



Top Bag Removable Pneu-Jet Filter

Operators Manual



Drew Kice
President
Kice Industries, Inc.

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

[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 controller on the work platform.

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 top bag removable pneu-jet filter; the "lid" type and a "walk in" version as shown below.



Filter Terminology

The image below shows some of the standard and optional features of your Kice Top Bag Removable Pneu-Jet 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 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 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 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.

The following safety decals will be located on the equipment. Look for them!





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.

A qualified engineer should design the foundation and/or footings for the filter. The slab should be extended to support accessory equipment as needed, such as a floor mounted fan. Refer to the drawings provided of your equipment for foot pad locations and weights. The weight of all the equipment and associated material load, along with the environmental forces for the location, must be considered as part of the foundation design.

7. STORAGE

Kice top bag removable pneu-jet 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 top bag removable pneu-jet 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 top bag removable pneu-jet 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.



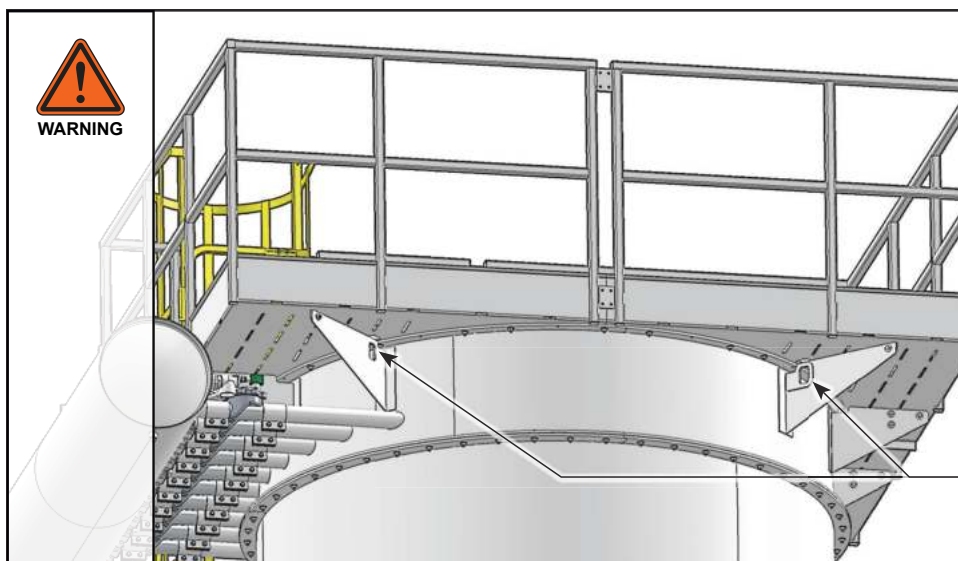
WARNING

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.



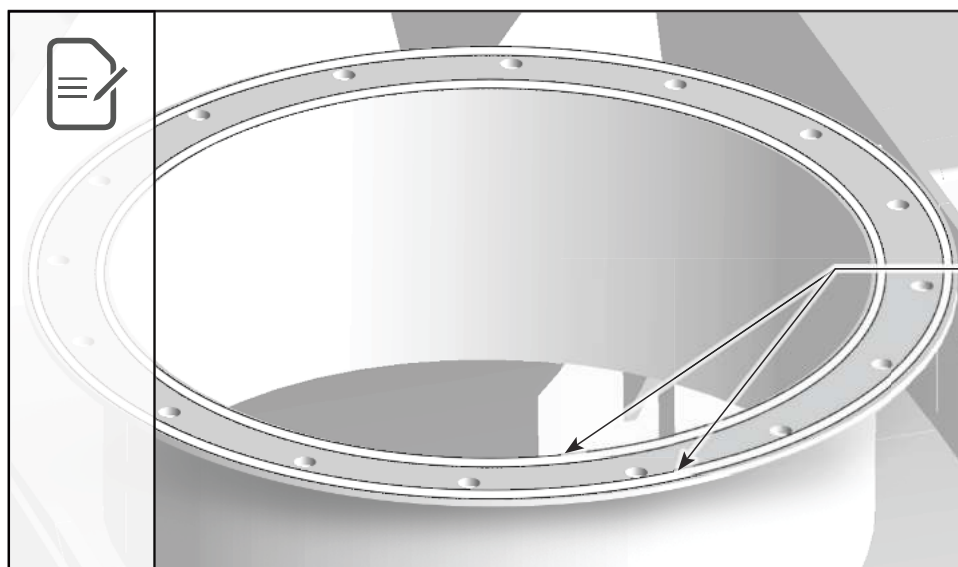
CAUTION

Ladder is not safe to use until all components and braces are properly installed.

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

Move filter to install area using proper equipment and rigging.

↑ Lift only by indicated lugs.

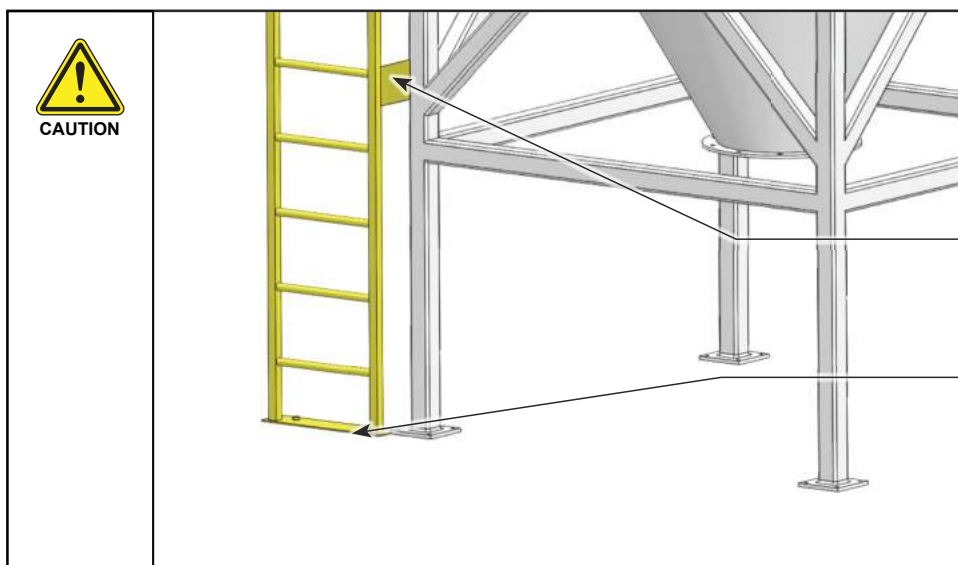
**Step 2****□ Add Caulking to Flanges**

Mating surfaces should be free of any foreign materials. Check all flanges.

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

Note:

If airlock valve is required it should be mounted to the hopper discharge flange. Additional support may be required. All duct work or stacks need to be independently supported.

**Step 3****□ Anchor Ladder**

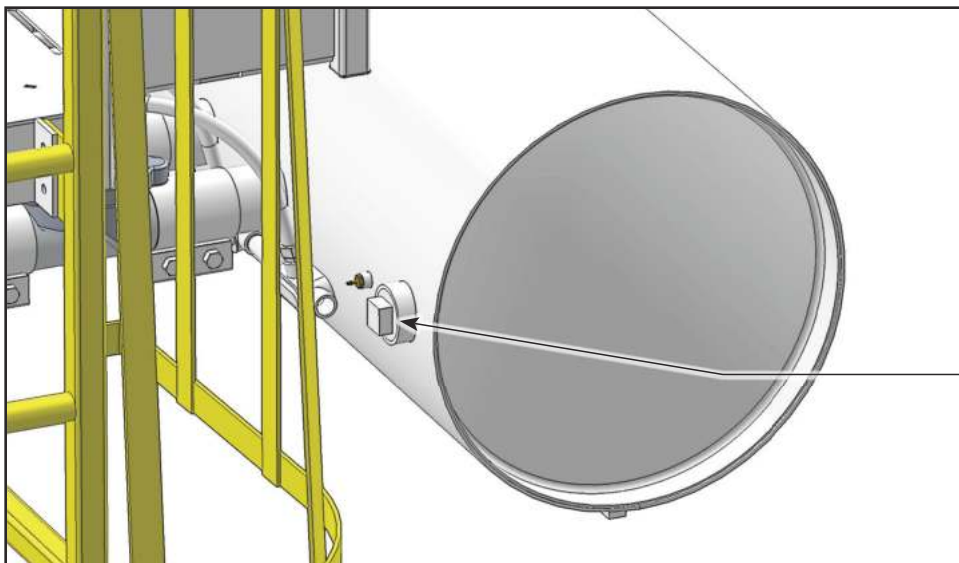
Make sure all support braces are attached before using ladder.

↑ Depending on span of ladder support braces may need connected.

↑ Shim ladder as needed for flush installation with pad.

Note:

Tighten all fasteners securely.

**Step 4****□ Connect Air Supply**

Connect medium pressure air supply (10-15 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 (one at each Kice Pneu-Jet solenoid valve) 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: The sequence controller is not dependent on the successful firing of the Kice Pneu-Jet blast valve to advance to the next valve in sequence. If, for any reason, a Kice Pneu-Jet blast valve does not fire, the controller will continue to time out the “off” time and activate the next valve in sequence.



Notice: Reference Page 13 in the Filter Operation section for example wiring diagram.

Step 5**□ Install Filter Bags and Cages**

Reference Page 18 in the Filter Maintenance Section.

Step 6**□ Verify Airlock Rotation**

Some systems will have a fan and airlock valve to be connected. Verify that the fan and airlock rotation direction is correct as marked.

