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INSTALLATION, OPERATION AND MAINTENANCE INSTRUCTIONS

MODEL T2005 & T2006

SKOTCH® TRIFECTA® OIL VALVE SYSTEMS

WARNING

Valves and valve actuators supplied by Engineered Valves are designed and manufactured using good workmanship and materials, and they meet the applicable industry standards. These valves are available with components of various materials, and they should be used only in services recommended herein or by a company valve engineer. Misapplication of the product may result in injuries or property damage. A selection of valve components of the proper material consistent with the particular performance requirement, is important for proper application.

Examples of the misapplication or misuse of a valve or valve actuator includes use in an application that exceeds the pressure/temperature rating, or failure to maintain the equipment as recommended.

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DRAWINGS

I. DESCRIPTION

The Model T2005 and T2006 Oil Valves are an integral valve system with all components housed within a single valve body. It is typically used on all oil-fired burners and igniters where steam or air atomization is required. The Skotch Trifecta's unique two-stem three-seat design enables it to perform all key functions, including fuel sequencing and purging of downstream piping by providing three distinct valve positions.

1. Closed - Both oil and purge media off
2. Fire - Oil flowing while purge is off
3. Purge - Purge media flowing while oil flow is off

The Model T2005 valve system, which is the Fail-in-Last Position model, utilizes a pair of dual coil momentary contact pilot solenoids for pneumatic operation and requires compressed air and electric power to open and close. The system fails in the last position on loss of pneumatic or electric power. It will not hold this position indefinitely if air is lost.

The Model T2006 valve system, which is the Fail Closed model, utilizes a pair of single coil maintain contact spring return pilot solenoids for pneumatic operation and requires compressed air and electric power to open. The system closes on a loss of pneumatic or electric power.

A single Skotch oil valve is typically installed in place of a multiple valve arrangement.

Consult order specification for detailed specifications of equipment supplied on each project.

II. OPERATION

Refer to Purchase Order Specification or solenoid valve assembly nameplate to determine proper line voltage. Operation is in accordance with reference drawings.

Check specific order options and wiring diagrams (60-008 for AC voltage or 60-009 for DC voltage) for electrical terminals supplied inside the junction box.

A. Closed: Oil Flow Off and Purge Flow Off

In this position the main valve plug is held against the main seat by the actuator return spring, blocking flow of the purge media. The oil valve plug is held in the oil seat by the oil valve return spring, blocking oil flow. The oil valve proof of closure (POC) switch is made. The valve closed limit switch is actuated and the valve open limit switch is deactuated.

Model T2005: Energizing both the fire and purge exhaust solenoids coils moves the system to the closed position.

Model T2006: De-energizing both the fire and purge solenoids moves the system to the closed position.

B. Fire: Oil Flowing and Purge Off

Pressurizing the Actuator's Fire cylinder causes the main stem to move downward towards the oil stem. As the main stem contacts the oil stem, it forces the oil plug out of its seat ring initiating oil flow while simultaneously seating in the purge seat. Prior to any oil flowing the oil valve POC switch changes contact states. The valve open and close limit switches change states from the valve closed position (Valve open actuated & valve closed deactuated).

Model T2005: Energizing the fire solenoid coil moves the system to the Fire position.

Model T2006: Energizing the fire solenoid causes the valve to go to the Fire position.

Operational Note: While in the Fire position there is an operational advantage in leaving the Purge solenoid energized while in Fire. In this scenario both actuator cylinders will be pressurized. Doing so will prevent the valve from traveling back to the Closed position causing a momentary loss in Purge pressure. This will help in ensuring the burner flame stays lit as the oil valve closes and the slug of oil remaining in the down stream piping of the valve is evacuated by the purge media. Maintaining a constant pressure on this slug of oil will ensure it is burned completely. If the Purge cylinder was not energized with the Fire cylinder the main valve would close and then open back up for Purge. This will cause a momentary drop in purge pressure causing the flame to suck back or possibly extinguish before the remaining slug of oil is evacuated.

C. Purge: Purge Media Flowing and Oil Off

Energizing only the purge solenoid moves the main stem to the purge position. In this position the main plug is positioned between, but not in contact with the main and purge seats. Accordingly, the main stem is not in contact with the oil plug, therefore the oil valve remains in the closed position. The purge media flows from the oil outlet, purging or clearing any oil which, remains in the downstream oil piping. There is no oil flow in the purge position and the oil valve POC switch is made. Both the valve open and valve closed limit switches are deactuated.

