Diverter Valve Operators Manual





Special execution, intended for use in potentially explosive atmosphere (zone 22) in conformity with category 3 of group II, according to the European ATEX Directive 94/9/EC. The equipment has the following marking:



KICE INDUSTRIES, INC.

1. INTRODUCTION

When you purchased your new Kice heavy duty two way diverter valve or bin fill valve, you bought a valve 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 diverter valves.

This owner's manual is intended as a guide for proper installation, operation and maintenance to keep your Kice valve 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.

1. INTRODUCTION

WARRANTY

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2. IMPORTANT KICE DIVERTER VALVE INFORMATION

Important Kice Diverter Valve Information

Write down the MODEL and SERIAL NUMBER of the Kice diverter valve, 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 diverter valve. 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.

Serial Number Date of Delivery or Installation / /	
Date of Delivery or Installation / /	iber
	livery or Installation / /
Additional Notes:	Notes:

To The Owner

The purpose of this manual is to assist owners and operators with installing, maintaining and operating the Kice diverter valve or bin fill valve. Please read it carefully; information and instructions furnished can help you achieve years of dependable performance. Separate manuals may be required for the auxiliary equipment that make up the controls for the valve, such as, the solenoid operated 4-way valve or the position switch. 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 diverter valve or bin fill valve. 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 diverter valve or bin fill valve 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 Kice diverter valve or bin fill valve to vary slightly in detail. Kice Industries, Inc. reserves the right to redesign and change the diverter valve or bin fill valve as deemed necessary, without

notification. If a change has been made to your Kice diverter valve or bin fill valve 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 Kice diverter value or bin fill value, serial number and date of manufacture can be found stamped on the metal identification plate (see Figure 1) located on the end plate of the value (see Figure 2).



Figure 1

Figure 2

Kice Diverter Valve Parts and Service

Use original Kice diverter valve 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 Illustrated Parts Lists 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 diverter valve or bin fill valve is configured to be used in a specific type of system, handling particular types of material. Using a Kice diverter valve or bin fill valve 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.

NOTICE: Purchased items (such as, position switches, solenoid valves, pneumatic cylinders, pneumatic rotary actuators, and electric actuators) are covered by the manufacturer's warranty. If there is a problem with a purchased item, check with the local supplier or service representative.



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 diverter valve or bin fill valve 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 diverter valve or bin fill valve. 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

- cover, guard, grate or maintenance gate.
- Do not attempt to install, connect power, operate or service a Kice diverter valve 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 diverter valves. 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.
- 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 (PPE) when and where appropriate, such as hard hats, helmets, gloves, earplugs, dust masks and eye protection devices. Keep personal protective equipment in good repair and convenient to the operator.
- The Kice diverter valve may also have factory supplied guards for rotating components. Do not connect power to or operate the Kice diverter valve 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 diverter valve and bin fill valve or attempt to operate the Kice diverter valve and bin fill valve if it is in need of service, lubrication, maintenance or repair.
- The Kice diverter valve and bin fill valve 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 diverter valve and bin fill valve at all times, until the POWER IS TURNED OFF AND LOCKED OUT.
- Do not attempt to work on, clean or service the Kice diverter valve and bin fill valve, 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 diverter valve and bin fill valve, 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 series or fatal injury. Only qualified, trained, and experienced personnel should perform installation, operation, and maintenance of electrical machinery.
- All diverter valve inlet and discharge openings must be completely connected to the piping system to prevent human access while the equipment is operating, and must remain connected until POWER IS TURNED OFF AND LOCKED OUT. Keep away from the moving parts of the diverter valve during operation.

• All energy sources associated with the Kice diverter valve 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

Assume at all times that power is "on". Treat all conditions as live. This practice ensures a cautious approach that

- If a Kice diverter valve and bin fill valve 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 diverter valve and bin fill valve 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 diverter valve and bin fill valve used in the processing of combustible materials or in hazardous environments require evaluation by the owner and regulatory bodies to determine appropriate Kice diverter valve and bin fill valve monitoring equipment, dust control, explosion protection and electrical equipment enclosures. Do not use a Kice diverter valve and bin fill valve in hazardous environments unless properly equipped for the hazard.
- 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 a Kice diverter valve.
- 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 diverter valve and bin fill valve 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 diverter valve and bin fill valve or component when it is being lifted.
- The unit must be lifted by a means with sufficient lifting capacity.
- Never allow any kind of metal or other foreign objects to enter a Kice diverter valve and bin fill valve while in operation.
- Special attention must be devoted to outside contractors engaged to enter and perform work on a Kice diverter valve and bin fill valve 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.
- Actuation components must be inspected and adjusted after transportation and periodically as required by operating conditions. Check clevis pins, lock nuts, bolts holding the mounting bracket to the valve, lever arm on the position switch, air hoses to the high pressure 4-way valve, coupling alignment, set screws and keys, as appropriate to job conditions.
- It is ultimately the operator's responsibility to apply the above listed precautions and ensure proper Kice diverter valve and bin fill valve 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.

The Kice diverter valve and bin fill valve has been inspected at Kice and should be in excellent condition upon delivery. A thorough customer inspection of the Kice diverter valve and bin fill valve should be completed upon receipt to verify its condition.

The Kice diverter valve and bin fill valve 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 diverter valve and bin fill is still secured to freight platform.

Kice diverter valve and bin fill valves 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 diverter valve that are shipped knocked down will be clearly labeled for reassemble. If the diverter valve 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 the inlet and outlets to prevent the accumulation of dirt and moisture inside the body. Cover the actuator and controls with waterproof material. Refer to the actuator maintenance information for further storage instructions.

WORK SAFELY AT ALL TIMES

5. DELIVERY INSPECTION

6. STORAGE

7. INSTALLATION

The following instruction are intended to assist the installer with the assembly and installation of their Kice diverter valve and bin fill valve 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.



WARNING: Use appropriate equipment when lifting or moving the Kice diverter valve and bin fill valve. 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. Before installing the diverter valve, it is recommended that its operation be verified. Test the diverter valve by energizing the solenoids of the 4-way valve. Keep clear of the rotor, the pneumatic

cylinder lever arm, and any pinch points. If any unusual noises occur, disconnect and lock out the power. Check the clearances between the diverter valve end plates and rotor (the rotor could have shifted to one side during shipment).



WARNING: When testing the diverter valve, care MUST be taken to keep objects and body parts out of the valve. The rotor operates with tight clearances and will move fast with force!

NOTICE: To prevent the connection between the actuator and the rotor from failing, the speed at which the diverter valve operates MUST be regulated by the flow control valves located on the exhaust ports of the 4-way valve.

2. Move the diverter valve to the installation area using proper equipment.

3. The diverter valve must be adequately supported in such a way that its weight is not transferred to the tubing or piping connected to the inlet and outlets of the valve.

4. Compression couplings are normally used to connect the inlet and outlets of the diverter valve to the conveying line. Check the ends of the tubing or piping that will be connected to the diverter valve and make sure to clean any burrs and straighten any dents. Make sure the gap between the diverter valve and the tubing or piping is small (less than ¼ inch). When installing the couplings, check the coupling gaskets to make sure they do not protrude into the air stream.



CAUTION: Couplings are used to seal the joint, not support the equipment.

INSTALLATION CONTINUED

5. Tighten all mounting fasteners securely. To insure proper operation, the diverter valve must be adequately supported and properly installed. All tubing or piping connected to the diverter valve should be independently supported, as excess weight may distort the diverter valve body and cause contact between moving parts. Additionally, a mounting bracket is provided with the valve (see

Figure 3). When installing outdoors, care must be taken to protect the controls from the weather. 6. Connect the high pressure air supply to the 4-way valve. Reference Appendix A - Actuator Guide for air supply line connections.

7. Connect the electrical control lines to the solenoids on the 4-way valve and to the position switches. Wiring from the controller to the solenoids should be #18 gauge. Reference Appendix B - Wiring Schematics.



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.

