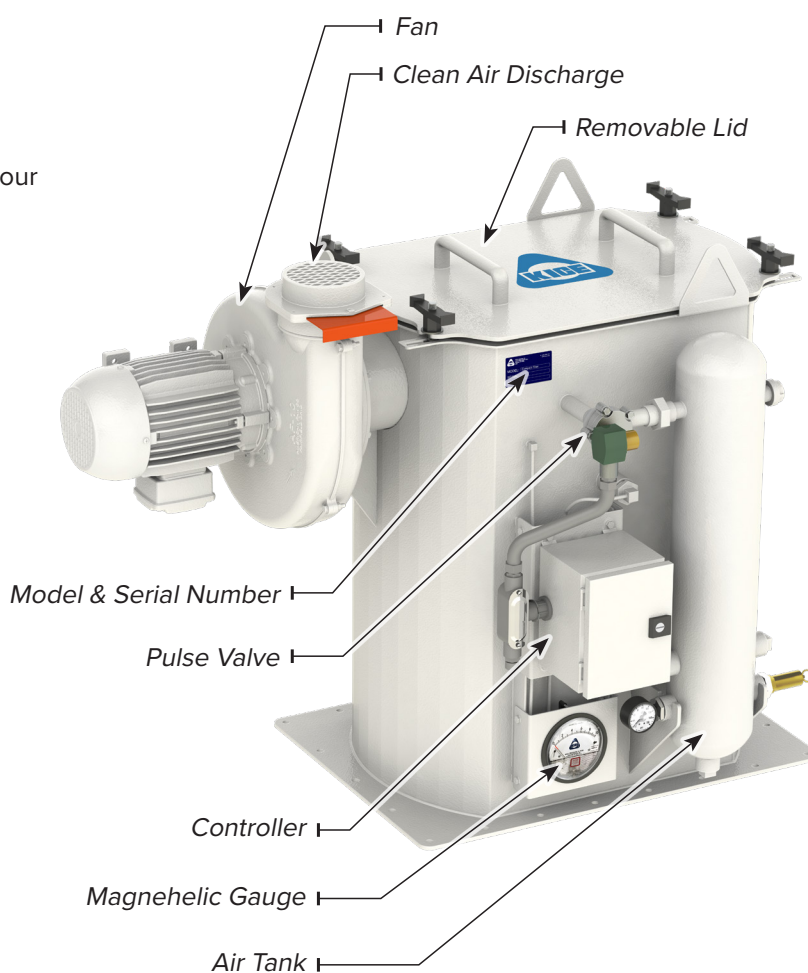
Model Types

There are two configurations of the compact filter; the four filter and eight filter version as shown below.



Filter Terminology

The image below shows some of the standard and optional features of your Kice Compact Filter. Note that this image is representative only; your machine's appearance may vary depending on the model and installed options.



4. HAZARD LEVEL ICONS

Hazard Levels Symbols - In Manual

Throughout this manual you'll see icons that are specific to hazards or dangers. Refer to these symbols and their respective definitions as you install, maintain, and repair your Kice equipment.



DANGER

Danger is used to indicate the presence of a hazard that **WILL** cause **SEVERE** personal injury, death or substantial property damage if the warning is ignored.



WARNING

Warning is used to indicate the presence of a hazard that **CAN** cause **SEVERE** personal injury, death or substantial property damage if the warning is ignored.



CAUTION

Caution is used to indicate the presence of a hazard that **WILL** or **CAN** cause **MINOR** personal injury or property damage if the warning is ignored.



NOTE – This symbol indicates practical tips and guidance that could be helpful.



REFERENCE MATERIAL – This symbol indicates further information is referenced in or outside of this manual.

5. SAFETY PRECAUTIONS

Safety Symbols - On Equipment



This safety alert symbol is used to call your attention to an important safety messages on equipment, safety decals and in manuals, to warn you of possible danger to your personal safety. When you see this symbol, be alert. Your personal safety or the safety of others may be affected. Follow the instructions in the safety message.

On Equipment Safety Decals - On Equipment

Equipment safety decals should not be removed, covered, painted or otherwise become illegible. If this occurs they should be replaced immediately. Contact Kice Industries, Inc. Customer Service Department for replacements.



All owners and operators should read this manual and be instructed in safe operating and maintenance procedures before attempting to uncrate, install, operate, adjust or service this equipment.

WORK SAFELY AT ALL TIMES

GSP_FM_10182017

- All energy sources associated with the equipment must be locked and tagged out in compliance with 29 CFR 1910.147, local enforcement authorities, OSHA, and facility safety practices, before removing any protective cover, guard, grate or maintenance gate.
- It is the owner's and employer's responsibility to adequately train each operator in the proper and safe use of the equipment. Written safety programs and formal instruction are essential. All new employees must be made aware of company policies, standard operating procedures (SOPs) and established health and safety procedures.
- Experienced employees should receive refresher training for potential hazards and up to date training records should be maintained at the job site.
- Do not attempt to install, connect power, operate or service the equipment without proper instruction and until you have been thoroughly trained in its operation and use by your employer.
- Before applying power to any equipment, make certain that all personnel are clear of the machine.
- Always operate safely. Use personal protective equipment (PPE) such as hard hats, helmets, gloves, earplugs, protective eye-wear, etcetera when and where appropriate. Keep PPE in good repair and accessible to operator or other affected personnel.
- If it becomes necessary to climb into the filter for service or repair work, adequate securing devices and fall arresters must be worn by personnel.
- The equipment is fully encapsulated if properly connected during installation and should only be operated after all pipes and hoses, including upstream and downstream components, have been completely connected to the piping system. This will prevent human access while the machine is running.
- All protective covers, guards, grates, maintenance panels, switches and warning decals must be kept in place and in good repair. Any equipment with a damaged, malfunctioning, defective, or missing protective device must be taken out of service until the protective device can be repaired or replaced.
- The equipment may also have factory supplied guards for rotating components. Do not connect power to or operate the equipment unless all moving parts are completely enclosed and all guards, grates and maintenance panels are in place and securely fastened.
- Do not abuse, overload, mistreat or misuse the equipment or attempt to operate the equipment if it needs service, lubrication, maintenance or repair.
- The equipment may be installed and programmed to start automatically or be controlled from a remote location. Always keep clear of all moving parts on industrial equipment, until the **POWER IS TURNED OFF AND LOCKED OUT**.
- Do not attempt to work on, clean or service the equipment, open or remove any protective cover, guard, grate, connection or maintenance panel until the **POWER IS TURNED OFF AND LOCKED OUT**. A main disconnect device must be installed to achieve this.
- The compressed air supply must be disconnected from the system before service and repair work is carried out. The switch-off devices for the compressed air supply, as with the electrical supply, are the responsibility of the distributing company (operator) of the overall system.
- During installation and operation, make sure the motor and frame of each piece of equipment, including the filter, is effectively and separately grounded in accordance with OSHA safety and health standards, the National Electrical Code, local codes and DIN EN 60204-1 or DIN EN 60439-1 as required for the classified area.
- High voltage and rotating parts can cause series or fatal injury. Only qualified, trained, and experienced personnel should perform installation, operation, and maintenance of electrical machinery.
- If equipped with a maintenance panel incorporating any Protective Interlocking Limit Switch (PLS), the PLS must be interlocked with all electrical controls so that all motors or powered devices on the unit will be de-energized if any protected cover, guard, grate, or maintenance panel is open or removed. Interlock function of the PLS must be tested and logged daily by supervisory personnel.

- Never attempt to manually override or electrically bypass a safety device.
- Filters must be equipped with a properly functioning Protective Interlocking Electrical Control Switch (PCS), a Pad-lockable Manual Power Lockout Switch, along with the other basic safety equipment listed above. On-Off, interlock and padlock functions of the PCS must be tested and logged periodically by supervisory personnel.
- Any device powered by air or hydraulic pressure must be equipped with a properly functioning Padlockable Manual Pressure Lockout and Internal Pressure Relief Valve (PLV) capable of safely relieving motive pressure between the isolation valve and device.
- Any equipment used in the processing of combustible materials or in hazardous environments require evaluation by the owner and regulatory bodies to determine appropriate monitoring equipment, dust control, explosion protection and electrical equipment enclosures. Do not use the equipment in hazardous environments unless properly equipped for the hazard.
- Always keep the workplace clean and free of dirt and dust. Do not attempt to work on slippery or unsafe surfaces, ladders or work platforms when maintenance or repair work is being performed on the equipment.
- Do not use a ladder or work platform unless it is in good repair and rated for the load required. Do not exceed maximum load ratings when installing or servicing equipment.
- Never stand under any kind of hoists or lifting mechanisms whether or not it is loaded or in operation. Never stand under or near a component when it is being lifted.
- All equipment lifting devices must be inspected by qualified personnel before each use. Do not use a lifting device to transport equipment. Never use a lifting device that is damaged, deteriorated or in need of repair.
- The unit must be lifted by a means with sufficient lifting capacity.
- The operator must ensure that adequate lighting conditions are provided at the location of equipment operation.
- Never allow any kind of metal or other foreign objects to enter the equipment while in operation, unless the system is specifically designed as a wire or metal reclaim system. Examined raw materials should be used through the machine to ensure proper and consistent operation. A material separator should be installed on the raw gas inlet.
- Special attention must be devoted to outside contractors engaged to enter and perform work on the equipment or in the workplace. Particular care must be exercised to ensure all such personnel are fully informed of potential hazards and plant safety procedures. Special emphasis should be placed on the use of explosion proof electrical, cutting, or welding tools where required.
- Free outlet of product must be guaranteed at all times. Otherwise, blockage and severe damage may result, or a dangerous situation may occur.
- Airflow to the equipment must be switched off long enough (approximately 30 minutes) for dust to settle in the raw gas or dirty air chamber before the service entrance is opened. This is to prevent zone entrainment and mitigate the risk of a potential event outside the system.
- Drive components must be inspected and adjusted after transportation and periodically as required by operating conditions. Check sprocket, sheave and coupling alignment and spacing, drive belt tension, setscrews, keys, fasteners, bearings, shafts, and motors as appropriate to job conditions.
- It is ultimately the operator's responsibility to apply the above listed precautions and ensure proper equipment use, maintenance and lubrication. Keep these instructions and list of warnings with your machine at all times.
- It cannot be assumed that every acceptable safety procedure is contained herein or that abnormal or unusual circumstances may not warrant or require additional procedures.

6. INSTALLATION PREPARATION

The filter has been inspected at Kice prior to shipment and should be in excellent condition upon delivery. A thorough customer inspection of the filter and any accessories should be completed upon receipt to verify its condition.

Delivery inspection should be completed before signing carrier's release. When a carrier signs the Kice Industries, Inc. bill of lading, the carrier accepts responsibility for any subsequent shortages or damage, evident or concealed. Therefore any resulting claim must be made against the carrier by the purchaser. Evident shortage or damage should be noted on the carrier's delivery document before signature of acceptance. Inspection by the carrier for damage, evident or concealed, must be requested.

7. STORAGE

Kice Compact Filters are shipped in many different configurations. Some units are completely assembled and skidded when size permits. These units may be handled and moved using good rigging techniques, being careful to avoid concentrated stresses that will distort any of the parts. Items or parts of the filter that are shipped knocked down will be clearly labeled for reassemble. If the filter is not to be installed promptly, store it in a clean, dry location to prevent rust and corrosion of steel components. If outdoor storage is necessary, protection should be provided. Cover any openings to prevent the accumulation of dirt and moisture inside the housing. Cover motors with waterproof material. Refer to the motor maintenance information for further storage instructions.

8. INSTALLATION

Use appropriate equipment when lifting or moving the compact filter. Make sure all persons and obstructions are clear from the path and installation area. When installing the equipment, make sure the moving parts inside the equipment are not accessible.

Contact Kice Industries, Inc., for any installation questions.
See following pages for installation details.

The following hazards are present:



WARNING

Use appropriate equipment when lifting or moving the compact filter. Make sure all persons and obstructions are clear from the path and installation area. When installing the equipment, make sure the moving parts inside the equipment are not accessible.

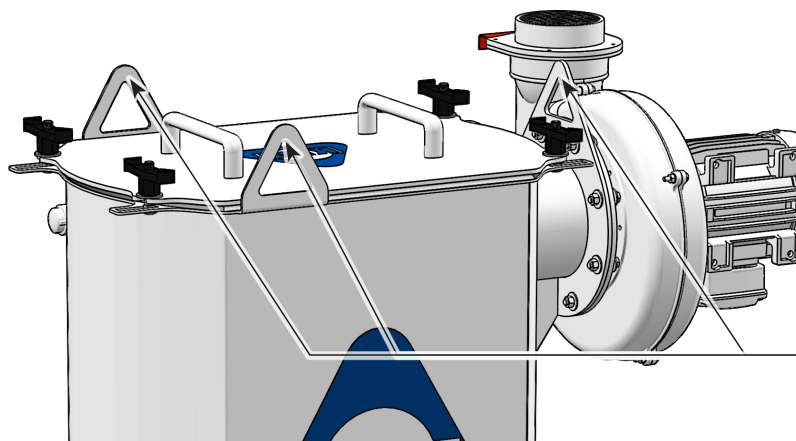


WARNING

High voltage and rotating parts can cause serious or fatal injury. Only qualified personnel should perform installation, operation and maintenance of electrical machinery. Make sure that any electric motor and the frame of the filter is effectively grounded in accordance with OSHA standards, the National Electrical Code and local codes.

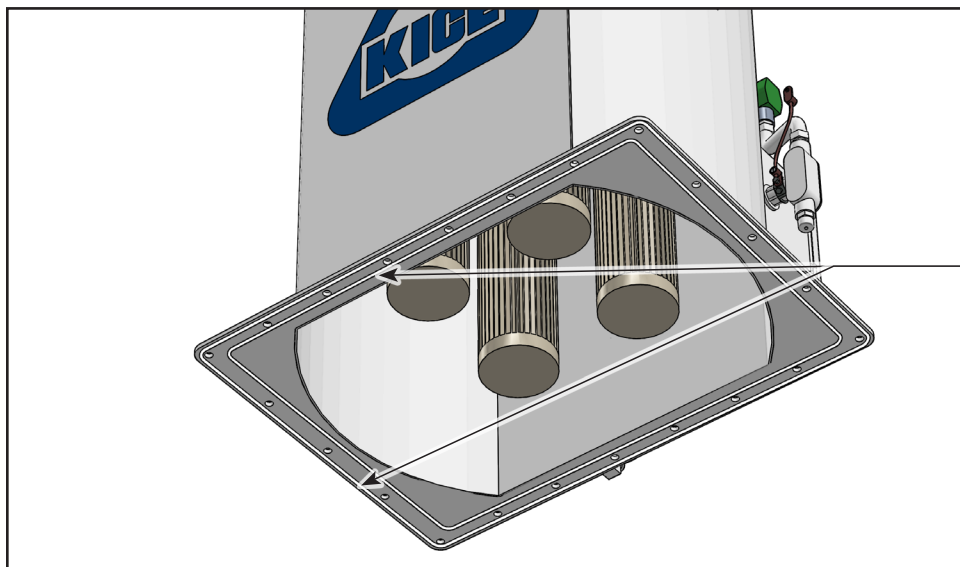


WARNING

**Step 1****□ Move Filter to Install Area**

Move filter to install area using proper equipment and rigging.

↑ Lift only by indicated lugs.