D. Notes

Some installations may require tip warm up prior to light-off. This can be accomplished by commanding the valve to "Purge" for a period of time before commanding to "Fire". Purge steam then passes down the fuel line, warming up the tip in preparation for ignition. Due to the stacked tandem cylinder design of the actuator, when both "Fire" and "Purge" solenoids are energized, the "Fire" command will override and the assembly will shift to the full open or "Fire" position. The Fire Solenoid must be de-energized for the valve to move to the purge position.

Assemblies may include a speed control block (black in color) which is located between the Fire solenoid body (red anodize) and the manifold adapter (gold anodize). This is used to slow opening time of the assembly when moving to the "Fire" position. It has no impact on closing time. Factory setting prior to shipment is full open. Speed adjustments are made using a small flat blade screwdriver. The adjustment screw is located on the top end surface of the plate.

Model T2005: Solenoid operated pilot valves are momentary contact type. As such, upon loss of pneumatic supply pressure or electrical power, the system will hold last position for some period of time.

Model T2006: Solenoid operated pilot valves are maintained contact spring return type. As such, upon loss of pneumatic supply pressure or electrical power, the system will fail in the closed position.

III. INSTALLATION

WARNING

Prior to installation and/or start-up, inlet piping should be verified as being free of dirt, grit, welding slag, or other particulate contamination. Failure to do so may result in damage to valve internals.

A. Unpacking

Do not remove protective plugs from valve and solenoid until ready to install.

If plastic protective caps are missing, verify no debris or foreign objects are inside valve.

Transporting - Use proper hoisting procedures to avoid damage to valve. Do not lift by conduit, switches, etc.

Purge all air lines prior to connecting solenoids.

B. Valve Installation

The oil valve installation should be in accordance with standard practices for end connection selected. Valves with weld end connections are supplied with end connections of sufficient length to prevent thermal damage to valve internals. As a safety precaution, methods to thermally block the transfer of heat to the valve body should be employed during welding. ***The end connections should not be modified to a shorter length.*** The weight of the valve must be properly supported to prevent excessive piping stresses. The valve may be installed in any position, but the ***actuator should be supported when the valve is installed horizontally. Adequate clearance should be provided for valve maintenance and repair.***

CAUTION

Valve must be installed in proper flow direction, per valve flow tag. Improper installation will result in fuel contamination of purge piping, and improper valve operation.

CAUTION

Ensure piping upstream of fuel inlet DOES NOT include a check valve since this will cause hydraulic locking of the oil valve in the closed position.

C. Pneumatic/Electrical Hook Up

Electrical power and clean dry air are required to operate the T2005 & T2006 oil valve systems. Wiring should be in accordance with referenced drawings and all applicable codes. All wiring connections are on the main terminal board located inside the Junction Box. Supply air is to be connected to Solenoid Assembly manifold block (See Drawings 117485 & 117486). Pneumatic supply air should be clean, dry and between 70 to 120 PSIG (482.3 - 826.8 KPa) at all times. It is important for proper valve performance that this pressure is available at the valve at all times. Historically, many field problems can be associated with inadequate pneumatic supply requirements or contamination.

Warning

Make certain electrical supply is isolated and tagged out before proceeding with electrical connections.

Note: *Some assemblies may include a preset filter regulator installed in supply piping.*

Use suitable thread sealing compound for pneumatic connection. Do not use PTFE tape.

The exhaust side of the solenoid should not be restricted, as this will slow down the closing rate of the valve.

D. Start-Up

When valve is placed in service, stroke the main stem and oil stem two or three times (Fire cycles) and then check for packing leaks. If leakage is present, tighten adjusting nut 1/8 turn, stroke valve several times to ensure proper setting of packing and recheck. Repeat until leakage is stopped. This should occur before nut is completely tight. If leakage is present when nut is completely tight, packing must be replaced and the stem inspected for wear. Refer to instructions in Section V.

CAUTION

DO NOT OVER-TIGHTEN PACKING. Over-tightened packing may cause excessive stem friction, inhibiting stem movement.