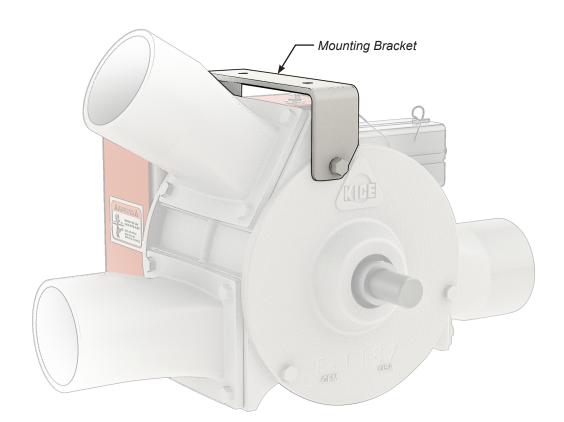




FIGURE 3

8. Test the valve after installation by energizing the solenoids of the 4-way valve, or (in the case of an electric actuator) by switching on the current to the electric motor. Keep clear of the pneumatic cylinder lever arm and any pinch points. If any unusual noises occur, disconnect and lock out the power. Check the clearances between the diverter valve end plates and rotor (the rotor could have shifted to one side during installation).

NOTICE: There is the possibility (especially with larger diverter valves) that, if a diverter valve is installed on its side (with the shaft pointing up), the weight of the rotor could cause the rotor to slip down against the lower end plate. If this occurs, contact a Kice representative. If specified at the time of order that the diverter valve would be installed in such a manner, a Teflon spacer could be inserted between the rotor and end plate to prevent the possibility of such a shift.

9. Reinstall any guards or covers removed during installation.

10. All Kice diverter valves have two 1/8" NPT ports in each end plate, either of which can be used for back pressure purging the void between the closed end rotor and the end plate. If the diverter valve is being used in an application that requires back pressure purge, remove one of the two plugs and connect plant air to each end plate. Adjust the air pressure with a regulator to at least 2 psig higher than the pressure inside the conveying line. The void can also be grease packed. If specified at the time of order, one of the 1/8" NPT openings will be fitted with a grease zerk and the void will be packed with food grade lubricant before the diverter valve is shipped from the factory. The purge air or the grease pack is used to prevent the conveyed product from getting between the closed end rotor and the end plates of the diverter valve.

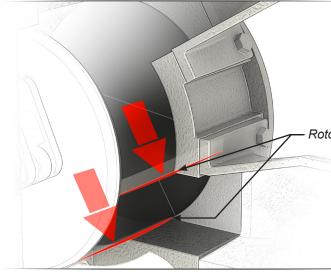
Connect Air Cylinder Controls

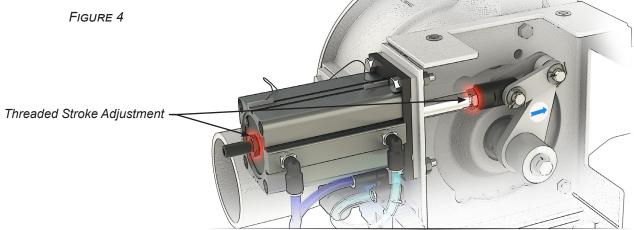
1. Wire the diverter valve up to the control panel. Note the voltage rating on the solenoid valve data plate.

2. Clean, dry, lubricated air at 100 psig is required for the 4-way valve and the actuator. The air lubricator should be no more than 10 feet from the actuator.

3. The purge air for the end plates of the diverter valve should be clean, dry and non-lubricated air.

4. When the diverter valve installation is completed, check for satisfactory operation and correct rotor positioning (see Figure 4). If the rotor does not position correctly, adjustment can be made by adjusting the jam nut and clevis on pneumatic cylinders (see Figure 5). If positioning is opposite of what is desired, reverse the air lines on the actuator side on the solenoid valve.





Rotor Leading Edge Should be Inline with Inlet Port

FIGURE 5

Change Diverter Valve Position

When a change of diverter valve position is desired:

Sequence of events for **DOUBLE** solenoid operated 4-way valve.

- 1. Select the desired diverter valve position on the control panel.
- 2. Push the button to close the contacts that energize the solenoid operated 4-way valve.
- 3. Hold the push button down until the position light comes on.
- 4. Release the push button. This will deactivate the solenoid on the 4-way valve.

NOTICE: In the event of an electrical power interruption or a solenoid failure, the diverter valve position can be changed as follows:

1. First try using the red manual override buttons on the 4-way valve.



2. Disconnect the compressed air supply from the solenoid valve.

3. Change the diverter valve position by manually moving the lever arm connecting the pneumatic cylinder to the diverter valve shaft (see Figure 6).

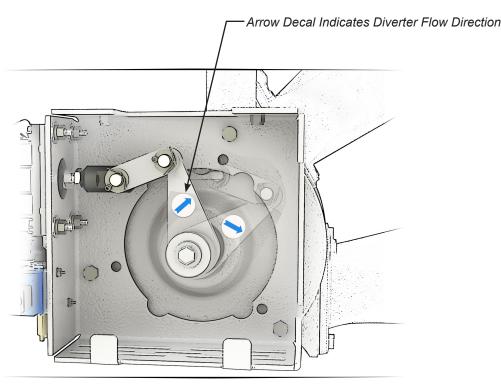


FIGURE 6





WARNING: When performing maintenance, all energy sources associated with the diverter valve 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. Removal of transitions which expose hazards such as nip points of a diverter valve rotor also require lockout and tagout precautions be employed.



maintenance on equipment.

The key to long and trouble free diverter valve operation is good maintenance practices. Periodically inspect the rotor for damage from foreign materials or wear. Inspect the bearings and the valve control system for excessive wear or loose connections.

A majority of the operating problems that occur with a diverter valve can be traced to improper adjustments and delayed, or neglected, maintenance. A consistently applied maintenance program will prevent many problems.

A thorough understanding of the diverter valve is a must if the operating problems are to be corrected satisfactorily. A good rule to follow when troubleshooting a problem is to never make more than one adjustment at a time, thereby isolating the problem by a process of elimination. The cause of a problem is usually simple and is easy to pinpoint if you systematically check each system and function.

Lubrication:

1. The diverter valve bearings are permanently lubricated. Therefore, lubrication of the diverter valve is generally not required or recommended. Check the oil level in the lubricator bowl on the compressed air supply at regular intervals. FILL AS REQUIRED! 2. If the void between the rotor and the end plate is packed with grease, then one of the 1/8" NPT ports in the end plate will have a grease zerk while the other will be plugged. Once a year, remove the plug and pump some grease in through the grease zerk until excess grease is expelled through the open port. Reinstall plug after greasing. 3. Check the general condition of the diverter valve. Look for loose fasteners or signs of leakage. 4. Provide normal maintenance for the actuator, solenoid operated 4-way valve and positions switches.

9. MAINTENANCE AND SERVICE

WARNING: Review all Safety Precautions noted in the manual before performing

Replacement Parts

It is recommended that only Kice supplied replacement parts be used. Kice parts are built to be fully compatible with the original diverter valve using specific alloys and tolerances. These parts carry a standard Kice warranty.

When ordering replacement parts, specify the part name, the Kice diverter valve serial number, the diverter valve model and the diverter size. Most of this information is on the metal nameplate attached to the valve endplate.

		Diverter Valve Models								
	67Q2-2 thru 67Q4-2	67Q5-2 / 67Q6-2	67Q8-2	67Q10-2/67Q12-2	67Q2-3 / 67Q4-3	67Q5-3 / 67Q6-3	67Q8-3	67Q10-3	68Q2 thru 68Q4	68Q5 / 68Q6
Bearings	WB2	19	WB223	WB231	WB	219	WB223	WB231	WB2	19
Seals	1154	-3	1154-2	1154-1	115	4-3	1154-2	1154-1	1154	-3
Pneumatic Actuator	10003234	10003235	10003235	10003237	10003374	10003304	1000)3375	10003236	10003237
Position Switch Options										
NEMA 4/4X/7/9	AFNB-E120				N/A	N/A	N/A	N/A	AFNB-E	120
NEMA 6					10003699					
IP 67					10003243*					
Class I/II Div I					10003241					
Solenoid Valve Options										
NEMA 4	L0703ABWWAA									
NEMA 7/9				L	0703ABWW391AA					

* Note: must also use conduit adapter 10003244 for Class II Div 2 area classification



WARNING: Review all Safety Precautions noted in the manual before performing maintenance on equipment.





