

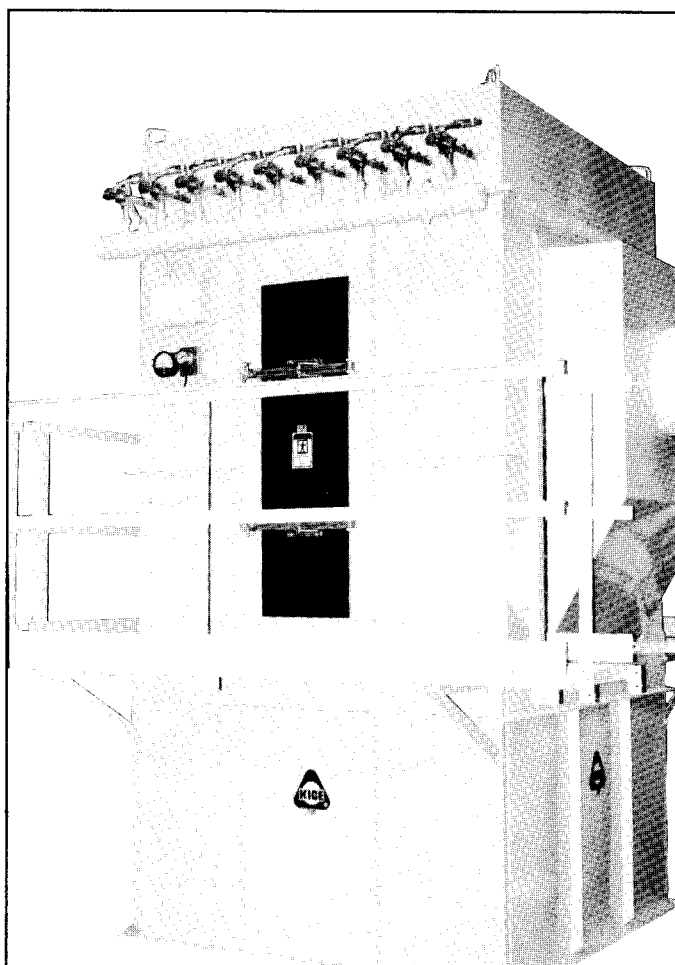


# Filter Manual

## MODEL

### VENTURI-JET

Assembly • Safety Instructions • Controls • Operation • Service & Maintenance



# 1. INTRODUCTION

When you purchased your Kice Venturi-Jet Blast Filter you bought an air-cleaning device which has been proven its reliability based on hundreds of installations and years of proven reliability and operation.

We're proud of our products and the people at Kice Industries who build them. At Kice, we start in our own foundry and follow the construction standards and manufacturing techniques that have proven superior over the last 50 years.

The results of our development work and input from the users has resulted in the present design of the Kice Venturi-Jet Blast Filters.

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,

Thomas F. Kice,  
President  
Kice Industries, Inc.

## WARRANTY

The Company warrants the equipment manufactured by the Company to be free of defects in material and workmanship for a period of one (1) year from the date of shipment. Kice agrees to repair or replace, at its option, any parts found defective in the opinion of the company. Kice 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, erosion abuse or misuse of the product. Assistance by Kice in system layout or selecting equipment does not imply Kice's responsibility.

Buyer agrees to look to the warranty, if any, of the manufacturer or supplier of equipment manufactured by others and supplied by Kice for any alleged defects in such equipment and for any damages of injuries caused thereby or as a result thereof. Where work is made to measurements or specifications furnished by the Buyer, Kice does not assume any responsibility for the accuracy of Buyer's specifications. Kice will not assume responsibility for alteration or repairs unless the same are made with the written consent and approval of Kice.

## ***PURCHASER SHALL BE RESPONSIBLE FOR COMPLIANCE WITH ELECTRICAL MANUFACTURER RECOMMENDATIONS, UNDERWRITER'S CODE AND ALL SAFETY PRECAUTIONS.***

Kice extends no other warranty for any of its products other than the above express warranty and there are no other warranties, express or implied, including warranties of merchant ability, fitness for a particular purpose or otherwise which extend beyond the above limited expressed warranty. Kice and its dealers shall not in any event be liable for consequential or incidental damages and the terms and conditions stated herein provides Buyer'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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## IMPORTANT:

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

For additional information, application assistance or special service, you should contact the factory. We'll need to know the **MODEL** and **SERIAL NUMBER** of your Kice 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..... / /

## **2. GENERAL INFORMATION:**

The purpose of this manual is to assist owners and operators in maintaining and operating the Kice Industrial Venturi-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 makes up a system such as discharge airlock valves, cyclones and fans. They contain additional information that may not be repeated in this manual. You are urged to read all manuals before attempting any operation or repair of the equipment in the system. If these manuals are not included in your owner's packet, contact our customer service department.

### **USING THIS MANUAL**

General operation, adjustment and maintenance guidelines are outlined for owners and operators of Kice Industrial Venturi-Jet Filters. Operating conditions vary considerably and cannot be addressed individually. Through experience, however, operators should find no difficulty in developing good operating safety and monitoring skills.

The term "**disconnect and lock-out**" as used in this manual means that power to the equipment has been disconnected through the use of a "**Pad Lockable Manual Power Cut-Off, or Power Lockout Switch**".

Directions used in this manual, for example **RIGHT** or **LEFT, CLOCKWISE** or **COUNTERCLOCKWISE**, refer to directions when facing the door of the filter, under the reverse jet cleaning mechanism. The metal identification plate, containing the model, serial number and date is attached to the housing next to the filter door.

Photographs and illustrations were current at the time of printing, but subsequent production changes may cause your Kice-Jet Blast Filter to vary slightly in detail. Kice Industries, Inc. reserves the right to redesign and change the equipment as deemed necessary, without notification. If a change has been made to your Kice Venturi-Jet Blast Valve Filter which is not reflected in this owner's manual, or the illustrated parts list, 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, located on the housing next to the access door.

### **KICE VENTURI-JET FILTER PARTS AND SERVICE**

Use original Kice Venturi-Jet Filter replacement parts only. These parts are available from Kice Industries, Inc. To obtain

prompt, efficient service, always provide the following information when ordering parts:

1. Correct part description and number, as given in the Illustrated Parts List section of this manual.
2. Correct model number.
3. Correct serial number.

For assistance in service or ordering parts, contact the customer service department:

**Kice Industries, Inc.,**  
**5500 North Mill Heights Drive**  
**Wichita, KS 67219-2658**  
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 type of Venturi-Jet Filter is designed to be used in a specific type of system. Using the Kice Venturi-Jet Filter for a purpose other than what it was designed, could result in personal injury, as well as product or property damage.

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

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

- ◆ Proper Installation
- ◆ Regular Maintenance
- ◆ Correct Operation within Original Design Parameters
- ◆ Proper application within a Process

Failure to 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.

Kice Industries product line includes a variety of equipment, all of which can be custom made to suit your application. Your Kice equipment was chosen 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 is installed, maintained and operated under the conditions originally designed and specified. Should your process needs change, please consult with Kice Industries prior to utilizing our equipment under different conditions.

### **3. SAFETY PRECAUTIONS:**

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, (Fig #1), be alert. Your personal safety or the safety of other persons is involved. Follow the instructions in the safety message.



Fig. 1

#### **HAZARD LEVELS**

The following definitions for identifying hazard levels are:

**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 which **WILL** or **CAN** cause **MINOR** personal injury or property damage if the warning is ignored.

**NOTICE (BLUE)** - Blue is used to indicate installation, operation, or maintenance information that is important but not hazard-related. Hazard warnings should never be included under the Notice signal word.



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

#### **SAFETY DECALS**

The Safety decals on the equipment should not be removed, covered over, painted, or otherwise become illegible. If this occurs, the decals should be replaced immediately. Contact our customer service department for replacements.

