



## Pneu-Jet Filter Operators Manual

# 1. INTRODUCTION

When you purchased your new Kice Pneu-Jet filter, you bought an air cleaning device that has proven its reliability based on hundreds of installations and years of dependable service.

We are proud of our products and the people at Kice Industries who craft them. At Kice, we use high manufacturing standards and processes to produce superior quality products, which have been a trademark of our organization for over 60 years.

The results of our development work, driven by input from our customers, has resulted in the present design of the Kice Pneu-Jet filter.

This owner's manual is intended as a guide for proper installation, operation and maintenance to keep your Kice filter operating safely and efficiently on the job. Service and spare parts 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 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.

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## 2. IMPORTANT KICE PNEU-JET FILTER INFORMATION

### Important Kice Pneu-Jet filter Information

Write down the MODEL and SERIAL NUMBER of the Kice Pneu-Jet filter, 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 Pneu-Jet filter. 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:

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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 Pneu-Jet filter. Please read it carefully; information and instructions furnished can help you achieve years of dependable performance. Separate manuals are included for auxiliary equipment that make up an air system, such as airlock valves, cyclones and fans. They contain additional information that may not be repeated in this manual. Please contact the Kice Customer Service Department if additional manuals are needed.

### Using This Manual

General operation and maintenance guidelines are outlined for owners and operators of Kice Pneu-Jet filters. 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 Kice Pneu-Jet filter has been disconnected through the use of a padlockable, manual power cutoff or power lockout switch pursuant to 29CFR1910.147.

Directions used in this manual, for example **RIGHT** or **LEFT, CLOCKWISE** or **COUNTERCLOCKWISE**, refer to directions when facing the door of the filter located under the reverse jet cleaning mechanism.

Photographs and illustrations were current at the time of printing but subsequent production changes may cause your Kice Pneu-Jet filter to vary slightly in detail. Kice Industries, Inc. reserves the right to redesign and change the filter as deemed necessary, without notification. If a change has been made to your Kice Pneu-Jet filter 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.

### Model and Serial Number

The model of the filter, serial number and date of manufacture can be found stamped on the metal identification plate (see Figure 1) located on the housing, next to the access door (see Figure 2).

## GENERAL INFORMATION CONTINUED



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

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

MODEL:

SERIAL:

DATE:

Figure 1



Figure 2

### Kice Pneu-Jet filter Parts and Service

Use original Kice Pneu-Jet filter replacement parts only. These parts are available from Kice Industries, Inc. only. To obtain prompt, efficient service always provide the following information when ordering parts:

1. Correct part description and number as shown in the Filter Maintenance and Service section of this manual.
2. Correct model number.
3. Correct serial number.

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. Each Kice Pneu-Jet filter is configured to be used in a specific type of system, handling particular types of material. Using a Kice Pneu-Jet filter for any purpose other than that for which it was designed could result in personal injury as well as product or property damage.

## GENERAL INFORMATION CONTINUED

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.*

The Kice Industries product line includes a variety of equipment, all of which can be custom-made to suit your application. Your Kice equipment was chose based on your specification of process, product and your application requirements for capacity, operating conditions, operating parameters, etc. It is essential that your Kice equipment be installed, maintained and operated under the conditions for which it was originally designed and specified. Should your process needs change, please consult with Kice Industries prior to utilizing the equipment under different conditions.

### Combustible Dusts and Explosion Protection

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<sub>st</sub>) and the maximum deflagration pressure (P<sub>max</sub>) 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>.



## 4. SAFETY PRECAUTIONS

### Safety Symbols



This safety alert symbol is used to call your attention to an important safety message 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.

### Hazard Levels

The following definitions are used to identify hazard levels:



**DANGER (RED)** – 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 (ORANGE)** – 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 (YELLOW)** – 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.

### Safety Decals

The Kice Pneu-Jet filter 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 Kice Pneu-Jet filter. Look for them!



## SAFETY PRECAUTIONS CONTINUED



**WARNING:** 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.

## SAFETY PRECAUTIONS

### WORK SAFELY AT ALL TIMES

- All energy sources associated with the Kice Pneu-Jet filter must be locked and tagged out in compliance with 29CFR1910.147, local enforcement authorities, OSHA, and facility safety practices, before removing any protective cover, guard, grate or maintenance gate.
- Do not attempt to install, connect power, operate or service a Kice Pneu-Jet filter without proper instruction and until you have been thoroughly trained in its use by your employer.
- It is the owner's and employer's responsibility to adequately train each operator in the proper and safe use of Kice Pneu-Jet filters. 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.
- Assume at all times that power is "on". Treat all conditions as live. This practice ensures a cautious approach that may prevent an accident or injury.
- Before applying power to any equipment, make certain that all personnel are clear of the machine.
- Operate safely at all times. Use personal protective equipment when and where appropriate, such as hard hats, helmets, gloves, earplugs, dust masks and eye protection devices. Especially when working inside the filter. Keep personal protective equipment in good repair and convenient to the operator.
- If it becomes necessary to climb into the Kice Pneu-Jet filter for service or repair work, adequate securing devices and fall arresters must be worn by personnel.
- The Kice Pneu-Jet filter 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.
- The Kice Pneu-Jet filter may also have factory supplied guards for rotating components. Do not connect power to or operate the Kice Pneu-Jet filter unless all moving parts are completely enclosed and all guards, grates and maintenance panels are in place and securely fastened.
- 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.
- Do not abuse, overload, mistreat or misuse the Kice Pneu-Jet filter or attempt to operate the Kice Pneu-Jet filter if it is in need of service, lubrication, maintenance or repair.
- The Kice Pneu-Jet filter may be installed and programmed to start automatically or be controlled from a remote location. Keep clear of all moving parts on industrial equipment and on the Kice Pneu-Jet filter at all times, until the **POWER IS TURNED OFF AND LOCKED OUT**.
- Do not attempt to work on, clean or service the Kice Pneu-Jet filter, 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, the motor and frame of each piece of equipment including the Kice Pneu-Jet filter, must be 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 serious or fatal injury. Only qualified, trained, and experienced personnel should perform installation, operation, and maintenance of electrical machinery. Make sure the Kice Pneu-Jet filter is grounded in accordance with OSHA, National Electric Code, and all other applicable regulatory bodies, including local codes and EN ISO 60204-1 as required for the classified area.

## SAFETY PRECAUTIONS CONTINUED

- If a Kice Pneu-Jet filter is 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. Never attempt to manually override or electrically bypass the PLS safety device. Interlock function of the PLS must be tested and logged daily by supervisory personnel.
- Kice Pneu-Jet 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 Kice Pneu-Jet filters used in the processing of combustible materials or in hazardous environments require evaluation by the owner and regulatory bodies to determine appropriate Kice Pneu-Jet filters monitoring equipment, dust control, explosion protection and electrical equipment enclosures. Do not use a Kice Pneu-Jet filter in hazardous environments unless properly equipped for the hazard.
- Operate safely at all times. Use personal protective equipment (PPE) such as hard hats, helmets, gloves, earplugs, protective eyewear, etcetera when and where appropriate. Keep PPE in good repair and accessible to affected personnel.
- Keep the workplace clean and free of dirt and dust at all times. Do not attempt to work on slippery or unsafe surfaces, ladders or work platforms when maintenance or repair work is being performed on an Kice Pneu-Jet filter.
- The Operator must ensure that all piping and connections are laid away from access routes, ladders and steps.
- Adequate and proper lighting must be provided at the equipment location.
- Do not use a ladder or work platform unless it is in good repair and rated for the load required to complete required Kice Pneu-Jet filter service.
- 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 Kice Pneu-Jet filter or component when it is being lifted.
- All Kice Pneu-Jet filter lifting devices must be inspected by qualified personnel before each use. Do not use a lifting device to transport a Kice Pneu-Jet filter. 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 a Kice Pneu-Jet filter 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 a Kice Pneu-Jet filter or in the workplace. Special 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 filter 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 Kice Pneu-Jet filter 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.

**WORK SAFELY AT ALL TIMES**

## 5. DELIVERY INSPECTION AND INSTALLATION PREPARATION

The Kice Pneu-Jet filter has been inspected at Kice and should be in excellent condition upon delivery. A thorough customer inspection of the Kice Pneu-Jet filter should be completed upon receipt to verify its condition.

The Kice Pneu-Jet filter and accessories should be inspected upon receipt for any shipping damage. Check for free operation of all moving parts before signing off on the receiver.

**NOTICE:** 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.

Complete a visual inspection paying particular attention to guards, overall external condition, protrusions (i.e. mating flanges, attachment points, valves, etc.) and safety decals while the Kice Pneu-Jet filter is still secured to freight platform.

### Slab Mounted Units

A qualified engineer should design the foundation and/or footings for the filter. The slab should be extended to support accessory equipment, such as a floor-mounted fan. The mass of the base must maintain the fan/driver alignment, absorb normal vibration, and resist lateral loads. The overall dimensions of the concrete base should extend at least six to twelve inches beyond the outline of the filter base and other equipment. The weight of the slab in the area where high speed rotating equipment is located should be two to three times the weight of the rotating assembly including the motor. The foundation requires firmly anchored fasteners, such as anchor bolts, and guy wiring the tall filter housing for wind load support. Hardware for anchoring the filter structure is generally not supplied with the filter and should be procured by the installer.

**NOTICE:** The following instruction are intended to assist the installer with the assembly and erection of their Kice Pneu-Jet filter but should not be considered a step-by-step instruction due to variations in the supplied product and site location. These variations could be due to application, customer specifications, orientations, etc. Any questions arising before or during installation should be directed to your Kice sales representative for clarification and recommendations.