Diverter valve position cannot be changed.

A. Possible Cause — Material or debris is jammed inside the diverter valve, blocking the movement of the rotor.

Suggested Remedies:

warranty.

- 1. Remove the diverter valve from the conveying line.
- 2. Remove the lodged material or debris.
- 3. Check for damage to the diverter valve rotor or body.

B. Possible Cause — Differential temperature between the interior and the exterior of the diverter valve is excessive.

Suggested Remedies:

1. Reduce the temperature of the conveying air. 2. Equalize the temperature between the interior and exterior of the diverter valve (insulate the body

and/or heat trace the housing).

3. Remove the rotor and machine the rotor diameter to increase the internal clearances (consult a Kice representative prior to performing this step).

C. Possible Cause — Moisture is causing the rotor to freeze or rust in place.

Suggested Remedies:

1. Disassemble the diverter valve and clean off the rust (take care during disassembly not to damage

any parts).

2. Insulate the conveying line and the diverter valve body and/or heat trace the body to keep the temperature of the inside air above the dew point. 3. Move the rotor a minimum of once every 8 hours.

10. TROUBLESHOOTING -COMMON DIVERTER 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

WARNING: Disconnect power before touching any component part!

TROUBLESHOOTING CONTINUED

5. Apply power while watching output lights for proper function.

6. If the diverter valve end plates are back pressure purged, check the plant air for moisture.

4. Chrome plate the interior of the body and nickel plate or epoxy coat the rotor (this should be

D. Possible Cause — Material is packed between the rotor and the end plates.

Suggested Remedies:

1. Disassemble the diverter valve and clear the void of material (take care during disassembly not to

damage any parts).

2. To prevent material from reforming in this area, food grade grease can be used as packing to prevent material from entering and binding the rotor.

3. Both ends of the rotor need to be cleaned and packed.

E. Possible Cause — Air pressure is off, too low, or interrupted.

Suggested Remedies:

1. Check for pinched air line, cut air line, closed shutoff valve, clogged filter, faulty pressure regulator or defective compressor.

F. Possible Cause — Control signal is not reaching the air control solenoid valve.

Suggested Remedies:

- 1. Check power supply to the panel.
- 2. Check circuit continuity from the panel to the solenoid valve.
- 3. Check the condition of position selector switch/push button.
- **G.** Possible Cause Solenoid is not responding to control signal.

Suggested Remedies:

1. If the temperature is near or below freezing, check to see if moisture condensing in the compressed air supply line has frozen in the solenoid valve spool. 2. Check the condition of the solenoid windings.

H. Possible Cause — Air lines from the solenoid valve to the pneumatic actuator are blocked or disconnected.

Suggested Remedies:

1. Replace pinched, cut or missing lines.

TROUBLESHOOTING CONTINUED

- I. Possible Cause Pneumatic actuator is inoperative. **Suggested Remedies:**
 - 1. Check for damage to the pneumatic actuator.
- J. Possible Cause 3-way valve does not shift properly between all 3 positions. **Suggested Remedies:**

1. Check for pinched or leaking air line.

2. Install Pneumatic Timer Kit - reference Appendix C.

Material leaks into the inactive leg of the diverter valve.

- A. Possible Cause Rotor position at each end of travel is incorrect. **Suggested Remedies:**
 - They must be adjusted properly.

2. Check for proper positioning of the rotor. See Section 8 Operation and Start Up Procedure to adjust rotor stop positions.

B. Possible Cause — Erosion has formed a path in the rotor or body for air and material to leak through.

Suggested Remedies:

1. Check for proper positioning of the rotor.

2. Return the diverter valve to Kice Industries for repair or for an advanced replacement.



2. If the diverter valve has been subjected to freezing temperatures, check for ice within the actuator that might be interfering with piston movement.

1. Check for proper setting of the flow control valves on the exhaust ports of the 4-way valve.

11. SPECIAL ATEX INFORMATION

Special ATEX Information

The outside of the diverter or bin fill valve is intended for use in areas in which explosive atmospheres caused by air/dusts mixtures are unlikely to occur or, if they do occur, are likely to do so only

infrequently and for a short period only.

The inside of the diverter or bin fill valve is intended for use withstanding an atmosphere where dust clouds are likely to be present occasionally during normal operation.

Installation Requirements

When installing equipment, make sure that the moving parts inside the diverter or bin fill valve are not accessible so that EN ISO 13857-1 is fulfilled.

When installing an electric actuator, drive motor/gear unit combination, other electric or non-electric equipment on the diverter or bin fill valve, be sure that all those components are suitable for being operated in zone 22. Specifically, they must fulfil the ATEX requirements for Group II category 3D equipment so that the formation of an electrically generated ignition source is not expected.

Suitable measuring, control and regulating devices (MCR) must be installed to ensure that the temperature of the device's interior never reaches the spontaneous ignition temperature of the product. The difference between the spontaneous ignition temperature and the product temperature must be at least 50 degrees centigrade.

The steel construction for installation of the appliance must be horizontal, stable and free from vibration. A constant temperature of 12-35 degrees centigrade must be maintained.

Electrical Requirements

Electrical installation must be executed according to EN ISO 60204-1 (a lockable all-phase power switching device must be provided, so the device can be switched off and secured before performing repair work).

Construction of the control system must be done under consideration of EN ISO 13849-1.

Electrical components must be mounted by EMC skilled specialists and in accordance with current guidelines and codes.

The operator or manufacturer of the facility must install an Emergency Stop circuit near the equipment, which is capable of turning off the machine immediately and securely under consideration of EN 13850.

SPECIAL ATEX INFORMATION CONTINUED

The safety circuit "EMERGENCY STOP button → safety relay → safe shut down of the drive motor (e.g. by means of motor protection switch)" must at least have performance level PL r=c according to

EN ISO 13849-1.

During installation, an electrical repair switch must be installed in order to disconnect the actuator motor, on all poles, from the power supply for service and maintenance activities to eliminate any personnel hazard. The safety circuit "repair switch - safe shutting down of the drive motor (e.g. by means of motor protection switch)" must at least have performance level PL r=c according to EN ISO 13849-1.

Grounding (Earthing) of Conducting Parts

It is normally sufficient to separately ground the static parts of the valve during installation and operation. If necessary, shaft grounding systems may be used. (This is to avoid any electrostatic charge and potentially dangerous situation).

Operation and Maintenance

The exterior surfaces of the diverter or bin fill valve must be cleaned periodically, when it is located in a dusty environment. Cleaning is to be done either with a vacuum cleaner approved for use in explosive zones, or with a damp cloth. Solvents or dry wool cloths (risk of sparking) must never be used.

Hot surfaces or tight gaps between movable parts must be cleaned regularly by vacuuming and with a vacuum approved for use in explosive zones or with an anti-static cloth in order to prevent ignition of dust deposits.

The rotor bearings must be replaced after having finished 90% of their lifetime: preferably by authorized KICE service personnel. Those exchange intervals are calculated to ensure that overheating or sparking as a result of a defective wearing part can be practically excluded. It is recommended that the User installs an operating hour counter in the control cabinet if the operating hours cannot be easily determined by other means.

Any present actuator or gear motor bearings must be replaced according to the specifications of the manufacturer (Category 3 GD for usage in Zone 22).

The service activities prescribed by the manufacturer of the actuator, gear motor or gearbox must be carried out according to schedule.

The service activities prescribed by the manufacturer of the coupling (if present) must be carried out according to schedule.

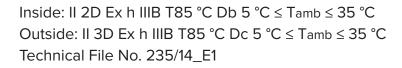
When assembling or reassembling any actuators, gear motors or couplings, exact alignment of shafts and drives must be maintained.