IV. MAINTENANCE AND DISASSEMBLY INSTRUCTIONS

A. Maintenance

The Skotch Trifecta Valve Systems requires periodic maintenance and adjustments in order to function properly. The following is a list of items which, must be inspected on a regular basis.

1. Testing Oil Valve Seal

Periodic leak testing should be performed per all applicable codes to verify proper operation of oil valve seal. See Section V for leak testing procedures.

2. POC Verification

Periodic testing should be performed per all applicable codes to verify proper operation of the oil valve POC switch. See Section VI for POC switch setting procedures.

3. Packing Inspection

Both the oil valve and the purge packing should be inspected regularly for leakage. If any leakage is noted the packing should be adjusted until the leakage has stopped. See Section III.D for instructions.

4. Pneumatic System Leaks

The pneumatic system (fittings, solenoid, actuator, etc.) should be inspected regularly for leakage or other damage. Any leakage or damage must be repaired or replaced immediately.

5. Body to End Flange Joint Inspection

Body end flange joints should be inspected regularly for leakage. Any leakage should be repaired immediately. See following Section for instructions.

CAUTION

Failure to repair the steam side end flange joint on steam purged systems may result in steam cutting of valve body, end flange assembly or both. This may result in serious damage to the valve.

B. Disassembly

All T2000 series Skotch Trifecta Valve Systems may be disassembled without removal from piping. It is recommended the work area be as clean as possible. Ensure all manual isolation valves are closed and tagged out, all electrical circuits are de-energized and isolate the pneumatic supply. BE SAFE!

The following instructions describe how to fully disassemble the valve system. Individual corrective tasks may not require complete disassembly. The user should judge what steps are appropriate for each task.

Special tools are needed to remove the valve seats. The following tools are available:

ITT P/N: 99-002, Oil seat ring tool. This tool will only remove the oil seat ring. This tool is only good for working on the oil side of the valve and is an economical solution in servicing the oil side of the valve.

ITT P/N: 85-002, T1000/T2000 seat ring tool, This tool will remove all three seats (main, purge and oil) from the oil valve body and is needed when servicing the purge side of the valve. With this tool it is not necessary to purchase 99-002.

NOTE: Customers that do not feel comfortable with rebuilding and testing Skotch valves can have them rebuilt by the factory. Call the number located on the front cover or (800) 366-1111 and ask to speak to Skotch, Customer Service for quotation and instructions.

1. Actuator Removal

Note: *Pneumatic supply pressure is required for actuator removal.*

CAUTION

Valve system MUST be stroked to purge position prior to decoupling stem connector for actuator removal. Failure to do so may result in damage to upper seat ring and/or main stem subassembly.

Commence actuator removal by removing the Junction Box and Solenoid Manifold Adapter Block from the actuator. Allow components to hang by the conduit. Remove the screws securing the Yoke Lens to the Yoke. Loosen Set Screw in the Stem Connector. Loosen Stem Connector Jam Nut. Stroke system to "Purge" in accordance with operating instructions (Paragraph II.C). Unscrew Stem Connector from Actuator Output Shaft. After 6-7 turns, stroke system to "Closed" (Paragraph II.A) and continue to unscrew Stem Connector. Remove the four hex nuts holding the Actuator

to the Yoke. Lift Actuator off of valve, being careful not to hit Valve Stem. The Yoke Box can be removed by removing the Yoke Lock Nut from the valve End Flange.

2. Purge Valve Disassembly

After completing Paragraph IV.B.1, unscrew Socket Head Cap Screws (Item 6) which retain End Flange (Item 2) to Body (Item 1). Remove End Flange and Body Gasket (Item 7). Be sure to thoroughly clean mating gasket surface, but do not damage it. Insert Seat Ring Wrench (P/N: 85-002) into lugs on Upper Seat Ring (Item 9). Unscrew and remove Seat Ring (Item 9), Seat Ring Gasket (Item 21), and Main Stem (Item 8). Insert other end of wrench into holes in Purge Seat Ring (Item 10) and remove.