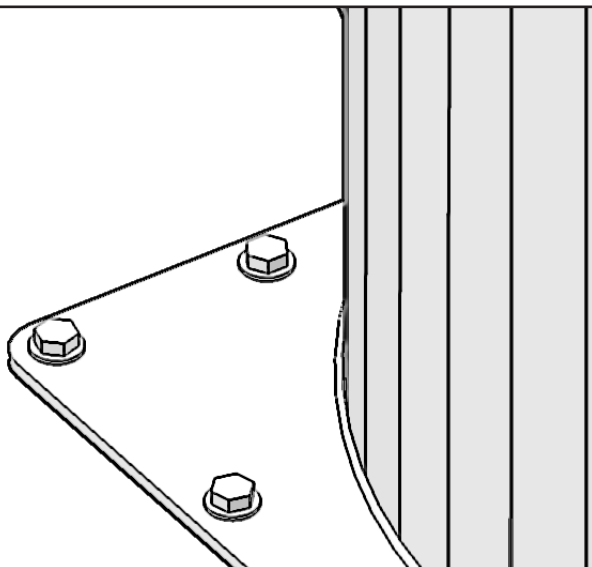
**Step 2****□ Add Caulking to Flanges**

Caulking can be added to either filter or mating flange. Mating surfaces should be free of any foreign materials. Check all flanges.

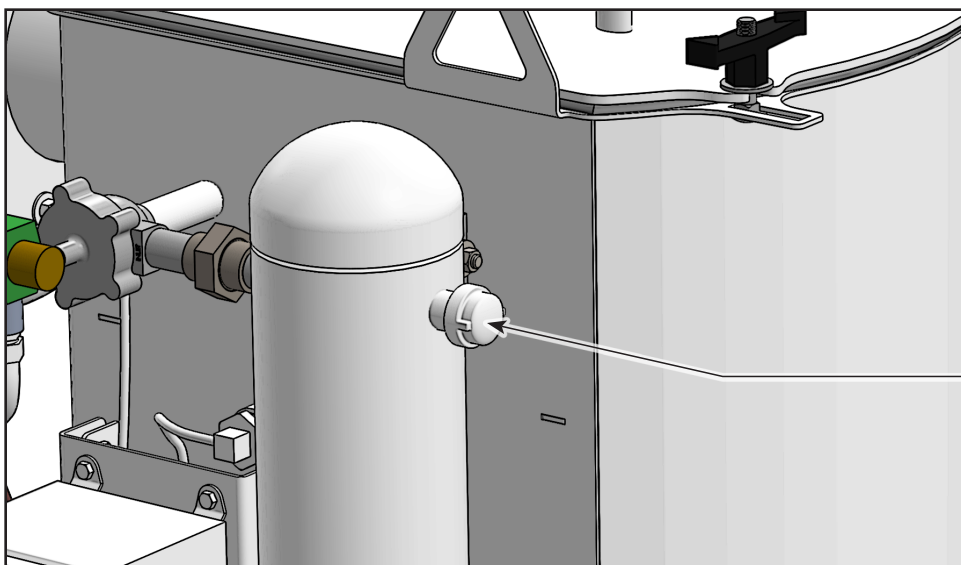
↑ Place two beads of caulking around inside and outside perimeter.



WARNING

**Step 3****□ Install Fasteners**

Ensure all fasteners are securely tightened to mating flange.

**Step 4****□ Connect Air Supply**

Connect medium pressure air supply (80-100 psig) to the filter air tank, utilizing the pressure regulator, filter and valve(s), if required.

→ Air line connection.

Electrical Installation

Electrical conduit and junction tees are furnished with each filter. The electrical manifold is pre-wired from the solenoids directly to the control box. A local electrician must run the required power connections to the control box.



Notice: Reference page 12 in the Filter Operation section for timer settings.



Notice: Reference page 31, Appendix D for wiring diagram.

Step 5**□ Install Cartridge Filters**

Reference page 15 in the Filter Maintenance Section.

Step 6**□ Reassemble**

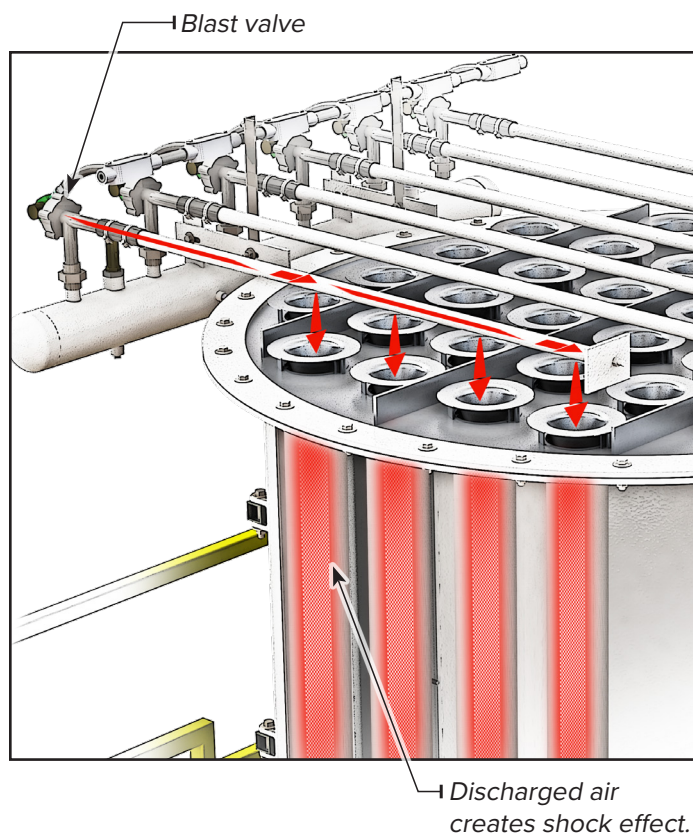
Reassemble any doors or covers removed during installation.

Step 7**□ Test Run**

Test run the filter. If any unusual noises occur, disconnect and lock out the power. Reference page 19 in the Troubleshooting Section.

9. FILTER OPERATION

Early day filters were simply dust chambers with cloth bags that had to be cleaned manually by shaking or rapping the bags to remove the dust. Mechanical shakers were devised to do the same thing, but compressed air jets provided a more positive cleaning effect. It is necessary to operate the cleaning jets at approximately 100 psig of pressure in order to induce the supplementary air volume (through a venturi) needed to provide adequate bag cleaning. The compressed air needs to be clean, dry, and oil free.



The compressed air is piped to the air tank mounted on the side of the filter, next to the clean air chamber. The Kice Venturi-Jet blast valves are located between the air tank and the manifold lines that run inside the clean air chamber above the filter cartridges. Each cartridge has an integral venturi. The air tank is filled with compressed air to a pressure of 80-100 psig, at which time an electric signal is sent to activate a solenoid on one of the Kice Venturi-Jet blast valves. The valve opens and quickly discharges the tank of pressurized air through the manifold and into the venturis located at the top of each of the filter cartridges. This pulse of air causes the dust particles collected externally on the filter media to be dislodged and fall into the hopper. After an adjustable amount of time, the controller cycles to the next Kice Venturi-Jet blast valve in

sequence and activates its solenoid, which releases air to clean the next row of filter cartridges.

The Kice Venturi-Jet blast valves are mounted between the air tank and the cleaning manifolds. The Kice Venturi-Jet blast valve is a 2 way, normally closed, diaphragm type valve utilizing a spring and air pressure above the diaphragm to cause the diaphragm to seal. When the pressurized air above the diaphragm is exhausted to the atmosphere through the solenoid valve, the diaphragm lifts to the open position. The air in the tank is then discharged into the cleaning manifold in a fraction of a second (the pulse duration is adjustable by the "on-time" setting in the control panel). When the solenoid valve closes the pressure equalizes, allowing the diaphragm to close. As this high pressure jet of air is fired through an orifice in the manifold and into the venturi located at the top of the filter cartridge, the jet of high-pressure air induces additional air from the clean air chamber to flow into the cartridge. This creates a shock effect that dislodges dust and other foreign material that is caked on the outside of the filter cartridge.

Operating Logic

The controller is electronic, mounted either in a NEMA 4 or an explosion proof enclosure.

The controller operates continuously. Upon application of input voltage, the controller starts timing. At the set time, the controller activates the valve and resets the timer. This continues until the input voltage is removed. The timer is a Macromatic TR-6512U. It operates on 24-240V AC @ 50/60 Hz or 12-125V DC with a maximum load of 3 VA. For VC 2x4 models: The output of the timer is run through an alternating relay. This relay switches the output between the two valves, alternating which set of 4 filter cartridges is cleaned. For 24V DC systems the alternating switch is Macromatic ARP024A6 and for 120V AC systems it is Macromatic ARP120A6.

Timing

The timer can be set between 0.05 seconds and 100 hours. The filter is hard wired to operate with T2 as the delay between the valve being opened and T1 as the time the valve is open. To set the times, first select the range (A thru P) and then adjust the time within the selected range by rotating the large knob. Note: The tick marks are for reference only.

Kice recommends setting T1 in range A between 0.10 and 0.5 seconds. T2 should be set to conserve plant air by maximizing the cycle time while still properly cleaning the filter cartridges.

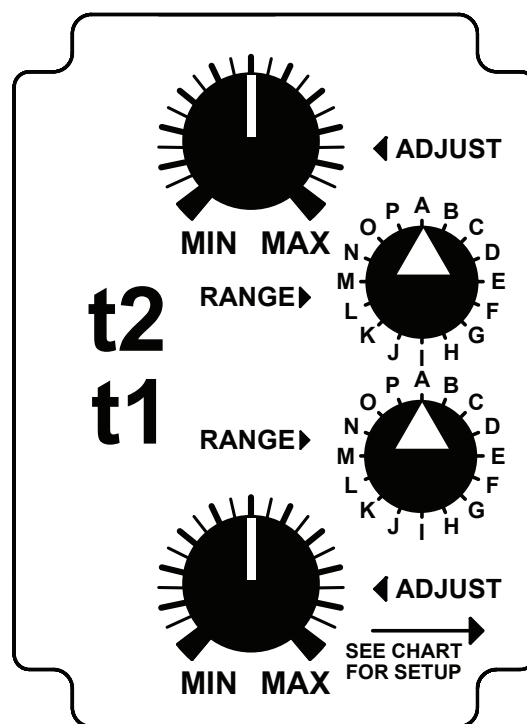
Dial Setting	Timing Range	
A	0.05 - 0.5 Sec.	Seconds
B	0.1 - 1 Sec.	
C	0.5 - 5 Sec.	
D	1 - 10 Sec.	
E	3 - 30 Sec.	
F	6 - 60 Sec.	
G	0.2 - 2 Min.	Minutes
H	0.5 - 5 Min.	
I	1 - 10 Min.	
J	3 - 30 Min.	
K	6 - 60 Min.	
L	0.2 - 2 Hr.	Hours
M	0.5 - 5 Hr.	
N	1 - 10 Hr.	
O	2.4 - 24 Hr.	
P	10 - 100 Hr.	

How to Adjust "OFF" Time

Step 1

□ Set T2 dial position for the desired time range – see chart. This should be set based on actual conditions and adjusted to balance cleaning efficiency, bag life, and air usage. Kice recommends starting around “E” and “max”. This will provide an “OFF” time between 30 – 60 seconds. This should be adjusted based on the actual conditions.

Notice: Timer relay is voltage **INDEPENDENT** (rated for 24vDC or 120vAC)



How to Adjust "ON" Time

Step 1

□ Make sure alternating relay is set to “ALTERNATE” function.

Step 2

□ Set T1 dial position for desired timing range – see chart. Kice recommends the “A” setting or 0.05 – 0.5 seconds ON

Step 3

□ Set adjustment dial for “min” to “max” of the range above.

EXAMPLE: If set to “A” and “min” the “ON” time is about 0.05 seconds; if set to “A” and “max” the “ON” time is about 0.5 seconds.

Start-Up Procedure

Step 1

- Check plant pressure in the filter air tank. The air tank pressure gauge should have a working range of 80-100 psig.

Step 2

- Controls should be wired in accordance with schematic diagram. Compact filters are normally pre-wired, fully assembled and tested at the factory.

Step 3

- Set the controller "off" time adjustment to the minimum time by rotating the dial counterclockwise. Allow the sequence controller to operate for 5 to 10 minutes to assure the mechanism has not been damaged in shipment and to allow a short run-in time for the electronics.

Step 4

- Set the controller "off" time adjustment to a longer time span by rotating the dial clockwise until you cannot turn the dial any further. With the "off" time adjustment at this setting, check to insure that the relief valve relieves at no more than 125 psig. This provides pressure relief safety for the air tank.

Step 5

- Set the controller "off" time adjustment to the desired time by turning the dial to the desired setting.

Shut-Down Procedure

After the filter is placed into operation, a good practice to follow on shutdown is as follows:

Step 1

- Shut off the suction fan only.

Step 2

- Allow the reverse air cleaning to operate for at least 15 minutes (a longer period of time is desirable if the operation will allow).

Step 3

- Then shut down the remainder of the system.

10. FILTER MAINTENANCE

The following hazards are present:



Depressurize the valve and bleed air from the air tank before making repairs. To do so, it is only necessary to activate the solenoid on the pilot valve or remove one pilot valve from one blast valve.



When performing maintenance, all energy sources associated with the filter must be locked and tagged out in compliance with 29 CFR 1910.147, local enforcement authorities, OSHA, and facility safety practices, before removing any protective cover, guard, grate or maintenance gate.

Daily Filter Inspection

Step 1

□ Check and note pressure differential across the filter cartridges. It is recommended that filter cartridges be replaced when they can no longer be cleaned to 6.0" WC differential pressure.

Step 2

□ Check the electronic controls to make sure all valves are operating.

General Valve Maintenance

Cleaning:

Periodic cleaning of all valves is desirable. The time between cleaning will vary, depending upon the condition of the plant air supply. In general, sluggish valve operation or excessive leakage or noise will indicate that cleaning is required.

Preventative Maintenance:

Periodic inspection of internal valve parts for damage or excessive wear is recommended. Thoroughly clean all parts. Replace any parts that are worn or damaged.

Causes of Improper Operation:

1. Incorrect Pressure: Check valve pressure. Pressure to valve must be within 5/125 psig.
2. Excessive leakage: Disassemble valves and clean all parts. Replace parts that are worn or damaged with a complete Spare Parts Kit (#96-875, [see Appendix A](#)).
3. Failure to Open or Close:
 - a. If the blast valve stays open, the bleed hole in the diaphragm may be clogged. If the blast valve stays

closed, the diaphragm may be torn. Disassemble the valve and clean or replace the diaphragm assembly.

b. Failure of the solenoid operated pilot valve can also cause the blast valve to stay closed or open. Inspect the solenoid operated pilot valve for proper operation.

Kice Venturi-Jet Blast Valve

Description:

The Kice Venturi-Jet blast valve is a 2 way, NC, diaphragm type air valve designed for remote pilot operation. This valve has an angle type aluminum body with a 1/8" NPT connection in the bonnet.

NOTICE: Reference *ASCO Valves installation and maintenance instructions in Appendix A*.

Kice Solenoid Operated Pilot Valve

Description:

The Kice solenoid operated pilot valve is a 2 way, NC, direct-acting solenoid valve designed as a pilot for a larger diaphragm valve for remote pilot operation. This valve has a rugged brass body with a general purpose (green) or explosion proof (black) solenoid enclosure.

NOTICE: Reference *ASCO Valves installation and maintenance instructions in Appendix B*.

Solenoid

Description:

The Kice pilot valve is operated by an ASCO Red-Hat II epoxy encapsulated solenoid. The green solenoid with lead wires and 1/2" conduit connection is designed to meet Enclosure Types 4 and 4X – Watertight. The black solenoid (designated by catalog number prefix "EF") is designed to meet Enclosure Types 7 and 9 – Explosion proof.

Solenoid:

Types 4 and 4X (Green) - #8262G2
Types 7 and 9 (Black) - #EF8262G2

NOTICE: Reference *ASCO Valves installation and maintenance instructions in Appendix C*.