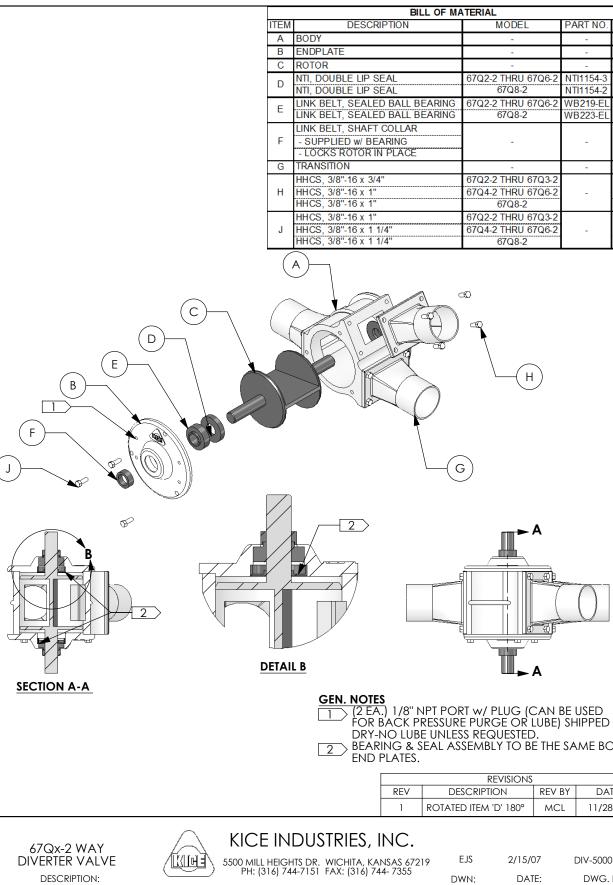
Electric driven appliances must not be used before the gearbox is filled with oil (if so equipped).

When replacing parts inside the diverter or bin fill valve, all bolts and nuts should be secured with Loctite[®] or a similar adhesive thread locker.

Markings

The nameplate shall be fixed permanently to the valve and indicate: Name and address of the manufacturer, date of construction, designation or type of valve, serial or identification number, the CE mark, and classification markings.







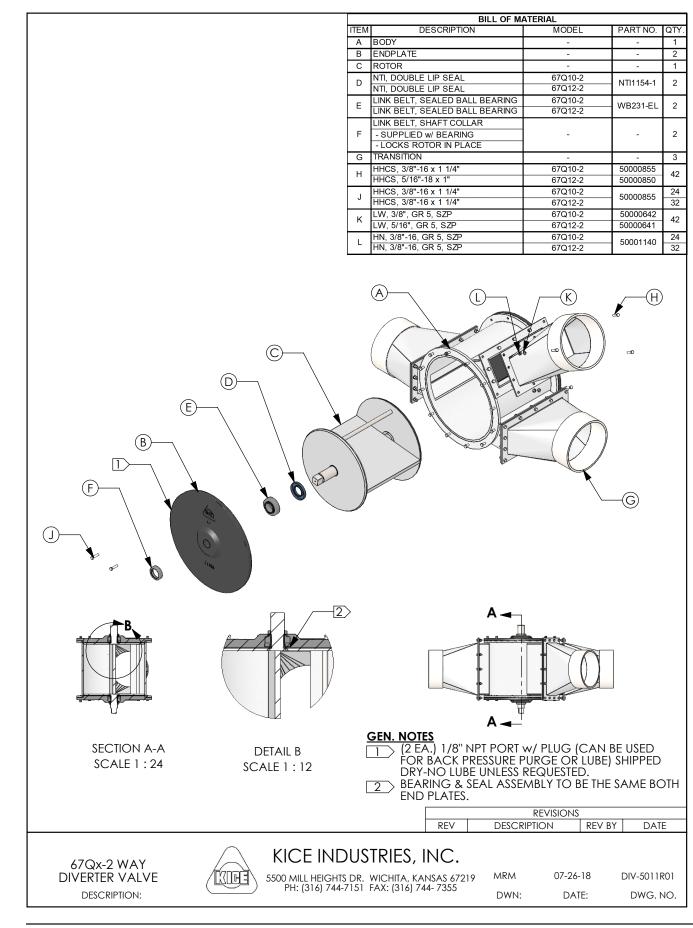
12. ILLUSTRATED PARTS LIST

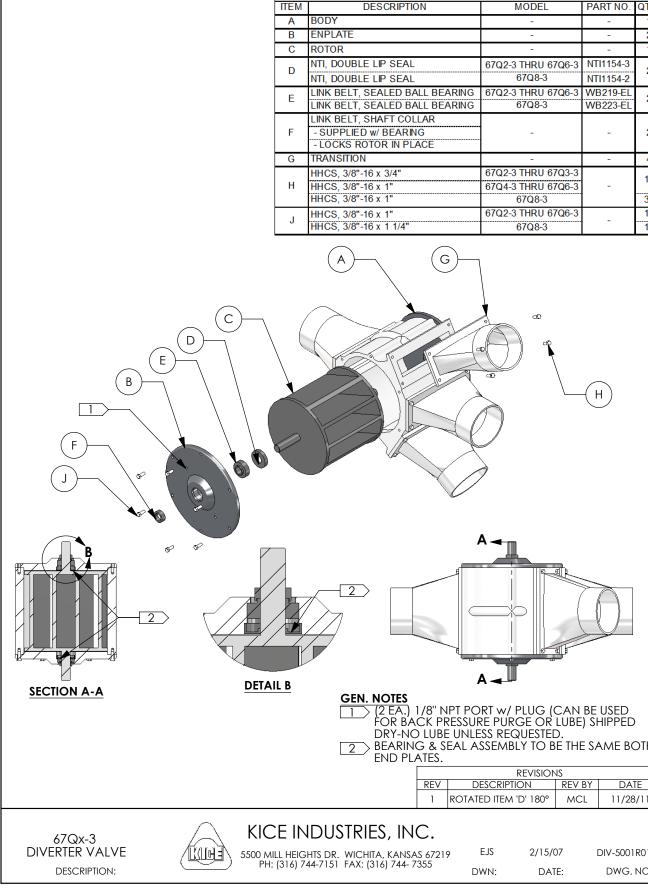
	BILL OF MATERIAL									
EM	DESCRIPTION	MODEL	PART NO.	QTY.						
A	BODY	-	-	1						
В	ENDPLATE	-	-	2						
С	ROTOR	-	-	1						
D	NTI, DOUBLE LIP SEAL NTI, DOUBLE LIP SEAL	67Q2-2 THRU 67Q6-2 67Q8-2	NTI1154-3 NTI1154-2	2						
E	LINK BELT, SEALED BALL BEARING LINK BELT, SEALED BALL BEARING	67Q2-2 THRU 67Q6-2 67Q8-2	WB219-EL WB223-EL	2						
F	LINK BELT, SHAFT COLLAR - SUPPLIED w/ BEARING - LOCKS ROTOR IN PLACE	-	-	2						
G	TRANSITION	-	-	3						
н	HHCS, 3/8"-16 x 3/4" HHCS, 3/8"-16 x 1" HHCS, 3/8"-16 x 1"	67Q2-2 THRU 67Q3-2 67Q4-2 THRU 67Q6-2 67Q8-2	-	12 24						
J	HHCS, 3/8"-16 x 1" HHCS, 3/8"-16 x 1 1/4" HHCS, 3/8"-16 x 1 1/4"	67Q2-2 THRU 67Q3-2 67Q4-2 THRU 67Q6-2 67Q8-2	-	6						

	NOTES
$ \rangle$	(2 EA.) 1/8" NPT PORT w/ PLUG (CAN BE USED
	(2 EA.) 1/8" NPT PORT w/ PLUG (CAN BE USED FOR BACK PRESSURE PURGE OR LUBE) SHIPPED
	DRY-NO LUBE UNLESS REQUESTED.
2>	BEARING & SEAL ASSEMBLY TO BE THE SAME BOTH END PLATES.

	REVISIONS							
	REV	DESCRIPTIO	Ν	REV BY	DATE			
	1	ROTATED ITEM 'D	' 180°	MCL	11/28/11			
NDUSTRIES, INC.								
GHTS DR. WICHITA, KAI	NSAS 6721	9 EJS	2/15/07		DIV-5000R01			
744-7151 FAX: (316) 74	4- 7355	DWN:	DAI	E:	DWG. NO.			