3. Oil Valve Disassembly

Remove Hex Nuts (Item 29) holding Limit Switch Box (Item 13) to End Flange (Item 39). Note: These two nuts must be removed uniformly. Remove Limit Switch Box (Item 13) and Oil Valve Return Spring (Item 19). Loosen Set Screw (Item 18) and unscrew Spring Seat (Item 17) from Oil Stem (Item 12). Remove the Socket Head Cap Screws (Item 6) securing End Flange (Item 39) to Body (Item 1), then remove End Flange (Item 39), Oil Stem (Item 12) and Body Gasket (Item 7). Insert Seat Ring Wrench in lugs of Oil Seat Ring (Item 11), and remove Oil Seat Ring and Seat Ring Gasket (Item 21).

CAUTION

To properly unload the Oil Valve Return Spring, make certain the nuts (Item 29) unthread from the studs. A hex wrench can be used to keep the studs from rotating.

4. Packing Removal

After removing end flanges in Paragraphs IV.B.2 and IV.B.3 above, unscrew Packing Nut (Item 3) and remove Packing (Item 4) and Packing Spring (Item 5).

5. Actuator Disassembly

The actuator should not be disassembled or repaired. Consult factory.

6. Inspection

After disassembly, inspect all sealing and bearing surfaces on valve and actuator parts for physical damage including nicks, scratches or corrosion. Be sure all gasket surfaces are thoroughly cleaned and free of old gasket material. Replace any damaged soft goods such as piston seals, o-rings and rod wipers. Replace packing. Inspect main/upper, oil and purge seat ring and the oil and main stem/plugs. If any visual damage is apparent, replace part.

C. Reassembly

1. Actuator Assembly to Yoke

Mount yoke to cylinder assembly with four hex nuts and lock washers. Replace switches, solenoid manifold, and junction box. Remake switch and solenoid wiring to terminal blocks per wiring diagram.

2. Packing/End Flange Reassembly

Place Packing Spring (Item 5) in stuffing box. Lubricate each individual packing component (Item 4) with KRYTOX® lubricant from DuPont. Individually install the components into the End Flange. The assembly order is male ring first, then chevrons, then female ring. Screw packing nut (Item 3) into end flange (Item 2 or 39) and snug up by hand. Do not tighten at this time. Take special precaution not to damage the packing when sliding over the stem threads. Some means of protecting the packing from damage during installation should be employed.

WARNING

Assure packing is installed in the correct orientation. See Drawing 03-005 for proper orientation. Failure to do so will cause the valve to leak severely from packing gland.

3. Oil Valve Reassembly

Lubricate the Oil Seat Ring (Item 11) soft seal sealing surface located on the inside diameter with Magnalube®-G from the Carleton-Stuart Corporation. Clean the body oil seat threads and gasket area. Apply Grafoil® GTS® sealant to both the Body (Item 1) and Oil Valve Seat Ring threads (Item 11), place the Seat Ring Gasket (Item 21) on the Oil Valve Seat Ring (Item 11) and thread into Body (Item 1). Torque to 130 Ft-Lbs (176.3 Nm). Lubricate the oil stem plug with Magnalube®-G and the shaft with antiseize lubricant. Carefully slide the oil stem (Item 12) into the End Flange (Item 39), making sure not to damage the Packing (Item 4). Slide the Body Gasket (Item 7) over the End Flange subassembly (Item 39). Lubricate the 4 end flange Screws (Item 6) with antiseize compound and fasten the End Flange assembly (Item 39) onto the Valve Body (Item 1), ensuring the limit switch box Studs (Item 14) are properly oriented (In line with piping). Torque the end flange Screws (Item 6) in two uniform increments. Torque screws initially in a crisscross pattern to 40 Ft-Lbs (54.2 Nm), repeat using 65-70 Ft-Lbs (88.1 - 94.9 Nm) and recheck. Push the Oil Stem (Item 12) up into the Valve Body (Item 1) until it seats in the Oil Valve Seat Ring (Item 11). This may require that the Oil Stem (Item 12) be lightly struck with a mallet until it is fully seated. Screw Spring Seat (Item 17) onto the Valve Stem (Item 12). Hold the Limit Switch Box (Item 13) in place, while adjusting the spring seat position to 2.05" (52.1

mm). This is measured from the inside surface of the Switch Box (Item 13) on which the spring rest to the spring seating surface on the Spring Seat (Item 17). Tighten the Set Screw (Item 18) so the spring seat is secure. Remove the Limit Switch Box (Item 13). Place Oil Valve Return Spring (Item 19) into the Spring Seat (Item 17) and mount the Limit Switch Box (Item 13) using the 2 mounting Nuts (Item 29) with Lock Washers (Item 28). Tighten these fasteners in a uniform manner, so the box is not cocked during assembly. Item 29 should be torqued to approximately 150 In-Lbs (14.1 Nm). Mount the Oil Valve POC Switch (Item 20) to the Limit Switch Box (Item 13) using Washer (Item 23), Lock Washer (Item 24) and Screw (Item 22). Verify the Spring Seat (Item 17) dimension is set correctly. The Oil Valve POC Switch must be set per section VI.