## 6. STORAGE

Kice 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.

## 7. INSTALLATION



**WARNING:** Use appropriate equipment when lifting or moving the Kice 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. This also fulfills EN ISO 13857-1 where required.

### Installation

1. Move the Kice Pneu-Jet filter to the installation area using proper equipment. Lift only by lugs indicated (see Figure 3).
2. Check the mating surfaces of the bin or filter hopper flange and the filter housing flange. They should be free of any foreign materials.
3. Place two beads of caulking on the flange of the bin or hopper (on each side of the bolt holes and around each hole) and mount the filter housing.
4. If an airlock valve is required, it should be mounted to the hopper discharge flange or sight glass assembly. Additional support may be required.
5. Tighten all fasteners securely. To insure proper operation, the filter must be adequately supported and properly installed. All duct work or stacks should be independently supported as excess weight may distort the filter housing and cause contact between moving parts. When installing outdoors, care must be taken to guy wire the unit in order to handle the wind loading. Contact Kice Industries, Inc., for the proper location and adjustment.
6. Anchor the base of the ladder to the concrete pad. Use shims as required to ensure the base of the ladder is flush with the pad. Depending on the span of the ladder there may be support bracing that will attach the ladder to the filter housing or structure. Make sure all of the support braces are connected and secure before using the ladder.

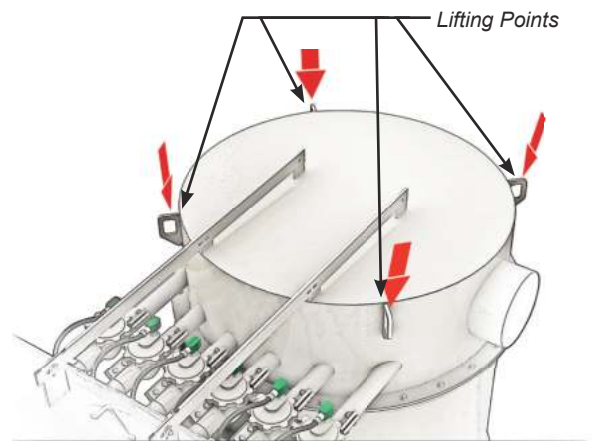


FIGURE 3



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

## INSTALLATION CONTINUED



**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.

7. Connect the medium pressure air supply (10-15 psig) to the filter air tank, utilizing the pressure regulator, filter and valve(s), if required.
8. The Kice Pneu-Jet filter controller is normally mounted adjacent to the Kice Pneu-Jet filter housing access door. However, it can be mounted in any convenient location. Orientation of the controller does not affect its performance.
9. Electrical conduit and junction tees (one at each Kice Pneu-Jet solenoid valve) are furnished with each filter. On filters with one air tank, the electrical manifold is pre-wired from the solenoids directly to the control box. On filters with two or more air tanks, each tank has an electrical manifold that is pre-wired from the solenoids to a junction box. Each air tank has its own junction box. A local electrician must run a conduit from the control box to each junction box on the filter. Wiring from the controller to the junction box terminals should be #18 gauge. One wire from each solenoid is connected to the corresponding terminal on the terminal strip. The second wire for each solenoid is connected to the common/neutral lead. For ease in assembly, a white wire should be used for the common/neutral lead. Wires of any color other than white or green can be used for the hot lines (numbering each end may be helpful).

**NOTICE:** Reference Figure 14 in the Operating Logic section for example wiring diagram.

10. 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.
11. Some systems will have a fan and airlock valve to be connected. Verify that the fan and airlock rotation direction is correct as marked.
12. 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.
13. Reassemble any doors or covers removed during installation.



## INSTALLATION CONTINUED

### Installing / Replacing Bags and Cages - Accessing Dirty Air Chamber

1. Locate proper cleaning platform (see Figure 5.1 and 5.2).
2. Remove any filter bags that may interfere with the position of the cleaning platform inside the chamber.
3. Place cleaning platform inside the filter access door as shown (see Figure 6.1 and 6.2). For door mount platform, make sure the tabs on both sides of the cleaning platform are on the outside of the door frame. Check to make sure the cleaning platform is level and secure. The platform should not rest against or interfere with any filter bags inside the chamber.

**NOTICE:** A hook is located on the bottom of the tube sheet that may be used to provide additional balance and stability when accessing the dirty air chamber (see Figure 4).



**WARNING:** The hook on the bottom of the tube sheet is not intended to be a tie off point for a fall arrest system.

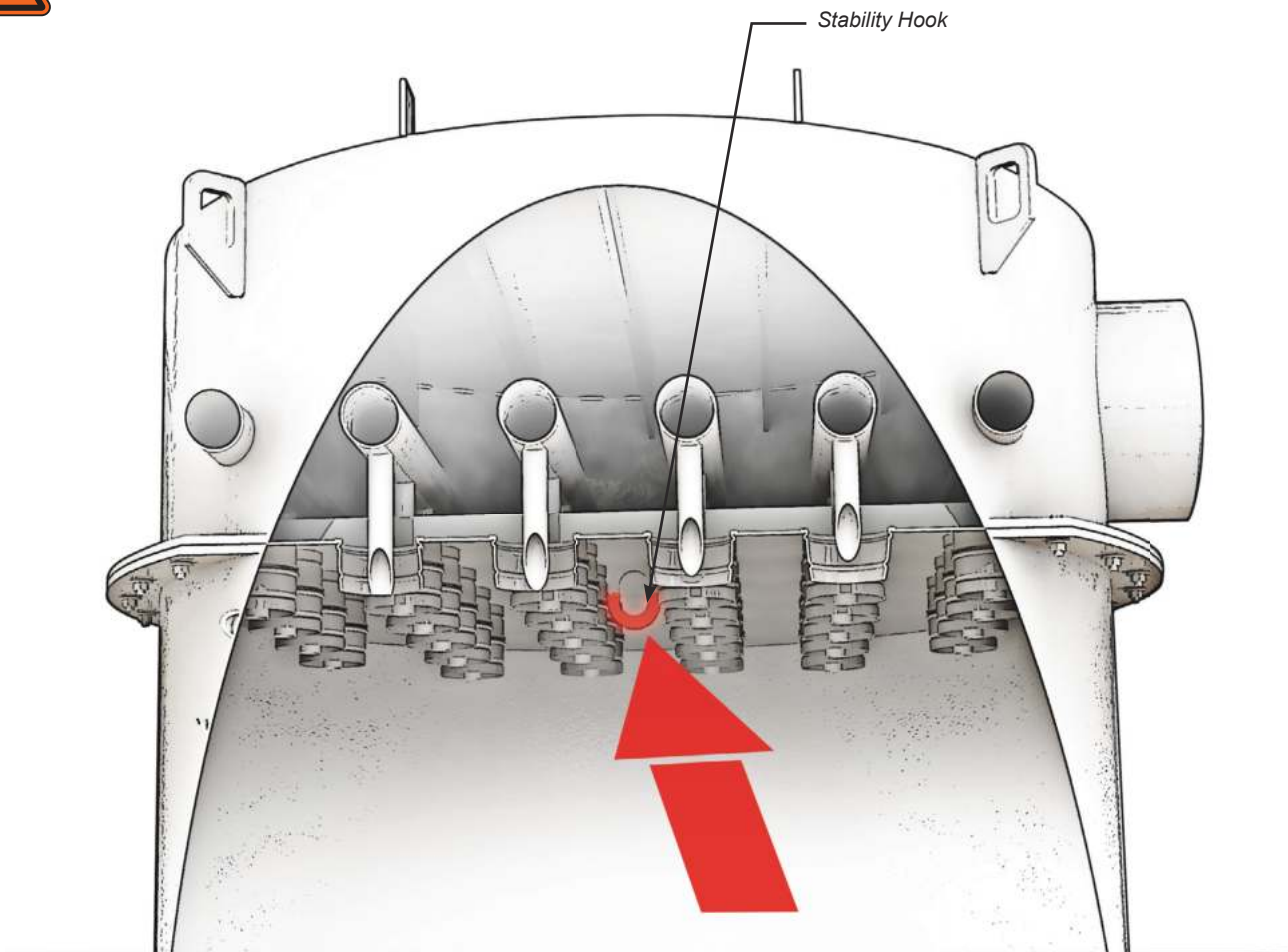


FIGURE 4

## INSTALLATION CONTINUED

**NOTICE:** Kice Industries, Inc., will always supply internal safety grating in the bottom of the filter housing if it is to be mounted onto a storage bin, to prevent personnel, bags and cages from dropping into the storage bin.