ILLUSTRATED PARTS LIST CONTINUED

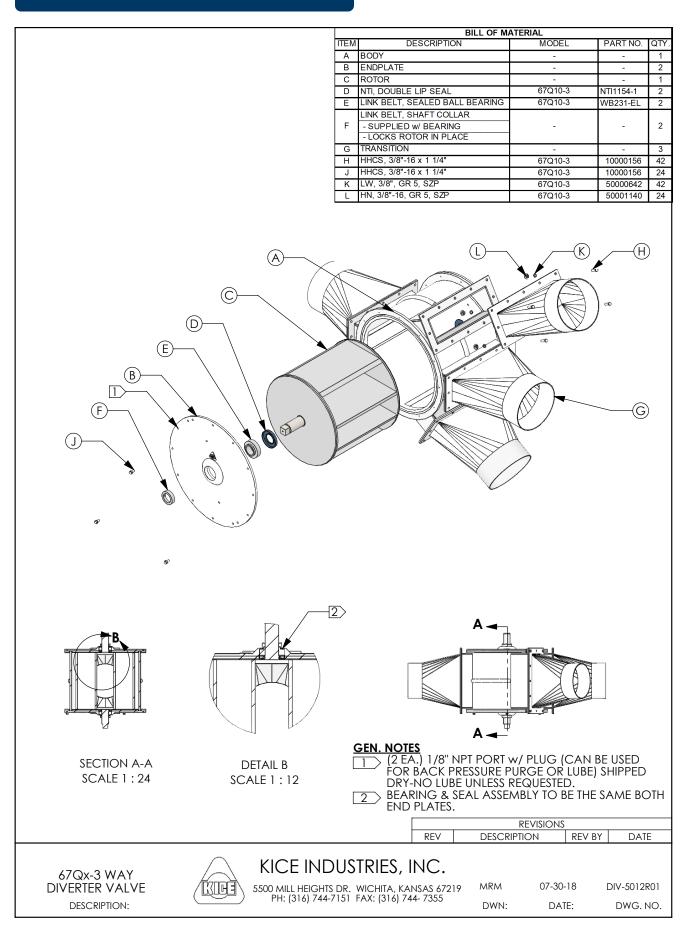


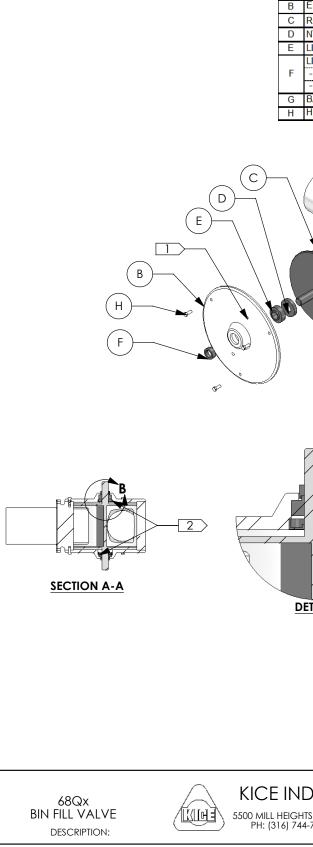


BILL OF MA	TERIAL						
DESCRIPTION	MODEL	PART NO.	QTY.				
BODY	-	-	1				
ENPLATE	-	-	2				
ROTOR	-	-	1				
NTI, DOUBLE LIP SEAL	67Q2-3 THRU 67Q6-3	NTI1154-3	2				
NTI, DOUBLE LIP SEAL	67Q8-3	NTI1154-2	2				
LINK BELT, SEALED BALL BEARING	67Q2-3 THRU 67Q6-3	WB219-EL	2				
LINK BELT, SEALED BALL BEARING	67Q8-3	WB223-EL	2				
LINK BELT, SHAFT COLLAR							
- SUPPLIED w/ BEARING	-	-	2				
- LOCKS ROTOR IN PLACE							
TRANSITION	-	-	4				
HHCS, 3/8"-16 x 3/4"	67Q2-3 THRU 67Q3-3		16				
HHCS, 3/8"-16 x 1"	67Q4-3 THRU 67Q6-3	-	10				
HHCS, 3/8"-16 x 1"	67Q8-3		32				
HHCS, 3/8"-16 x 1"	67Q2-3 THRU 67Q6-3		12				
HHCS, 3/8"-16 x 1 1/4"	67Q8-3	-	16				

GEN. NOIES (2 EA.) 1/8" NPT PORT w/ PLUG (CAN BE USED FOR BACK PRESSURE PURGE OR LUBE) SHIPPED DRY-NO LUBE UNLESS REQUESTED. BEARING & SEAL ASSEMBLY TO BE THE SAME BOTH END PLATES.									
		RE	VISION	15					
	REV	DESCRIPTIO	N	REV BY	DATE				
	1	ROTATED ITEM 'D'	180°	MCL	11/28/11				
DUSTRIES, INC.									
	S DR. WICHITA, KANSAS 67219 EJS 2/15/07 DIV-5001R01								
-7151 FAX: (316) 744- 7	355	DWN:	DAT	E:	DWG. NO.				

ILLUSTRATED PARTS LIST CONTINUED





KICE INDUSTRIES, INC.

		-

ITEM

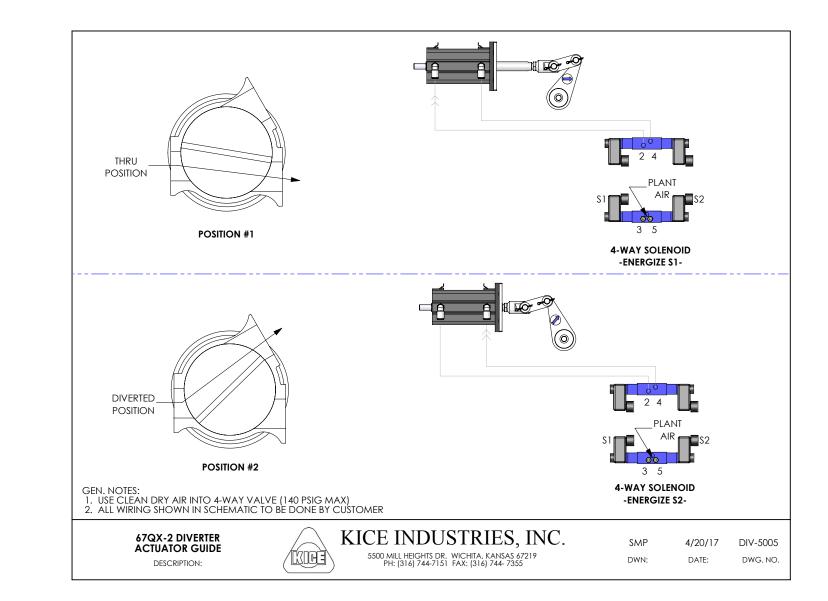
Α

BILL OF MA				
DESCRIPTION	MODEL	PA	ART NO.	QTY.
BODY	-		-	1
ENPLATE	-		-	2
ROTOR	-		-	1
NTI, DOUBLE LIP SEAL	68Q2 THRU 6		FI1154-3	2
INK BELT, SEALED BALL BEARING	68Q2 THRU (68Q6 W	8219-EL	2
JNK BELT, SHAFT COLLAR - SUPPLIED w/ BEARING			-	2
- LOCKS ROTOR IN PLACE				
BAFFLE	-		-	1
HHCS, 3/8"-16 x 1"	68Q2 THRU	6Q80	-	6
A C C C C C C C C C C C C C C C C C C C				
GEN. NOTES (2 EA.) 1/8" NPT POI FOR BACK PRESSUR DRY-NO LUBE UNLES BEARING & SEAL AS END PLATES.	e purge or Ss requeste	LUBE) S D.	HIPPED	
	REVISION			
	CRIPTION	REV BY	DAI	
1 ROTATED	ITEM 'D' 180°	MCL	11/28	/11
DUSTRIES, INC.				
	JS 2/15/0)7	DIV-5002	R01
-7151 FAX: (316) 744- 7355 DW	N: DAI	E:	DWG.	NO.