Installing Cartridge Filters - Accessing Dirty Air Chamber

For correct and trouble free operation filter cartridges should be installed as shown in the following instructions.

The following hazards are present:



When performing maintenance, all energy sources associated with the filter must be locked and tagged out in compliance with 29 CFR 1910.147, local enforcement authorities, OSHA, and facility safety practices, before removing any protective cover, guard, grate or maintenance gate.

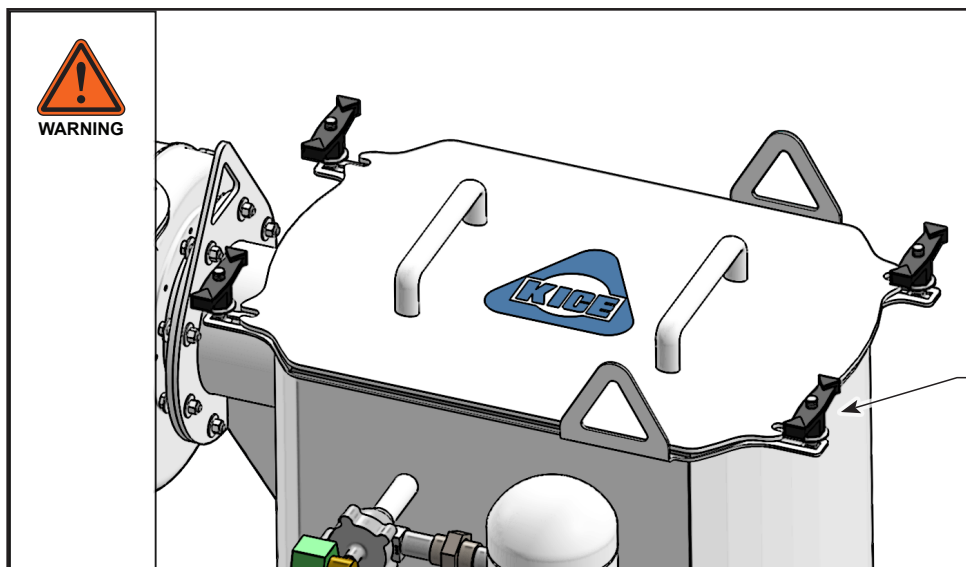


Disconnect power before touching any component part.



Depressurize the valve and bleed air from the air tank before making repairs. To do so, it is only necessary to activate the solenoid on the pilot valve or remove one pilot valve from one blast valve.

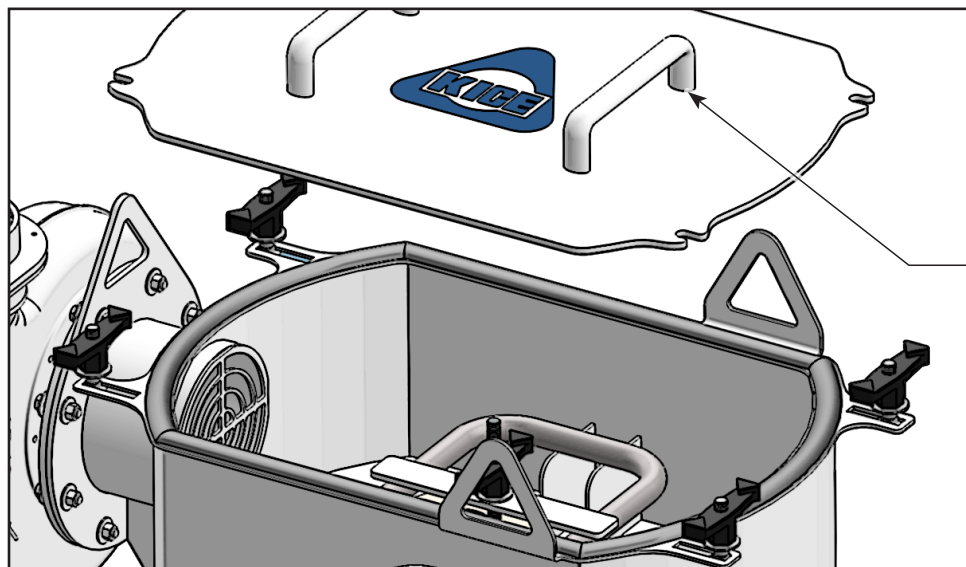
NOTICE: The filter cartridges are installed or removed directly from the top of the filter. Depending on the filter model the minimum height required above the filter to change cartridges is 24 - 36 in. Clearance should be verified before installing filter.



Step 1

Loosen Threaded Lid Locks

Loosen all lid locks and slide out of way.

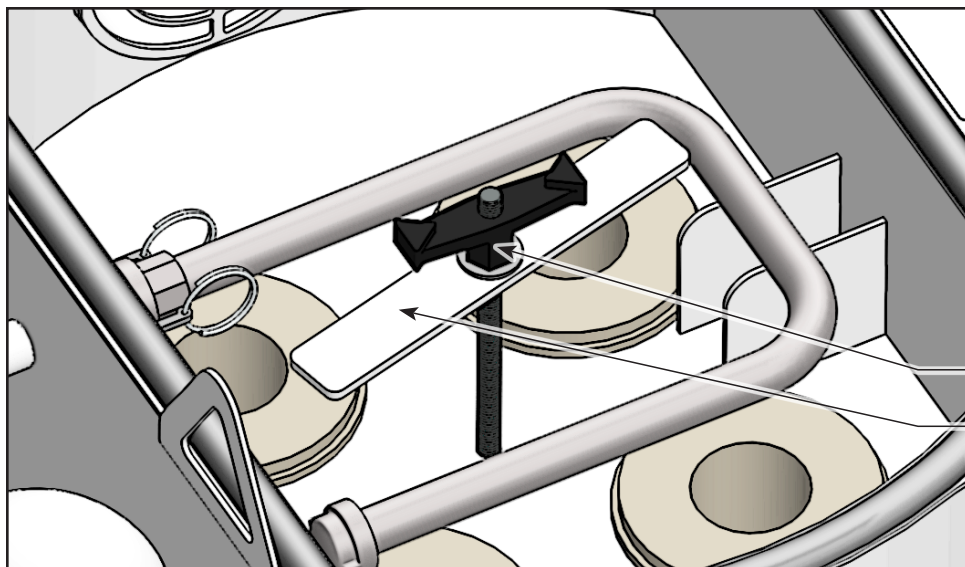


Step 2

Remove Lid

Carefully remove lid by utilizing the grab handles.

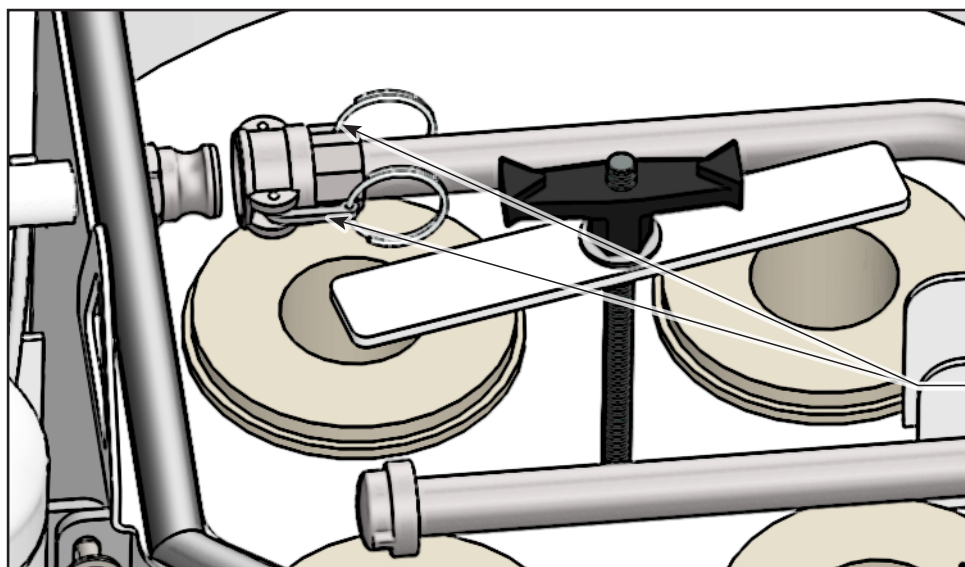
Use supplied grab handles.

**Step 3****□ Loosen Lateral Hold Down**

Turn threaded handle several revolutions to loosen lateral hold down. Pivot hold down out of way.

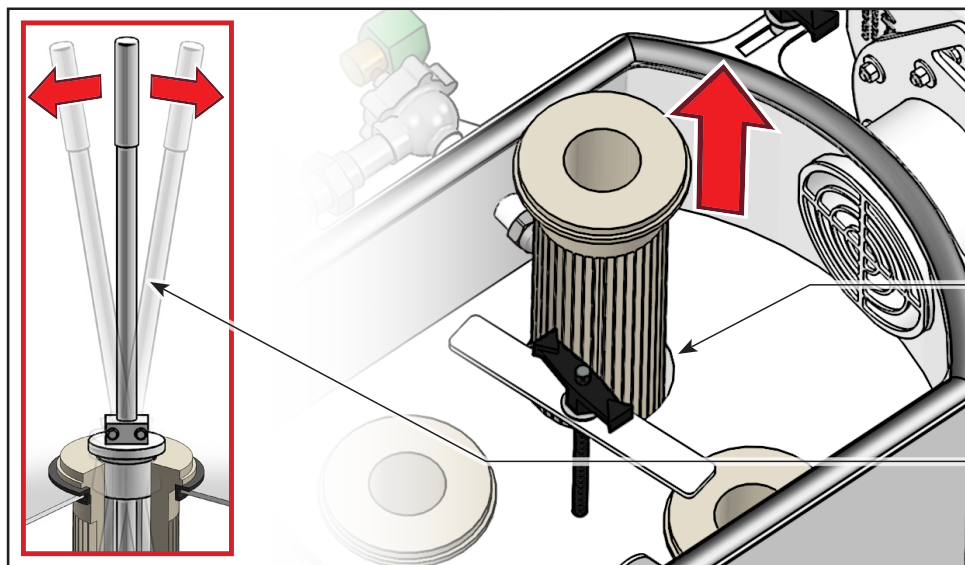
└ Threaded T-handle.

└ Lateral hold down.

**Step 4****□ Remove Lateral & Coupling**

Disengage cam locks and remove lateral and coupling. Carefully stow lateral out of way.

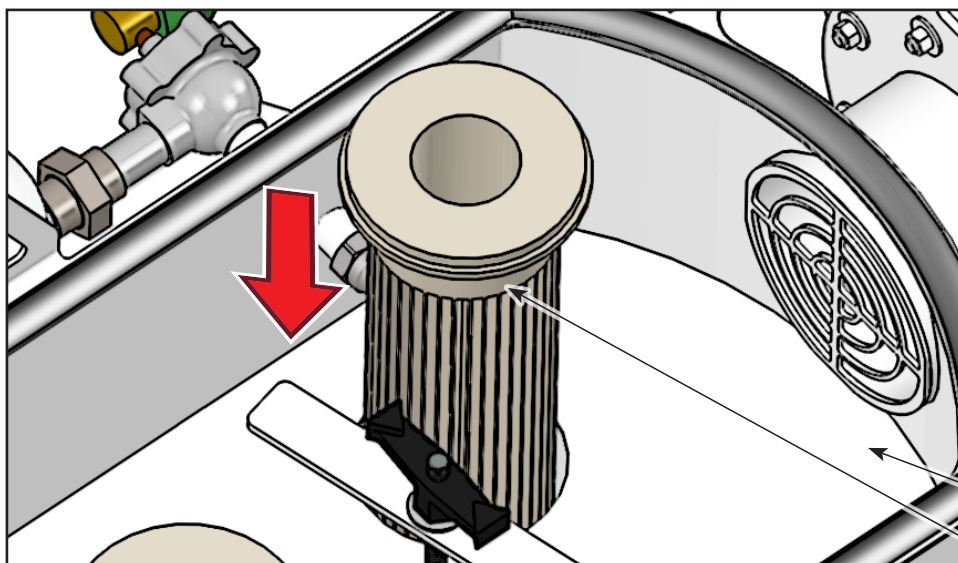
└ Cam locks.

**Step 5****□ Remove Filter Cartridges**

Carefully pull each cartridge up and out of tube sheet.

└ Cartridge is secured to tube sheet with snap fit.

└ If using Kice removal tool, insert the tool into the filter and rock side to side until cartridge releases from the tube sheet.

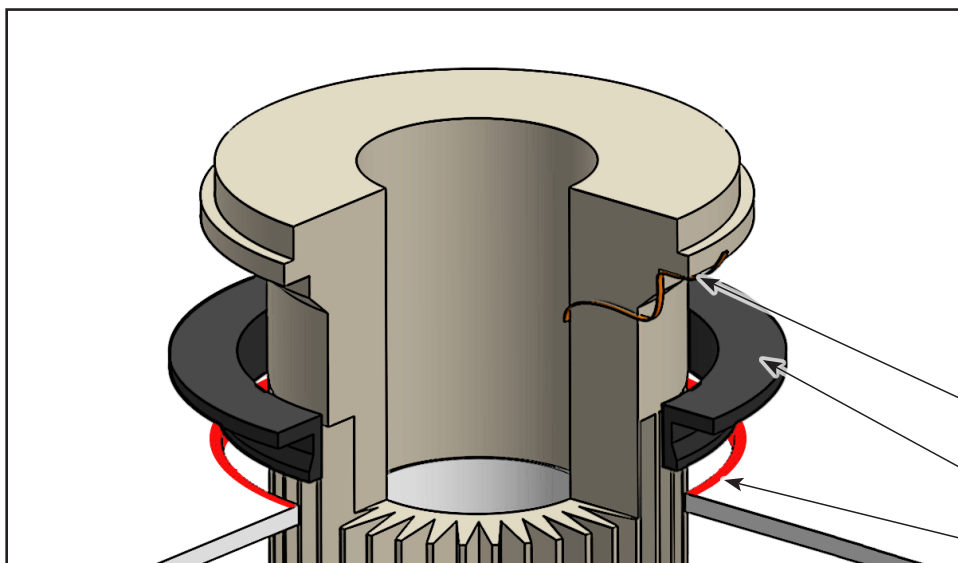
**Step 6****□ Install New Filter Cartridges**

Place the new filter cartridge into the hole on the tube sheet. Ensure the groove of the snap band is lined up with the edge of the hole in the tube sheet and let the cartridge snap into place.

Check the fit of the snap band. It should fit securely all around without any gaps. The top ring of the band should be above the tube sheet.

└ Tube sheet

└ Cartridge boot

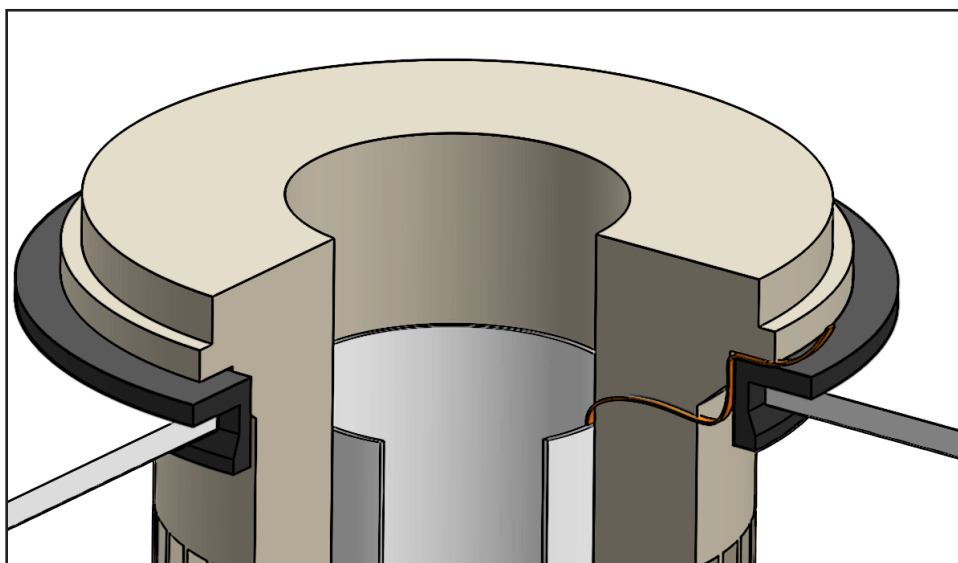
**Step 7 (Optional)****□ Install Grounding Straps Prep**

A ground strap at the top of the cartridge is intended to ground the cage to the tube sheet by way of a conductive gasket. Before installing remove any paint or coatings on the tube sheet hole. The tube sheet hole must be bare metal for conductivity.