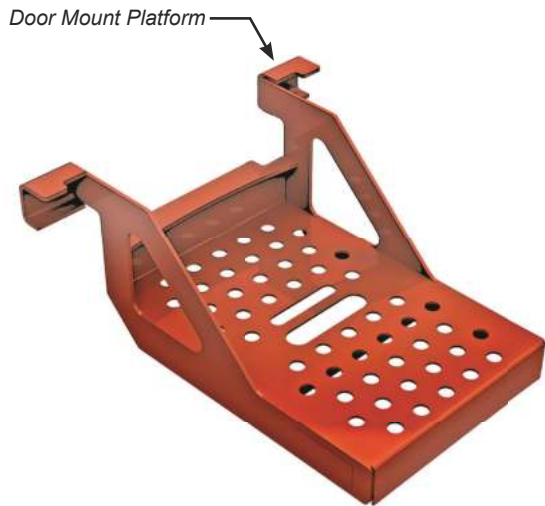


FIGURE 5.1

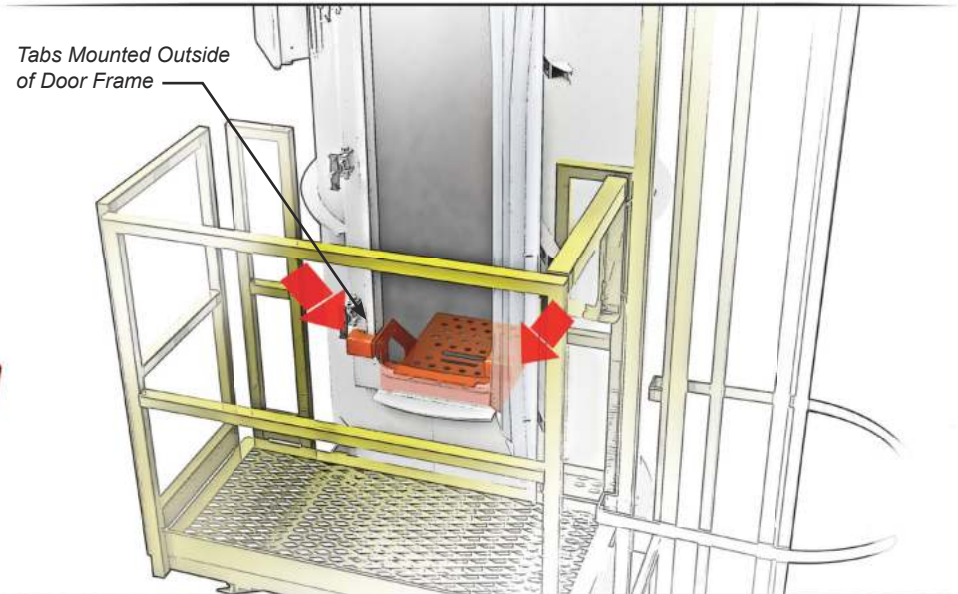


FIGURE 6.1

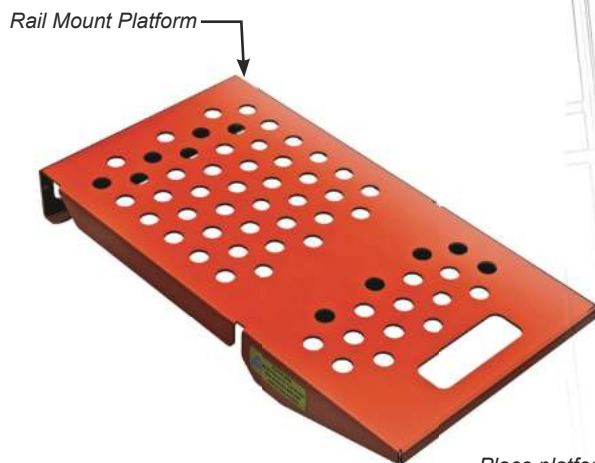


FIGURE 5.2

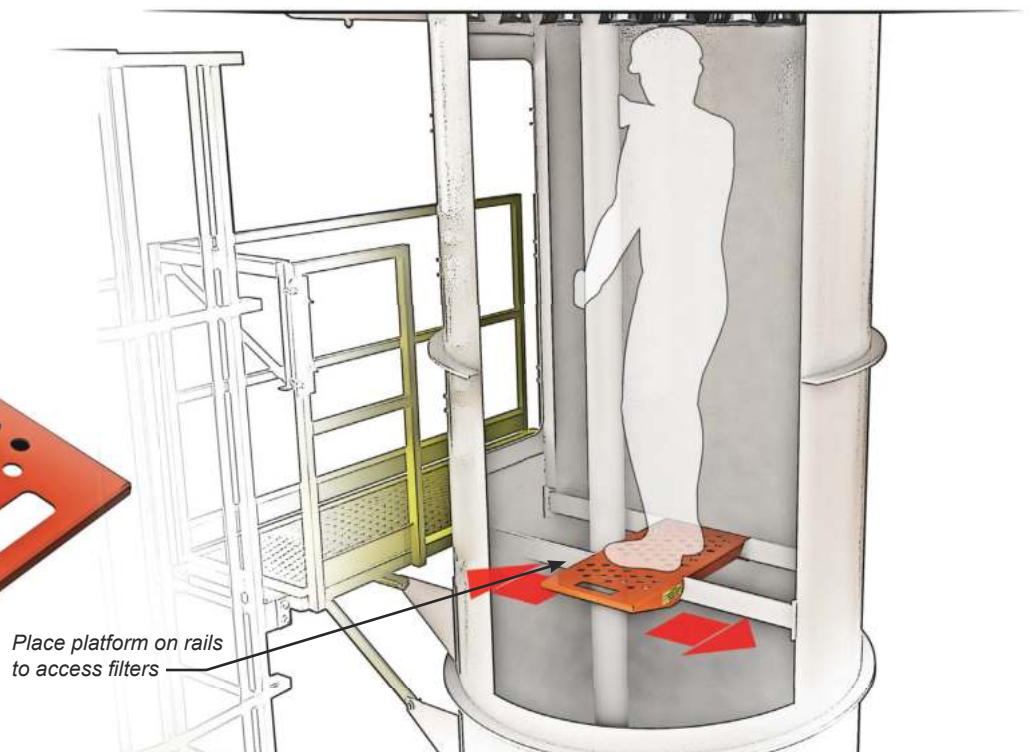


FIGURE 6.2

**NOTICE:** Two platforms may be used in conjunction when using rail mount system.



## INSTALLATION CONTINUED

### Installing / Replacing Bags and Cages - Bottom Load

1. Slip the filter bag over the wire cage retainer until the bottom of the bag is in contact with the bottom of the retainer. The filter media seam should be located 180 degrees from the gap in the retainer sleeve (see Figure 7).

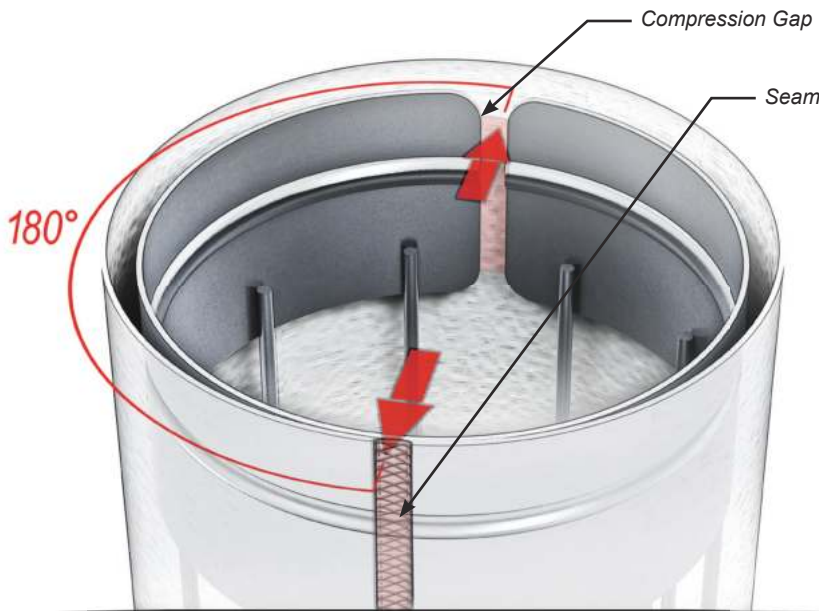


FIGURE 7

2. Check the filter bag for proper length. The filter bag should be only 2" longer than the bag retainer cage.

3. Tuck the overextended portion of the filter media inside the retainer sleeve (see Figure 8).

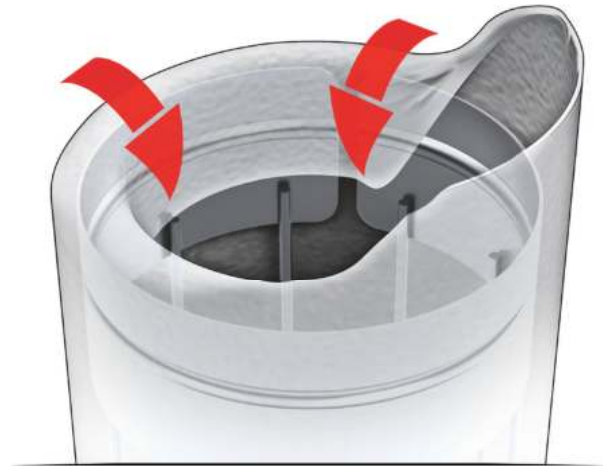


FIGURE 8

4. Place the clamp over the bag and locate the clamp approximately in the middle of the retainer sleeve. The clamp head should not be placed over the seam or over the gap in the retainer sleeve (see Figure 9).