1. Do not attempt to install, connect power to, operate or service your new filter without proper instruction and until you have been thoroughly trained in its use by your employer.
2. Do not attempt to work on, clean, service the filter, open, or remove any protective cover, guard, grate or maintenance panel until the **POWER** has been turned off and **LOCKED OUT**.

3. Do not manually override or electrically by-pass any protective device.
4. Do not connect power to or operate the filter unless all moving parts are covered and all covers, guards, grates, and maintenance panels are in place and securely fastened.
5. Do not abuse, overload, mistreat or misuse the filter or attempt to operate the equipment if it is in need of service, lubrication, maintenance or repair.
6. Never place any part of your body in or near rotating members or moving parts of the filter.
7. The filter may have factory supplied drive guards for rotating components. Moving parts must be completely enclosed before connecting power and before operation.
8. The filter is equipped with maintenance panel, and access doors in the housing. The entrance into the housing is a confined space, and proper measure for entry and exit must be observed.
9. Many filter systems are installed and programmed to start automatically or operate from a remote control location. Keep clear of all moving parts on industrial equipment at all times.
10. Industrial filters must be equipped with a properly functioning Protective Interlocking Electrical Control Switch (PCS), a Pad Lockable Manual Power Lockout Switch and with the other basic safety equipment listed above. On/Off, Interlock and Padlock functions of the PCS must be tested and logged daily by supervisory personnel.
11. It is the owner and employer's responsibility to adequately train the employee-operator in the proper and safe use of the equipment. Written safety programs and formal instructions are essential. All new employees must be made aware of company policies and operating rules, especially the established safety and health procedures. Refresher training of experienced employees in the potential hazards of the job is important. Up to date training records must be maintained at the job site.
12. Special attention must be devoted to outside contractors engaged to enter and perform work on equipment or in the work place. Special care must be exercised to insure all such personnel are fully informed of the potential hazards and follow plant rules - with special emphasis on explosion proof electrical tools, and cutting or welding in unsafe environments.

13. Keep the work place clean and free of dirt and dust at all times. Do not attempt to work on slippery or unsafe ladders or work platforms when maintenance inspecting or repair work is being performed on the filter.
14. Do not climb on ladders or work on platforms unless maximum load rating is posted. Do not exceed maximum load ratings when installing or servicing the valves.
15. Never allow any kind of metal or other foreign objects to enter a filter while in operation.
16. All filter inlet and discharge fittings must be completely connected to the piping system to prevent human access when the machine is running and remain enclosed until **POWER IS TURNED OFF AND LOCKED OUT**. Keep away from the moving parts of the filter and auxiliary equipment during operation.
17. Operate safely at all times. Use personnel protective equipment when and where appropriate, such as hard hats, helmets, gloves, ear plugs, fall arrest, and eye protection devices. Keep personal protective equipment in good repair and convenient to the operator.
18. Drive components must be inspected and adjusted after transportation, and periodically as required by operating conditions. Check the chain drives of the airlock valves, and the V-Belt drives of the fans and Air Power Unit, appropriate to job conditions.
19. High voltage and rotating parts can cause serious or fatal injury. Only qualified, trained, and experienced personnel must perform installation, operation and maintenance of electrical machinery. Make sure that the motor and the frame of each piece of equipment is effectively grounded in accordance with OSHA safety and health standards, the National Electric Code and local codes.
20. Never stand under any kind of hoist or lifting mechanism, whether or not it is loaded or in operation. Never stand under or near equipment or a component when it is being lifted.
21. Qualified personnel before each use must carefully inspect all lifting devices. Never use lifting device to transport equipment. Never use lifting device that is damaged, deteriorated or in any way in need of repair.
22. All protective covers, guards, grates, maintenance panels, switches and warning decals must be kept in place and in good repair. Any equipment with damaged, malfunctioning, defective, or missing protective devices must be taken out of service until protective device can be repaired or replaced.
23. Any device powered by air or hydraulic pressure must be equipped with a properly functioning Pad lockable Manual Pressure Lockout and Internal Pressure Relief Valve (PRV).
24. Any filter which is used in the processing of hazardous materials or in hazardous environments requires an evaluation and determination, by the user and operator, of the proper and adequate monitoring equipment, dust control, explosion relief venting, and electrical equipment enclosures. Do not use your equipment in hazardous environments unless it has been properly equipped for the hazard.
25. It is ultimately the operator's responsibility to implement the above listed precautions and insure proper use of the equipment, and proper maintenance and lubrication. Keep these instructions and list of warnings with your machine at all times.
26. It cannot be assumed that every acceptable safety procedure is contained herein or that abnormal or unusual circumstances may not warrant or require future or additional procedures.

**WORK SAFELY AT ALL TIMES!**

# **4. GENERAL RECEIVING, HANDLING & INSTALLATION**

## **RECEIVING AND INSPECTION**

Kice Industries Inc., has prepared your new filter for shipment in accordance with the Uniform Freight Classification. It is thoroughly inspected at the factory and, barring damage in transit, should be in perfect condition upon arrival.

The filter and accessories should be inspected on receipt for any shipping damage. If dampers or shutters are provided, check these accessories for free operation of all moving parts.

When a carrier signs the Kice Industries Inc., bill of lading, the *carrier accepts the responsibility* for any subsequent shortages or damage evident or concealed, and *the purchaser must make any claim against the carrier*. Evident shortage or damage should be noted on the carrier's delivery document before signature of acceptance. Inspection by the carrier of damage evident or concealed must be requested. After inspection, issue a purchase order for necessary parts or arrange for return of the equipment to Kice Industries Inc., factory for repair.

## **HANDLING AND STORAGE**

Kice 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 reassembly.

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 the components to prevent the accumulation of dirt and moisture in the housing. Cover motors with waterproof material. Refer to the motor maintenance information for further storage instructions.

**Caution:** Use proper equipment when lifting or moving the filter. Make sure all persons and obstructions are clear from path and installation area.

## **INSTALLATION**

1. Move the filter to the installation area using proper equipment, tool truck or fork lift.
2. Check all mounting surfaces of bin or hopper flange and filter housing flange. They should be free of any foreign materials.

3. Place two beads of caulking on the flange, on each side of the bolt holes and around each hole, of the bin or hopper, and mount the filter housing.

**NOTE:** Kice Industries, Inc. will **always** supply internal safety grating in the housing if it is mounted on an existing storage bin, to prevent personnel, bags, and cages from dropping to the bottom of the storage bin.

4. If an airlock valve is required, it should be mounted to the hopper discharge flange.
5. Tighten all mounting fasteners securely. To insure proper operation, the Filter must be adequately supported and properly installed. All ductwork or stacks should be independently supported as excess weight may distort the filter housing and cause contact between moving parts. When installing outside, care must be taken to guy wire the unit to take the wind loading, consult Kice Industries Inc., for proper location and adjustment.
6. Connect the high-pressure air supply to the assembled filter, using the pressure regulator, filter, and valves furnished by Kice with the unit.



**WARNING: High voltage and rotating parts can cause serious or fatal injury. Only qualified personnel must perform installation, operation and maintenance of electrical machinery. Make sure that any motor and the frame of each filter is effectively grounded in accordance with OSHA standards, the National Electric Code and local Codes.**

7. The filter controller can be mounted in any convenient location. Orientation of the controller does not effect its performance.

An electrical conduit and junction tee (one at each Venturi-Jet Blast solenoid valve) is furnished with each filter.

The electrical manifold is prewired from the solenoids to a junction box. A local electrician must run a conduit from the control box to the junction box on the filter.

Wiring from the controller to the solenoids 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 other color, other than white or green, can be used for the hot lines. Numbering each end may be helpful. The sequence programmer is not dependent on the successful firing of the Venturi-Jet Blast valve to advance to the next valve in sequence. If, for any reason, a Venturi-Jet Blast does not fire, the programmer will continue to time out the "off" time and activate the next valve in sequence.