Step 7**□ Test Run**

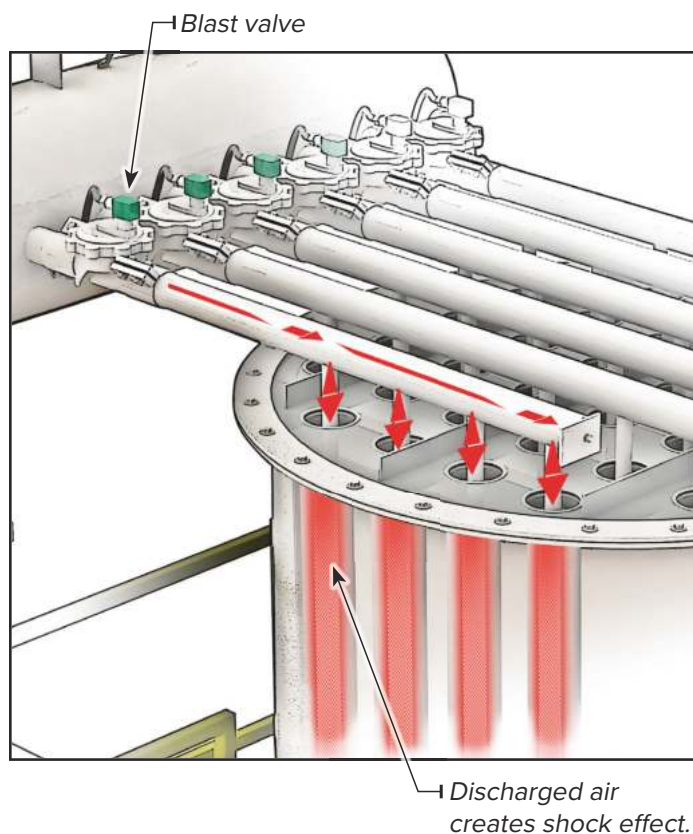
Test run the filter. If any unusual noises occur, disconnect and lock out the power. Check the fan, airlock valve and screw conveyor, if furnished.

Step 8**□ Reassemble**

Reassemble any doors or covers removed during installation.

9. FILTER OPERATION

A remote fan on the outlet of the clean air chamber draws air through the filter. Most of the dust entering the filter is directed to the hopper and out the discharge through cyclonic action entering the filter. The remaining dust laden air is directed to the filter bags. Dust collects on the outside of the filter media. Reverse air pulse valves periodically clean dust off the filter bags causing it to drop into the hopper. Filtered air then passes through the bags and out the clean air discharge.



The reverse air pulse valves are mounted between the air accumulation tank and the manifold lines that run inside the clean air chamber above the filter bags. The valves are controlled by a timer that can be set to clean continuously or clean on demand when the pressure drop across the filter bags increases beyond a certain point. When the pulse valve opens it quickly discharges the tank of pressurized air through the manifold and into the filter bags in that row. This pulse of air creates a shock effect and causes the dust particles collected externally on the filter media to be dislodged and fall into the hopper. The controller cycles to the next valve after a period of time, which can be adjusted by the operator. The complete filter control circuit is shown on the schematic located on page 13.

Operating Logic

The controller is an electronic, 100% solid-state board mounted in either a NEMA 4 or an explosion proof enclosure.

The controller can function in two modes:

Continuous Mode: The pressure switch terminals are shorted. Upon application of input voltage, the controller activates output #1 after the preset off time. It will continue to activate outputs sequentially until input voltage is removed.

On Demand Mode: The pressure switch terminals are connected to an isolated set of contacts of a differential pressure switch. The controller will activate the outputs sequentially whenever the pressure switch contacts are closed. When the pressure switch contacts open, the output sequencing stops. Reclosing of the contacts will cause the controller to resume activating the outputs.

A jumper wire allows the user to select the maximum number of outputs to be activated.

NOTICE: Controller is shipped with a jumper across the pressure switch terminals.

The Part Number of the Controllers Used Are:

Dwyer Instruments Timer Controller
2009 to Present:

Model #	Number of Channels	Filter Models
DCT1022DC	22	M & R Series
DCT1010	10	S Series
DCT510ADC	10	R & S Series
DCT610	10	R Series
DCT622	22	R132

Reference the *Dwyer Electronic Controller Schematic on page 13* for more detail.

The DCT610 and DCT622 both operate on 85 to 270 VAC/50 or 60 Hz. The DCT600 Timer Controllers are mainly used for on-demand, pulse-jet type dust controllers or continuous pneumatic conveying systems.

The DCT1022DC operates on 24 VDC. The DCT100DC Dust Collector Timer Controller series is mainly used for continuous cleaning or timer-controlled on-demand cleaning.

The DCT510ADC operates on 10 to 35 VDC. The DCT500ADC Low Cost Timer Controller is designed for continuous cleaning methods or on-demand pulse-jet cleaning systems.

Dwyer Instruments Timer Controller Schematic

Model	Max. No. Of Outputs	Programmable No. of Outputs
DCT1022DC	22	6 - 22
DCT510ADC	10	4 - 10
DCT610	10	4 - 32
DCT622	22	4 - 32

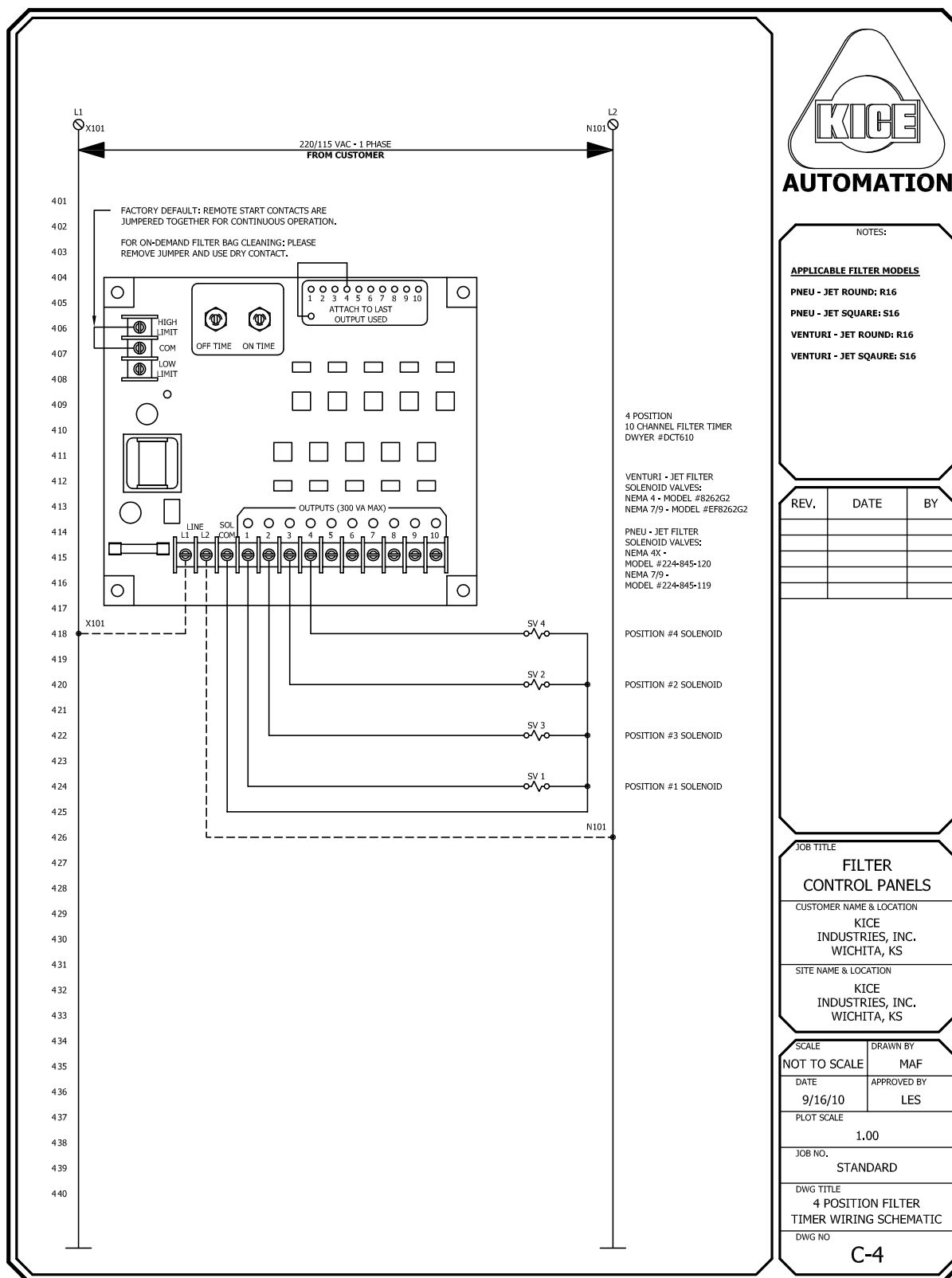
Specifications:

Time Delay:		Input:	
On Time	Adjustable from 50 to 500 Milliseconds *DCT1022DC: Adjustable from 10 to 600 Milliseconds	Operating Voltage	120 +-10% VAC, 50/60 Hz
Off Time	Adjustable from 1 to 180 Seconds *DCT1022DC: Adjustable from 1 to 225 Seconds	Optional Voltage	220 +-10% VAC, 50/60 Hz

Output:		Protection:	
Type	10-30 VDC power	Solenoid Fault Light	Notifies operator when solenoid valve fails to activate properly

Environmental:	
Operating Temperature:	-40°F to 140°F (-40°C to 60°C)

...Dwyer Instruments Timer Controller Schematic Continued



FOR CONSTRUCTION - 9/16/10

Start-Up Procedure

Step 1

- Check the air power unit for correct rotation and speed to provide pressurized air (10-15 psig) to the filter air tank.