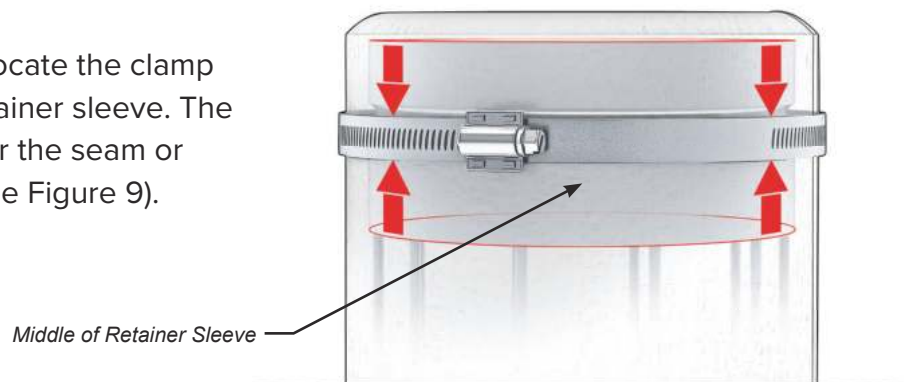


FIGURE 9

## INSTALLATION CONTINUED

5. Slip the retainer/bag/clamp assembly over a collar in the tube sheet (see Figure 10).
6. Match the groove in the retainer sleeve with the groove in the tube sheet collar to prevent the assembly from slipping off (see Figure 11).
7. Tighten the clamp with either a screwdriver, a nut runner with a 5/16" socket, or a ratchet with an extension (which will help facilitate the installation). It is very important to tighten the clamp very firmly so as to prevent the assembly from leaking or slipping off the tube collar.
8. Shake the bag and cage assembly by hand and retighten the clamp.

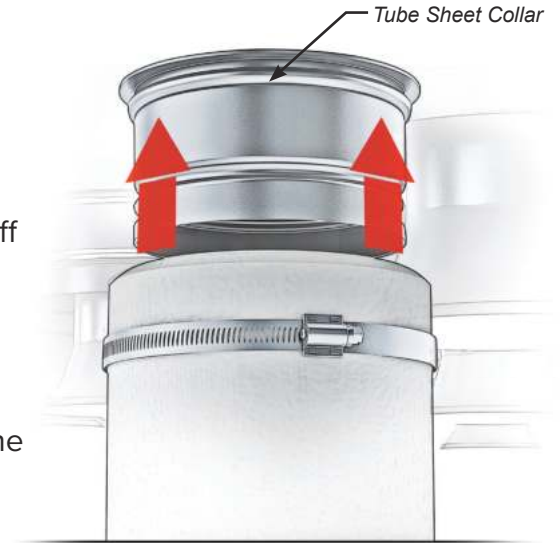


FIGURE 10

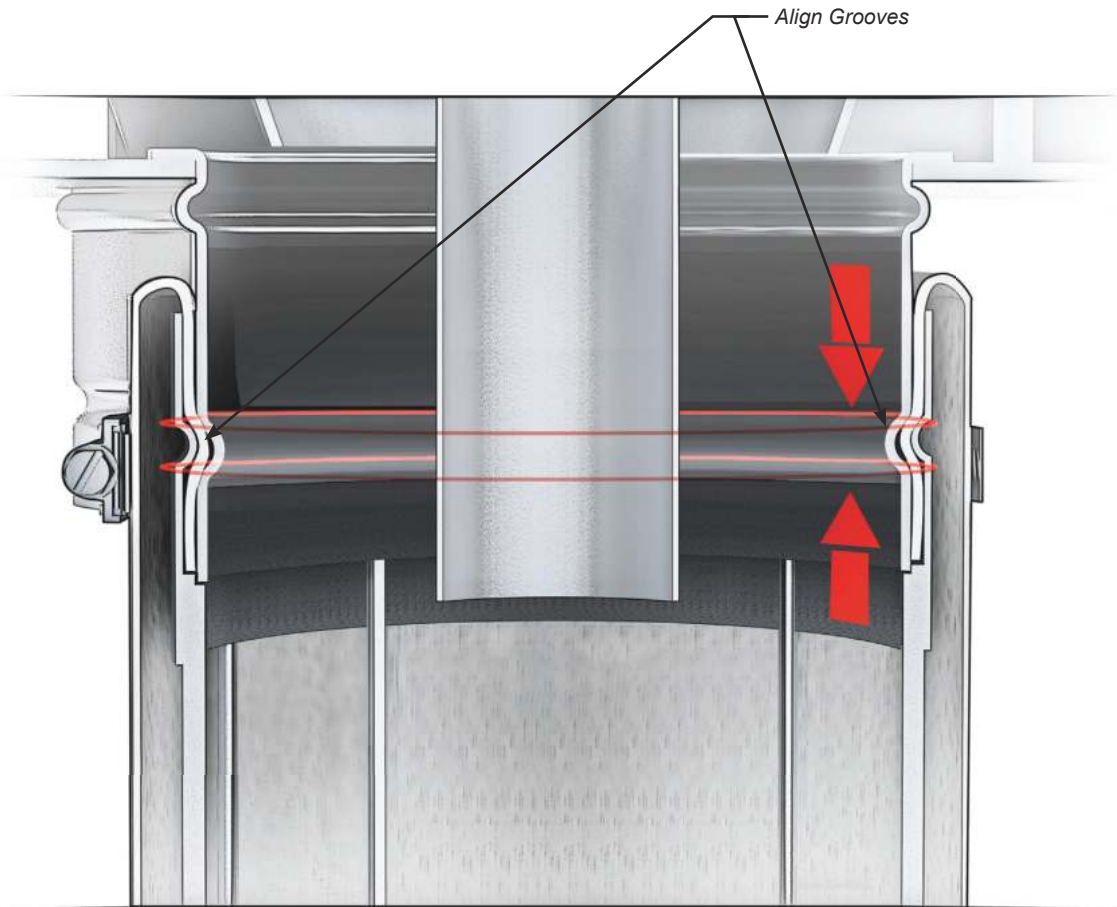


FIGURE 11

## 8. FILTER OPERATION & START-UP PROCEDURE

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. However, the compressed air needs to be clean, dry, and oil free..

The Pneu-Jet method uses direct jets of medium pressure (10-15 psig) air to clean the bags. The air is piped to the filter air tank, which is connected through the Kice Pneu-Jet valves to the manifold lines above the filter bags. The manifold lines are mounted in the clean air chamber with a vertical drop into the center of each bag. The air tank is filled with compressed air to a pressure of 10-15 psig, at which time an electric signal is sent to activate a solenoid valve to open the Pneu-Jet blast valve, which suddenly discharges the tank of pressurized air through the manifold into the top of each bag in that row. 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 Pneu-Jet valve in sequence and activates its solenoid, which releases air to clean the next row of bags.

The complete Kice Pneu-Jet filter control circuit is shown on (Figure 14) on page 22. The Pneu-Jet valves are mounted between the air tank and the cleaning manifolds. (Figure 12) These valves are an exclusive Kice design to provide a high-energy release of air that is used for cleaning the filter media. The Pneu-Jet 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 atmosphere, the diaphragm lifts to the open position, discharging the pressurized air (10-15 psig) into the cleaning manifold in a fraction of a second.

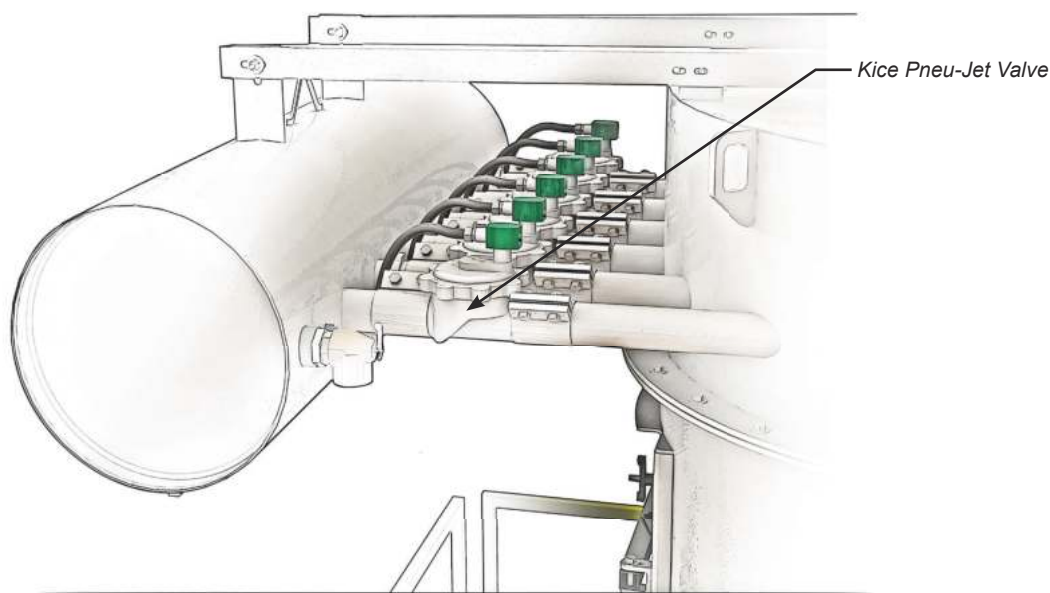


FIGURE 12

## FILTER OPERATION & START-UP PROCEDURE CONTINUED

When the solenoid valve closes the pressure equalizes, allowing the diaphragm to close. As the pulse of air is fired through the manifold and down the tubes located above the filter bag, the pulse creates a shock effect that dislodges dust and foreign material that is caked on the outside of the filter bags (see Figure 13).