13. TORQUE VALUES FOR MAINTENANCE AND INSTALLATION

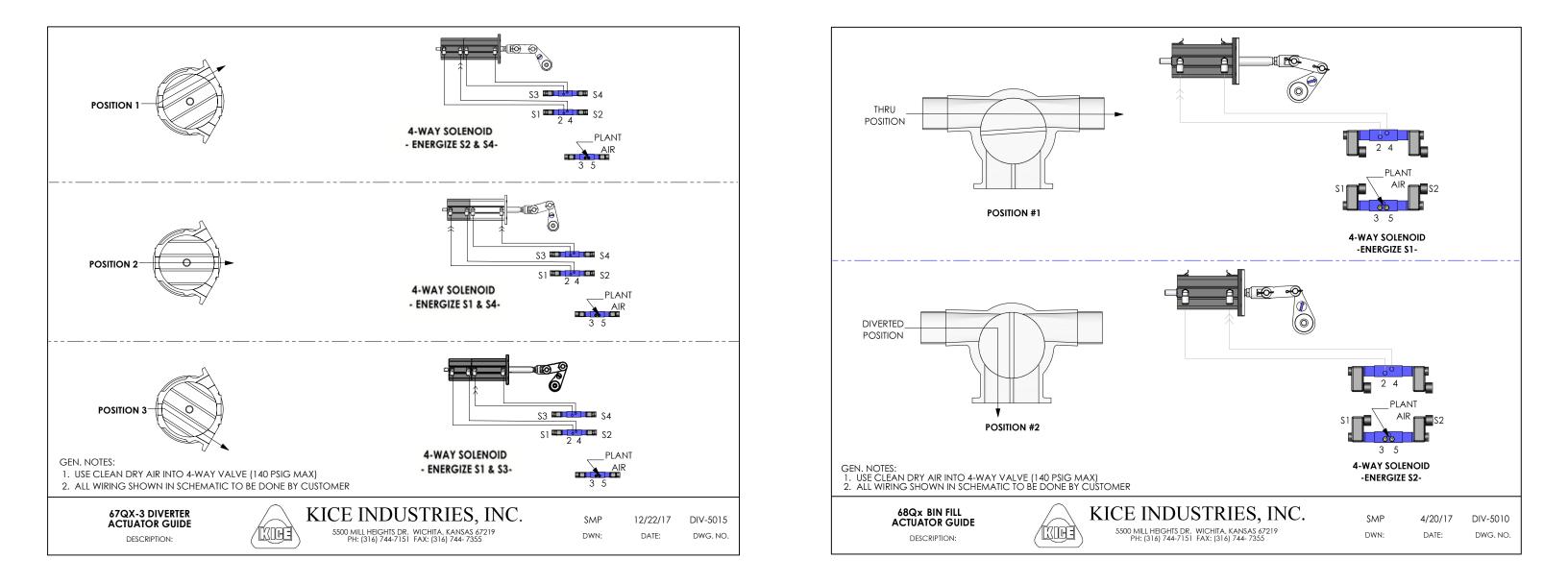
Recommended U.S. BOLT TORQUE* Coarse thread only								
		SAE Grade 5	SAE Grade 5	SAE Grade 8	SAE Grade 8	Socket head cap screw	Socket head cap screw	
Bolt Dia.	Thread Size	lb – ft	N – m	lb – ft				
1/4	20	8.4	11	12			15	
5/16	18	17	24	25	33	23	31	
3/8	16	31	42	44	59	41	55	
7/16	14	49	67	70	95	65	59	
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.