Step 2

- Check screw conveyors and airlocks (if furnished) for proper directions of rotation.

Step 3

- Controls should be wired in accordance with schematic diagram. Round model filters are normally pre-wired, fully assembled and tested at the factory. Check all wiring connections to assure proper bag cleaning sequence. The air tank pressure gauge should have a working range of 0-30 psig.

Step 4

- 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 5

- 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,

Step 6

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

Step 7

- If a Pneu-Jet blast valve does not fire on start-up, first check the output LED to confirm that power is being sent to the solenoid on the Pneu-Jet blast valve.

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, airlock and screw conveyor 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 bags. It is recommended that filter bags 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 2-15 psig.
2. Excessive leakage: Disassemble valves and clean all parts. Replace parts that are worn or damaged with a complete Spare Parts Kit (#K234-169, 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 Pneu-Jet Blast Valve

Description:

The Kice Pneu-Jet blast valve is a 2 way, NC, diaphragm type air valve designed for remote pilot operation. This valve has an aluminum body with 3" pipe port connections and 3" orifice diameter.

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

Kice Solenoid Operated Pilot Valve

Description:

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

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.

Causes of Improper Operation:

1. Incorrect Pressure: Check valve pressure. Pressure to valve must be within 2-15 psig.
2. Excessive leakage: Disassemble valves and clean all parts. Replace parts that are worn or damaged with a complete Spare Parts Kit (#K234-169).

Solenoid:

Types 4 and 4X (Green) - #224-845-120
Types 7 and 9 (Black) - #224-845-119

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

Valve Disassembly and Reassembly

Depressurize the valve and bleed the air from the air tank before making repairs. Remove the pilot valve from one unit to insure the air tank is at atmospheric pressure.

Step 1

□ The solenoid operated pilot valve is mounted to the main valve bonnet with four screws. Remove bonnet screws, valve bonnet, diaphragm spring and diaphragm assembly.

Step 2

□ Diaphragm assembly is now accessible for cleaning or replacement. Replace diaphragm assembly if worn or damaged.

Step 3

□ Reassemble in reverse order of disassembly, paying careful attention to the drawing provided for identification and placement of parts.

Step 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.

Step 5

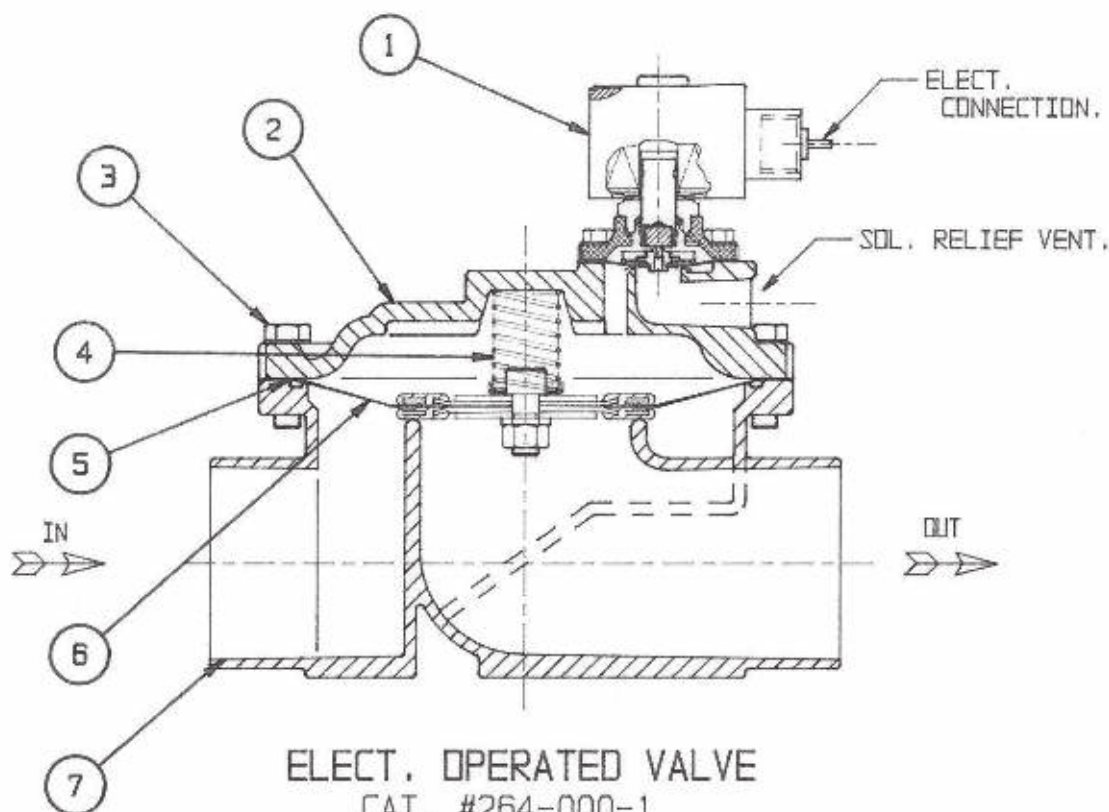
□ Replace pilot valve.

Step 6

□ After maintenance, operate the valve a few times to be sure of proper opening and closing.

NOTICE: Reference Valve detail drawing on page 17.

Valve Detail Drawing



ELECT. OPERATED VALVE

CAT. #264-000-1

120V, 50/60Hz, N.C.

DATE STARTED USING: MAY 1993 TO PRESENT.

ITEM	NAME	QTY.	ITEM	NAME	QTY.
● 1	ELECT. OPERATOR ASSY. (NEMA-4 GREEN) (NEMA-7&9 BLACK)	1	△ 4	SPRING	1
2	BONNET	1	△ 5	GASKET, BODY	1
3	SCREW (SEMS)	8	△ 6	DIAPH. ASSY,	1
			7	BODY	1

- ELECTRIC SOLENOID VALVE NEMA- 4 (GREEN) KIT #224-845-120
- ELECTRIC SOLENOID VALVE NEMA- 7&9 (BLACK) KIT #K224-845-119
- △ PNEUJET BODY REPAIR KIT #K234-169

Installing Filter bags - Accessing Dirty Air Chamber

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

The following hazards are present:



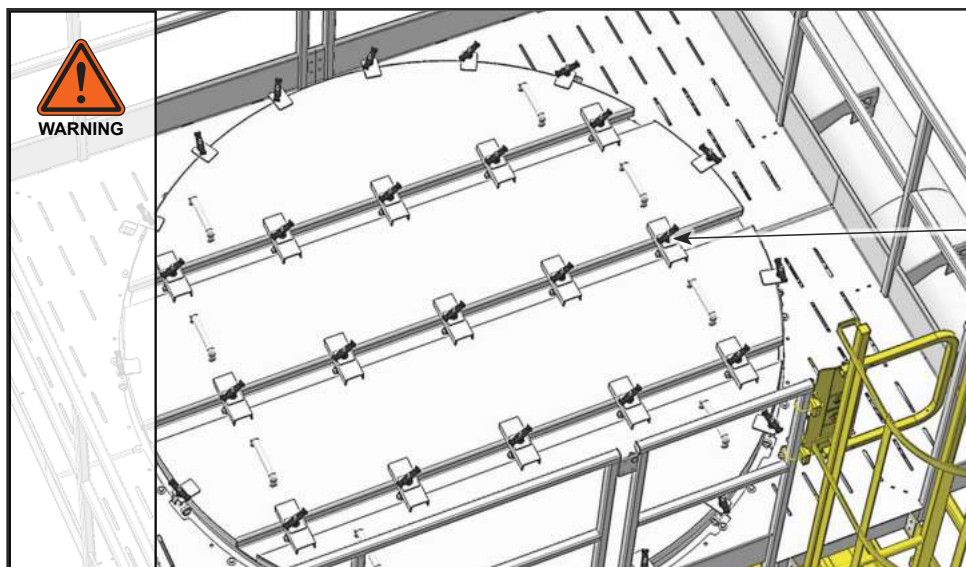
When performing maintenance, all energy sources associated with the filter must be locked and tagged out in compliance with 29 CFR 1910.147, local enforcement authorities, OSHA, and facility safety practices, before removing any protective cover, guard, grate or maintenance gate.



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.

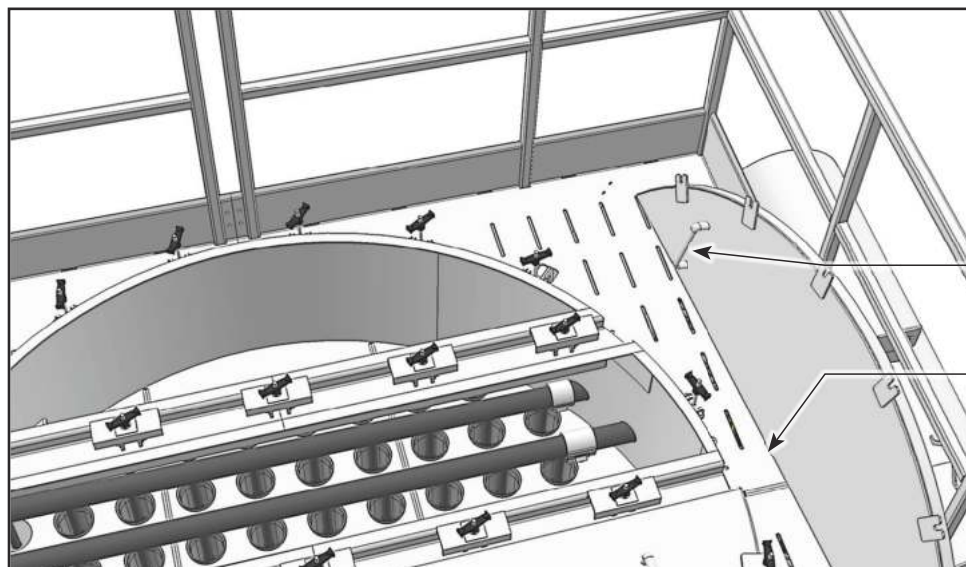


Step 1

□ Remove Threaded Lid Locks

Remove all lid locks.