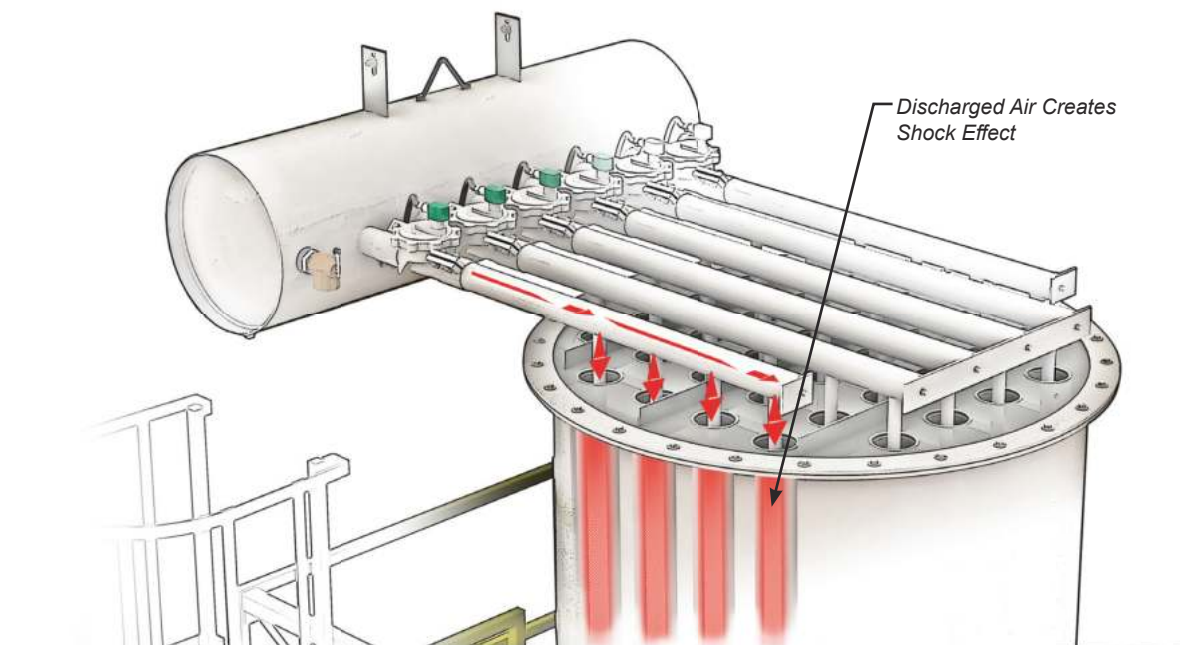


FIGURE 13

## FILTER OPERATION & START-UP PROCEDURE CONTINUED

### 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 (Figure 14) on page 22 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 DCT1010 and DCT1022DC operates on 24 VDC. The DCT100DC Dust Collector Timer Controller series is mainly used for continuous cleaning or timer-controlled on-demand cleaning.

FILTER OPERATION & START-UP PROCEDURE CONTINUED

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

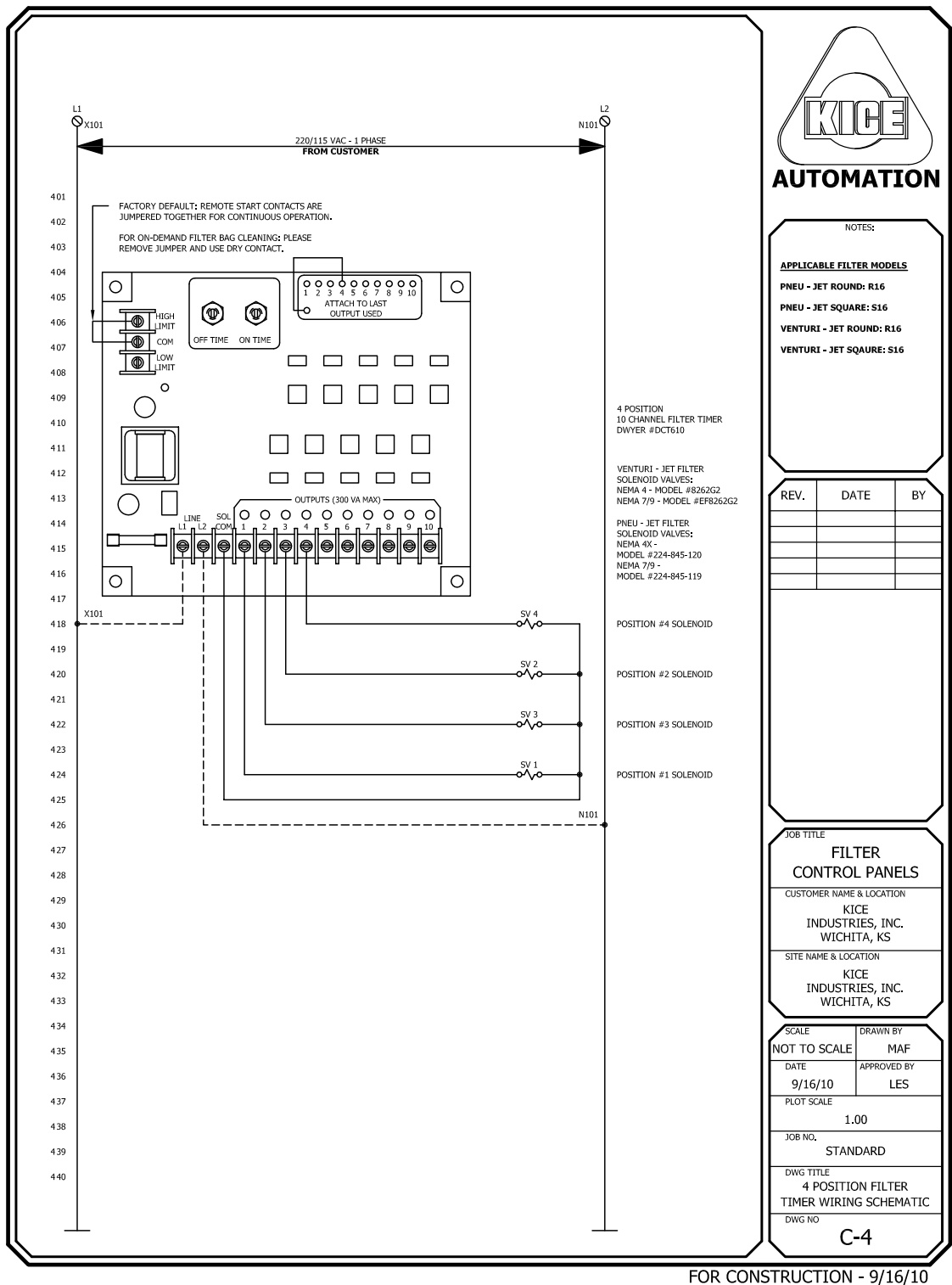


FIGURE 14

## FILTER OPERATION & START-UP PROCEDURE CONTINUED

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)



## FILTER OPERATION & START-UP PROCEDURE CONTINUED

### Ametek Electronic Controller

1994 to 2008:

Model #	Number of Positions	Filter Models
DNC-T2010-A10	3 to 10	R, S & C Series
DNC-T2020-A10	11 to 20	All "M" Series
DNC-T2032-A10	17 to 32	M 168 & 336

Reference the Ametek NCC Electronic Controller Schematic (see Figure 14) on page 22 for more detail.

The Model DNC-T2010-A10, DNC-T2020-A10 and DNC-T2032-A10 controllers operate on 120 VAC, 50/60 Hz, and single-phase power. The "on" time is adjustable from 50 milliseconds to 500 milliseconds and the "off" time is adjustable from 1.5 seconds to 30 seconds. Each output has an LED (light emitting diode) indicator to let the operator know at the control box that an output signal is being generated.

With power applied continuously to terminals L1 and L2, the number 1 output "on" time will activate followed by an independently timed "off" period. Each time sequence is infinitely adjustable within the stated time range. Following the number 1 "on" and "off" time, the number 2 "on" and "off" time will be activated. This sequence of events continues to the last selected output, then returns to the number 1 output and repeats the sequence as long as power is applied.

The controller may be stopped at any point in its sequence by the opening of a simple switch (such as a differential pressure switch). Upon closure of the switch, the controller will resume activating the outputs from where it left off.

A program wire allows for field selection of the number of outputs required. The loose end of the program wire can be moved from one numbered position to another to change the number of outputs activated. Remove this jumper by pulling it off the numbered pin to which it is currently connected and move it to the numbered pin corresponding to the number of outputs desired (each pin closer to the fixed end of the program wire reduces the output quantity by one).