└ Ground strap

└ Conductive gasket (Black EPDM)

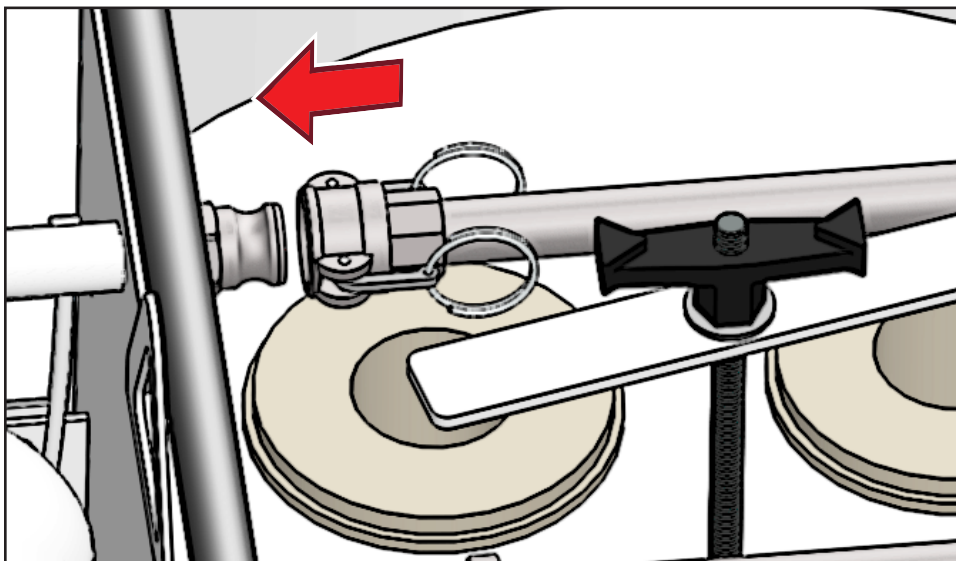
└ Bare metal surface

**Step 8 (Optional)****□ Install Grounding Straps**

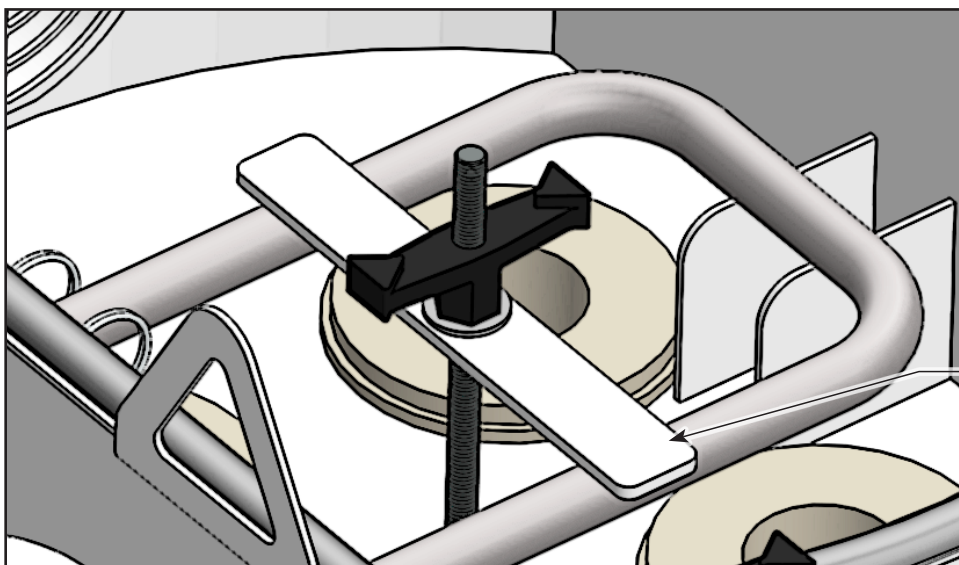
Install the cartridge and conductive gasket in the tube sheet hole ensuring the ground strap is positioned between the OD of the cartridge and ID of the conductive gasket.

Ensure proper grounding by verifying the resistance between the cage and tube sheet does not exceed 10 ohms.

Refer to NFPA 77 Recommended Practice on Static Electricity for additional information.

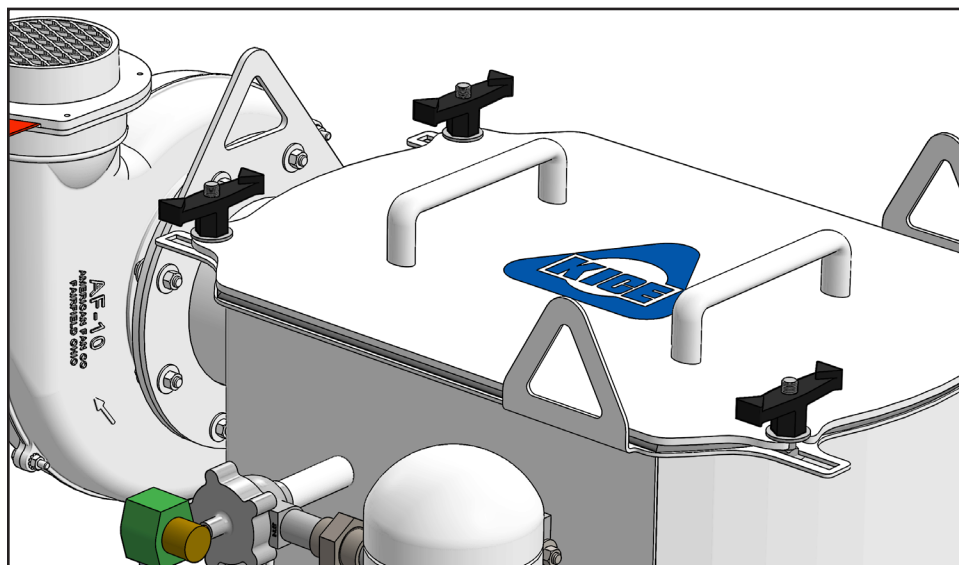
**Step 9****□ Reinstall Lateral & Coupling**

Carefully reinstall the lateral. Lower the lateral onto the support flange and align coupling. Slide into fitting and secure cam locks.

**Step 10****□ Reinstall Lateral Hold Down**

Carefully move hold down into place and tighten threaded T-handle.

Hold down should be perpendicular to fitting.

**Step 11****□ Reinstall Threaded Lid Locks**

Reinstall lid. Verify all threaded lid locks are secure.

11. TROUBLESHOOTING - COMMON PROBLEMS

The following hazards are present:



When performing maintenance, all energy sources associated with the filter must be locked and tagged out in compliance with 29 CFR 1910.147, local enforcement authorities, OSHA, and facility safety practices, before removing any protective cover, guard, grate or maintenance gate.



Disconnect power before touching any component part!



Testing and troubleshooting the circuit board with a grounded test instrument or applying any external voltage to pressure switch terminals will cause serious damage to circuit board components. Failure to comply will void any warranty.

A. Filter Discharge from Clean Air Chamber

Probable Cause/Suggested Remedies:

1. Check for holes in the filter media.
2. Check filter cartridge boot is fully seated (see Installation).

B. Pressure Drop Starts to Increase

Probable Cause/Suggested Remedies:

1. Should one venturi-jet blast valve not fire for an extended period of time, the filter cartridge could become masked with dust (see "D" - venturi-jet blast valve fails to fire).
2. If filter has 2 blast valves, ensure both blast valves are firing.
3. Check to ensure filter lateral is correctly installed and aligned with cartridges.
4. After a long period of time, the dust may buildup to the point that the filter media needs to be removed for cleaning. (This condition may be corrected by running the cleaning cycle without the dusty air flowing through the filter media section.)
5. If the air volume has been increased to the filter, the air-to-cloth ratio may exceed the recommended ratio.

C. Inlet Air Volume Insufficient

Probable Cause/Suggested Remedies:

1. Check the fan direction of rotation.

2. Check the fan speed (If connected to a VFD, check settings).
3. Check for high pressure differential (see "B" - Pressure drop starts to increase).
4. Check for leaks in the ductwork.
5. Check for plugged or partially plugged ductwork.
6. Check for closed or partially closed damper.

D. Pressure Holds Constant in Air Tank - Venturi-Jet

Blast Valve Fails to Fire

Probable Cause/Suggested Remedies:

1. Check power to the controller.
2. Check for power at the solenoid or for a faulty solenoid.
3. Check operator assembly of the 2 way solenoid valve to see if it is broken. (If the valve is faulty, replace the valve or diaphragm.)

E. Cleaning Pressure Varies

Probable Cause/Suggested Remedies:

1. Check "off" time potentiometer.
2. Check "on" time potentiometer.
3. Check pressure in air line feeding air tank.

F. Pressure in Air Tank will Not Build

Probable Cause/Suggested Remedies:

1. Check the compressed air line filter and regulator.
2. Check the compressed air line solenoid valve.
3. Check the compressed air line manually operated maintenance valve.
4. Check the venturi-jet blast valves for leaks.
5. Check to see if any of the venturi-jet blast valves are stuck open and bleeding air straight into the filter. (This is usually caused by the solenoid operated 2 way pilot valve being stuck open).
6. Check the air piping for leaks.
7. Check connections for leaks between the air tank and the venturi-jet blast valves.
8. Check plant air supply.

G. Sequence Controller Troubleshooting

Probable Cause/Suggested Remedies:

1. Check input power.
2. Check for power at the solenoid or for a faulty solenoid:
 - a. If valve stays open after it is de-energized, replace the valve.
 - b. If valve stays energized, replace the controller.

Some Things NOT TO DO

1. DO NOT mount controls in areas of high dust or corrosive atmospheres without a protective enclosure.
2. DO NOT use a converter or inverter for the power source.
3. DO NOT mount the control in a high transient voltage area without an isolation transformer.
4. DO NOT leave the control box door open.
5. DO NOT allow a local repair shop to repair the controller. For service info call Kice.

Replacement Parts

It is recommended that only Kice supplied replacement parts be used. These parts carry a standard Kice warranty.

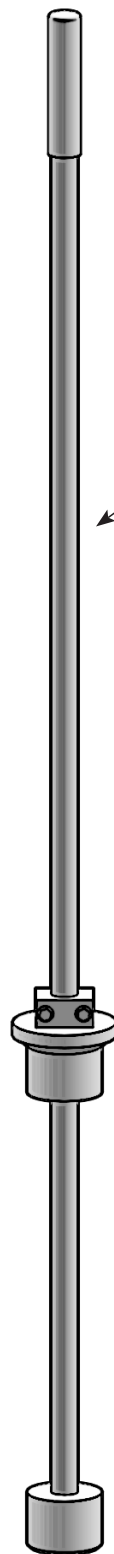
When ordering solenoids for ASCO solenoid operators or valves, order the number stamped on the solenoid. Also, specify voltage and frequency. When ordering a replacement electronic controller, refer to the Filter Maintenance and Service section.

Cartridge Removal Tool

Kice now offers a cartridge removal tool that can make the process of changing cartridges easier and faster. To purchase contact Kice at:

Kice Quickship Department
Toll Free: (877) 289-5423
Phone: (316) 744-7151
Email: quickship@kice.com
Hours: 8 a.m. – 5 p.m. CST

Cartridge Removal Tool Part Number: 10003803



Kice Cartridge Removal Tool
Part Number: 10003803

12. APPENDIX A

I&M No. V 5162 R6

INSTALLATION AND MAINTENANCE INSTRUCTIONS REMOTE PILOT OPERATED 2-WAY VALVES

BULLETIN

8353

Kit No. 96-875

DESCRIPTION

Bulletin 8353 is a 2-way diaphragm type air valve designed for remote pilot operation. Valves have an angle type aluminum body with a 1/8 N.P.T. connection in the valve bonnet for connection to the ASCO remote pilot valve. Valves are designed for multi-unit installations with separately mounted ASCO pilot valves.

OPERATION

When remote pilot valve opens, pressure above the diaphragm is released allowing main line pressure to act against the underside of the diaphragm, opening the main valve orifice. When pilot valve closes, main line pressure bleeds to the top of the diaphragm and closes the main orifice.

INSTALLATION

Check valve bonnet for correct catalog number, pressure and service.

POSITIONING

Valve may be mounted in any position.

PIPING/TUBING

Connect piping to valve according to markings on valve body. Apply pipe compound sparingly to male pipe threads only; if applied to valve threads, it may enter the valve and cause operational difficulty. Pipe strain should be avoided by proper support and alignment of piping. When tightening pipe, do not use valve as a lever. Wrenches applied to valve body or piping are to be located as close as possible to connection point. The remote ASCO pilot valve should be mounted as close as possible to the main valve. For correct ASCO pilot valve, consult factory. For proper operation of valve, a specific pilot valve must be utilized. Connecting tubing lengths of ten feet or less have little effect on the pulse response. Installations with over ten feet of tubing must be tested under actual operating conditions. Tubing with 1/4 O.D. is recommended for all installations.

CAUTION: To avoid damage to the valve body, DO NOT OVERTIGHTEN PIPE CONNECTIONS. If teflon tape, paste, spray or similar lubricant is used, use extra care due to reduced friction.

IMPORTANT: For the protection of the valve, install a strainer or filter suitable for the service involved in the inlet side as close to the valve as possible. Periodic cleaning is required, depending on the service conditions. See Bulletins 8600, 8601 and 8602 for strainers.

MAINTENANCE

WARNING: Depressurize valve and bleed air from header before making repairs. It is necessary only to remove the tubing from the remote pilot valve.

CLEANING

A periodic cleaning of all valves is desirable. The time between cleaning will vary, depending upon media and service conditions. In general, sluggish valve operation or excessive leakage or noise will indicate that cleaning is required.

PREVENTIVE MAINTENANCE

1. Keep the medium flowing through the valve as free from dirt and foreign material as possible.
2. While in service, operate valve at least once a month to insure proper opening and closing.
3. Periodic inspection (depending on media and service conditions) of internal valve parts for damage or excessive wear is recommended. Thoroughly clean all parts. Replace any parts that are worn or damaged.

IMPROPER OPERATION

1. **Incorrect Pressure:** Check valve pressure. Pressure to valve must be within 5-125 psi.
2. **Excessive Leakage:** Disassemble valve and clean all parts. Replace parts that are worn or damaged with a complete Spare Parts Kit for best results.
3. **Failure to Open or Close:**
 - A. If diaphragm valve stays open, bleed hole may be clogged. If diaphragm valve stays closed, diaphragm may be torn. Disassemble valve and clean or replace diaphragm assembly.
 - B. Failure of the remote pilot solenoid valve can also cause the diaphragm valve to stay closed or open. Inspect remote pilot solenoid valve for proper opening and closing.