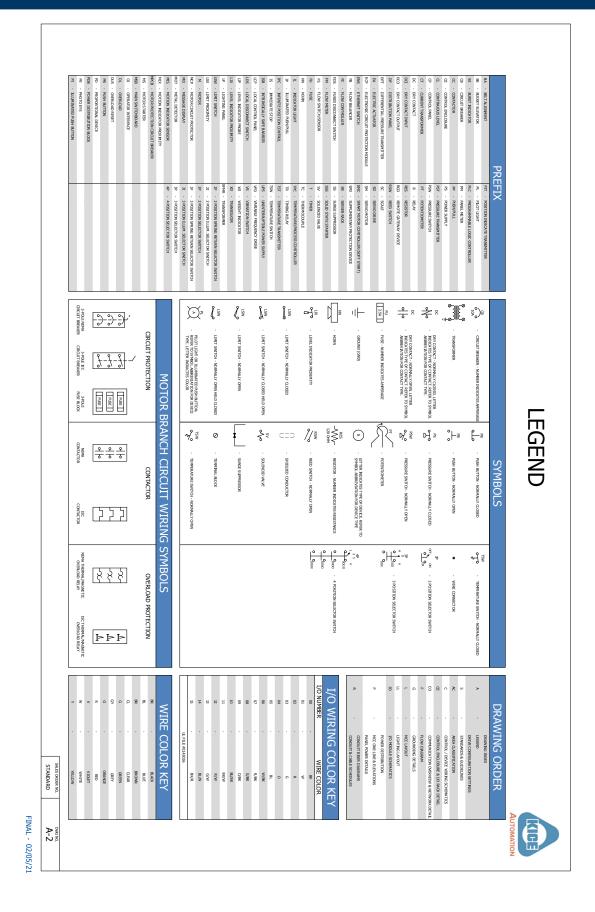
14. APPENDIX A - ACTUATOR GUIDE

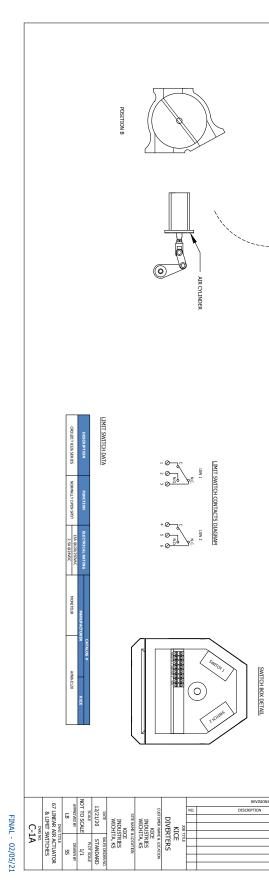


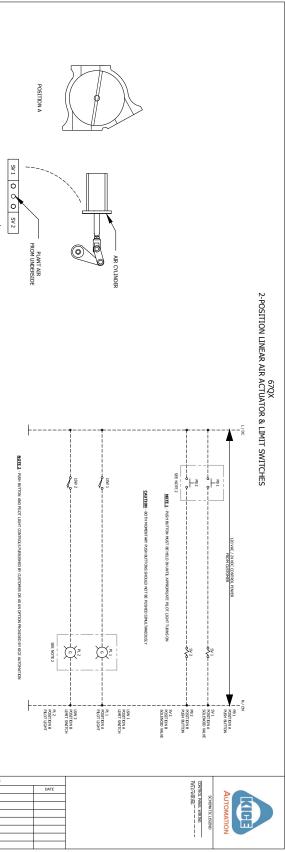


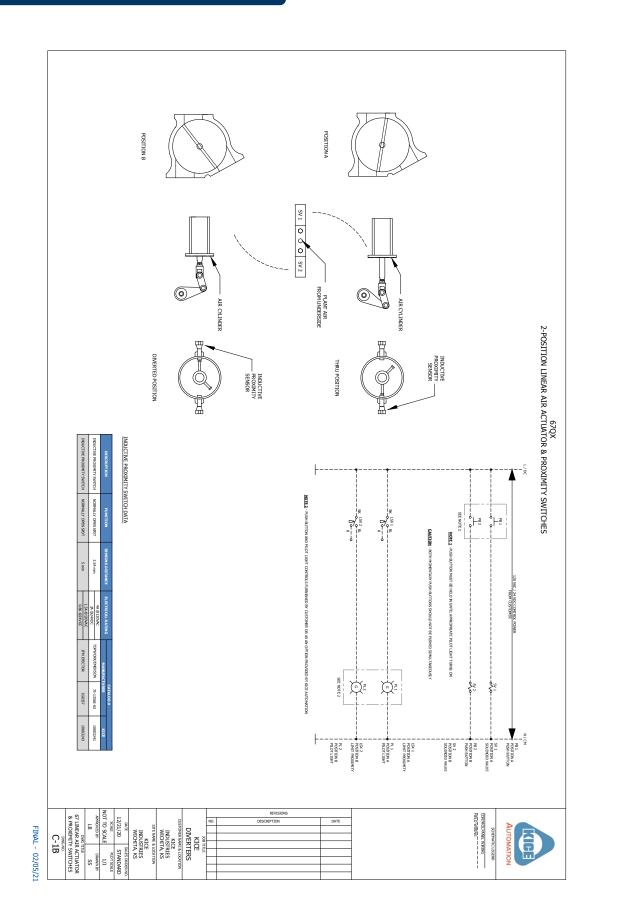
15. APPENDIX B - WIRING SCHEMATICS

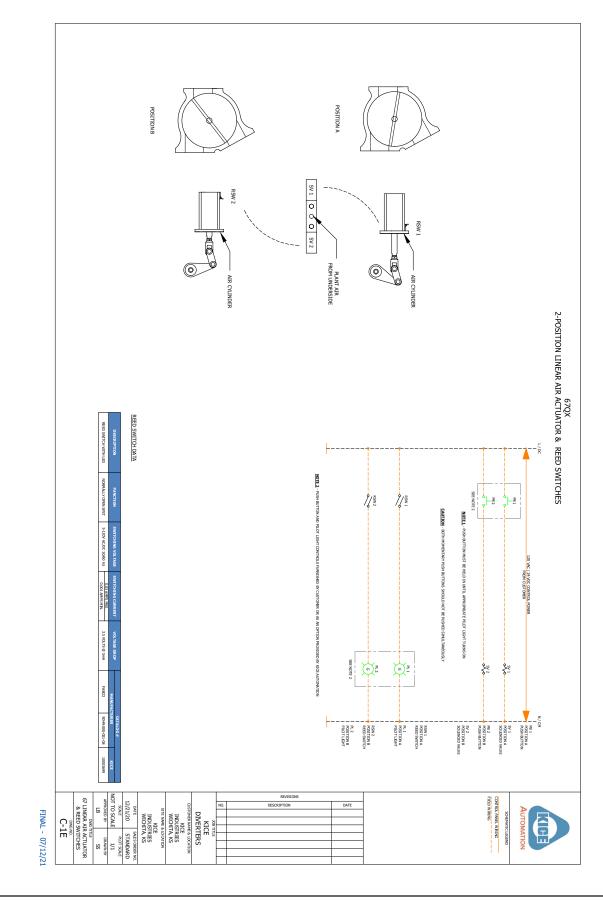
APPENDIX B - WIRING SCHEMATICS CONTINUED