FILTER OPERATION & START-UP PROCEDURE CONTINUED

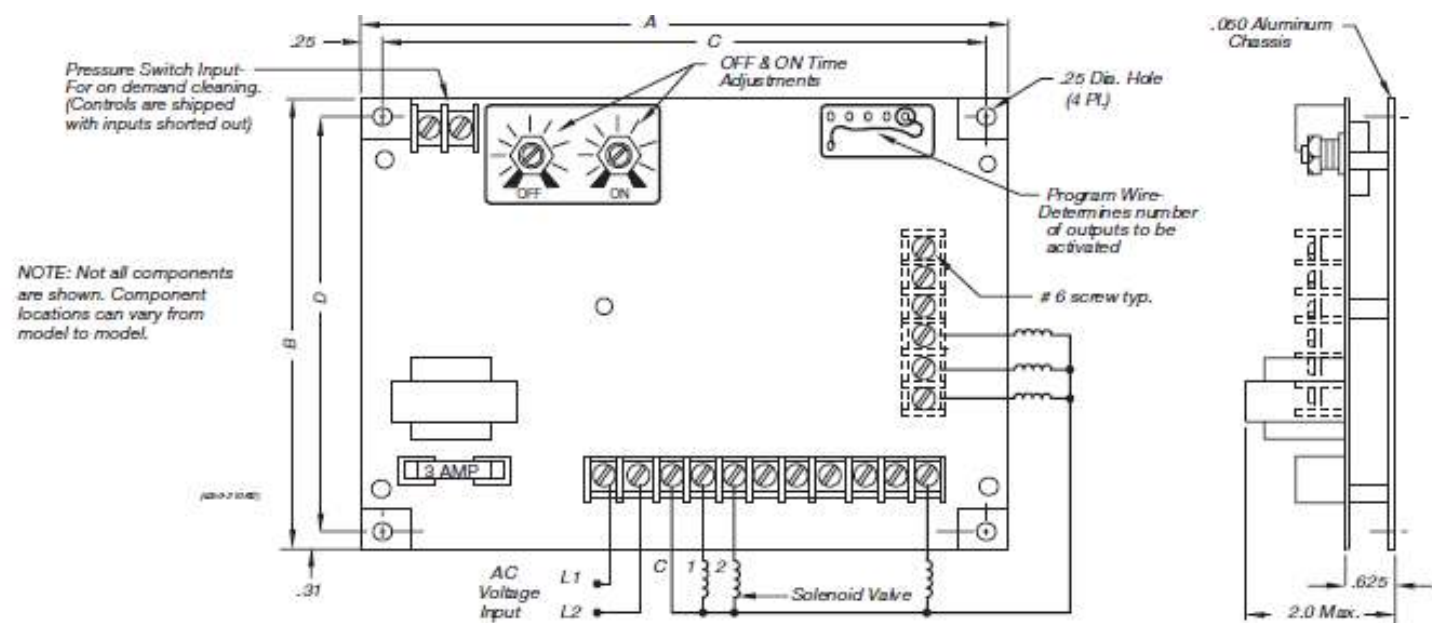


FIGURE 15

Model	Max. No. Of Outputs	Size of NEMA 4 Enclosure required	Programmable No. of Outputs
DNC-T2010-A10	10	10" x 8"x 4"	3 - 10
DNC-T2020-A10	20	12" x 10"x 5"	11 - 20
DNC-T2032-A10	32	14" x 12"x 6"	17 - 32

Specifications:

Time Delay:		Input:	
On Time	Adjustable from 50 to 500 Milliseconds	Operating Voltage	120 +-10% VAC, 50/60 Hz
Off Time	Adjustable from 1.5 to 30 Seconds	Optional Voltage	220 +-10% VAC, 50/60 Hz

Output:		Protection:	
Type	Solid State Switch rated at 200 VA max. per output (position of program wire determines number of outputs)	Transient voltage Short Circuit Protection	30 Joule Varistor 3 amp fuse

Environmental:	
Operating Temperature:	-40 degrees to 150 degrees F (-40 degrees to 66 degrees C)

## **FILTER OPERATION & START-UP PROCEDURE CONTINUED**

### **Start-Up Procedure**

1. Check the Air Power Unit for correct rotation and speed to provide pressurized air (10-15 psig) to the filter air tank.
2. Check screw conveyors and airlocks (if furnished) for proper directions of rotation.
3. Controls should be wired in accordance with schematic diagram (Figure 14). Square and 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.
4. Make sure the timer board is on whenever the APU is operating.
5. 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.
6. 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 15 psig. This provides pressure relief safety for the air tank.
7. Set the controller “off” time adjustment to the desired time by turning the dial to the desired setting.
8. 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:

1. Shut off the suction fan only.
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).
3. Then shut down the remainder of the system.

**NOTICE:** Reference the Air Power Unit manual for additional information regarding operation or maintenance.

## 9. FILTER MAINTENANCE AND SERVICE



**WARNING:** 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.

### Daily Filter Inspection

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. Normal pressure differential for new filters should read around 0.5"w.c. or as low as 0.1-0.2"w.c.
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 (see Figure 16).
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 (see Figure 16).

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

## **FILTER MAINTENANCE AND SERVICE CONTINUED**

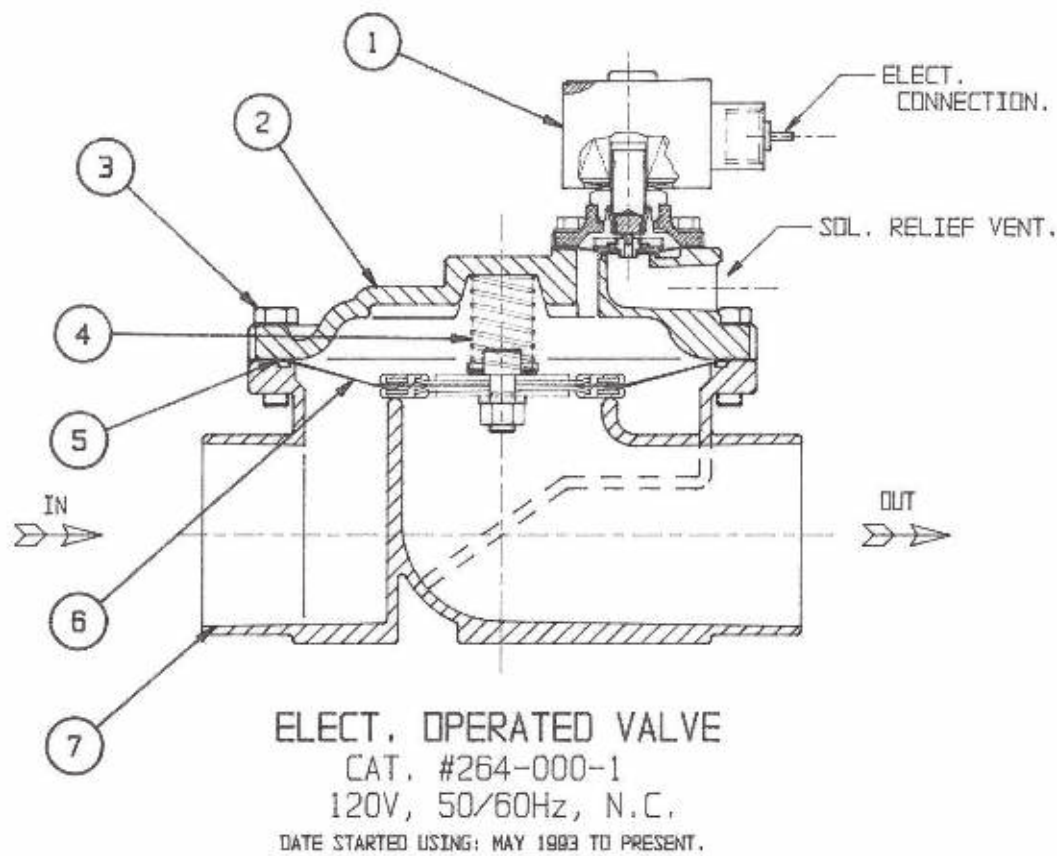
Operation: When the solenoid operated pilot valve opens, the pressure above the diaphragm is released allowing the main line pressure to act against the underside of the diaphragm, opening the main valve orifice. When the pilot valve closes, the main line pressure bleeds to the top of the diaphragm and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

### **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.

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.
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 the drawing provided for identification and placement of parts (see Figure 16).
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.
5. Replace pilot valve.
6. After maintenance, operate the valve a few times to be sure of proper opening and closing.

FILTER MAINTENANCE AND SERVICE CONTINUED



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

FIGURE 16

## **FILTER MAINTENANCE AND SERVICE CONTINUED**

### **Solenoid**

**Description:** The Kice pilot valve is operated by an ASCO Red-Hat II epoxy encapsulated solenoid. The green solenoid with lead wires and ½” 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.

*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** solenoid series 8003.

## 10. TROUBLESHOOTING - COMMON FILTER PROBLEMS



**CAUTION** (SENSITIVE CIRCUITRY): 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.



**WARNING:** Disconnect power before touching any component part!

### A. Filter Discharging Dust 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).
4. Check for leaks in the ductwork.
5. Check for plugged or partially plugged ductwork.
6. Check for closed or partially closed damper.

### 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.

## **TROUBLESHOOTING CONTINUED**

### **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 air line from the Air Power Unit to the tank.
2. Check the inlet filter on the Air Power Unit and clean or replace as required.
3. Check for leaks:
  - a. Check the Pneu-Jet blast valves for leaks
  - b. Check to see if any of the Pneu-Jet blast valves are stuck open and bleeding the tank air straight to the filter. (The electric operated 2 way pilot exhaust valve being stuck open usually causes this. Check by manually plugging the exhaust port.)
  - c. Check the air piping for leaks.
  - d. Check the couplings for leaks between the air tank and Pneu-Jet blast valves.
4. Check that the Air Power Unit motor is energized and that the blower is operating with the proper rotation.

### **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.



## TROUBLESHOOTING CONTINUED

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.
9. If a valve stays energized, replace the timer board.
10. If a valve does not operate when its output light is on, replace the wiring or the solenoid valve.



**WARNING:** Disconnect power before touching any component part!

## 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. Kice filter parts are built to be fully compatible with the original filter, using specific alloys and tolerances. These parts carry a standard Kice warranty.

When ordering replacement parts, specify the part name, the Kice filter serial number, the filter model, and the filter size, series (M, S, or R) and number of filter bags. Most of this information is on the metal nameplate attached to the filter housing next to the access door.

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.



**WARNING:** 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.

# 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 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

#### 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 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.

# 11. 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, 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 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](http://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 1 pound, 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-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).

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## APPENDIX B CONTINUED

**▲ 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.

Prefix	Coil Class	Watt Rating	Maximum Ambient Temperature
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 <sup>1</sup>	Coil Class	Watt Ratings			Maximum Ambient Temperature	
		AC		DC		
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 <sup>2</sup>	104 <sup>2</sup>
EF, EV	HF	-	-	15.6		
EF, EV	HB	-	-	22.6		
	HT	10.1	10.1	-	60 <sup>3</sup>	140 <sup>3</sup>
	HB	17.1	17.1	-		
EF, EV	HT	10.1	10.1	-		
EF, EV	HB	17.1	17.1	-		
EF, EV	HC	-	-	24.6		

<sup>1</sup> = EF, EV data applies to Explosionproof coils only.