8. Some systems will have a fan and airlock valve to be connected. The fan must rotate in the direction of rotation marked on the housing.
9. Test run the filter. If any unusual noises occur, disconnect and lockout the power. Check the fan, airlock valve or the screw conveyor if these items are furnished.
10. Reassemble any doors or covers removed during installation.

### SLAB-MOUNTED UNITS

A correctly designed and level concrete foundation provides the best means of installing a filter outside. 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 housing for wind load support.

### INSTALLING BAGS AND CAGES

1. Slip the filter bag over the wire cage retainer. The bottom of the bag should be in contact with the bottom of the retainer. Filter media seam should be located 180 degrees from the gap in the retainer sleeve.
2. Tuck the overextended portion of the filter media inside the retainer sleeve. (Figure 2).

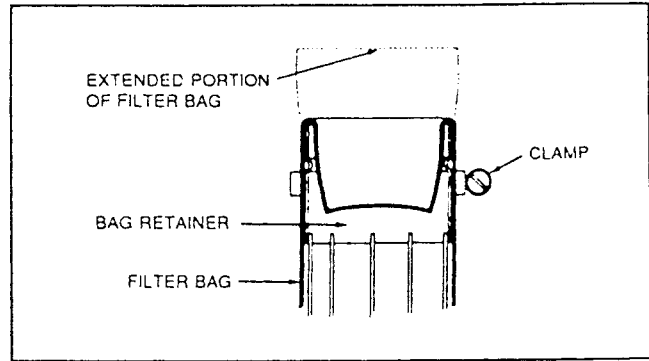


Figure 2

3. 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.
4. Slip the retainer-bag-clamp assembly over a collar in the tube sheet. (Figure 3).
5. The clamp is then tightened with a screwdriver, or a nut runner with a  $\frac{5}{16}$ " socket. A ratchet with an extension 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.
6. Shake the bag and cage assembly by hand, and again tighten the clamp.

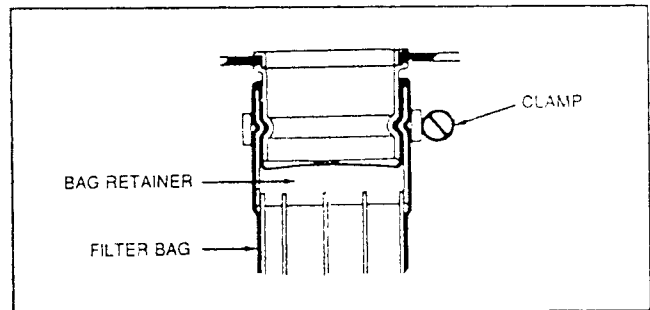


Figure 3

### IMPORTANT

- (A) Matching grooves in the retainer sleeve and collar in the tube sheet have to mate to prevent assembly from slipping off.
- (B) Check the filter bag for proper length. The filter bag should be only 2" longer than the bag retainer cage.

## 5. FILTER OPERATION & STARTUP 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. It is necessary to operate the cleaning jets at approximately 100 psig of pressure in order to induce the supplementary air volume (through the Venturi) needed to provide adequate bag cleaning. This type cleaning of the filter bags is proving to be very reliable with the advent of clean compressed air from the new generation of rotary compressors.

The oil and water free, compressed air is piped to the air tank, mounted on the side of the filter next to the clean air chamber. The Kice Venturi valves are between the air tank and the manifold lines above the Venturi mounted in the clean air chamber. Each bag has a Venturi mounted above the open end, in the tube sheet. The air tank fills and holds pressure at 100 psig an electric signal is sent to activate a solenoid, on a Venturi-Jet Blast valve. The valve opens and quickly discharges the tank of positive pressure air through the manifold above the venturi in each bag. This sudden flow 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 Venturi-Jet Blast valve and manifold, in sequence, and activates a solenoid, which release air to clean the next row of filter bags.

A. The complete Venturi-Jet Blast filter control circuit is shown on schematic (drawing # 1-3829). The Venturi-Jet Blast valves (Figure # 4), are mounted between the air tank and the cleaning manifolds. The Venturi-Jet Blast valves are two-way, normally closed, diaphragm type valves, with differential pressure causing the diaphragm to be sealed when air pressure is above the diaphragm. When the air above the diaphragm is exhausted to atmosphere, this causes the diaphragm to lift to the open position. The air in the tank is then discharged into the cleaning manifold in a fraction of a second. With air pressures equalized above and below the diaphragm, the Venturi-Jet Blast valve will return to the closed position with the aid of spring pressure.

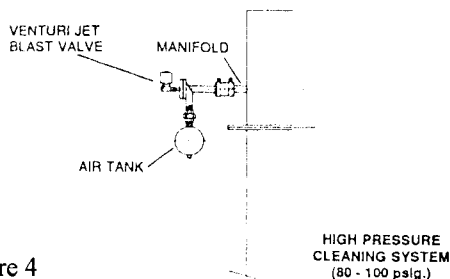


Figure 4

B. The chamber above the diaphragm of the Venturi-Jet Blast valve is connected to a two-way normally closed, solenoid operated valve. The Venturi-Jet Blast valve is internally piloted, which equalizes the pressure on the diaphragm thus keeping it in the closed position. The solenoid mounted on the two-way normally, closed valve is wired to the terminal block of the electric controller. An electric signal (120 Vac) actuates the solenoid, causing the actuator valve to open and exhaust the air/pressure above the Venturi-Jet Blast diaphragm. The diaphragm moves to the open position allowing the air in the pressure tank (100 psig) to discharge into the manifold above one row of bags.

As this high-pressure jet of air is fired through an orifice in the manifold into the Venturi above the filter bag, the jet of high-pressure air induces additional air from the clean air chamber to flow into the bag. This creates a shock effect that dislodges dust and other foreign material that is caked on the outside of the filter bag. (Reference fig 5).

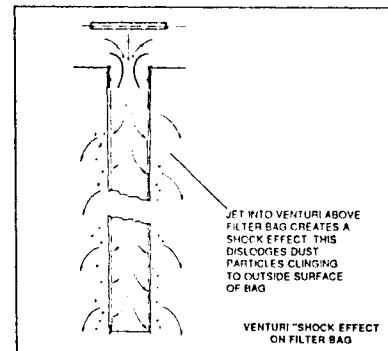


Figure 5

C. The sequence programmers used are electronic, 100% solid state mounted in a dust tight, moisture proof or explosion proof enclosure.

### Description of Operating Logic:

Input power is applied to control at all times. For "On Demand" cleaning, closure of isolated control contacts (pressure switch) initiates the "Off" time. At the end of the Off time the control energizes solenoid no. 1 to provide a cleaning pulse; it then transfers to the next compartment initiating the off time again. This cycle continues until the control contacts open. The control remembers the last output activated and will activate the next one in line when the control contacts close. For "continuous" cleaning the pressure switch terminals should be shorted together. A program wire allows for field selection of number of outputs.

The part numbers of the programmers used are:

8. kiceventurjetfilter.doc(10-20-00)

**Starting 8-26-93 - to Present**

Model #	Number of Positions	Filter Model
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

The Model DNC T2010, T2020 & T2032 programmer operates on 115v, 50/60hz, 1 Ph power, with an output rating of 3 amps at 115 Vac. Each controller has a pair of contacts for customer's pressure switch input, for on demand cleaning. For "On Demand" cleaning, closure of isolated control contacts (pressure switch) initiates the "Off" time. At the end of the off time the control energizes solenoid no. 1 to provide a cleaning pulse; it then transfers to the next compartment initiating the off time again. This cycle continues until the control contacts close.

These contacts are shipped, shorted out, for "continuous" cleaning. Each controller has two potentiometers to adjust the "on" time and the "off" time. The "on" time range is 50 milliseconds to 500 milliseconds. The "off" time range is 1.5 to 30, or 8.5 to 180 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 to terminals L1 & L2 at all times the timer 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. This sequence repeats as long as power is applied.