VALVE DISASSEMBLY AND REASSEMBLY (Refer to Figures 1 & 2)

Depressurize valve and bleed air from headers before making repairs. Remove tubing connection from remote pilot valve. Proceed in the following manner:

1. Remove bonnet screws, valve bonnet, diaphragm spring and diaphragm assembly. If the valve you are disassembling contains a square cut gasket or a step spacer as shown in the sectioned view, Figure 2, the square cut gasket or step spacer need not be replaced unless damaged. If a replacement is required, order by the numbers indicated in Figure 2.
2. Diaphragm assembly is now accessible for cleaning or replacement. Replace diaphragm assembly if worn or damaged.
3. Reassemble in reverse order of disassembly paying careful attention to exploded view provided for identification and placement of parts.
4. Replace diaphragm assembly. (for ease of assembly, the tab may be located in any position) diaphragm spring, valve bonnet and bonnet screws. Torque bonnet screws in a crisscross manner to 10 - 11 foot-pounds.
5. Replace tubing connection from remote pilot valve.
6. After maintenance, operate the valve a few times to be sure of proper opening and closing.

SPARE PARTS KITS

Spare Parts Kits are available for ASCO valves. Parts marked with an asterisk (*) are supplied in Spare Parts Kit.

ORDERING INFORMATION FOR SPARE PARTS KITS

When Ordering Spare Parts Kits,
Specify Valve Catalog Number and Serial Number.
Order Kit No. 96-875

For Square Cut Gasket, Order
Part No. 88-224-228A

For Step Spacer, Order
Part No. 93-834-1

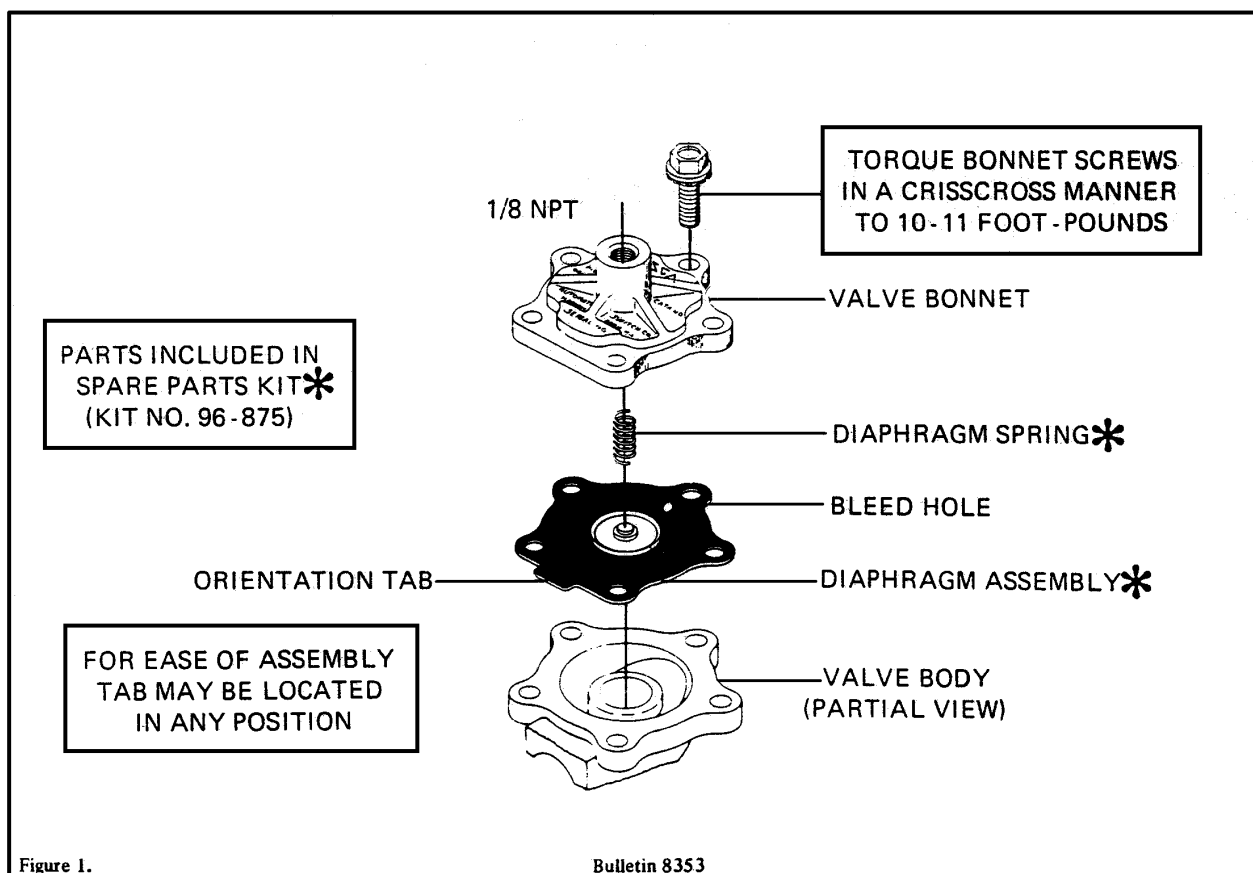


Figure 1.

Bulletin 8353

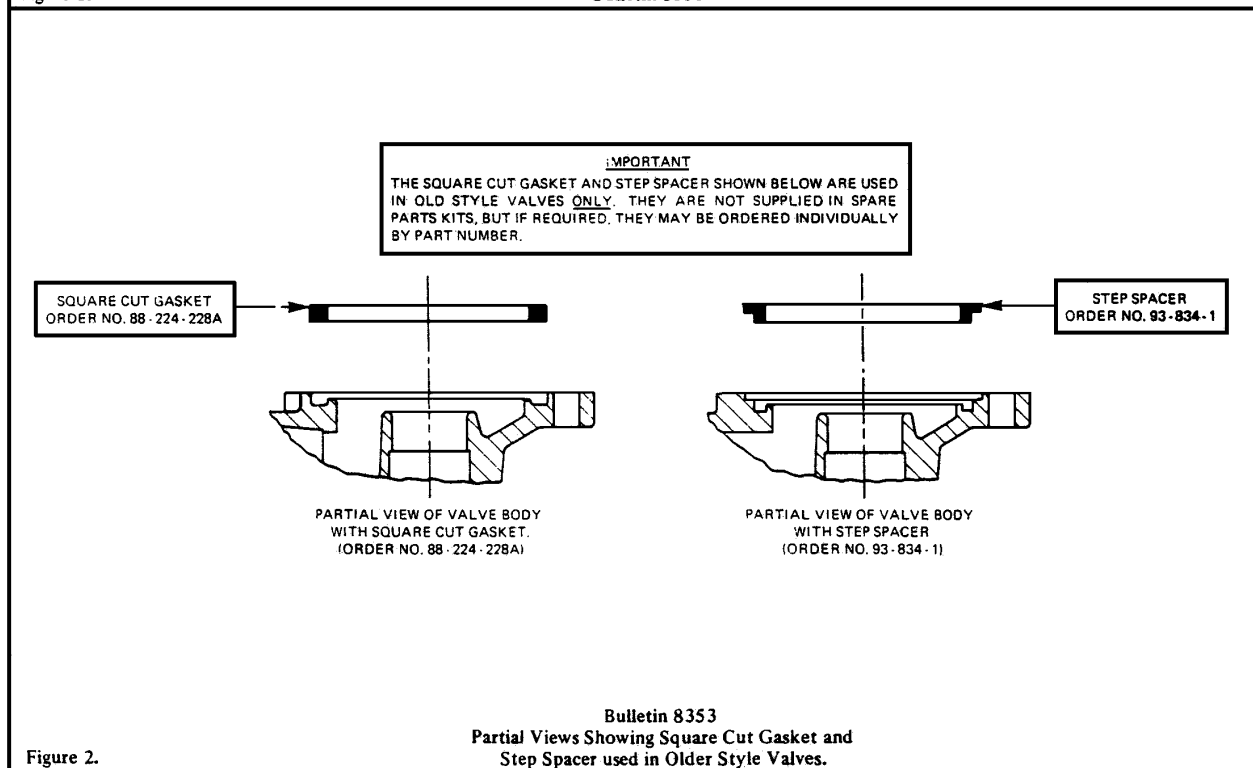


Figure 2.

13. APPENDIX B

I&M No. V 9575 R5 - Sec. 1

Installation & Maintenance Instructions

2-WAY DIRECT-ACTING SOLENOID VALVES

REVISION "H" & "R"

NORMALLY OPEN OR NORMALLY CLOSED OPERATION

BRASS OR STAINLESS STEEL CONSTRUCTION - 1/8, 1/4, OR 3/8 PIPE THREADS

SERIES**8262****8263**

(Section 1 of 2)

IMPORTANT: See separate solenoid installation and maintenance instructions for information on: Wiring, Solenoid Temperature, Causes of Improper Operation, and Coil or Solenoid Replacement.

DESCRIPTION

Series 8262 and 8263 valves are 2-way direct-acting general service solenoid valves. Valves bodies are of rugged brass or stainless steel. Series 8262 or 8263 valves may be provided with a watertight/explosionproof solenoid enclosure.

Notice: Brass valves are not certified as lead-free under the Safe Water Drinking Act SWDA 1417 and are not intended for use on drinking water systems. They are intended for control of water in industrial applications. Consult ASCO for valves rated for use in potable water applications.

OPERATION

Normally Open: Valve is open when solenoid is de-energized; closed when energized.

Normally Closed: Valve is closed when solenoid is de-energized; open when energized.

IMPORTANT: No minimum operating pressure required.

Manual Operation (Valves with Suffix MS)

Manual operator allows manual operation when desired or during an electrical power outage. To engage manual operator, rotate stem on the side of the body clockwise until it hits a stop, approximately 90° from its original position. Do NOT rotate beyond stops. Do NOT apply excessive force beyond stops. Valve will now be in the same position as when the solenoid is energized. To disengage, rotate stem counterclockwise until it hits a stop, approximately 90° from its original position. Do NOT rotate beyond stops. Do NOT apply excessive force beyond stops.

MS option is not available on normally closed valves that have a pressure rating greater than 750 PSI. MS option is not available on normally open valves.

⚠ CAUTION: Do NOT rotate beyond 90 stops. Do NOT apply excessive force beyond stops. Rotating beyond the 90 result in equipment damage.

⚠ CAUTION: For valve to operate electrically, manual operator stem must be fully rotated counterclockwise.

INSTALLATION

Check nameplate for correct catalog number, pressure, voltage, frequency, and service. Never apply incompatible fluids or exceed pressure rating of the valve. Installation and valve maintenance to be performed by qualified personnel.

Note: Inlet port will either be marked "I" or "IN". Outlet port will be marked "2" or "OUT". (see Figure 1)

Future Service Considerations.

Provision should be made for performing seat leakage, external leakage, and operational tests on the valve with a nonhazardous, noncombustible fluid after disassembly and reassembly.

Temperature Limitations

For maximum valve ambient and fluid temperatures, refer to the following tables. Use catalog number, coil prefix, suffix, and watt rating on nameplate to identify the maximum ambient and fluid temperatures.

NOTE: The following Temperature Limitations Tables do not apply to Magnetic Latch Valves: Catalog Numbers 8262A610 to 8262A627; 8263A615 to 8263A618, and 8263A624 to 8263A627. See separate Instruction Manual.

Max. Ambient Temperature Limitations for AC and DC Coil Valves, Catalog Numbers 8262H/R & 8263H/R								
Prefix ①	Coil Class	Watt Ratings			Max Ambient Temperature			
		AC		DC	Normally Closed		Normally Open	
		60Hz	50Hz		°C	°F	°C	°F
EF, EV	FT	6.1, 10.1	8.1, 10.1	-	52	125	52	125
EF, EV	FB	9.1, 17.1	11.1, 17.1	-	-	-	-	-
	FT	6.1, 10.1	8.1, 10.1	-	55	131	55	131
	FB	9.1, 17.1	11.1, 17.1	-	-	-	-	-
	HT	-	-	10.6, 11.6	40	104	55	131
	HB	-	-	22.6, 18.6	②	②	-	-
EF, EV	HT	-	-	10.6, 11.6	-	-	-	-
EF, EV	HB	-	-	22.6, 18.6	-	-	-	-
	HT	6.1, 10.1	8.1, 10.1	-	60	140	60	140
	HB	9.1, 17.1	11.1, 17.1	-	-	-	55	131
EF, EV	HT	6.1, 10.1	8.1, 10.1	-	60	140	60	140
EF, EV	HB	9.1, 17.1	11.1, 17.1	-	-	-	-	-
-	-	2	2	2	-	-	60	140

Max. Ambient Temperature Limitations for AC and DC Coil Valves Catalog Numbers 8262H/R & 8263H/R						
Valve Elastomer/ Suffix	Coil Class	Watt Ratings			Max. Fluid Temp.	
		AC		DC		
		60Hz	50Hz		°C	°F
UR/None④	FT, FB, HT, HB®	6.1, 10.1, 9.1, 17.1, 2	8.1, 10.1, 11.1, 17.1, 2	10.6, 11.6, 18.6, 22.6, 2	60	140
NBR/ None④					82	180
CR/J					⑤	⑤
Lt-Nitrile/A					75	167
EPDM/E					99	210
		⑤	⑤		⑤	⑤
FKM/V & PTFE/T	FT	6.1, 10.1	8.1, 10.1	-	99	210
	FB		11.1, 17.1	-		
	HT with EF/EV Prefix	6.1, 10.1	8.1, 10.1	10.6, 11.6		
	HB with EF/EV Prefix	9.1, 17.1	11.1, 17.1	18.6, 22.6		
	HT	6.1, 10.1	8.1, 10.1	10.6, 11.6	121	250
	HB®	9.1, 17.1	11.1, 17.1	18.6, 22.6		
	-	2	2	2		

① = EF, EV data applies to Explosionproof coils only.

② = DC Normally closed solenoid valves can be operated at maximum ambient temperature of 55° C / 131° F with reduced pressure ratings. See page 5 of 5, Section 2 of 2 for maximum operating pressure differential.

③ = Solenoid coils with prefix EF & EV are limited to a maximum fluid temperature of 99°C/ 210°F

④ = Urethane (UR) elastomer applies to catalog numbers 8262H079, 089, 096 099, 106, 107, 154, 155, 159, 161, 167, 168, 173, 175, 176, 180, 181, 198, 199, 200, 214 and 8262R107, 181, 155, 161, 168, 169.

⑤ = Normally open 8262H & 8263H valves fitted with HB 17.1 watt AC coils have a maximum fluid temperature of 75°C (167°F)

Positioning

These valves are designed to perform properly when mounted in any position. However, for optimum life and performance, the solenoid should be mounted vertically and upright to reduce the possibility of foreign matter accumulating in the solenoid base sub-assembly area.

Mounting

Two (2) M5 threaded holes are provided in the valve body for mounting. (See Figure 1)

Optional mounting bracket can be obtained with valve as Suffix MB or separately as a kit.

Piping

Connect piping or tubing to valve according to markings on valve body. Inlet port will either be marked "1" or "IN". Outlet port will be marked "2" or "OUT". Wipe the pipe threads clean of cutting oils. Apply pipe compound sparingly to male pipe threads only. If applied to valve threads, the compound may enter the valve and cause operational difficulty. Avoid pipe strain by properly supporting and aligning piping. When tightening the pipe, do not use valve or solenoid as a lever. Locate wrenches applied to valve body or piping as close as possible to connection point.

IMPORTANT: To protect the solenoid valve, install a strainer or filter suitable for the service involved, in the inlet side as close to the valve as possible. Clean periodically depending on service conditions. See ASCO Series 8600 and 8601 for strainers.