→ Lid locks.



Step 2

□ Remove Lids

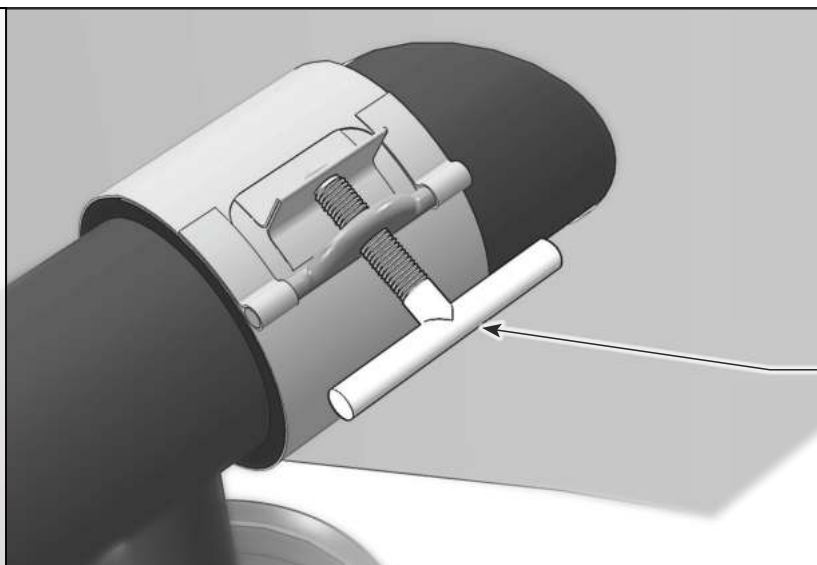
Carefully remove each lid by utilizing the grab handles. Make sure each lid is secure in its stowed position.

→ Use supplied grab handles.

→ Stow lids on walkway.

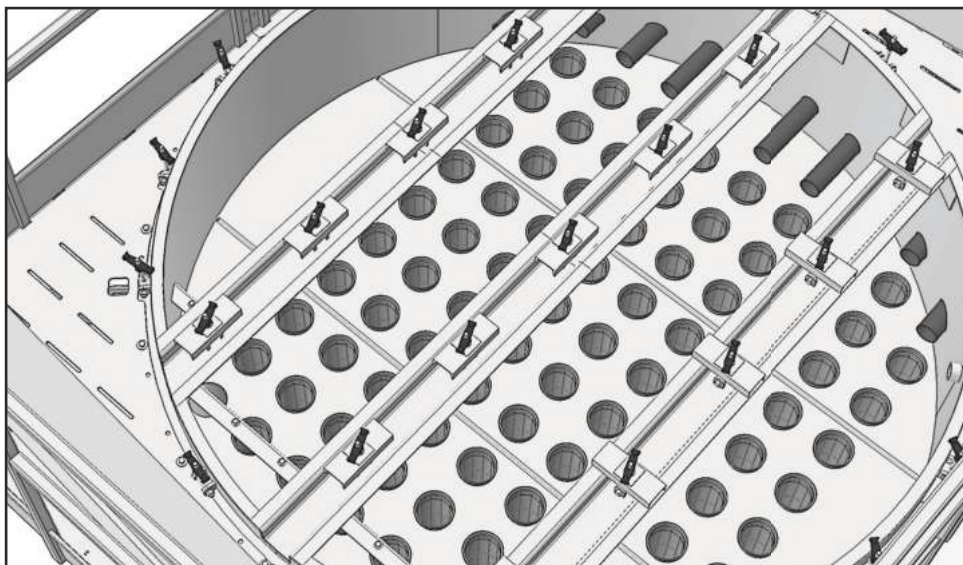


WARNING

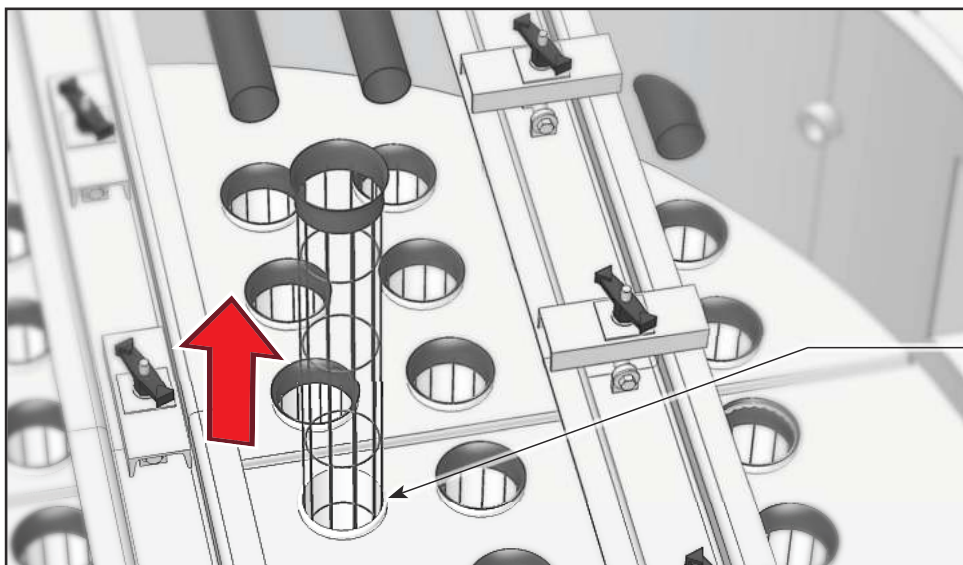
**Step 3****□ Release Couplings**

Release couplings one lateral at a time. Turn threaded handle several revolutions to loosen coupling.

└ Threaded coupling T-handle.

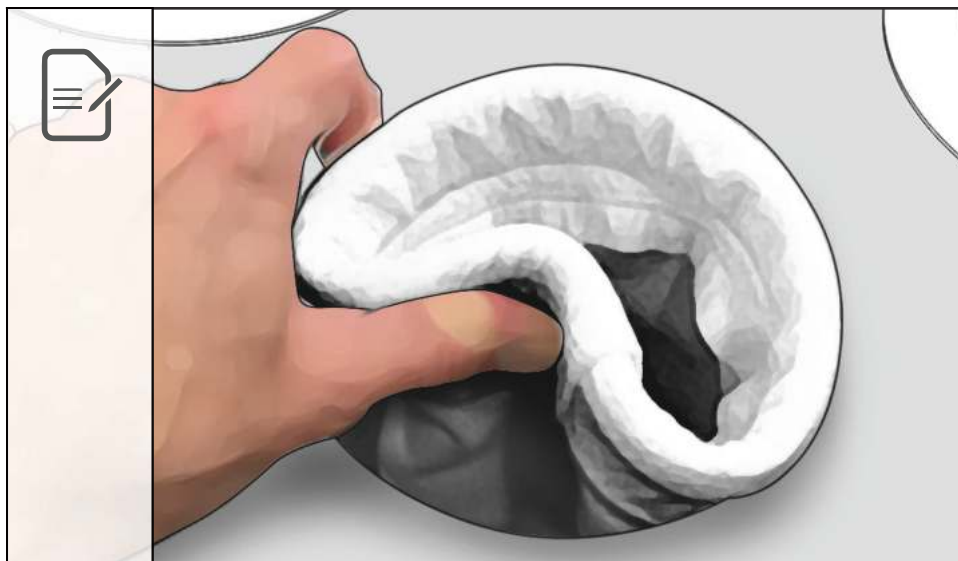
**Step 4****□ Remove All Laterals & Couplings**

Remove laterals and couplings one section at a time. Carefully stow laterals on walkway.

**Step 5****□ Remove Cage**

Carefully pull each cage up revealing the filter bag ring and snap.

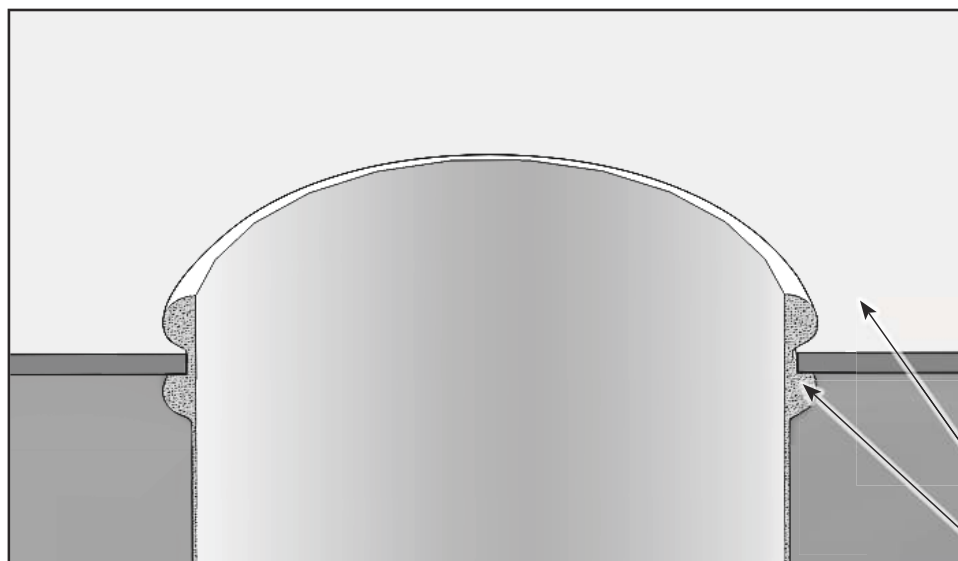
└ Filter bag is secured to tube sheet.