This control may be stopped at any point in its sequence, either on or off, by a simple switch closure, such as a simple light switch. Upon closing of the switch, the controller will restart at position number 1 after the normal adjusted time period.

A program wire allows for field selection of the number of outputs required. The program wire is inserted in a small numbered socket to reduce the number of output positions. Remove this jumper by pulling lightly until it retracts from the socket position, insert into the corresponding socket to the number of outputs desired (each hole closer to the fixed end reduces the output quantity by one).

**1980 - to - 8-26-93**

Model #	Number of Positions	Filter Model
7937-8037	4 to 10	R, S C Series
7940-8037	4 to 20	All "M" Series
7943-8037	8 to 32	M 168 & 336

The Model 7937, 7940 & 7943 programmer operates on 115v, 50/60hz, 1ph power, with an output rating of 1-3 amps at 115 Vac. Each controller has two potentiometers to adjust the "on" time and the "off" time. The "on" time range is 30 milliseconds to 1.2 seconds. The "off" time range is 1 to 60, or 1.5 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 to terminals H & N at all times, the timer 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. This sequence repeats as long as power is applied.

This control may be stopped at any point in its sequence, either on or off, by a simple switch closure, such as a differential pressure switch. Upon closing of the switch, the controller will restart at position number 1 after the normal adjusted time period.

To select the proper program, a gold jumper on the component side of the control is provided for selecting the number of outputs. It is inserted in a small socket. To reduce the number of output positions, remove this jumper by pulling lightly until it retracts from the socket position, insert into the corresponding socket to the number of outputs desired (each hole closer to the fixed end reduces the output quantity by one).

**Start-Up Procedure**

1. Check plant air pressure in the filter tank, gear motors driving airlocks and screw conveyors (if furnished) for proper oil level. For proper oil specifications, refer to manufacturer's recommendations.
2. Check screw conveyors, and airlocks for proper directions of rotation.

3. Controls should be wired in accordance with schematic diagram. Square and round models are normally prewired, fully assembled and tested at the factory. Check all wiring connections to assure proper sequence. The air tank pressure gauge should work in the 0-150 psig range.
4. Set the adjustable "off" time adjustment at the minimum time by rotating the adjusting screw CCW with a small screwdriver. Allow the sequence programmer to operate for 5 to 10 minutes to assure mechanism has not been damaged in shipment and to allow a short run-in time for the electronics.
5. Set the adjustable "off" time adjustment at a longer time span by rotating the adjusting screw CCW until you cannot turn the screw any further. With the "off" time adjustment in this setting, set the relief valve at 120 psig. This provides pressure relief safety for the air tank.
6. Bring the adjustable "off" time adjustment to the desired time by turning the screw CCW until the Sequence Programmer fires a Venturi-Jet Blast valve.
7. If a Venturi-Jet Blast does not fire on start up, first check the output LED to confirm the power is being sent to the solenoid on the Venturi-Jet Blast solenoid.
8. After the filter is placed into operation, a good practice to follow on shutdown is as follows:
  - A. Shut off the suction fan only.
  - B. Allow the reverse air cleaning, airlock and screw conveyor to operate for at least 15 minutes. (a longer period of time is desired if the operation will allow.)
  - C. Then shut down the remainder of the system.

## **6. FILTER MAINTENANCE & SERVICE**

### **Daily**

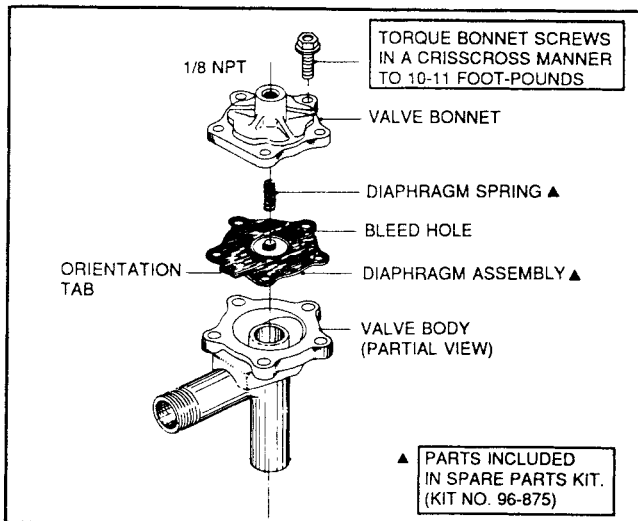
1. Check and note pressure differential across the filter.
2. Check the electronic controls to insure sure all valves are operating.

### **Monthly**

1. Check the oil/grease in the speed reducers driving airlock valves and screw conveyors.
2. Check the fan bearings.

### **VALVE INSTALLATION AND MAINTENANCE INSTRUCTIONS**

#### **I. Kice VenturiJet Blast Valve, (Figure 6)**



**DESCRIPTION** (Figure 6)

The Kice VenturiJet valve is a 2-way, NC diaphragm type (PN 8353C4M) air valve designed for remote pilot operation. This

Valve is an angle type aluminum body with a 1/8 N.P.T. connection in the bonnet

### **OPERATION**

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

### **POSITIONING**

The Kice VenturiJet valve may be mounted in any position.

### **PIPING/TUBING**

Connect piping to the valve according to markings on the valve body. Apply pipe compound sparingly to male pipe threads only; if applied to valve threads, it may enter the valve and cause operational difficulty. Proper support and alignment of the piping should avoid pipe strain. When tightening the pipe, do not use the valve as a lever. Wrenches applied to valve body or piping are to be located as close as possible to connection point. The solenoid operated, pilot

valve is mounted to the main valve bonnet with a 1/8" close nipple.

**Caution:** To avoid damage to the valve body, DO NOT OVER TIGHTEN PIPE CONNECTIONS. If Teflon tape, paste, spray or similar lubricant is used, use extra care due to reduced friction.

## MAINTENANCE



**Warning:** Depressurize the valve and bleed air from the air tank before making repairs.

It is necessary only to activate the solenoid on the pilot valve, or remove one pilot valve from one blast valve.

**Cleaning:** A 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.

**Preventive 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.

### Improper operation:

1. Incorrect Pressure: Check valve pressure. Pressure to valve must be within 5-125 psig.
2. Excessive leakage: Disassemble valves and clean all parts. Replace parts that are worn or damaged with a complete Spare Parts Kit P.N. 238-864 (FV-96-875).

## II. Kice Solenoid operated Pilot Valve 2-way NC.

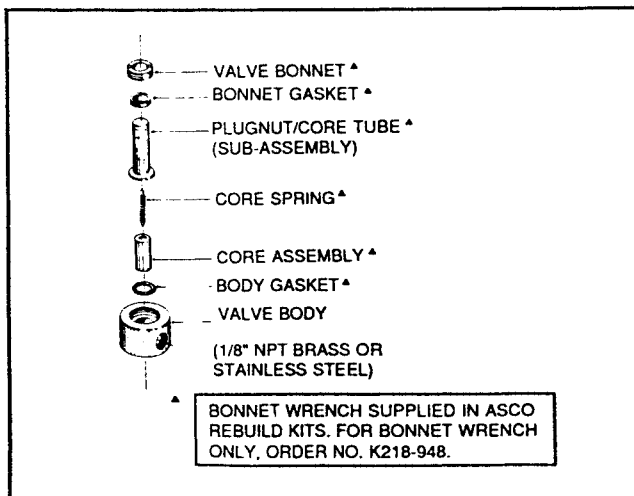


Figure 7

3. Failure to Open or Close:
  - a. If the valve stays open, bleed hole in the diaphragm may be clogged. If the diaphragm valve stays closed, the diaphragm may be torn. Disassemble the valve and clean or replace the diaphragm assembly.
  - b. Failure of the remote pilot solenoid valve can also cause the diaphragm valve to stay closed or open. Inspect remote pilot solenoid valve for proper opening and closing.