<sup>2</sup> = 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.

<sup>3</sup> = 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

- The open-frame solenoid is provided with DIN terminals to accommodate the plug connector kit.
- Remove center screw from plug connector. Using a small screwdriver, pry terminal block from connector cover.
- 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.
- 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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## APPENDIX B CONTINUED

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  $5 \pm 1$  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.

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### 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  $175 \pm 25$  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.

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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

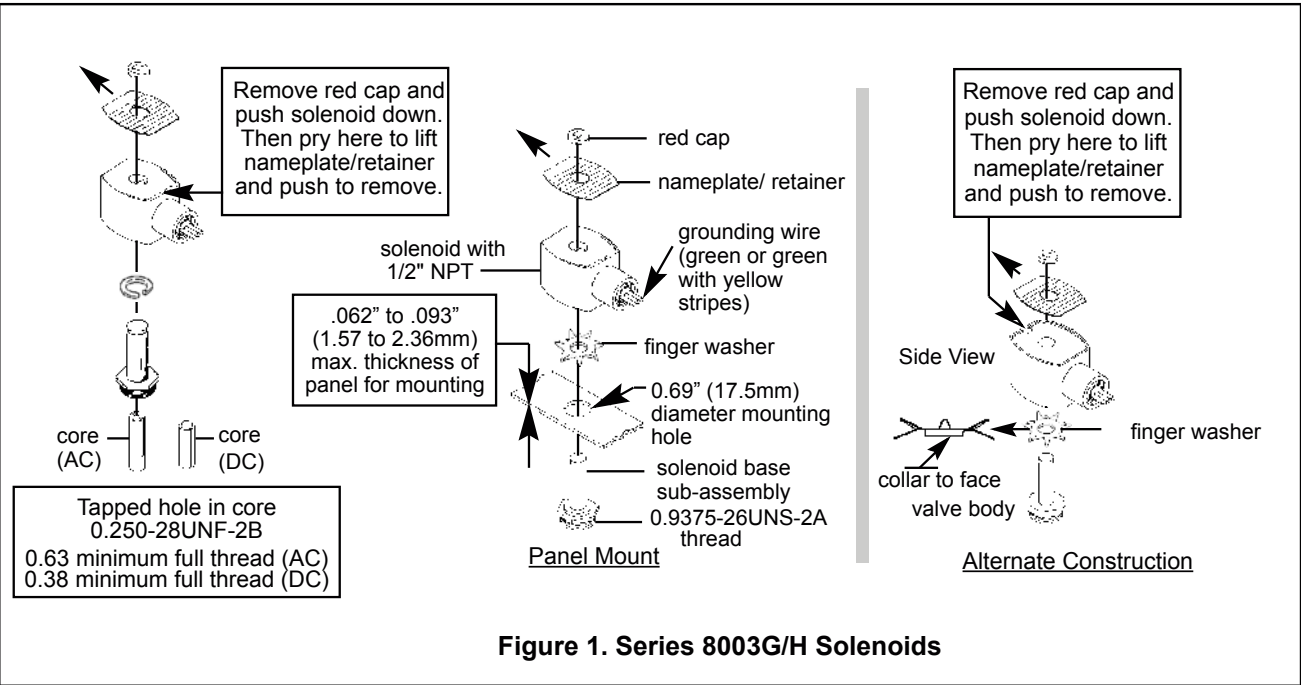


Figure 1. Series 8003G/H Solenoids

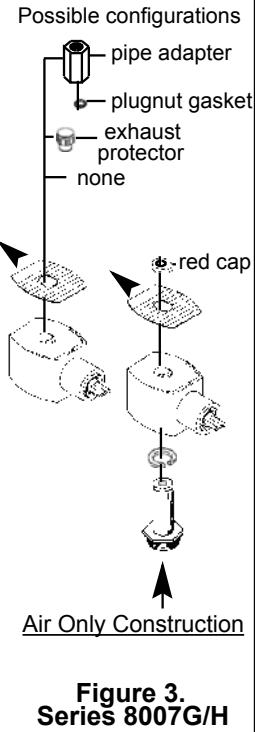
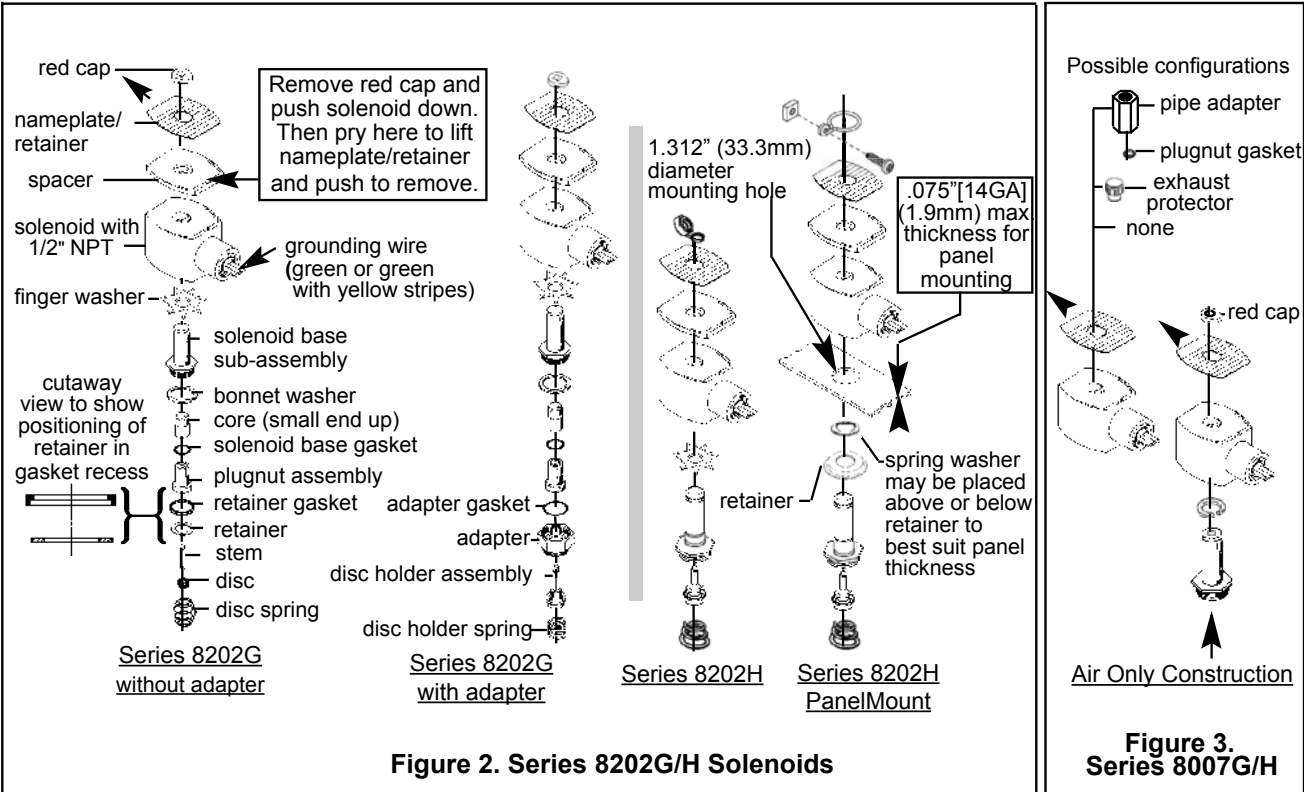