**Step 6****□ Remove Snap Band and Bag**

Bend the snap band at the top of the bag to remove it from the tube sheet hole. The used filter bag can be dropped into the dirty air chamber. Retrieve all used filter bags after installation is complete.

Note:

Bag should snap out of place.

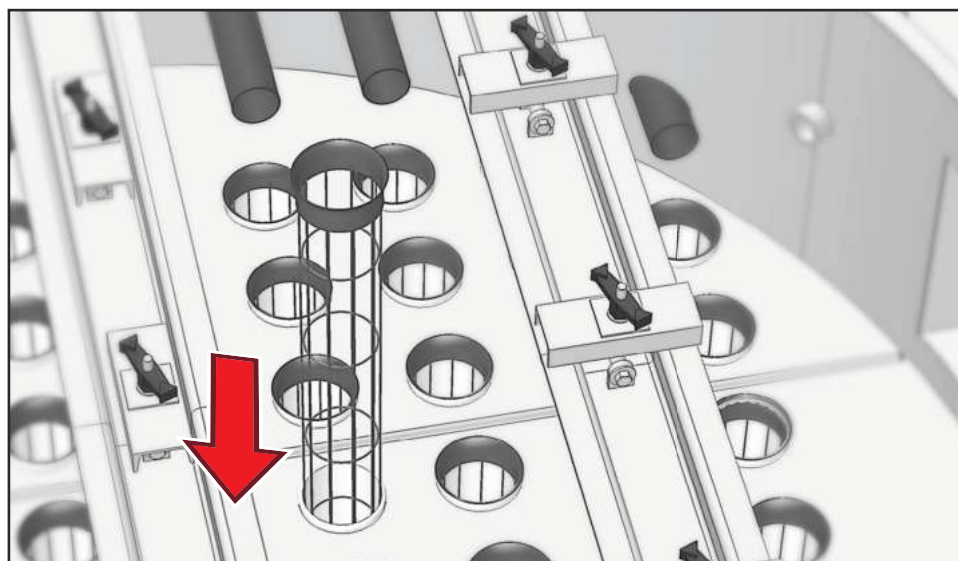
**Step 7****□ Install New Filter Bag**

Place the new filter bag 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 bag snap into place.

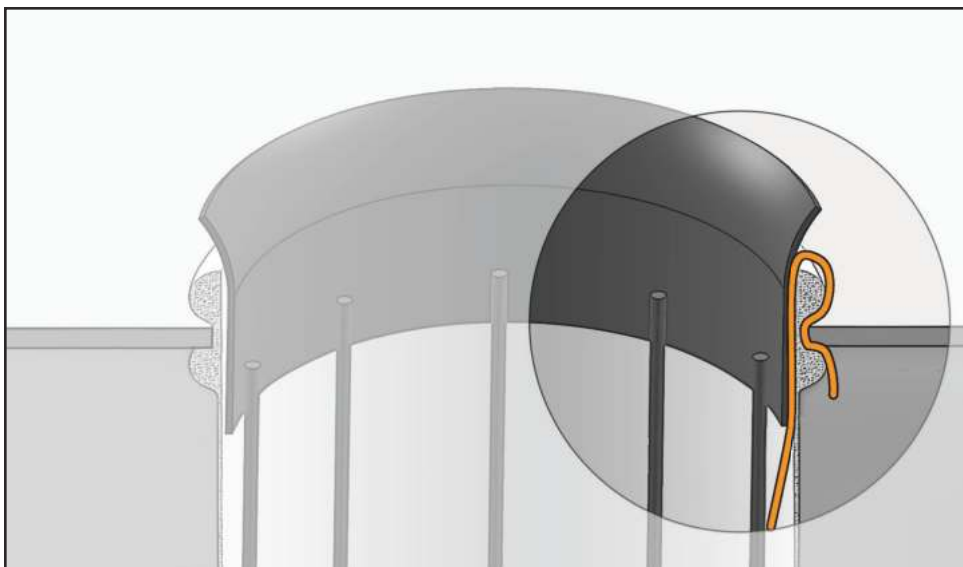
Check the fit of the snap band. It should fit securely all around without any gaps. The top ring of the band should be above the tube sheet.

— Tube sheet

— Snap band ring

**Step 8****□ Lower the Cage Into the Bag**

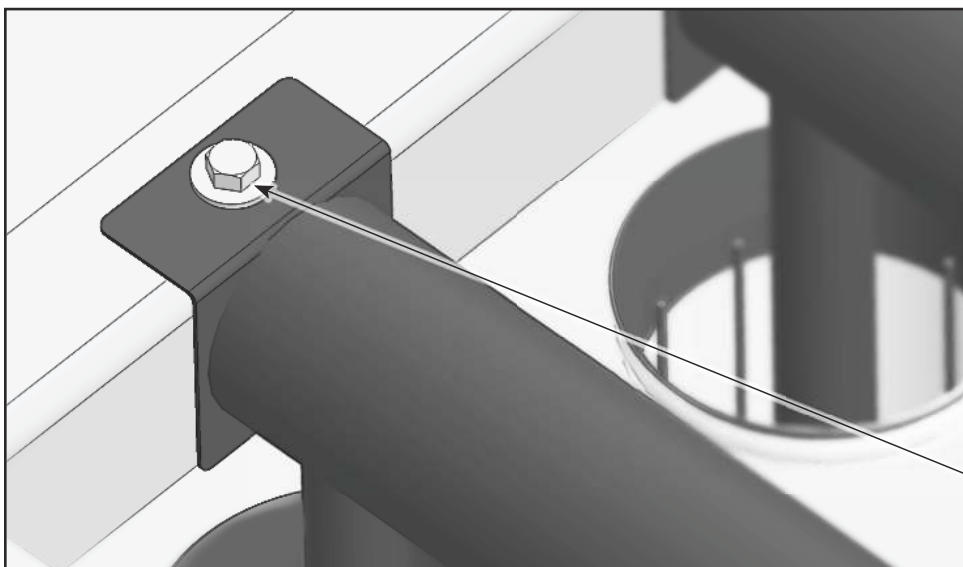
Lower the cage into the bag. The flange of the cage will rest on the top ring of the filter bag.

**Step 9 (Optional)****□ Install Grounding Straps**

Grounding straps at the top of the bag are intended to ground the cage to the tube sheet. Install the bag in the tube sheet hole ensuring the ground strap is in good contact with the cage and tube sheet.

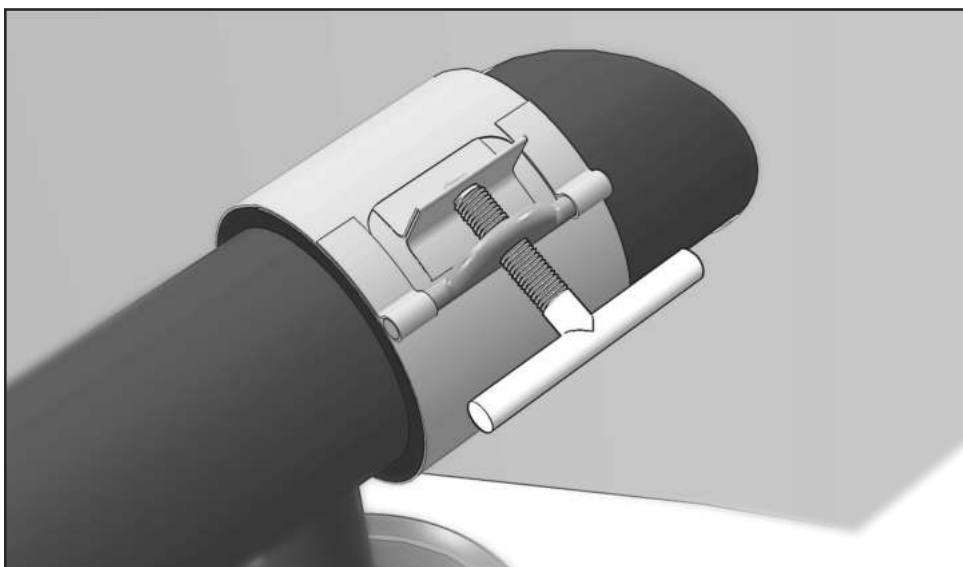
Ensure proper grounding by verifying the resistance between the cage and tube sheet does not exceed 10 ohms.

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

**Step 10****□ Reinstall All Laterals**

Carefully reinstall all laterals. Lower lateral onto flange and align both coupling and flange ends. Secure cam lock onto fitting then tighten bolt on flange end.

Securely tighten bolt on flange end.

**Step 11****□ Check All Couplings**

Make sure that all couplings are fully seated and threaded tight to laterals.

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 for loose bag clamps.
3. Check filter bag installation (see Installation).

B. Pressure Drop Starts to Increase

Probable Cause/Suggested Remedies:

1. Should one Pneu-Jet blast valve not fire for an extended period of time, a row of filter bags could become masked with dust (see "E" - Pneu-Jet blast valve fails to fire).
2. 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.)
3. 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 (drive belts may be slipping or sheaves may be reversed).
3. Check for high pressure differential (see "B" - Pressure drop starts to increase).

D. Product Does Not Discharge

Probable Cause/Suggested Remedies:

1. Check the direction of rotation of the airlock and screw conveyor (if furnished).
2. Check for plugged or partially plugged gravity spouting.
3. Check for bridging in the filter hopper.