## VALVE DISASSEMBLY AND REASSEMBLY

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. 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 exploded view provided for identification and placement of parts. (reference Figure 6).
4. Replace diaphragm assembly, (for ease of assembly, the tab may be located in any position) diaphragm spring, valve bonnet and bonnet screws. Torque bonnet screws in a crisscross manner to 10-11 foot-pounds.
5. Replace pilot valve.
6. After maintenance, operate the valve a few times to be sure of proper opening and closing.

### Description:

The Kice solenoid pilot valve is a 2-way. NC direct acting type (PN 8262G2, & EF 8262G2) air valve designed as a pilot for a larger diaphragm valve for remote pilot operation. This valve is a rugged brass body provided with a general purpose (green) or explosion proof (black) solenoid enclosure.

### Operation:

**Normally Closed:** Valve is closed when the solenoid is de-energized; open when energized. Valve will operate with no minimum pressure.

**IMPORTANT:** No Minimum operating pressure required

### Installation:

Check nameplate for correct catalog number, pressure, voltage, frequency, and service. Check with the factory before using a different type, or make of valve on a Kice Venturi-Jet Blast Filter.

## Positioning:

This valve is designed to perform properly when mounted in any position.

## Piping/Tubing:

Connect piping to the valve according to markings on the valve body. Inlet port will be marked "I" or "IN".

Apply pipe compound sparingly to male pipe threads only; if applied to valve threads, it may enter the valve and cause operational difficulty. Proper support and alignment of the piping should avoid pipe strain. When tightening the pipe, do not use the valve as a lever.


Wrenches applied to valve body or piping are to be located as close as possible to connection point. The solenoid operated pilot valve is mounted to the main valve bonnet with a 1/8" close nipple.

**Caution:** To avoid damage to the valve body:

**DO NOT OVER TIGHTEN PIPE CONNECTIONS.**

If Teflon tape, paste, spray or similar lubricant is used, use extra care due to reduced friction.


## Maintenance:

 **Warning:** To prevent the possibility of personal injury or property damage, turn off electrical power, depressurize the valve and bleed air from the air tank before making repairs. It is necessary only to activate the solenoid on the pilot valve, or remove one pilot valve (8262G2) from one blast valve(8353C4M).

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

**Preventive 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.

## Valve Disassembly

 **Warning:** To prevent the possibility of personal injury or property damage, turn off electrical power, depressurize the valve and bleed air from the air tank before making repairs.

1. Disassemble the valve using exploded views for identification of parts. (Ref. fig # 6).
2. Remove solenoid: Remove red cap and push solenoid down. Then pry the nameplate/retainer and push to remove.
3. Unscrew solenoid base sub-assembly with special wrench adapter supplied in ASCO Rebuild Kit. For wrench adapter only, order No. **K218-948**. Remove core assembly, core spring, and solenoid base gasket from the valve body.
4. All parts are now accessible to clean or replace. If parts are worn or damaged, install a complete ASCO Rebuild Kit (P.N. K302014).

## Valve Reassembly

1. Use exploded views for identification, orientation and placement of parts. Reference figure 7.
2. Lubricate all gaskets with DOW CORNING @ 111 Compound lubricant or equivalent high-grade silicone grease.
3. Torque valve bonnet to 90 +/-10 in-lbs. Torque solenoid base sub-assembly to 175+/- 25 in-lbs.
4. Install solenoid, use exploded views for identification and placement of parts. After assembly make the electrical hookup to the solenoid.
5. Restore line pressure and electrical power supply to the filter.
6. After maintenance is completed, operate the valve a few times, or watch the filter operate through several cycles, to be sure of proper operation. A metallic "click" signifies the solenoid is operating.

# SOLENOID INSTALLATION AND MAINTENANCE INSTRUCTIONS (8262G2 & EF8262G2)

## III. SOLENOID REPLACEMENT

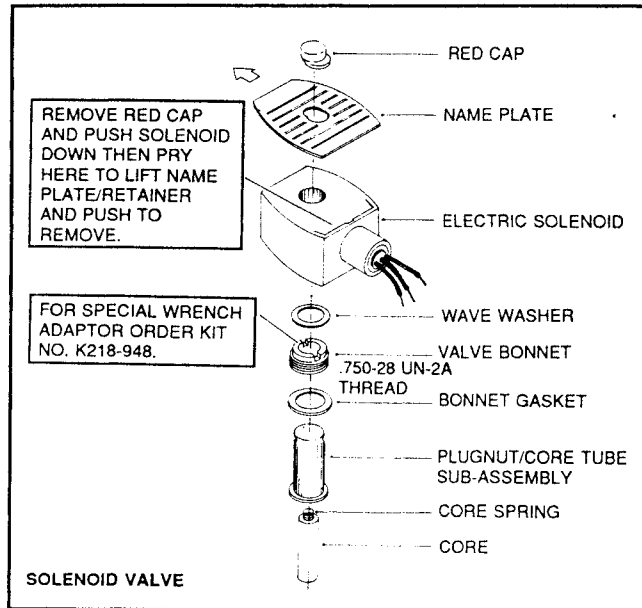


Figure 8

### Description

The Kice pilot valve is operated by a series 8016G epoxy encapsulated pull-type solenoid. The green solenoid with lead wires and 1/2" conduit connection is designed to meet Enclosure Type 4 and 4X - Watertight. The black solenoid or catalog numbers prefix "EF" is designed to meet Enclosure Type 7 (A,B,C,& D) Explosion proof Class I, Groups A,G,C,& D and Type 9 (E,F & G), - Dust - Ignition proof Class II, Group E,F & G.

### Operation

When the solenoid is energized, the core is drawn into the solenoid base sub-assembly. **IMPORTANT:** When the solenoid is de-energized, the initial return force for the core, whether developed by spring, pressure, or weight, must exert a minimum force to overcome residual magnetism created by the solenoid. Minimum return force for AC construction is 11 ounces, and 4 ounces for DC construction.

### Installation

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

For Green Enclosure Types 4 (238-210-032D)

For Black Enclosure Types 7 and 9 only

PN 238-214-032-D

**CAUTION:** To prevent fire or explosion, do not install solenoid and or valve where ignition temperature of hazardous atmosphere is less than 165 degrees C.

**NOTE:** These solenoids have an internal, non-re-settable 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 explosion proof/dust - ignition proof enclosures (Types 7 & 9).

### POSITIONING

This solenoid is designed to perform properly when mounted in any position.

### 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 degrees. For the watertight and explosion proof solenoid, electrical fittings must be approved for use in the approved hazardous locations.

### 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. The 3/4" bonnet construction (Figure 7) must be disassembled for installation and installed with a special wrench adapter.

### CAUSES OF IMPROPER OPERATION

1. **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 lead wires or splice connections.
2. **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.
3. **Low Voltage:** Check voltage across the solenoid leads. Voltage must be at least 85% of rated voltage.

**SOLENOID INSTALLATION AND MAINTENANCE  
INSTRUCTIONS (8262G2 & EF8262G2)**

**SOLENOID REPLACEMENT**

1. On solenoids with lead wires, disconnect conduit, coil leads, and grounding wire.
2. Snap off red cap from top of solenoid base sub-assembly.
3. Push down on solenoid. Then using a suitable screwdriver, insert blade in slot provided between solenoid and nameplate retainer. Pry up slightly and push to remove. Then remove solenoid from solenoid base sub-assembly.
4. Reassemble using exploded views for parts identification and placement. (Reference Figure #8).

**Disassembly and Reassembly of Solenoids**

1. Remove solenoid, (see *Solenoid Replacement*.)
2. Remove spring washer from solenoid base sub-assembly.
3. Unscrew solenoid base sub-assembly.
4. Solenoid has a plug nut/core tube sub-assembly, bonnet gasket and bonnet in place of the solenoid base sub-assembly. To remove bonnet use special wrench adapter supplied in ASCO Rebuild Kit. For wrench adapter only, order ASCO Wrench Kit No. K 218-948.
5. The core is now accessible for cleaning or replacement.
6. The solenoid is part of the valve, refer to basic valve installation and maintenance instructions for further disassembly.
7. Reassemble using exploded views for identification and placement of parts.