MAINTENANCE

▲ WARNING: To prevent the possibility of death, serious injury or property damage, turn off electrical power, depressurize valve, and vent fluid to a safe area before servicing the valve.

NOTE: It is not necessary to remove the valve from the pipeline for repairs.

Cleaning

All solenoid valves should be cleaned periodically. The time between cleanings will vary depending on the medium and service conditions. In general, if the voltage to the coil is correct, sluggish valve operation, excessive noise or leakage will indicate that cleaning is required. In the extreme case, faulty valve operation will occur and the valve may fail to open or close. Clean strainer or filter when cleaning the valve.

Preventive Maintenance

- Keep the medium flowing through the valve as free from dirt and foreign material as possible.
- Periodic exercise of the valve should be considered if ambient or fluid conditions are such that corrosion, elastomer degradation, fluid contamination build up, or other conditions that could impede solenoid valve shifting are possible. The actual frequency of exercise necessary will depend on specific operating conditions. A successful operating history is the best indication of a proper interval between exercise cycles.
- Depending on the medium and service conditions, periodic inspection of internal valve parts for damage or excessive wear is recommended. Thoroughly clean all parts. Replace any worn or damaged parts.

Causes of Improper Operation

- Incorrect Pressure:** Check valve pressure. Pressure to valve must be within range specified on nameplate.
- Excessive Leakage:** Disassemble valve (see Maintenance) and clean all parts. If parts are worn or damaged, install a complete ASCO Rebuild Kit.

Valve Disassembly (see Figures 2, 3 & 4)

- Disassemble valve using exploded views for identification of parts.
- Remove solenoid, see separate instructions.
- Unscrew solenoid base sub-assembly with wrench. Remove core assembly, core spring, and solenoid base gasket from valve body.
- For normally open construction (Figure 4) remove spring, and disc holder assembly.
- All parts are now accessible to clean or replace. If parts are worn or damaged, install a complete ASCO Rebuild Kit.

Valve Reassembly

- Use exploded views for identification, orientation and placement of parts.
- Lubricate all gaskets with DOW CORNING® 200 Compound lubricant or an equivalent high-grade silicone oil.
- For normally open construction (Figure 4), install disc holder assembly and disc holder spring.
- Replace solenoid base gasket, core assembly with core spring and solenoid base sub-assembly. Note: For core assemblies with internal type core springs, install wide end of core spring in core assembly first, closed end of core spring protrudes from top of core assembly. (see Figure 2)
- Torque solenoid base sub-assembly to 175±25 in-lbs [19,8±2,8 Nm].
- Install solenoid. See separate solenoid instructions. Then make electrical hookup to solenoid.

▲ WARNING: To prevent the possibility of death, serious injury or property damage, check valve for proper operation before returning to service. Also perform internal seat and external leakage tests with a nonhazardous, noncombustible fluid.

- Restore line pressure and electrical power supply to valve.
- After maintenance is completed, operate the valve a few times to be sure of proper operation. A metallic *click* signifies the solenoid is operating.

ORDERING INFORMATION FOR ASCO REBUILD KITS

Parts marked with an asterisk (*) in the exploded views in Figure 2 & 3 are supplied in Rebuild Kits. When Ordering Rebuild Kits for ASCO valves, order the Rebuild Kit number stamped on the valve nameplate. If the number of the kit is not visible, order by indicating the quantity of kits required, and the Catalog Number and Serial Number of the valve(s) for which they are intended.

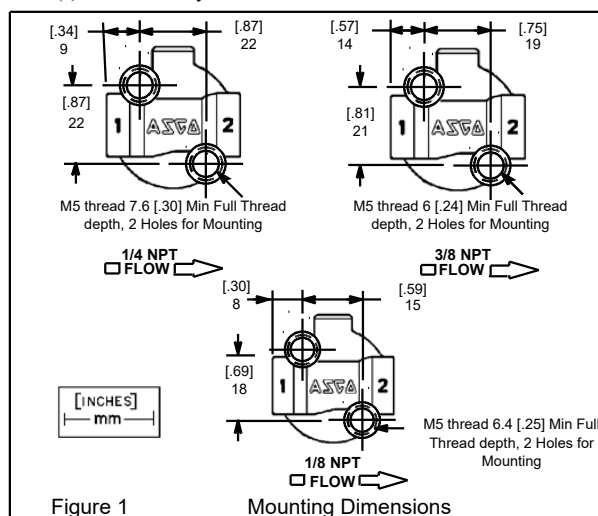
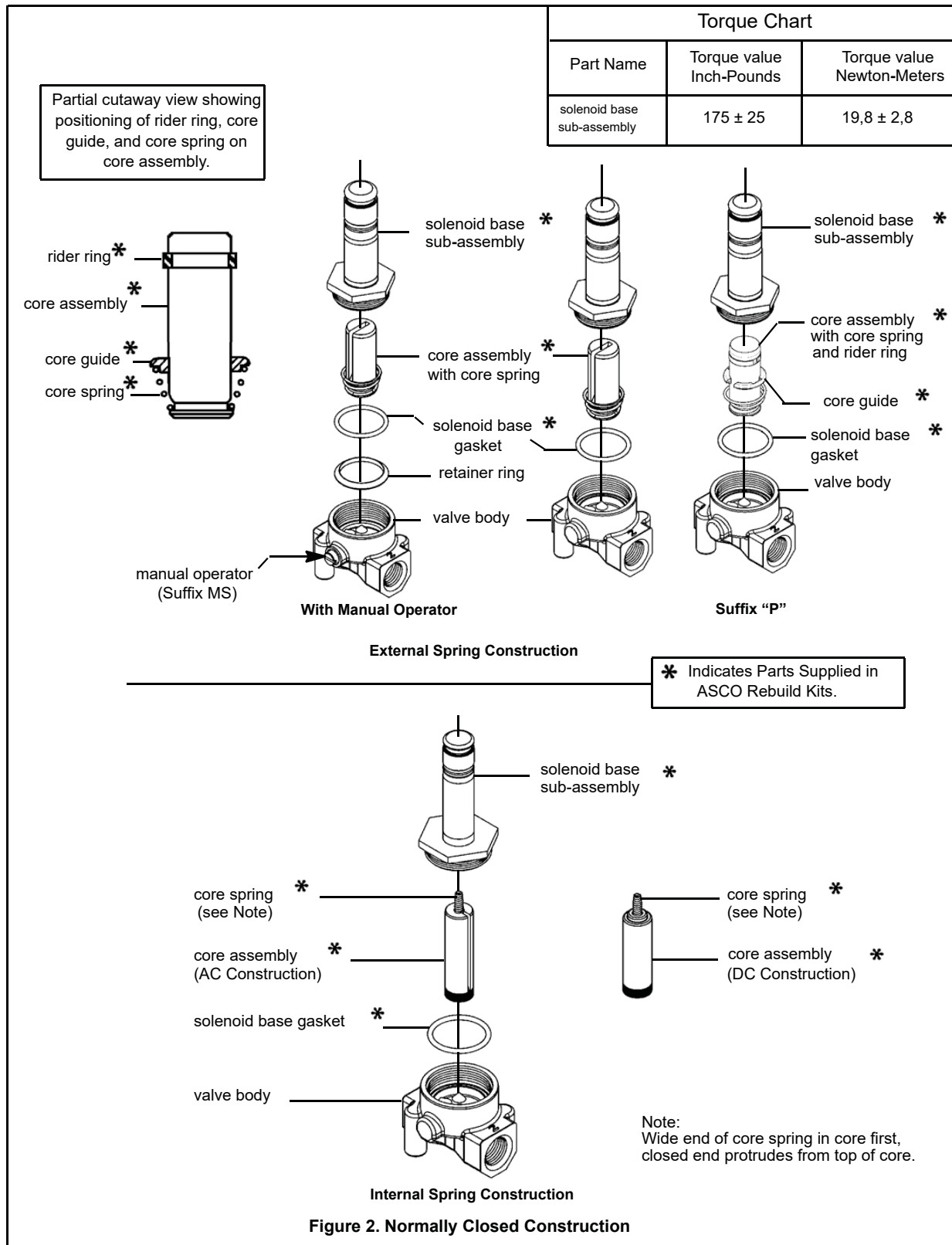


Figure 1

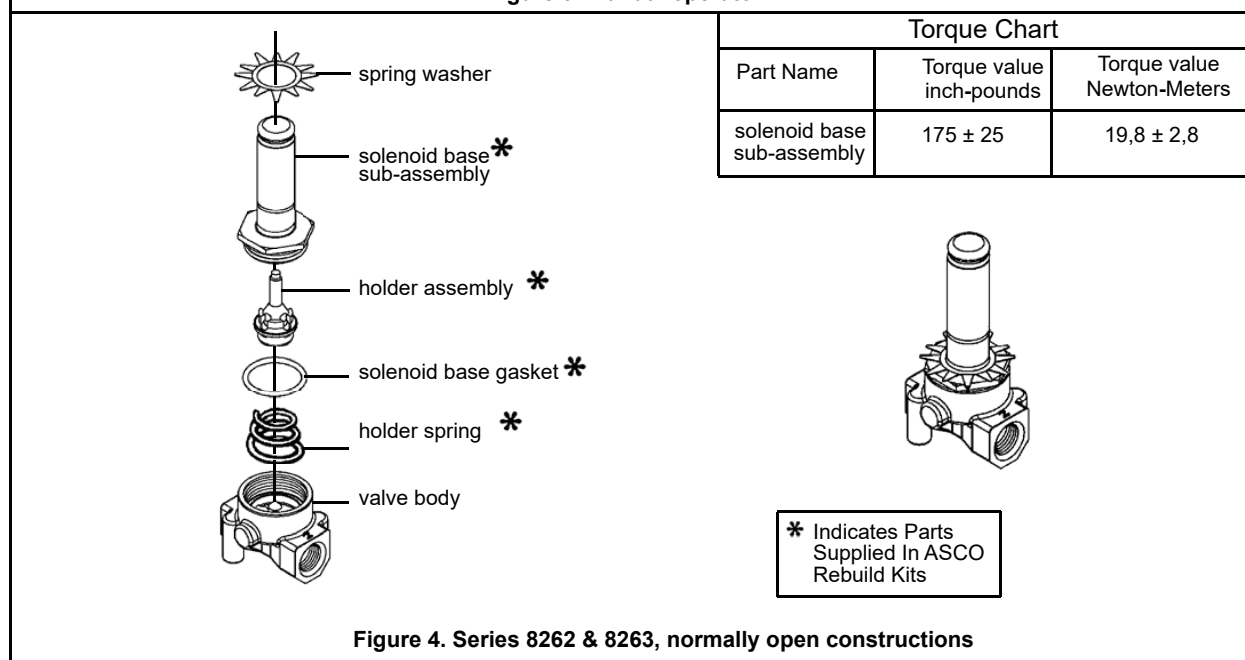
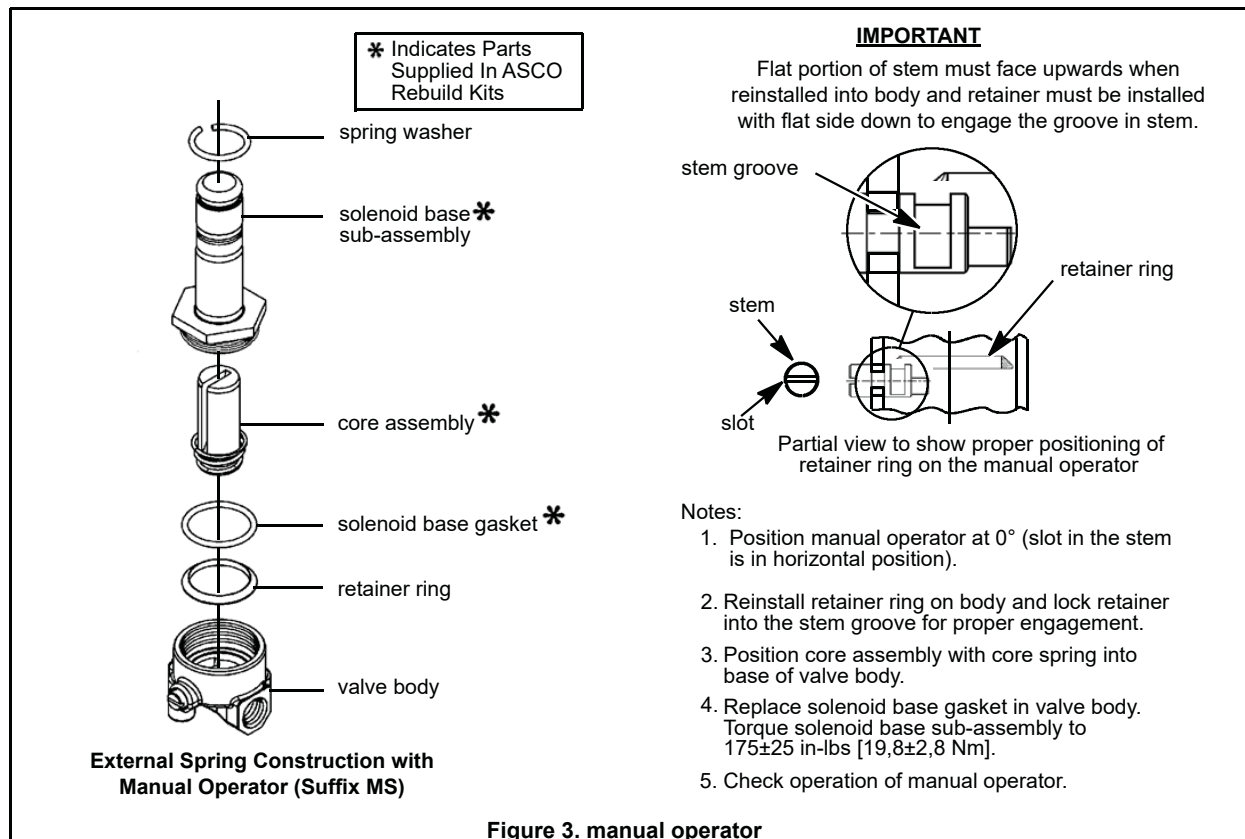
Mounting Dimensions



Disassembly and Reassembly of Manual Operator (Refer to Figure 3)

1. Position core assembly with core spring attached into base of manual operator body.
2. Ensure retaining ring is properly located in valve body.

3. Replace solenoid base gasket and solenoid base sub-assembly into valve body. Torque solenoid base sub-assembly to 175 ± 25 in-lbs [$19,8 \pm 2,8$ Nm].
4. Check manual operator for proper operation. Turn stem clockwise and counterclockwise; stem should turn freely without binding.



14. APPENDIX C

I&M V 6583 R12

Installation & Maintenance Instructions



OPEN-FRAME, GENERAL PURPOSE, WATERTIGHT/EXPLOSIONPROOF SOLENOIDS
OPTIONAL FEATURE FOR OPEN FRAME (GENERAL PURPOSE) CONSTRUCTION ONLY

SERIES
8016G/H

— SERVICE NOTICE —

ASCO™ solenoid valves with design change letter “G” or “H” in the catalog number (ex. 8210G1) have an epoxy encapsulated ASCO Red Hat II® solenoid. This solenoid replaces some of the solenoids with metal enclosures and open-frame constructions. Follow these installation and maintenance instructions if your valve or operator uses this solenoid.