E. Pressure Holds Constant in Air Tank - Pneu-Jet

Blast Valve Fails to Fire

Probable Cause/Suggested Remedies:

1. Check power to the controller.
2. Check LED output indicators.
3. Check for power at the solenoid or for a faulty solenoid.
4. 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.)

F. Cleaning Pressure Varies

Probable Cause/Suggested Remedies:

1. Check "off" time potentiometer.
2. Check "on" time potentiometer.
3. Check for skipping in bag cleaning sequence (Pneu-Jet blast valve not firing).

G. 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 Pneu-Jet blast valves for leaks.
5. Check to see if any of the Pneu-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 Pneu-Jet blast valves.
8. Check plant air supply.

H. Sequence Controller Troubleshooting

Probable Cause/Suggested Remedies:

1. Check input power.
2. Observe RED power light:
 - a. If power light is not on, check fuse.
 - b. If fuse is OK, replace timer board.

3. Before replacing blown fuse, disconnect power and check output circuits only for short circuit. Correct, if necessary.
4. Replace fuse.
5. Apply power while watching output lights for proper function.
6. Make sure cycle starts at output #1, continues to last output selected, and then restarts.
7. If fuse blows, observe at which output light the malfunction occurs and recheck that output circuit for shorted condition.
8. If a valve stays open after it is de-energized, replace the valve.
 - a. If a valve stays energized, replace the timer board.
 - b. If a valve does not operate when its output light is on, replace the wiring or the solenoid valve.

Some Things NOT TO DO

1. DO NOT mount controls in high vibration areas without shock mounts.
2. DO NOT mount controls in areas of high dust or corrosive atmospheres without a protective enclosure.
3. DO NOT use a converter or inverter for the power source.
4. DO NOT mount the control in a high transient voltage area without an isolation transformer.
5. DO NOT leave the control box door open.
6. 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 solid-state electronic controller, refer to the Filter Maintenance and Service section, or by specifying the total number of outputs on the controller you are replacing.



Vent area may differ between explosion panel manufacturers. The required vent area should be verified when replacing panels. Contact Kice Industries for explosion vent replacement and information.

12. EXPLOSION VENTS

Explosion Vents

Many fine dusts collected by filters are combustible. Most dusts can catch fire if three components are present: fuel, ignition source and oxygen. Dust is the fuel, a spark or flame may provide the ignition source, and air provides the oxygen. The deflagration index (K_{st}) and the maximum deflagration pressure (P_{max}) of a particular dust will determine the violence of the fire and the amount of destructive force that has to be vented from the filter. This information, provided by the operator, will be used to calculate the number of explosion vents required for Kice Filters.

The National Fire Protection Association (NFPA) provided comprehensive guidelines and standards for dealing with explosive dusts and fires. The following publications provide valuable information on fire and explosion protection and can be helpful to insure your facility is properly equipped.

- NFPA 652 – Standard on the Fundamentals of Combustible Dust
- NFPA 61 - Standard for the Prevention of Fires and Dust Explosions in Agricultural and Food Processing Facilities
- NFPA 68 - Standard on Explosion Protection by Deflagration Venting
- NFPA 69 - Standard on Explosion Prevention Systems
- NFPA 77 - Recommended Practice on Static Electricity
- NFPA 654 - Standard for the Prevention of Fire and Dust Explosions from the Manufacturing, Processing, and Handling of Combustible Particulate Solids
- NFPA 664 - Standard for the Prevention of Fires and Explosions in Wood Processing and Woodworking Facilities

This is not a comprehensive list of standards for all applications. These and other standards and guidelines from the NFPA that may be applicable for your facility can be ordered or viewed at <http://www.nfpa.org>.

13. APPENDIX A

I&M No. V 5779 R7

General Installation & Maintenance Instructions

DESCRIPTION

This sheet is specifically designed to provide general installation and maintenance instructions for specially designed valves. Not all paragraphs on this sheet are applicable to each design. You must review this sheet and select the paragraphs which apply to the valves you have. This sheet is designed to cover a wide range of valve designs, for example: solenoid operated valves, air operated valves, manual operated valves, special designs for special applications and conditions. Refer to the offset assembly drawing which is packaged with your valve for information on size, type, material, and operation.

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

Refer to assembly drawing for flow diagrams and general instructions on operation.

INSTALLATION

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

FOR VALVES WITH LEVER TYPE OPERATING MOVEMENTS

▲ WARNING: Do not obstruct movement of lever. Lever must be free to move or valve will not shift position.

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

Refer to assembly drawing for ambient and fluid temperature limitations.

Positioning

Refer to assembly drawing for positioning.

Piping

Connect piping to valve according to markings on valve body (consult flow diagrams on assembly drawings). 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.

▲ CAUTION: To avoid damage to the valve body, DO NOT OVERTIGHTEN PIPE CONNECTIONS. If PTFE tape, paste, spray or similar lubricant is used, use extra care when tightening due to reduced friction. This applies mainly to valves with aluminum or zinc bodies.

▲ CAUTION: For the protection of the solenoid valve (all valves in general) 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 service conditions. See Series 8600 and 8601 for strainers.

Minimum Operating Pressure Differential

For all valves requiring a minimum operating pressure differential, the pressure and exhaust lines must be full size without restriction. Minimum operating pressure differential as stamped on the nameplate must be maintained for dependable operation. For 3 and 4-way valves minimum operating pressure differential must be maintained between pressure and exhaust at the moment of

changeover. Hydraulic pumps or air reservoirs must have adequate capacity to maintain the minimum pressure during changeover. To check pressure during changeover, install a pressure gauge in the pressure connection as close as possible to the valve.

MAINTENANCE

▲ WARNING: To prevent the possibility of death, serious injury or property damage, turn off electrical power and depressurize valve. If the valve handles combustible fluid, extinguish all open flames and avoid any type of sparking or ignition. Vent fluid to a safe area before servicing the valve.

NOTE: For most valves it is not necessary to remove valve from pipeline for repairs. For air operated valves the auxiliary pressure line must be disconnected.

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 shift. Clean strainer or filter when cleaning the valve.

Preventive Maintenance

- Keep medium flowing through 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. If parts are worn or damaged, install a complete rebuild kit.
- For special designs where an operating movement is utilized, periodic inspection of the movement should be carried out. Operating movement should be kept clean and free from paint, foreign matter, corrosion, freezing and icing conditions.

Causes Of Improper Operation

- **Faulty Control Circuits:** Check the electrical system by energizing the solenoid. Ultramicroscopes check that the solenoid is operating. Absence of the click indicates loss of power supply. Check for loose or blown fuses, open circuited or grounded coil, broken lead wires, or splice connections.
- **Burned-Out Coil:** Check for open-circuited coil. Replace coil as necessary. Check supply voltage; it must be the same as specified on nameplate and as marked on the coil.
- **Low Voltage:** Check coil voltage across coil leads. Voltage must be at least 85% of nameplate rating.
- **Incorrect Pressure:** Check valve pressure. Pressure to valve must be within range specified on nameplate.
- **Air Operator:** Check line pressure to air operator.
- **Excessive Leakage:** Disassemble valve and clean all parts. Replace worn or damaged parts with a complete ASCO Rebuild Kit for best results.

ORDERING INFORMATION FOR ASCO REBUILD KITS AND COILS

Parts marked with an asterisk (*) on the assembly drawing are supplied in Rebuild Kits. When Ordering Rebuild Kits for ASCO valves, order the Rebuild Kit number stamped on the valve nameplate. When Ordering Coils for ASCO valves, order the number stamped on your coil. If the number of the kit or the coil is not visible, order by indicating the number of kits required, and the Catalog Number and Serial Number of the valve(s) for which they are intended.

14. APPENDIX B

I&M No. V 6584 R19 sec1

Installation & Maintenance Instructions



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

SERIES
8003G/H
8007G/H
8202G/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.

See separate instructions for basic valve.

DESCRIPTION

Catalog numbers 8003G/H, 8007G/H and 8202G/H and 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” or “EV” 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, Division1 Groups A, B, C, & D and Type 9, -Dust-Ignitionproof Class II, Division1 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 or 0.63 minimum full thread.

NOTE: Catalog number prefix “EV” denotes stainless steel construction.

Solenoid catalog numbers 8202G/H1, 8202G/H3, 8202G/H5 and 8202G/H7 are epoxy encapsulated push-type, reverse-acting solenoids having the same enclosure types as previously stated for Catalog numbers 8003G/H1 and 8003G/H2. 8007G/H are 3-way solenoid operators with a pipe port or adapter, exhaust protector or vent at the top of the solenoid base sub-assembly.

Series 8003G/H, 8007G/H and 8202G/H solenoids 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. Refer to Figures specified in this I&M and the section on *Installation of Panel Mounted Solenoid* for details.
- **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).
- **Multipin Connectors:** All Multipin connectors (VT, VB, ZT, ZB) do not have any enclosure ratings.

NOTE: For China RoHS Hazardous Substances table, please go to the link below or scan QR code:
www.asco.com/ChinaRoHSDisclosure



OPERATION

Series 8003G/H and 8007G/H - 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 11 ounces, and 5 ounces for DC construction.

Series 8202G/H - When the solenoid is energized, the disc holder assembly seats against the orifice. When the solenoid is de-energized, the disc holder assembly returns. **IMPORTANT:** Initial return force for the disc or disc holder assembly, whether developed by spring, pressure, or weight, must exert a minimum force to overcome residual magnetism created by the solenoid. Minimum return force is 1pound, 5 ounces.

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.

▲ AVERTISSEMENT: Risque d'accès aux parties électriques actives. Afin d'éviter tout risque de mort, blessure ou dommage, installer la bobine dans un boîtier.