**7. TROUBLE SHOOTING - COMMON FILTER PROBLEMS:**

**CAUTION SENSITIVE CIRCUITRY:** Testing and trouble shooting this circuit board with a grounded test instrument or applying any external voltage to pressure switch terminals will cause serious damage to circuit boards components. Failure to comply will void any warranty.

Problem	Probable Cause/Suggested Remedies
<b>A. Filter discharging dust from the clean air chamber</b>	<ol style="list-style-type: none"> <li>1. Check for holes in the filter media.</li> <li>2. Check for loose bag clamps.</li> <li>3. Check filter bag installation (ref. Installation Section).</li> </ol>
<b>B. Pressure drop starts to increase.</b>	<ol style="list-style-type: none"> <li>1. Should one Venturi-Jet Blast valve not fire for an extended period of time, a row of filter bags could become masked with dust. (See E-Venturi-Jet Blast Valve Misfires).</li> <li>2. After a long period of time, the dust may build-up 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.)</li> <li>3. If the air input has been increased to the filter, the air-to-cloth ratio may exceed the recommended ratio.</li> </ol>
<b>C. Inlet Air volume insufficient</b>	<ol style="list-style-type: none"> <li>1. Check the fan direction of rotation.</li> <li>2. Check the fan speed. (Belts may be slipping or pulleys may be reversed.)</li> <li>3. Check for high-pressure differential (See B-Pressure drop starts to increase).</li> <li>4. Check for leaks in the ductwork.</li> <li>5. Check for clogged or partially clogged ducts.</li> <li>6. Check for closed or partially closed damper in the dust system.</li> </ol>

Problem	Probable Cause/Suggested Remedies
<b>D. Product does not discharge</b>	<ol style="list-style-type: none"> <li>1. Check the direction of rotation of the airlock and screw conveyor</li> <li>2. Check for clogged or partially clogged gravity spouts.</li> <li>3. Check for bridging in the hopper.</li> </ol>
<b>E. Pressure holds constant Venturi-Jet Blast valve fails to fire</b>	<ol style="list-style-type: none"> <li>1. Check power to the controller.</li> <li>2. Check LED output indicators.</li> <li>3. Check for power at the solenoid, or a faulty solenoid.</li> <li>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.</li> </ol>
<b>F. Air Pressure in the Air Manifold Tank will not build</b>	<ol style="list-style-type: none"> <li>1. Check the filter regulator assembly.</li> <li>2. Check the inlet solenoid valve.</li> <li>3. Check the manually operated maintenance inlet valve.</li> <li>4. Leaks <ol style="list-style-type: none"> <li>a. Check Venturi-Jet Blast valves on the tank for leaks.</li> <li>b. Check to see if any of the Venturi-Jet Blast valves are stuck open and bleeding tank air straight into the filter. This is usually caused by the electric operated 2 way pilot exhaust valve being stuck open.</li> <li>c. Check the air piping for leaks.</li> <li>d. Check couplings for leaks between the air tank and the Venturi-Jet Blast valves.</li> </ol> </li> <li>3. Check plant air supply.</li> </ol>
<b>G. Cleaning pressure varies</b>	<ol style="list-style-type: none"> <li>1. Check "off" time potentiometer</li> <li>2. Check "on" time potentiometer</li> <li>3. Check for skipping sequence/Venturi-Jet Blast valve not firing.</li> </ol>
<b>H. SEQUENCE CONTROLLER TROUBLESHOOTING</b>	<ol style="list-style-type: none"> <li>1. Check incoming power</li> <li>2. Observe RED power light <ol style="list-style-type: none"> <li>a. If no power light, check fuses</li> <li>b. Fuses OK, replace timer board</li> </ol> </li> <li>3. Before replacing blown fuse, disconnect power and check (see next function) <b>output</b> circuits (only) for short circuits and correct if necessary.</li> <li>4. Replace Fuse</li> <li>5. While watching output lights for proper function apply power</li> <li>6. Cycle starts at #1 and continues to last output selected then restarts.</li> <li>7. If fuse blows, observe at which output light the malfunction occurred and recheck that output circuit for shorted condition</li> <li>8. If an output stays energized with power off, replace the valve <ol style="list-style-type: none"> <li>a. If a valve stays energized, replace the timer board</li> <li>b. If a valve does not operate when it's output light is on, replace the wiring or the solenoid valve.</li> </ol> </li> </ol>

**SOME THINGS NOT TO DO!!!**



**Warning: Disconnect Power before touching any component part!**

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 controls. For service call on DNC model controllers, call National Controls Corp. 1-800-323-2593, in IL call 1-312-932-6900.

**REPLACEMENT PARTS:**

It is recommended that only Kice Manufactured and 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, Kice Serial Number, Filter model, Filter size, series (VM, VS, or VR), and number of filter bags.

Most of this information is on the metal nameplate attached to the filter housing next to the door.

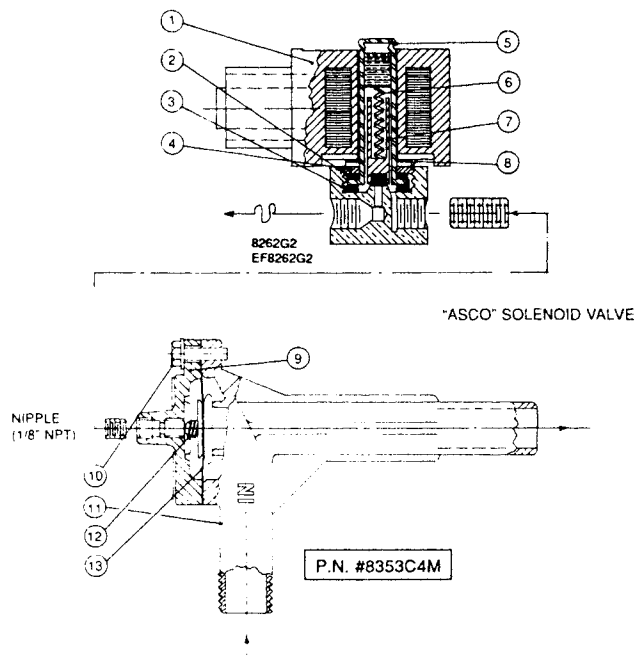
When ordering solenoids for ASCO solenoid operators or valves, order the number stamped on the solenoid. Also specify voltage and frequency.

When ordering replacement cards for the solid-state electronic controller, order by part # (see page 15), or by specifying the total number of outputs on the card you are replacing.

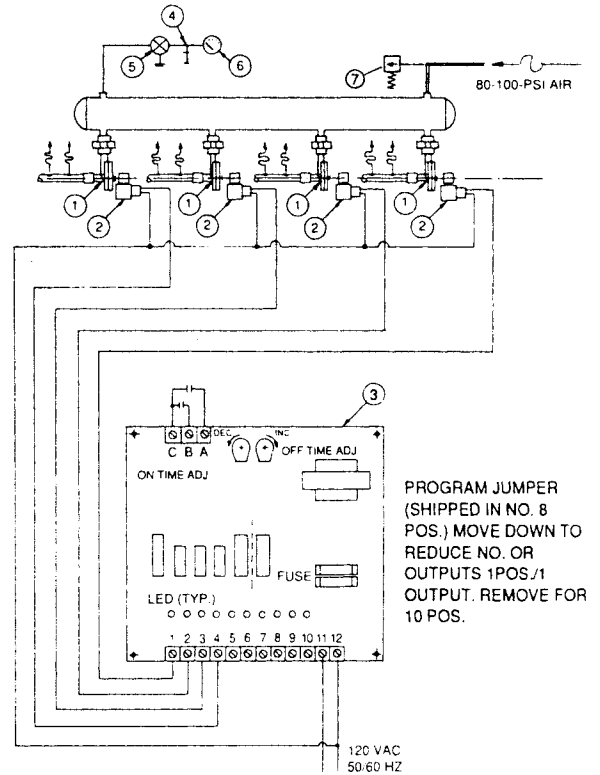
# 8. ILLUSTRATED PARTS LIST

## 3/4" Blast Valve & Solenoid

### 3/4" BLAST VALVE & SOLENOID



### ELECTRICAL CONTROL SCHEMATIC



ITEM	NAME	QTY
	3/4" Blast valve and Solenoid	
•1	Electric solenoid Nema 4, or 9	1
2	Wave Washer	1
3	Valve Bonnet	1
4	Bonnet Gasket	1
5	Plug nut/Core Tube	1
6	Core	1
7	Core Spring	1
8	Body Gasket	1
9	Bonnet	1
10	Screw Body	1
11	Body	1
♦12	Diaphragm & Seat	1
♦13	Diaphragm Spring	1