DESCRIPTION

Catalog numbers 8016G/H1 and 8016G/H2 are epoxy encapsulated pull-type solenoids. The green solenoid with lead wires and 1/2 conduit connection is designed to meet Enclosure Type 1-General Purpose, Type 2-Dripproof, Types 3 and 3S-Raintight, and Types 4 and 4X-Watertight. The black solenoid on catalog numbers prefixed “EF” is designed to meet Enclosure Types 3 and 3S-Raintight, Types 4 and 4X-Watertight, Types 6 and 6P-Submersible, Type 7, Explosionproof Class I, Division I Groups A, B, C, & D and Type 9, -Dust-Ignitionproof Class II, Division I Groups E, F & G. The Class II, Groups F & G Dust Locations designation is not applicable for solenoids or solenoid valves used for steam service or when a class “H” solenoid is used. See *Temperature Limitations* section for solenoid identification and nameplate/retainer for service. When installed just as a solenoid and not attached to an ASCO valve, the core has a 0.250-28 UNF-2B tapped hole, 0.38 minimum full thread.

Series 8016G/H are also available in:

- **Open-Frame Construction:** The green solenoid may be supplied with 1/4" spade, screw or DIN terminals. (Refer to Figure 4)
 - **DIN Plug Connector Kit No. K236034:** Use this kit only for solenoids with DIN terminals. The DIN plug connector kit provides a two pole with grounding contact DIN Type 43650 construction (See Figure 6).
- **Panel Mounted Construction:** These solenoids are specifically designed to be panel mounted by the customer through a panel having a .062 to .093 maximum wall thickness. (Refer to Figure 3 and section on *Installation of Panel Mounted Solenoid*).
- **Junction Box:** This junction box construction meets Enclosure Types 2, 3, 3S, 4, and 4X. Only solenoids with 1/4" spade or screw terminals may have a junction box. The junction box provides a 1/2" conduit connection, grounding and spade or screw terminal connections within the junction box (See Figure 5).

OPERATION

When the solenoid is energized, the core is drawn into the solenoid base sub-assembly.

IMPORTANT: When the solenoid is de-energized, the initial return force for the core, whether developed by spring, pressure, or weight, must exert a minimum force to overcome residual magnetism created by the solenoid. Minimum return force for AC construction is 0.69lbs (3.1N) and 0.31 lbs (1.38N) for DC.

INSTALLATION

Check nameplate for correct catalog number, service, and wattage. Check front of solenoid for voltage and frequency.

⚠ WARNING: Electrical hazard from the accessibility of live parts. To prevent the possibility of death, serious injury or property damage, install the open - frame solenoid in an enclosure.

FOR BLACK ENCLOSURE TYPES 7 AND 9 ONLY

⚠ CAUTION: To prevent fire or explosion, do not install solenoid and/or valve where ignition temperature of hazardous atmosphere is less than 165°C. On valves used for steam service or when a class “H” solenoid is used, do not install in hazardous atmosphere where ignition temperature is less than 180°C. See nameplate/retainer for service.

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I&M V 6583 R12

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NOTE: These solenoids have an internal non-resettable thermal fuse to limit solenoid temperature in the event that extraordinary conditions occur which could cause excessive temperatures. These conditions include high input voltage, a jammed core, excessive ambient temperature or a shorted solenoid, etc. This unique feature is a standard feature only in solenoids with black explosionproof/dust-ignitionproof enclosures (Types 7 & 9).

⚠ CAUTION: To protect the solenoid valve or operator, install a strainer or filter, suitable for the service involved in the inlet side as close to the valve or operator as possible. Clean periodically depending on service conditions. See ASCO Series 8600 and 8601 for strainers.

Temperature Limitations

For maximum valve ambient temperatures, refer to chart. The temperature limitations listed, only indicate maximum application temperatures for field wiring rated at 90°C. Check catalog number prefix and watt rating on nameplate to determine maximum ambient temperature. See valve installation and maintenance instructions for maximum fluid temperature.

NOTE: For steam service, refer to *Wiring* section, *Junction Box* for temperature rating of supply wires.

Temperature Limitations For Series 8016G Solenoids for use on Valves Rated at 6.1, 8.1, 9.1, 10.6 or 11.1 Watts			
Watt Rating	Catalog Number Coil Prefix	Class of Insulation	Maximum § Ambient Temp.
6.1, 8.1, 9.1 & 11.1	None, FB, KF, KP, SC, SD, SF & SP	F	125°F (52°C)
6.1, 8.1, 9.1 & 11.1	HB, HT, KB, KH, SS, ST & SU	H	140°F (60°C)
10.6**	None, KF, SF, SC, HT, KH, ST & SU	F & H	104°F (40°C)
7.1 @ 60Hz (8.1 @ 50Hz)		F & H	175°F (79°C)*
10.6**		F & H	140°F (60°C)

§ Minimum ambient temperature -40°F (-40°C).

* When used with watertight aluminum junction boxes (screw or spade) max. ambient and fluid temperature will be reduced to 157°F (69.4°C)

** 10.6 Watt solenoids rated for 104°F are 8030, 8260, 8316, 8321, 8320, 8360 & 8344 valves while those rated for 140°F are 8040 valves

Temperature Limitations for Series 8003H, 8007H and 8202H solenoids							
Prefix ①	Coil Class	Watt Ratings			Maximum Ambient Temperature		
		AC		DC			
		60 Hz	50 Hz		°C	°F	
EF	FT	6.1	8.1	-	52	125	
EF	FB	9.1	11.1	-			
	FT	6.1	8.1	-	55	131	
	FB	9.1	11.1	-			
	HT	-	-	10.6	40 ②	104②	
	HB	-	-	18.6			
EF	HT	-	-	10.6			
EF	HB	-	-	18.6			
	HT	6.1	8.1	-	60 ③	140 ③	
	HB	9.1	11.1	-			
EF	HT	6.1	8.1	-	60 ③		140 ③
EF	HB	9.1	11.1	-			

① = EF data applies to Explosionproof coils only.

② = Some DC solenoid valves can be operated at maximum ambient temperature of 55°C / 131°F with reduced pressure ratings. See valve I&M for maximum operating pressure differential ratings.

③ = Steam Service Valves have a maximum ambient temperature of 55° C / 131°F.

Positioning

This solenoid is designed to perform properly when mounted in any position. However, for optimum life and performance, the solenoid should be mounted vertically and upright to reduce the possibility of foreign matter accumulating in the solenoid base sub-assembly area.

Wiring

Wiring must comply with local codes and the National Electrical Code. All solenoids supplied with lead wires are provided with a grounding wire which is green or green with yellow stripes and a 1/2" conduit connection. To facilitate wiring, the solenoid may be rotated 360°. For explosionproof solenoid version, the conduit lead wires are factory sealed for use in hazardous locations.

Additional Wiring Instructions For Optional Features:

• Open-Frame solenoid with 1/4" spade terminals.

For solenoids supplied with screw terminal connections use #12-18 AWG stranded copper wire rated at 90°C or greater. Torque terminal block screws to 10±2 in-lbs [1,0±1,2 Nm]. A tapped hole is provided in the solenoid for grounding, use a #10-32 machine screw. Torque grounding screw to 15-20 in-lbs [1,7-2,3 Nm]. On solenoids with screw terminals, the socket head screw holding the terminal block to the solenoid is the grounding screw. Torque the screw to 15-20 in-lbs [1,7-2,3 Nm] with a 5/32" hex key wrench.

• Junction Box

The junction box is used with spade or screw terminal solenoids only and is provided with a grounding screw and a 1/2" conduit connection. Connect #12-18 AWG standard copper wire only to the screw terminals. Within the junction box use field wire that is rated 90°C or greater for connections. For steam service use 105°C rated wire up to 50 psi or use 125°C rated wire above 50 psi. After electrical hookup, replace cover gasket, cover, and screws. Tighten screws evenly in a crisscross manner.

• DIN Plug Connector Kit No. K236034

1. The open-frame solenoid is provided with DIN terminals to accommodate the plug connector kit.
2. Remove center screw from plug connector. Using a small screwdriver, pry terminal block from connector cover.
3. Use #12-18 AWG stranded copper wire rated at 90°C or greater for connections. Strip wire leads back approximately 1/4" for installation in socket terminals. The use of wire-end sleeves is also recommended for these socket terminals. Maximum length of wire-end sleeves to be approximately 1/4". Tinning of the ends of the lead wires is not recommended.
4. Thread wire through gland nut, gland gasket, washer and connector cover.

NOTE: Connector housing may be rotated in 90° increments from position shown for alternate positioning of cable entry.

5. Check DIN connector terminal block for electrical markings. Then make electrical hookup to terminal block according to markings on it. Snap terminal block into connector cover and install center screw.
6. Position connector gasket on solenoid and install plug connector. Torque center screw to 5±1 in-lbs [0,6±1,1 Nm].

NOTE: Alternating current (AC) and direct current (DC) solenoids are built differently and cannot be converted from one to the other by changing the coil.

Installation of Solenoid

Solenoids may be assembled as a complete unit. Tightening is accomplished by means of a hex flange at the base of the solenoid.

Installation of Panel Mounted Solenoid (See Figure 3)

Disassemble solenoid following instruction under *Solenoid Replacement* then proceed.

3/4" Valve Bonnet Construction

1. Install retainer (convex side to solenoid) in 1.312 diameter mounting hole in customer panel.
2. Position spring washer over plugnut/core tube sub-assembly.
3. Install plugnut/core tube sub-assembly through retainer in customer panel then replace solenoid, nameplate and red cap.

15/16" Valve Bonnet Construction

1. Install solenoid base sub-assembly through 0.69 diameter mounting hole in customer panel.
2. Position spring washer on opposite side of panel over solenoid base sub-assembly then replace.

Solenoid Temperature

Standard solenoids are designed for continuous duty service. When the solenoid is energized for a long period, the solenoid becomes hot and can be touched by hand only for an instant. This is a safe operating temperature.

MAINTENANCE

▲ WARNING: To prevent the possibility of death, serious injury or property damage, turnoff electrical power, depressurize solenoid operator and/or valve, and vent fluid to a safe area before servicing.

Cleaning

All solenoid operators and valves should be cleaned periodically. The time between cleaning will vary depending on medium and service conditions. In general, if the voltage to the solenoid is correct, sluggish valve operation, excessive noise or leakage will indicate that cleaning is required. Clean strainer or filter when cleaning the valve.

Preventive Maintenance

- Keep the medium flowing through the solenoid operator or valve as free from dirt and foreign material as possible.
- Periodic exercise of the valve should be considered if ambient or fluid conditions are such that corrosion, elastomer degradation, fluid contamination build up, or other conditions that could impede solenoid valve shifting are possible. The actual frequency of exercise necessary will depend on specific operating conditions. A successful operating history is the best indication of a proper interval between exercise cycles.
- Depending on the medium and service conditions, periodic inspection of internal valve parts for damage or excessive wear is recommended. Thoroughly clean all parts. Replace any worn or damaged parts.

Causes of Improper Operation

- **Faulty Control Circuit:** Check the electrical system by energizing the solenoid. A metallic *click* signifies that the solenoid is operating. Absence of the *click* indicates loss of power supply. Check for loose or blown fuses, open-circuited or grounded solenoid, broken leadwires or splice connections.
- **Burned-Out Solenoid:** Check for open-circuited solenoid. Replace if necessary. Check supply voltage; it must be the same as specified on nameplate/retainer and marked on the solenoid. Check ambient temperature and check that the core is not jammed.
- **Low Voltage:** Check voltage across the solenoid leads. Voltage must be at least 85% of rated voltage.

Solenoid Replacement

1. On solenoids with lead wires disconnect conduit, coil leads, and grounding wire.

NOTE: Any optional parts attached to the old solenoid must be reinstalled on the new solenoid.

2. Disassemble solenoids with optional features as follows:

• Spade or Screw Terminals

Remove terminal connections, grounding screw, grounding wire, and terminal block (screw terminal type only).

NOTE: For screw terminals, the socket head screw holding the terminal block serves as a grounding screw.

• Junction Box

Remove conduit and socket head screw (use 5/32" hex key wrench) from center of junction box. Disconnect junction box from solenoid.

• DIN Plug Connector

Remove center screw from DIN plug connector. Disconnect DIN plug connector from adapter. Remove socket head screw (use 5/32" hex key wrench), DIN terminal adapter, and gasket from solenoid.

3. Snap off red cap from top of solenoid base sub-assembly.
4. Push down on solenoid. Then using a suitable screwdriver, insert blade in slot provided between solenoid and nameplate/retainer. Pry up slightly and push to remove. Then remove solenoid from solenoid base sub-assembly.
5. Reassemble using exploded views for parts identification and placement.

Disassembly and Reassembly of Solenoids

1. Remove solenoid, see *Solenoid Replacement*.
2. Remove spring washer from solenoid base sub-assembly.
3. Unscrew solenoid base sub-assembly.

NOTE: Some solenoid constructions have a plugnut/core tube sub-assembly, bonnet gasket and bonnet in place of the solenoid base sub-assembly. To remove bonnet use special wrench adapter supplied in ASCO Rebuild Kit. For wrench adapter only, order ASCO Wrench Kit No. K218948.