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.

▲ ATTENTION : Afin d'éviter le risque de feu ou d'explosion, ne pas installer la bobine ou l'électrovanne où la température d'inflammation en atmosphère explosible est inférieure à 165°C. Pour les vannes vapeur ou lorsqu'une bobine de classe H est utilisée, ne pas installer en atmosphère explosible lorsque la température d'inflammation est inférieure à 180°C. Consulter les conditions d'utilisations sûres indiquées sur le produit ou dans la notice.

NOTE: These solenoids have an internal non-resetable 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.

⚠ ATTENTION : Afin de protéger l'électrovanne ou l'actionneur, installer une crépine ou un filtre adapté le plus proche possible en amont de l'électrovanne ou de l'actionneur. Nettoyer périodiquement le filtre en fonction des conditions d'utilisation. Se référer aux séries 8600 et 8601 pour les crépines.

Temperature Limitations

For maximum solenoid 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 ambient and fluid temperatures.

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

10.1 & 17.1	None, FB, KF, KP, SC, SD, SF, SP, VT, VB, ZT & ZB	F	125°F (52°C)
10.1, 17.1 & 24.6	HB, HT, KB, KH, SS, ST, SU, HC	H	140°F (60°C)
11.6 & 22.6	None, FB, KF, KP, SC, SD, SF, SP, VT, VB, ZT & ZB	F	104°F (40°C)
11.6 & 22.6	HP, HT, KB, KH, SS, ST, SU & SV	H	104°F (40°C)
15.6	None, KB, SS, SV	H	104°F (40°C)

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

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
EF, EV	FT	10.1	10.1	-	52	125
EF, EV	FB	17.1	17.1	-		
	FT	10.1	10.1	-	55	131
	FB	17.1	17.1	-		
	HT	-	-	11.6		
	HF	-	-	15.6		
	HB	-	-	22.6		
EF, EV	HT	-	-	11.6	40 ²	104 ²
EF, EV	HF	-	-	15.6		
EF, EV	HB	-	-	22.6		
	HT	10.1	10.1	-	60 ³	140 ³
	HB	17.1	17.1	-		
EF, EV	HT	10.1	10.1	-		
EF, EV	HB	17.1	17.1	-		
EF, EV	HC	-	-	24.6		

¹ = EF, EV 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.

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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.

⚠ CAUTION: Cryogenic Applications - Solenoid lead wire insulation should not be subjected to cryogenic temperatures. Adequate lead wire protection and routing must be provided.

⚠ ATTENTION: Application cryogénique. Les câbles électriques ne doivent pas être soumis à des températures cryogéniques. Une protection adéquate des câbles électriques doit être fournie.

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.

Multipin Connector		
Connector Type	Mating Connector	Application
VT / VB	4-Pin, M12, Female, Single Keyway	DC
	4-Pin, M12, Female, Dual Reverse Keyway	AC
ZT / ZB	3-Pin, Mini, Female, Single Keyway	AC / DC

- **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.

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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 [$0,6 \pm 1,1$ 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 Figures 1 and 2)

1. Disassemble solenoid following instruction under *Solenoid Replacement* then proceed.
2. Install solenoid base sub-assembly through customer panel. 8202H panel mounted solenoids include a retainer to adapt the solenoid base sub-assembly to the customer panel. (See Figure 2)
3. Position finger washer on opposite side of panel over solenoid base sub-assembly.
4. Replace solenoid, nameplate/retainer and red cap.
5. Make electrical hookup, see *Wiring* section.

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.

▲ AVERTISSEMENT: Pour éviter tous danger de mort, de blessure grave ou de dommage matériel, avant d'intervenir sur la vanne, couper le courant, purger la vanne dans une zone sécurisée.

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. Disconnect conduit, coil leads, and grounding wire.

NOTE: Any optional parts attached to the old solenoid must be reinstalled on the new solenoid. For 3-way construction, piping or tubing must be removed from pipe adapter.

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. Remove red cap or retainer from top of solenoid base sub-assembly. For 3-way construction with pipe adapter (Figure 3), remove pipe adapter, nameplate and solenoid. Omit steps 4 and 5.
4. Push down on solenoid. Then using a suitable screwdriver, insert blade between solenoid and nameplate/retainer. Pry up slightly and push to remove. **NOTE:** Series 8202G/H solenoids have a spacer between the nameplate/retainer and solenoid.
5. Remove solenoid from solenoid base sub-assembly.
6. Reassemble in reverse order of disassembly. Use exploded views for identification and placement of parts.
7. Torque pipe adapter to 90 inch-pounds maximum [$10,2$ Nm maximum]. Then make up piping or tubing to pipe adapter on solenoid.

Disassembly and Reassembly of Solenoids

1. Remove solenoid, see *Solenoid Replacement*.
2. Remove spring washer from solenoid base sub-assembly. For 3-way construction, remove pipe adapter and plugnut gasket.
3. Unscrew solenoid base sub-assembly from valve body.
4. Remove internal solenoid parts for cleaning or replacement. Use exploded views for identification and placement of parts.
5. If the solenoid is part of a valve, refer to basic valve installation and maintenance instructions for further disassembly.
6. Torque solenoid base sub-assembly and adapter to 175 ± 25 in-lbs [$19,8 \pm 2,8$ Nm].

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.

I&M No. V 6584 R19 sec1

Torque Chart

Part Name	Torque Value in Inch-Pounds	Torque Value in Newton-Meters
solenoid base sub-assembly	175 ± 25	19,8 ± 2,8
pipe adapter	90 maximum	10,2 maximum