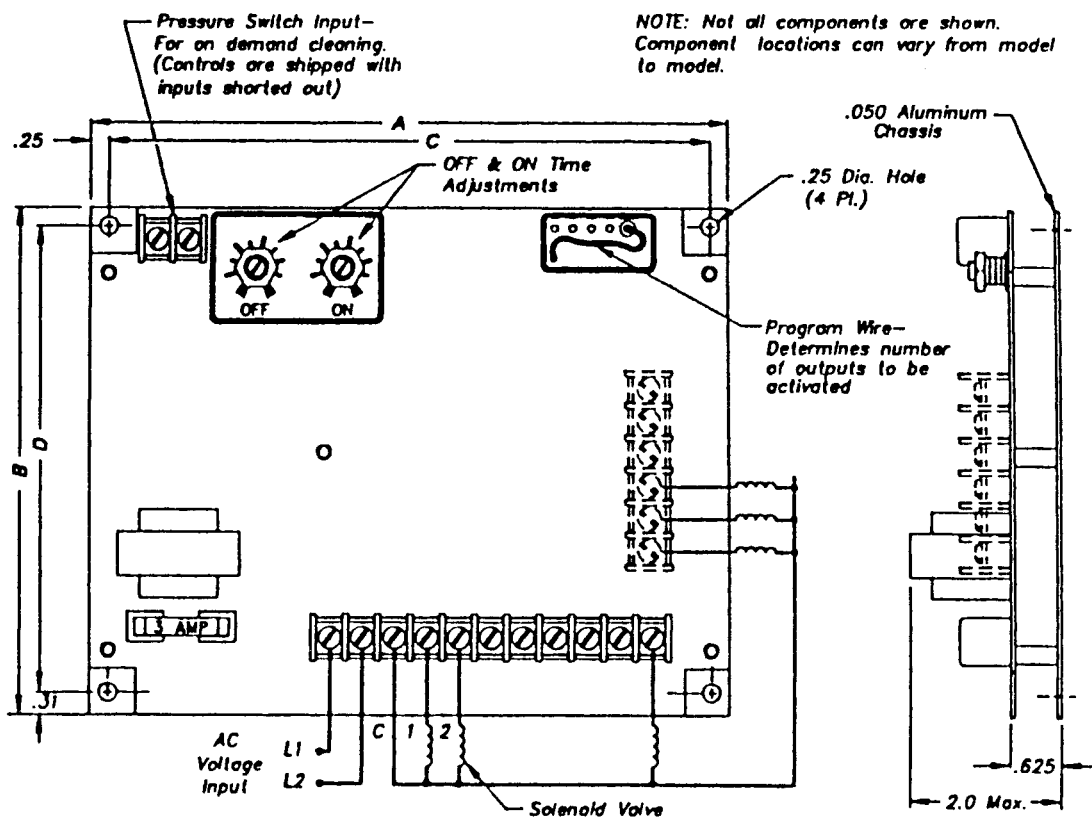
Sequence Programmer	# Positions
DNC T2010-A10	3 -10
DNC T2020-A10	11-20
DNC T2032-A10	17-32

ITEM	NAME	QTY
	Electrical Control Schematic	
1	3/4 " Blast Valve ASCO 8353C4M	1
2	Electric Solenoid 2 way NC	1
3	Sequence Programmer	1
4	Pressure Bleed Cont. Orifice	1
5	Palm Button Valve	1
6	Air Tank Pressure Gauge	1
7	Pressure Relief Valve	1

• Electric Solenoid Valve NEMA 2 - 4 (Green) ASCO #8262G2	• Electric Solenoid Valve NEMA 7&9 (Black) ASCO # EF8262G2	♦ Venturi Jet Blast Valve Repair Kit #96-8751
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# Electronic Controller Schematic

Starting 8-26-94 to Present



Model	Off Time Sec.	Max. No. of Outputs	Size of NEMA 4 Enclosure required	Programmable No. of Outputs
DNC-T2010-A10	1.5 - 30	10	10" x 8" x 4"	3 - 10
DNC-T2020-A10	1.5 - 30	20	12" x 10" x 5"	11 - 20
DNC-T2032-A10	1.5 - 30	32	14" x 12" x 6"	17 - 32

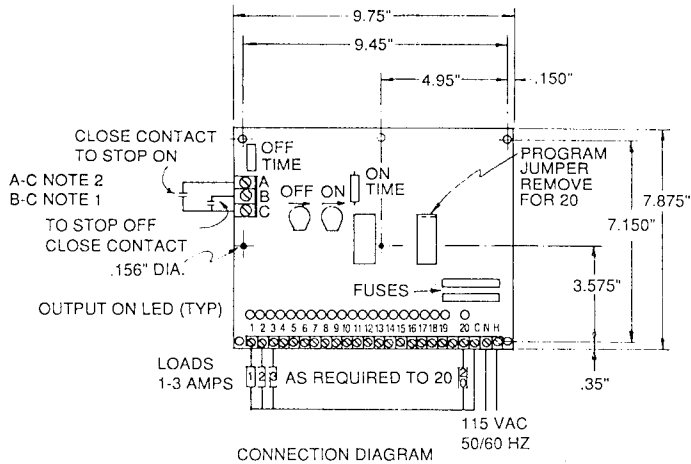
### Specifications:

Time Delay:		Input:	
On Time	Adjustable from 50 to 500 Milliseconds	Operating voltage	105 to 135 Volts AC, 50/60 Hz, 1ph
Off Time	Adjustable from 1.5 to 30 Seconds		Optional: 220volts AC, 50/60 Hz, 1ph
Output:		Protection	
Type	Solid State Switch rated at 200 VA max. per output. Position of program wire determines number of outputs	Transient voltage	30 Joule Varistor
		Short Circuit Protection	3 amp fuse
Environmental:			
Operating Temperature:		(-40° to 150° F) (-40° to 66° C)	

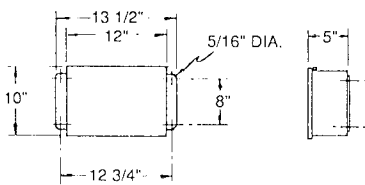
# CONTROLLER USED FROM 1980 TO AUG. 1993

**! CHECKING CIRCUIT BOARD FOR CONTINUITY MAY DAMAGE THE COMPONENTS.**

## SEQUENCE PROGRAMMER #7940-2-6

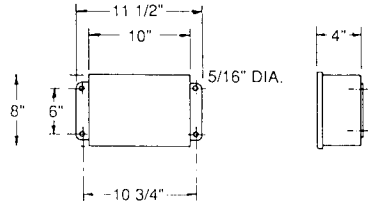
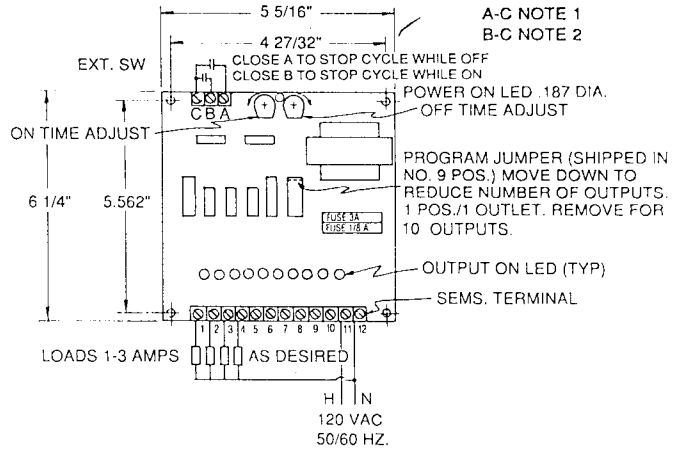