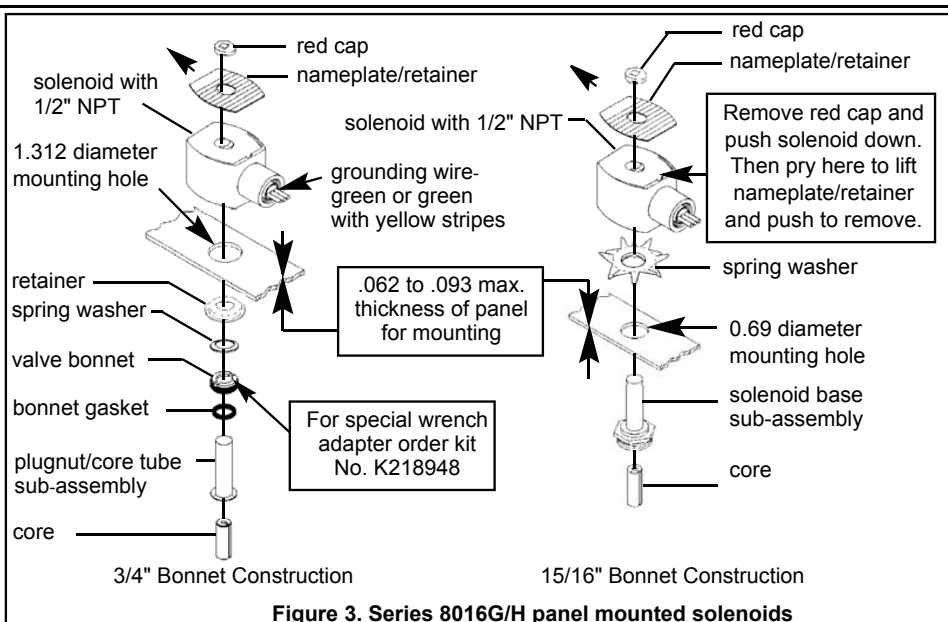
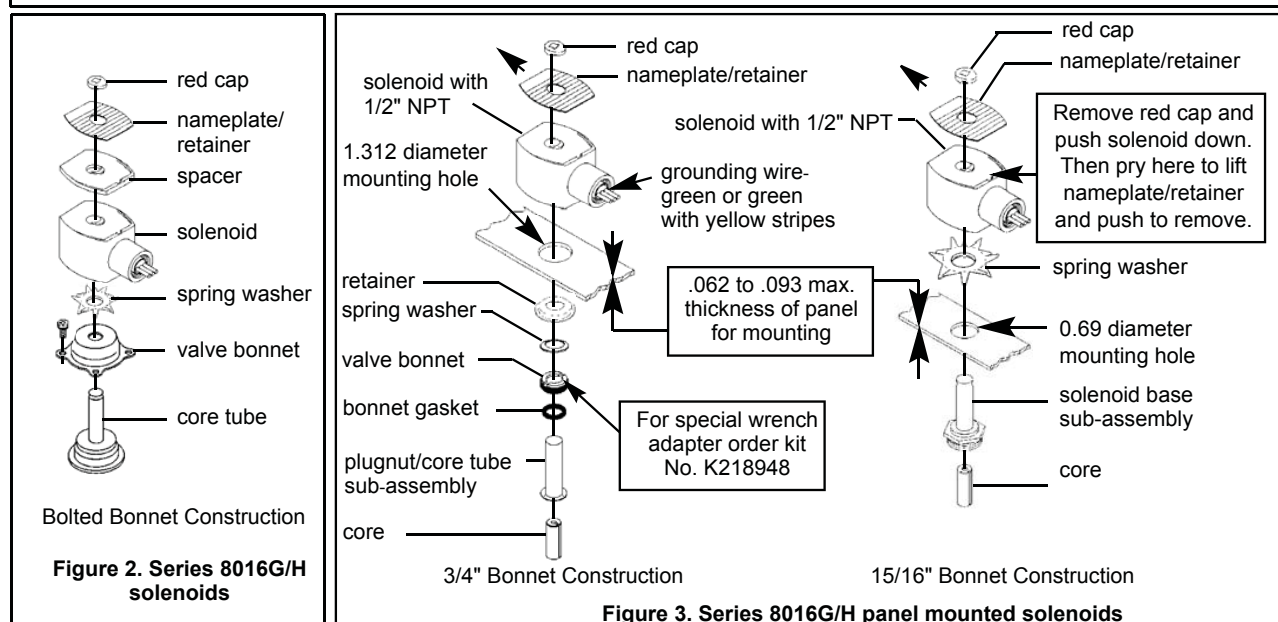
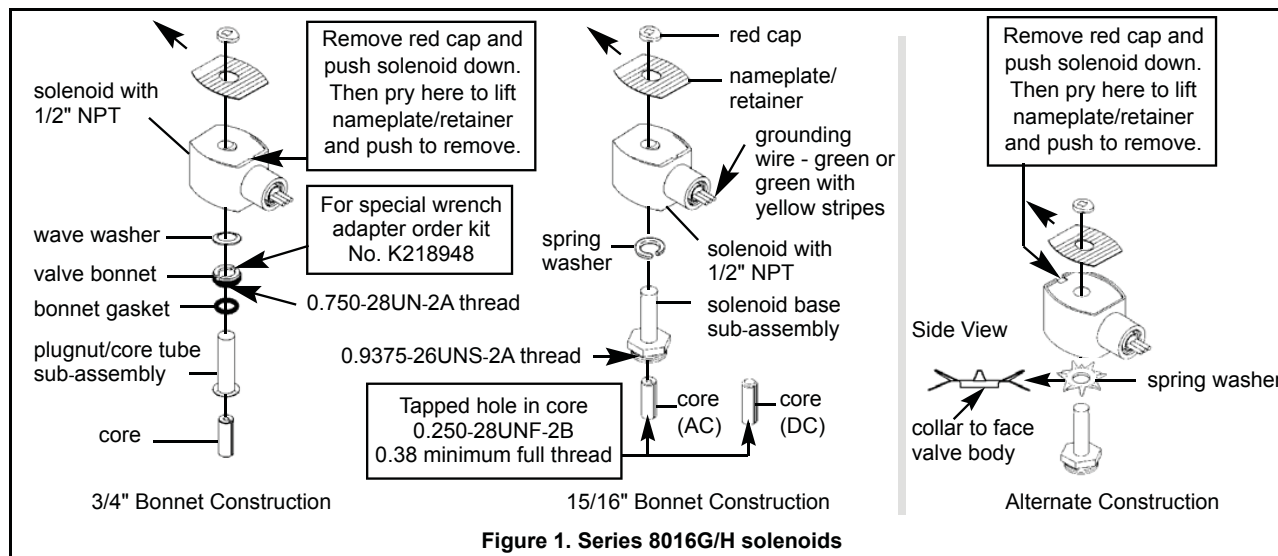
4. The core is now accessible for cleaning or replacement.
5. If the solenoid is part of a valve, refer to basic valve installation and maintenance instructions for further disassembly.
6. Reassemble using exploded views for identification and placement of parts.

ORDERING INFORMATION FOR ASCO SOLENOIDS

When Ordering Solenoids for ASCO Solenoid Operators or Valves, order the number stamped on the solenoid. Also specify voltage and frequency.

Torque Chart

Part Name	Torque Value in Inch-Pounds	Torque Value in Newton-Meters
solenoid base sub-assembly	175 ± 25	19,8 ± 2,8
valve bonnet (3/4" bonnet construction)	90 ± 10	10,2 ± 1,1
bonnet screw (3/8" or 1/2" NPT pipe size)	25	2,8
bonnet screw (3/4" NPT pipe size)	40	4,5



Torque Chart

Part Name	Torque Value in Inch-Pounds	Torque Value in Newton-Meters
terminal block screws	10 ± 2	1,1 ± 0,2
socket head screw	15 - 20	1,7 - 2,3
center screw	5±1	0,6 ± 0,1

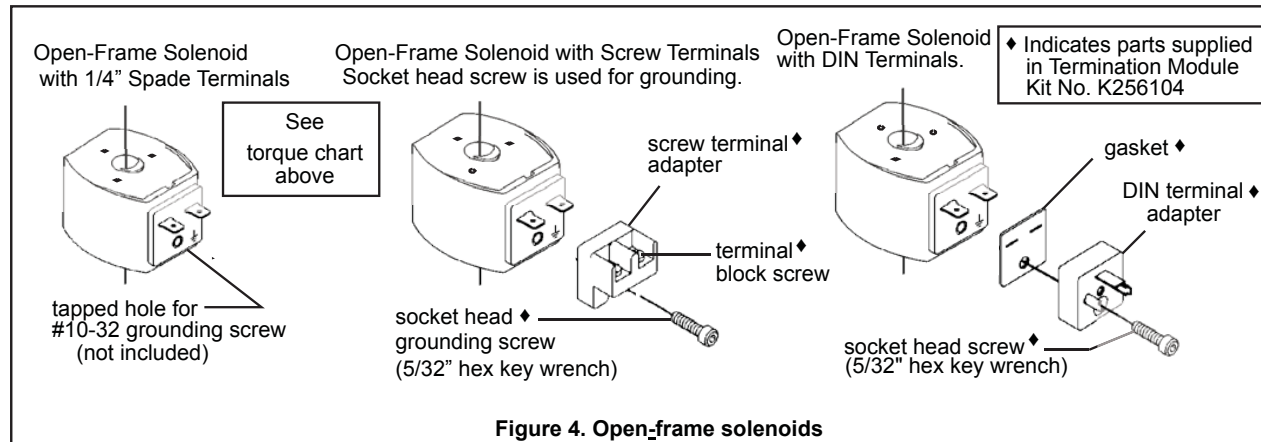


Figure 4. Open-frame solenoids

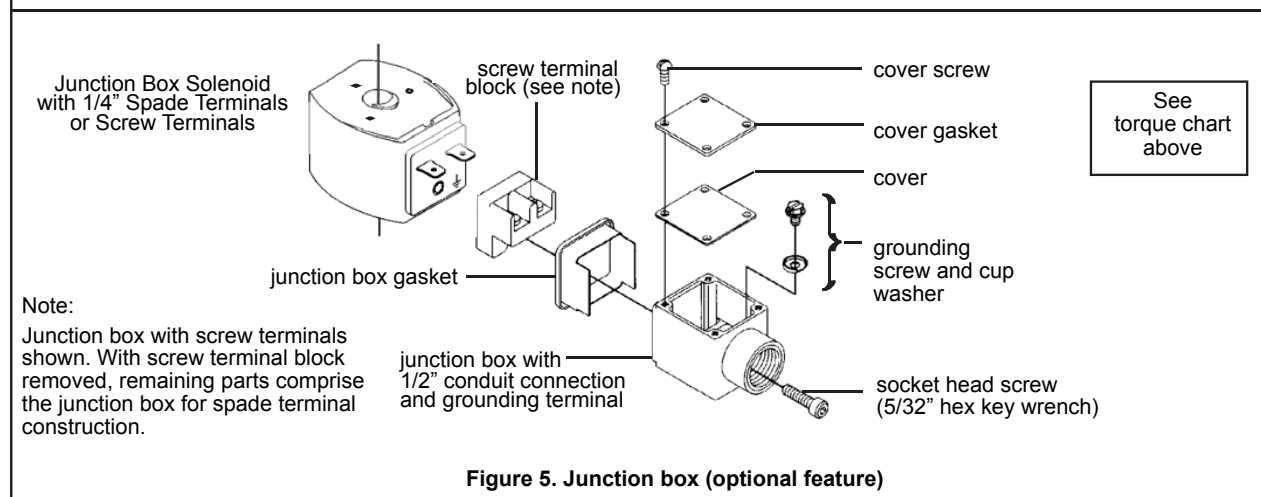


Figure 5. Junction box (optional feature)

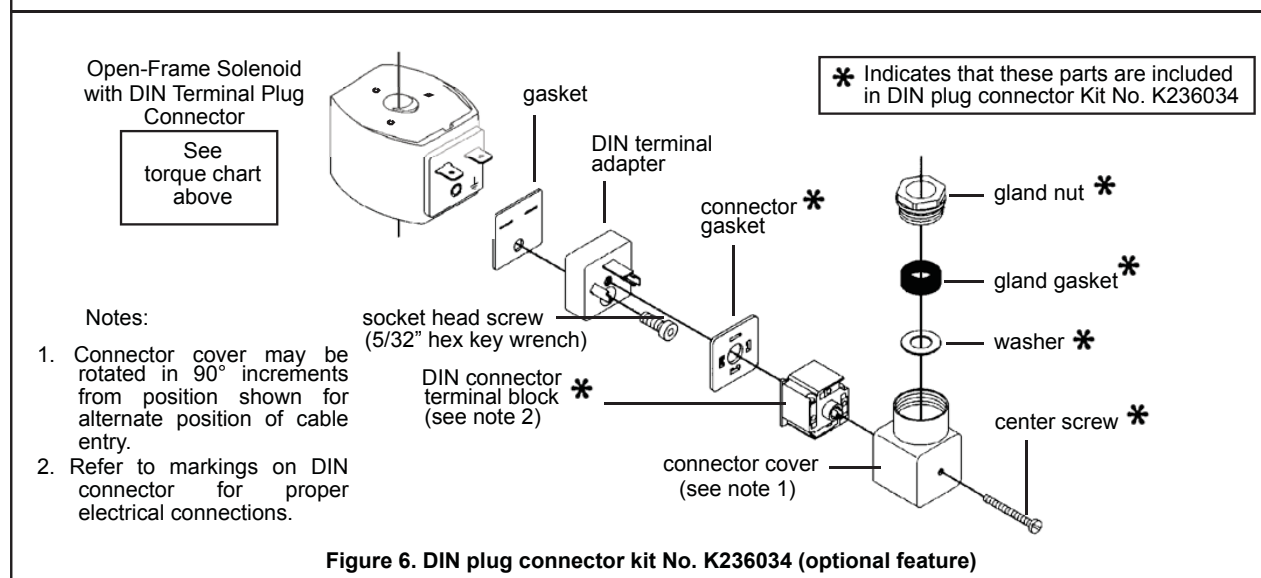
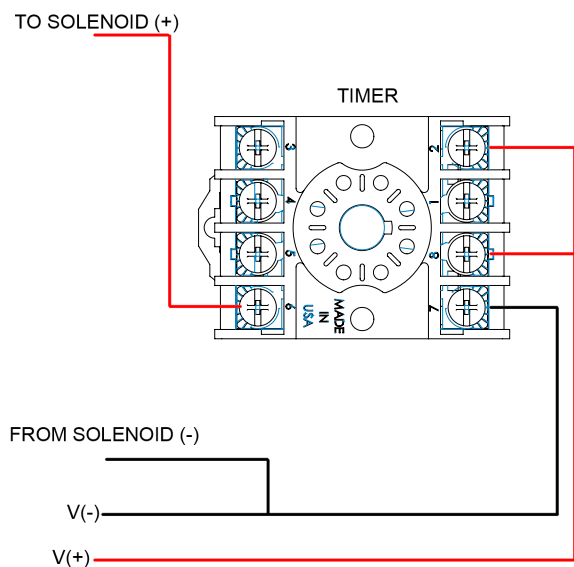


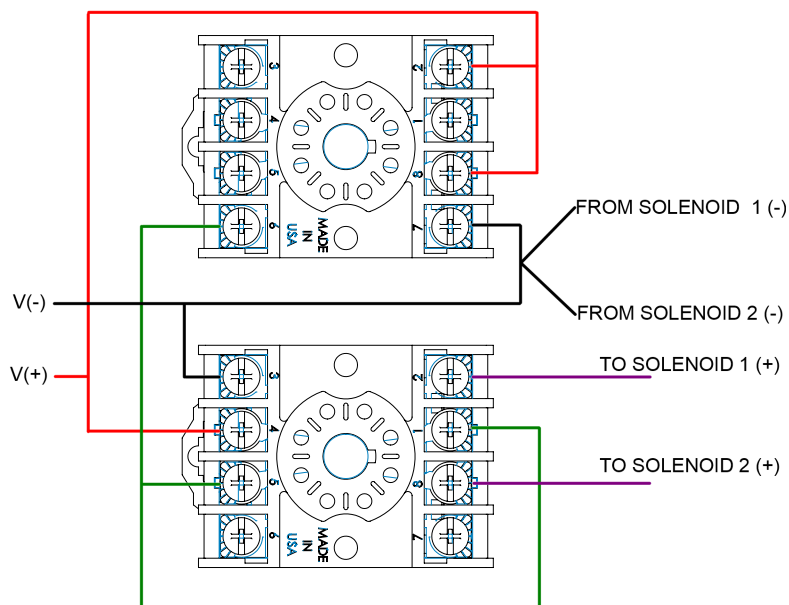
Figure 6. DIN plug connector kit No. K236034 (optional feature)

15. APPENDIX D

WIRING DIAGRAM FOR SINGLE LATERAL



WIRING DIAGRAM FOR TWO LATERALS



GENERAL NOTES:

- POLARITY IS GIVEN FOR DC POWERED SOLENOIDS.
- FOR AC POWERED SOLENOIDS, USE (-) AS THE COMMON WIRE AND (+) AS THE POWERED WIRE

16. TORQUE VALUES

Recommended U.S. BOLT TORQUE*							
<i>Coarse thread only</i>							
		SAE Grade 5	SAE Grade 5	SAE Grade 8	SAE Grade 8	Socket head cap screw	Socket head cap screw
Bolt Dia.	Thread Size	lb – ft	N – m	lb – ft	N – m	lb – ft	N – m
1/4	20	8.4	11	12	16	11	15
5/16	18	17	24	25	33	23	31
3/8	16	31	42	44	59	41	55
7/16	14	49	67	70	95	65	89
1/2	13	74	100	110	140	100	130
9/16	12	100	140	150	210	140	200
5/8	11	140	190	210	290	200	270
3/4	10	240	330	380	510	350	480
7/8	9	390	520	610	820	570	770
1	8	570	780	910	1100	850	1200
1-1/8	7	790	1100	1300	1700		
1-1/4	7	1100	1500	1800	2500		
1-3/8	6	1500	2000	2400	3200		
1-1/2	6	1900	2600	3200	4300		
1-5/8	5.5	2400	3300	4300	5900		
1-3/4	5	3000	4100	5000	6800		
2	4.5	4500	6100	7500	10000		

*Values above are approximations; consult with the manufacturer for torque data.
Significant variation may exist within the same grade and size between manufacturers.

KICE INDUSTRIES, INC.

5500 N. Mill Heights Dr.

Wichita, KS 67219-2358

(P) 316.744.7151

(F) 316.744.7355

sales@kice.com

kice.com