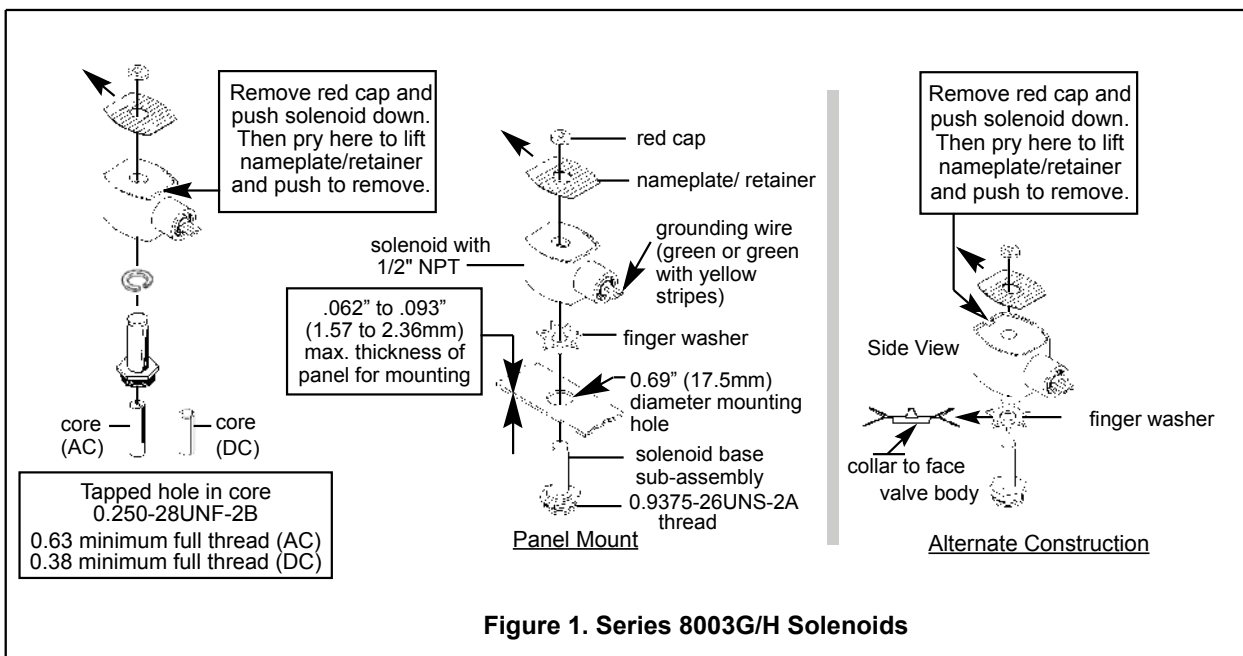


Figure 1. Series 8003G/H Solenoids

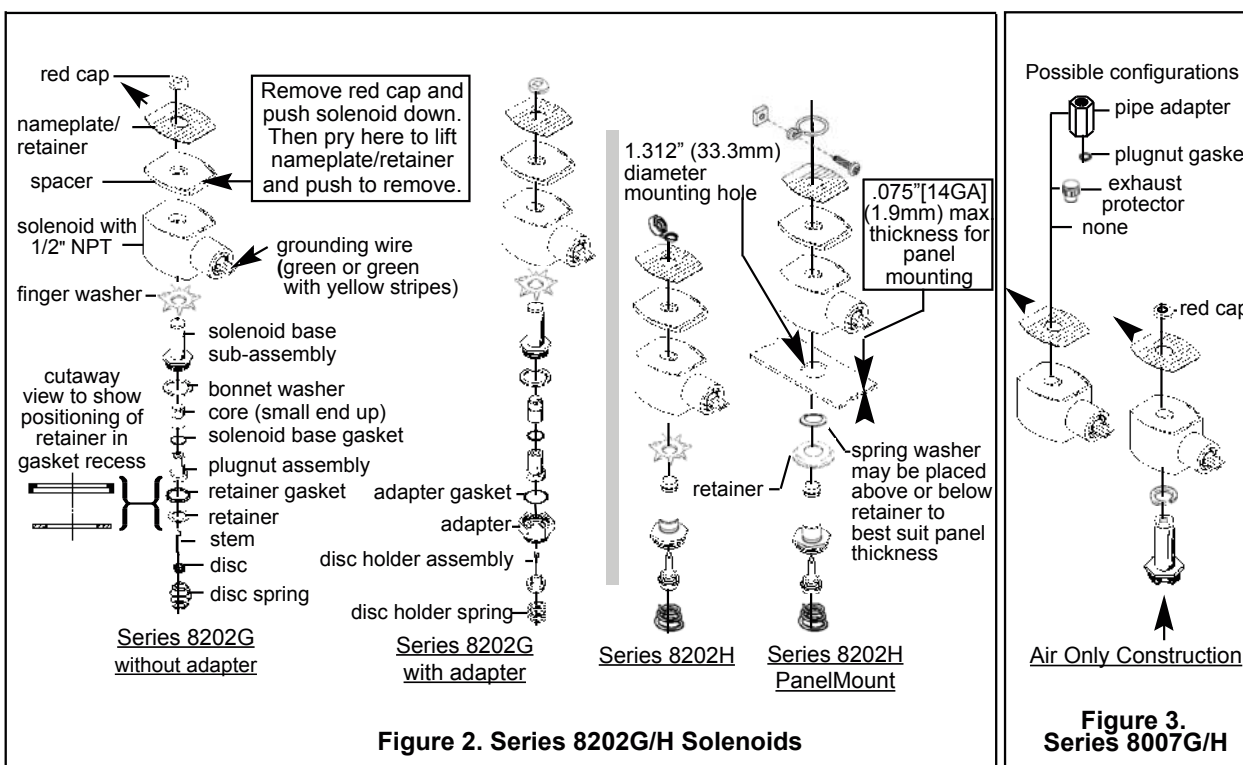


Figure 2. Series 8202G/H Solenoids

Figure 3. Series 8007G/H

I&M V 6584 R19 sec2

<h2 style="text-align: center;">Installation & Maintenance Instructions</h2> <p style="text-align: center;">ASCO Red-Hat II™</p> <p style="text-align: center;">OPEN-FRAME, GENERAL PURPOSE, WATERTIGHT/EXPLOSIONPROOF SOLENOIDS OPTIONAL FEATURE FOR OPEN FRAME (GENERAL PURPOSE) CONSTRUCTION ONLY</p>	<p>SERIES</p> <p>8003G/H 8007G/H 8202G/H</p>
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NOTICE: See Installation and Maintenance Instructions, I&M No. V_6584_R19 - Section 1 of 2 for detailed instructions.

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

Open-Frame Solenoid with 1/4 Spade Terminals

See torque chart above

tapped hole for #10-32 grounding screw (not included)

Open-Frame Solenoid with Screw Terminals. Socket head screw is used for grounding.

◆ socket head grounding screw (5/32 hex key wrench)

◆ screw terminal adapter

◆ terminal block screw

Open-Frame Solenoid with DIN Terminals.

◆ Indicates parts supplied in Termination Module Kit No. K256104

gasket ◆

DIN terminal adapter ◆

socket head screw (5/32 hex key wrench)

Figure 4. Open-frame solenoids

Junction Box Solenoid with 1/4 Spade Terminals or Screw Terminals

Note: Junction box with screw terminals shown. With screw terminal block removed, remaining parts comprise the junction box for spade terminal construction.

screw terminal block (see note)

cover screw

cover

cover gasket

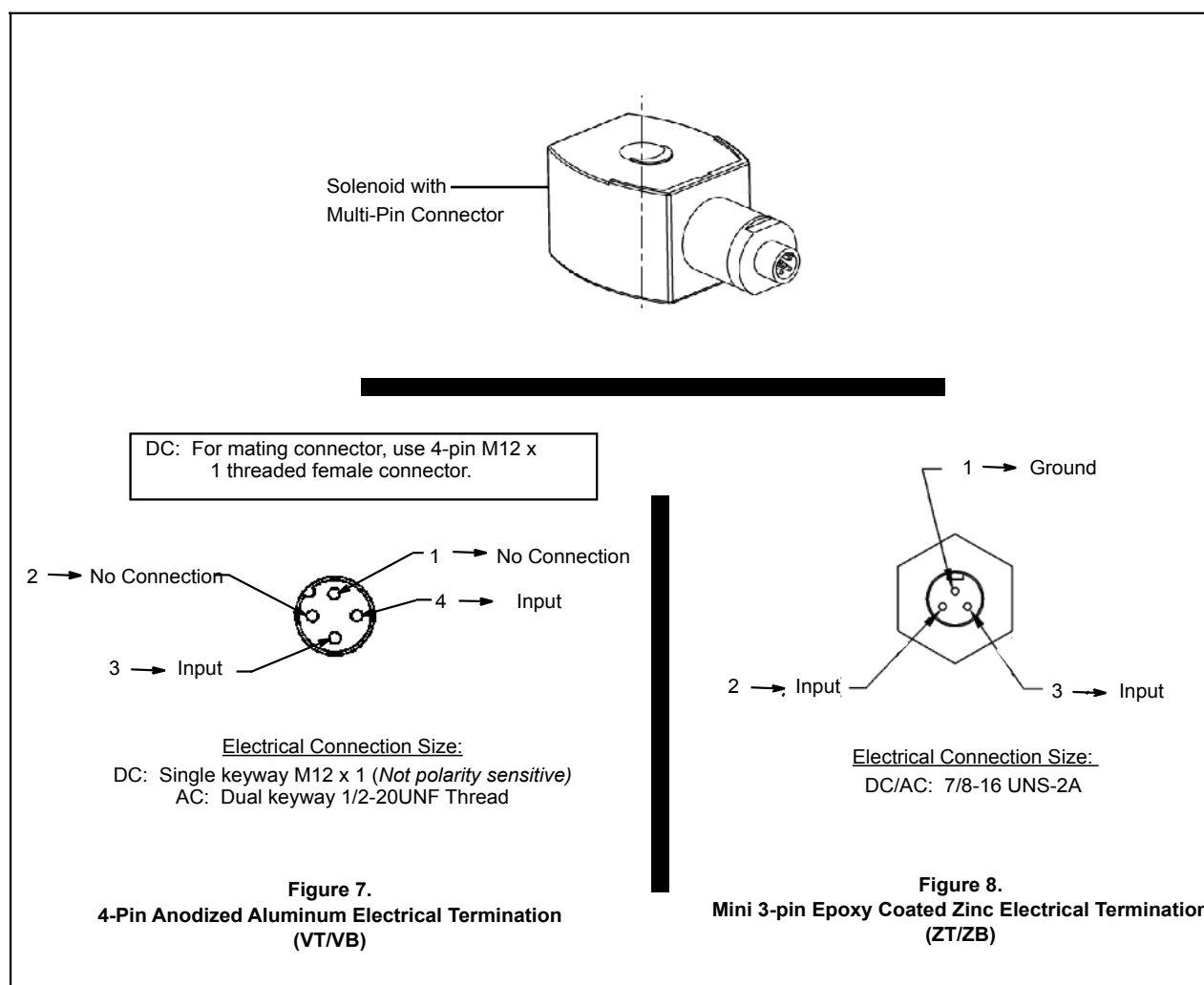
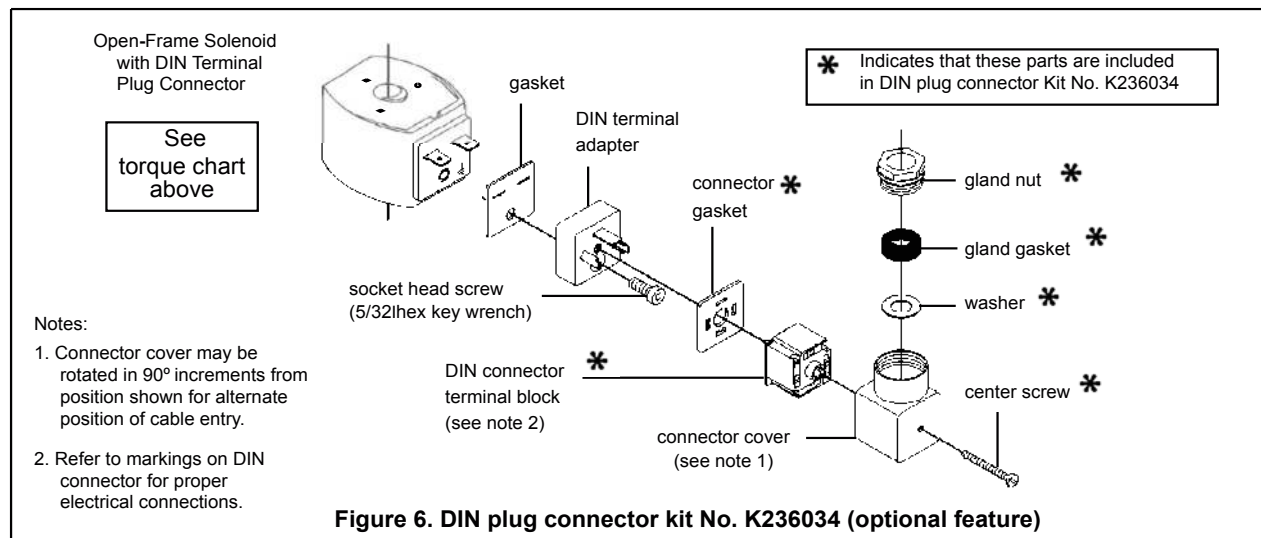
grounding screw and cup washer

junction box gasket

junction box with 1/2 inch conduit connection and grounding terminal

socket head screw (5/32 hex key wrench)

Figure 5. Junction box (optional feature)



15. 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.

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