CONNECTION DIAGRAM



NEMA 4 & 12 MOUNTING

## SEQUENCE PROGRAMMER #7937-2-6

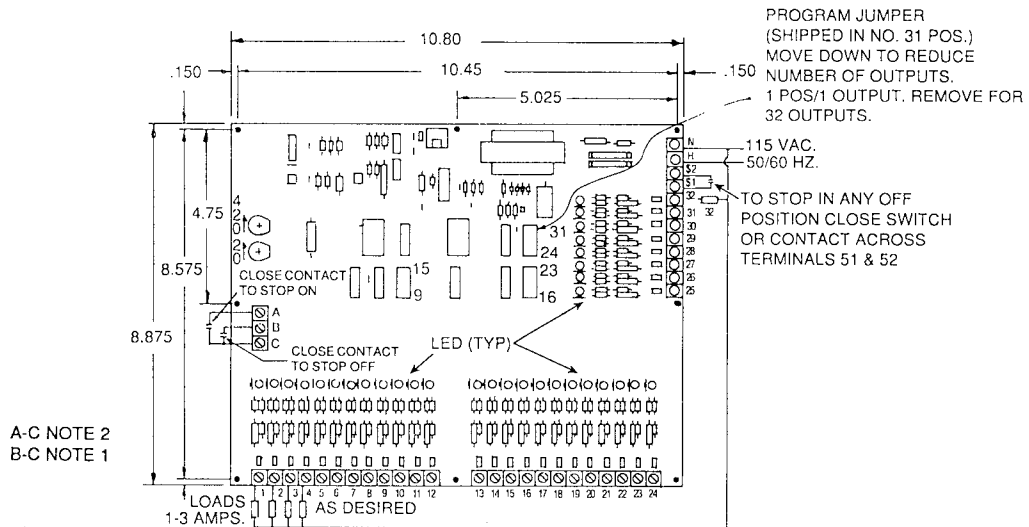


NEMA 4 & 12 MOUNTING

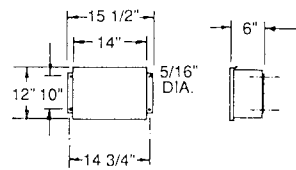
**NOTE:**

- 1) AT PRESSURE SWITCH CLOSURE, SEQUENCE WILL STOP IN THE OFF CONDITION AFTER ANY ON TIME, AND WILL RESUME AT THAT POINT.
- 2) AT PRESSURE SWITCH CLOSURE, SEQUENCE WILL STOP IN THE ON CONDITION AFTER ANY OFF TIME, AND WILL RESUME AT THAT POINT.

## SEQUENCE PROGRAMMER #7943-2-6



A-C NOTE 2  
B-C NOTE 1

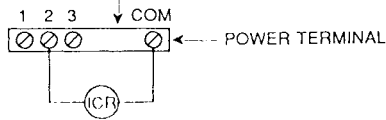
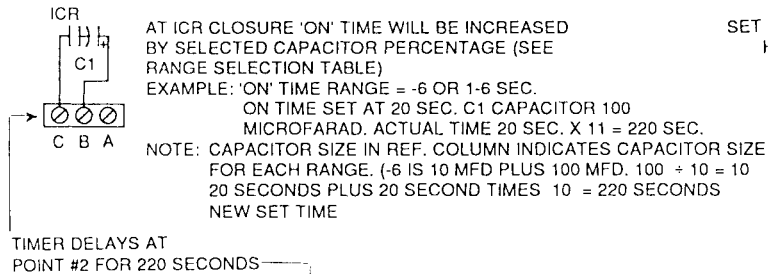


NEMA 4 & 12 MOUNTING

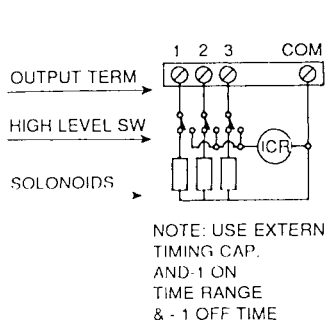
**SEQUENCE:**

- 1) NO. 1 ON THEN NO. 2 AND SO ON TO LAST SELECTED OUTPUT, THEN BACK TO NO. 1 AND CONTINUING EACH OUTPUT IDENTICAL.
  - 2) ON AND OFF TIME ARE INDEPENDENTLY ADJUSTABLE.
- ON TIME RANGE - 30 MILLISECONDS TO 1.2 SECONDS  
— OFF TIME RANGE - 1 - 60 SECONDS

# ELECTRICAL CONTROL APPLICATION DATA

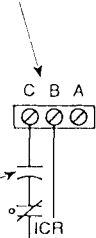


## DELAY FOR LONGER TIME AT ANY POINT

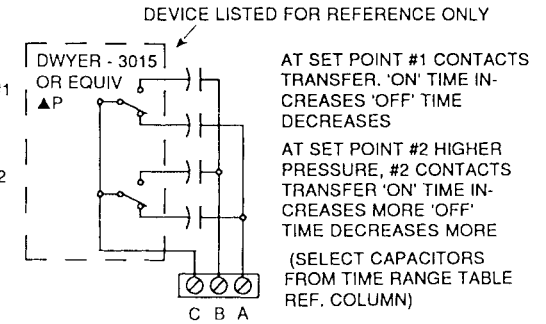


## KEEP FULL SEQUENCE

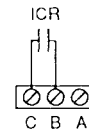
TIMING ACCESS TERMINAL



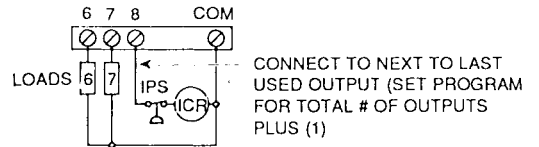
IF HIGH LEVEL SWITCH CALLS FOR MATERIAL AT ITS RESPECTIVE POINT, TIMER WILL TIME OUT FOR REQUIRED (ADJUSTMENT) FILL PERIOD.  
 IF ZONE FILLS OR IS FULL AS INDICATED BY LEVEL SWITCH, TIMER WILL RAPID ADVANCE TO NEXT POINT AND SCAN TO FIND A ZONE REQUIRING MATERIAL



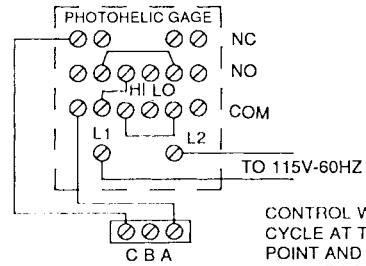
## AUTOMATIC TIMING ADJUSTMENT



AT REMOTE SWITCH OPENING THE CONTROL WILL COMPLETE ONE FULL CYCLE AND STOP IF REMOTE SWITCH CLOSES.



## INTERMITTENT FULL CYCLE



CONTROL WILL START TO CYCLE AT THE HIGH SET POINT AND STOP AT THE LOW SET POINT, CYCLE WILL RESUME AT THE NEXT OUTPUT, AFTER THE LAST OUTPUT ACTIVATED FROM THE PREVIOUS CYCLE.

## CYCLE ON DEMAND

DWG. #2 - 2374



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