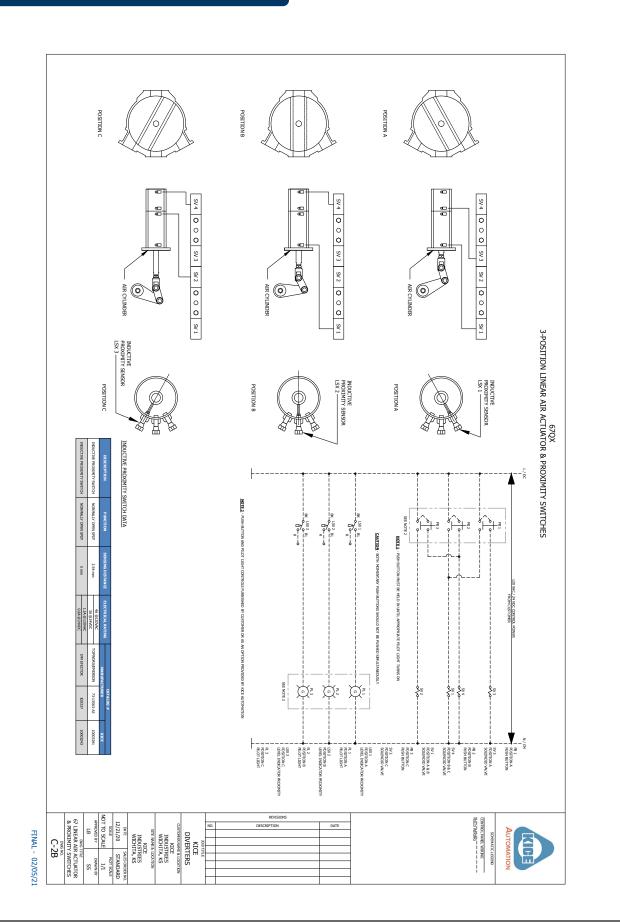


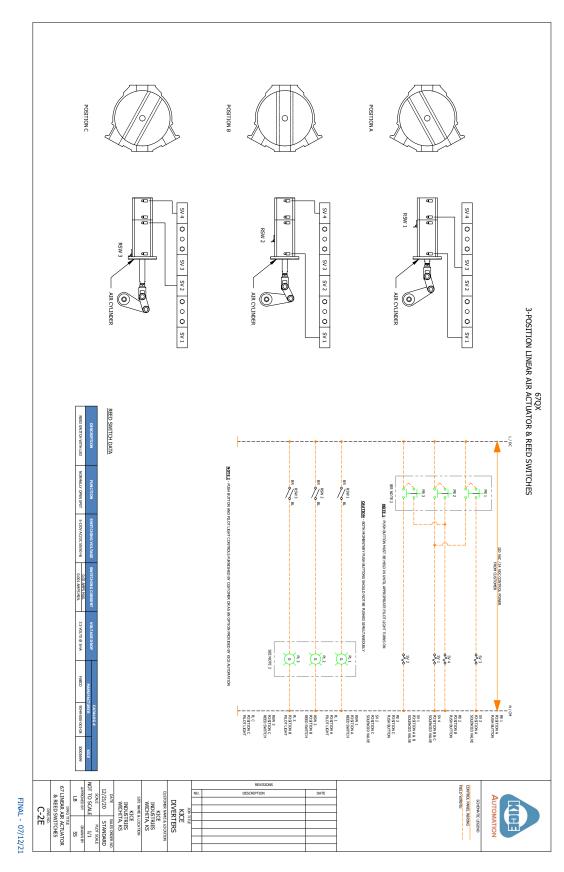


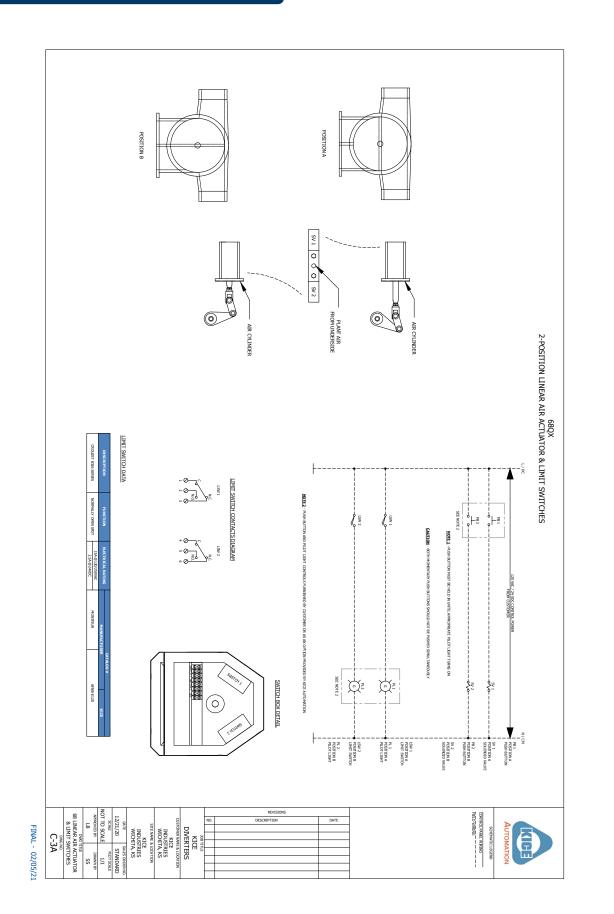


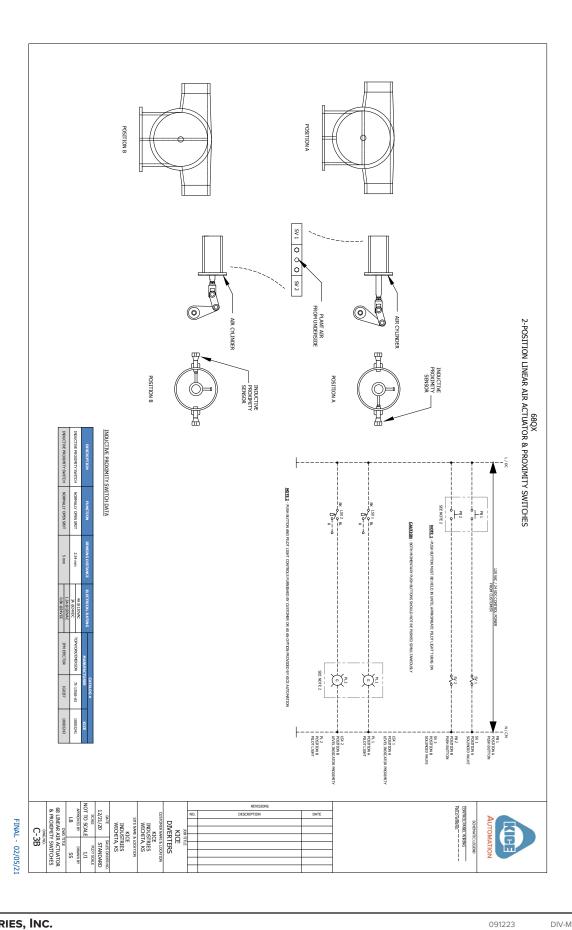










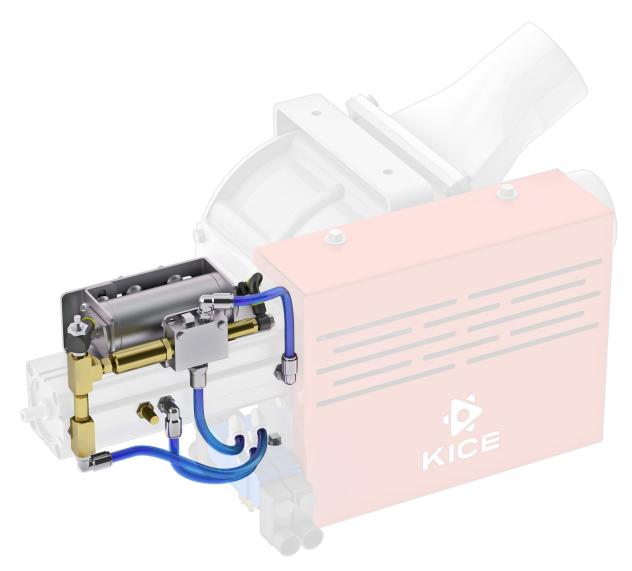


16. APPENDIX C - PNEUMATIC TIMER KIT

APPENDIX B - WIRING SCHEMATICS CONTINUED

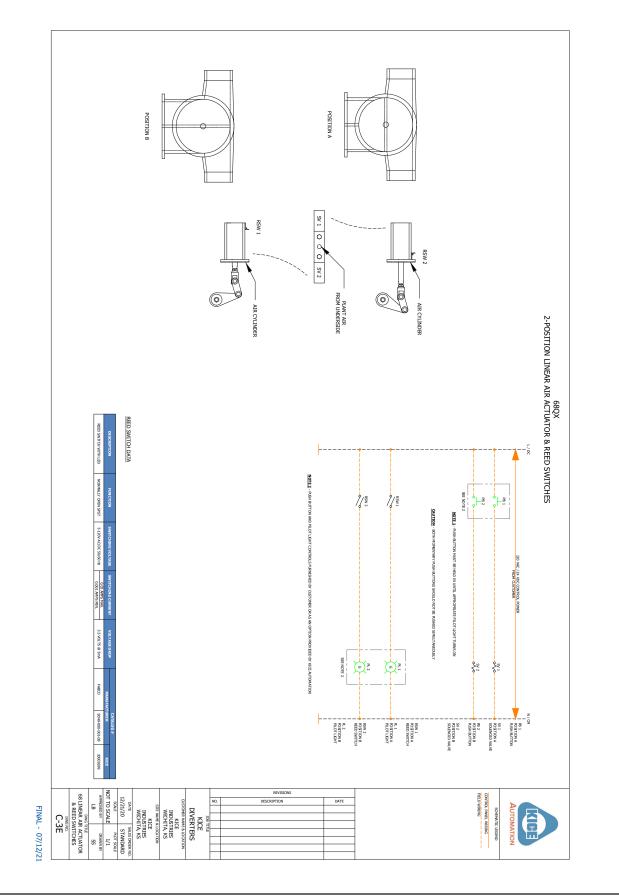
Pneumatic timer installation

The purpose of these instructions is to show how to install the pneumatic timer circuit (as shown in the image below) for 67Qx-3 valves.



Step 1:

Remove all components from ports on air cylinder on existing diverter valve.

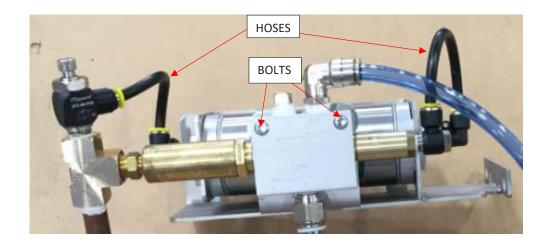


Installation Time 15-20 minutes

Step 2:

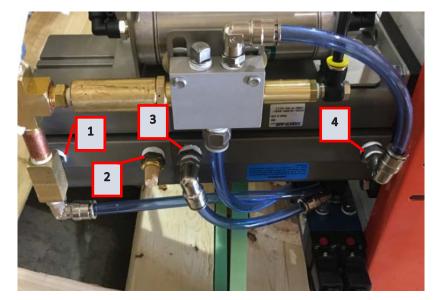
Timer assembly will arrive mostly assembled. Some disassembly is required to install the timer on diverter valve.

Remove the bolts holding the valve block to the bracket and the $\frac{1}{2}$ " hoses connecting the circuit to the air tank.



Step 3:

Install the timing assembly in Port 1, muffler in Port 2, and elbows in Ports 3 and 4. Depending on cylinder size, the reducing bushings may have to be removed.

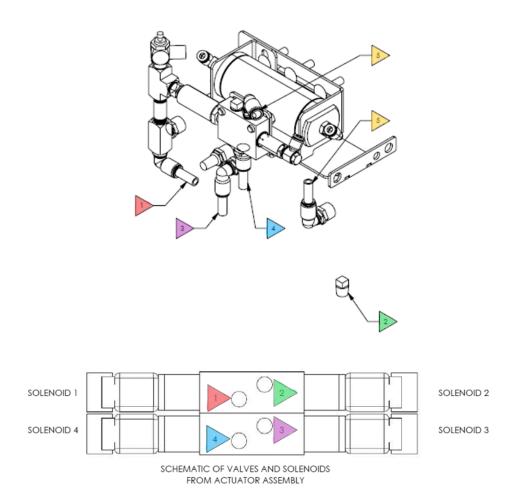


Step 4:

Install the bracket onto the cylinder using the existing cylinder mounting bolts. The mounting bracket for the air tank and valve block may have to be repositioned. Reinstall the bolts and hoses for the valve block removed in step 2.

Step 5:

Replace the elbow in port 2 with the provided plug and connect the hoses per the diagram below (Flag 1 connects to Flag 1).



Step 6:

To set the timing of the assembly:



- Turn valve all the way closed (clockwise) -
- Open valve ½ turn -
- Turn on air to actuator -
- time, open valve further.

Fire the solenoids indicated below to achieve the desired position:

FULL RETRACT (TOP): 2 & 4 simultaneously

MIDDLE: 1 & 4 simultaneously

FULL EXTEND (BOTTOM): 3

Troubleshooting:

If the diverter is commanded to change position before the timing circuit has stopped venting, the operation of the valve may be erratic. To correct, move the valve to the middle position by firing solenoids 1 & 4 simultaneously and wait for the timing circuit to complete. Then move the diverter to the desired position.

Cycle through the positions of the valve. When cycling to the middle position, there should be venting for a period of time and then the timer will stop the venting. This time should be between 3-5 seconds. To increase this time, close valve, to decrease

For questions or additional assistance, please contact the Customer Service Department or Quick Ship Department.

Kice Industries, Inc. 5500 Mill Heights Drive Wichita, KS 67219-2358 Toll Free: (877) 289-5432 Main Phone: (316) 744-7151 Fax: (316) 744-7355 <u>www.kice.com</u>

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