Figure 3. Series 8007G/H

# Installation&Maintenance Instructions



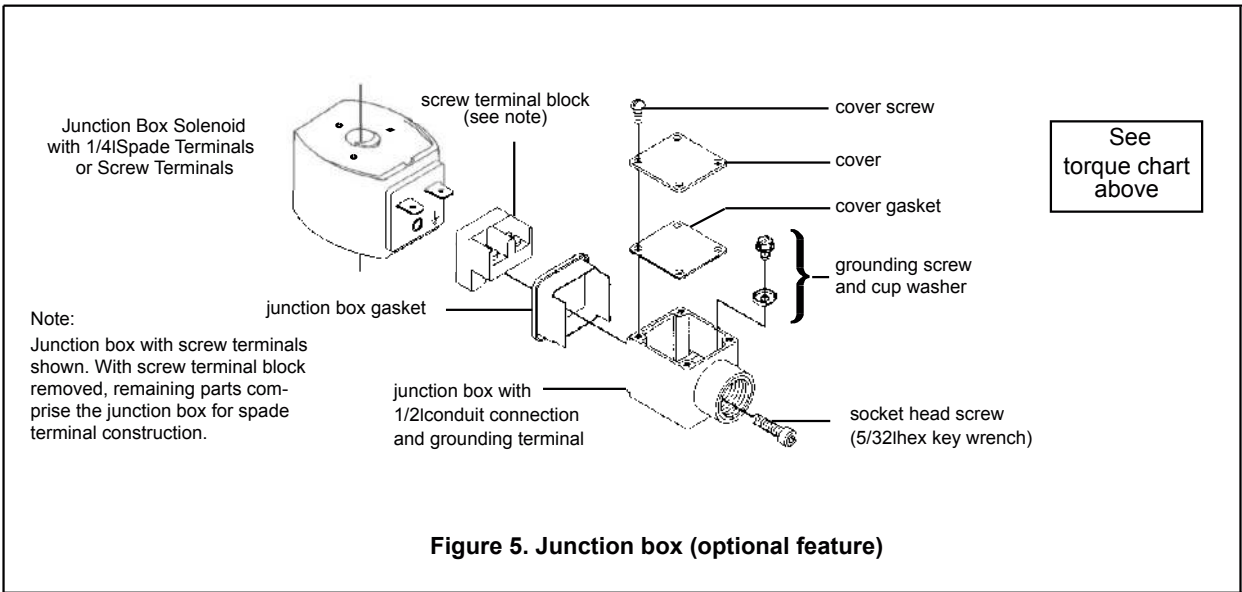
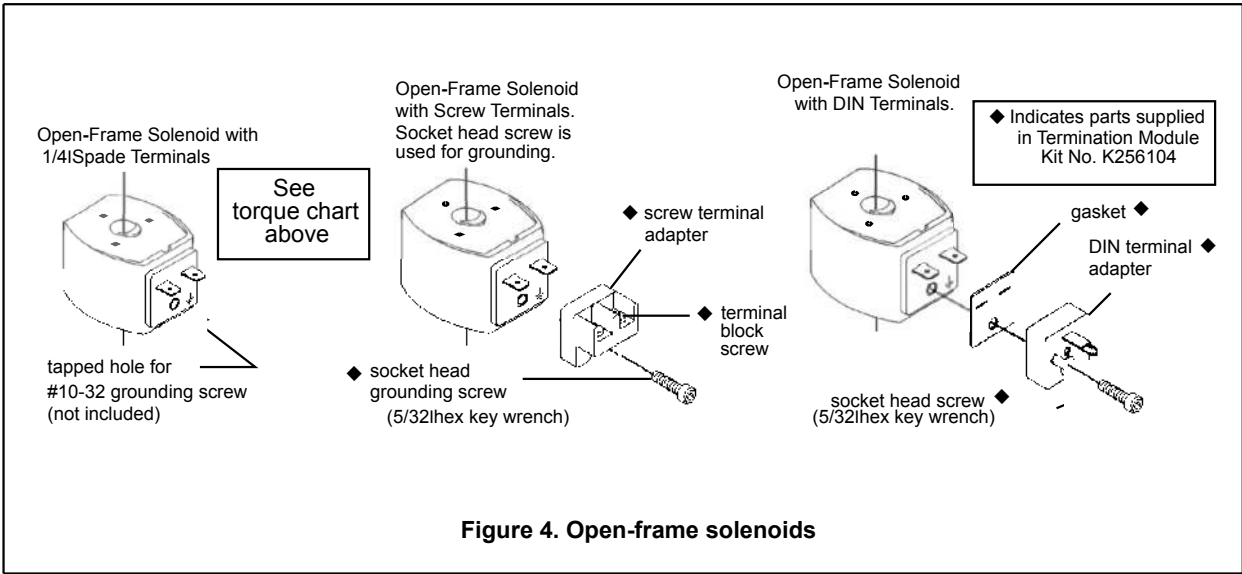
OPEN-FRAME, GENERAL PURPOSE, WATERTIGHT/EXPLOSIONPROOF SOLENOIDS  
OPTIONAL FEATURE FOR OPEN FRAME (GENERAL PURPOSE) CONSTRUCTION ONLY

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

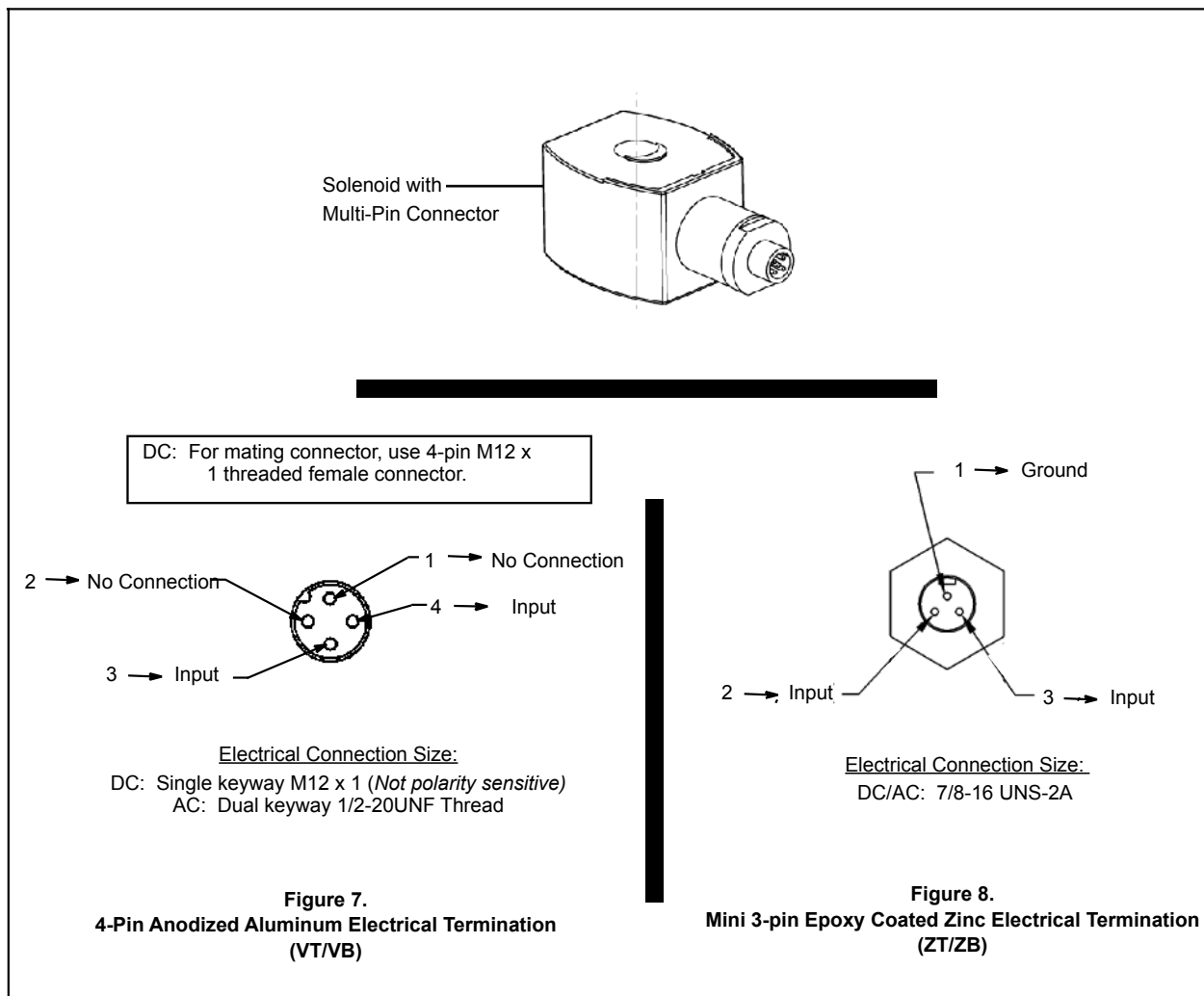
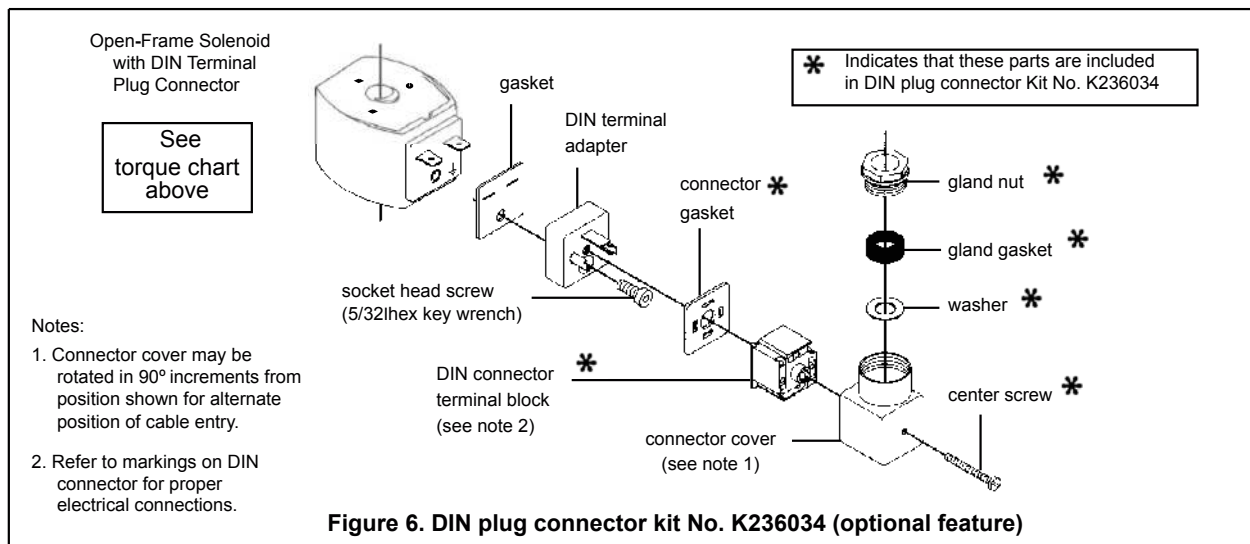
NOTICE: See Installation and Maintenance Instructions, I&M No. V\_6584\_R19 - Section 1 of 2 for detailed instructions.

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







## 14. TORQUE VALUES FOR MAINTENANCE AND INSTALLATION

Recommended U.S. BOLT TORQUE*							
Coarse thread only							
		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	140
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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