4. Main/Purge Valve Reassembly

Clean the thread/surface area in the Body (Item 1) of both the Purge Seat (Item 10) and Seat Ring (Item 9). Apply Grafoil® GTS® sealant to both the Purge Seat (Item 10) and Body (Item 1) threads, and screw into the Valve Body (Item 1). Torque to 100 Ft-Lbs (135.6 Nm). Insert the Main Stem (Item 8) into the Valve Body (Item 1). Place the Seat Ring Gasket (Item 21) over the Seat Ring (Item 9), apply Grafoil® GTS® sealant to both the Seat Ring (Item 9) threads and body threads and screw into Valve Body (Item 1). Torque to 130 Ft-Lbs (176.3 Nm). Place Body Gasket (Item 7) on End Flange (Item 2). Carefully slide End Flange (Item 2) and Body Gasket (Item 7) over the Main Stem (Item 8) making sure not to damage the Packing (Item 4). Lubricate the 4 end flange Screws (Item 6) with antiseize compound and fasten the End Flange assembly (Item 2) onto the Valve Body (Item 1). Torque the end flange Screws (Item 6) in two uniform increments. Torque screws initially in a crisscross pattern to 40 Ft-Lbs (54.2 Nm), repeat using 65-70 Ft-Lbs (88.1 - 94.9 Nm) and recheck. Screw the stem connector onto the Main Stem (Item 8) and tighten set screws.

5. Actuator Reinstallation

Carefully place actuator onto valve. Screw yoke lock nut onto valve end flange (Item 2) hand tight. Slide valve stem up and thread stem connector onto actuator shaft. Rotate slowly until resistance is felt. Securely tighten yoke lock nut. Make pneumatic and electrical connections to assembly and stroke valve to "Purge" (Paragraph II.C). Rotate connector onto shaft one additional turn plus enough to line up switch trip bracket mounting holes. Tighten the jam nut, and fasten set screw located in the stem connector. Close valve (Paragraph II.A) and install switch trip bracket and indicator onto stem connector. The valve is now ready for testing.

6. Test

Conduct the following tests to assure system performance is satisfactory after rebuild.

a) Valve Stroke

Verify no oil stem movement occurs when the valve strokes from the Closed to Purge position. If the oil stem moves, thread stem connector onto actuator shaft an additional turn while the valve is in Purge and retest. Continue until no movement occurs.

b) Auxiliary Open/Close Switches

Using an electrical testing device verify the Valve Closed limit switch is actuated only when the valve is in the Closed position and the Valve Open limit switch is actuated only when the valve is in the Fire position. Ensure neither switch is actuated when in Purge. Limit switches are adjusted by repositioning the switch roller levers.

c) Oil Valve Proof of Closure

The oil valve Proof of Closure switch must be adjusted in accordance to Section VI.

V. Leak Testing

After assembly, the Skotch Trifecta Valve should be leak tested to verify proper operation as follows:

A. Upper Seat Ring

1. Place the valve in the Closed position.

2. The fuel inlet port must be plugged so that test media cannot escape for this port.

3. Pressurize the purge inlet to 50 PSIG (344.7 KPa) air while monitoring the leakage rate from the fuel outlet. The leakage rate should not exceed ANSI Class IV limits or 1254 cc/min.

4. If leakage is excessive, stroke the valve 10 to 20 times to allow the metal seat to wear in with the metal plug and retest the valve. If valve leakage is still excessive, the main stem and seat should be replaced and the valve retested.

Note: If the actuator was removed anytime prior to testing, the actuator/valve coupling nut should be checked for proper installation. The main stem closure force is due to the return spring located inside the actuator. If the coupling nut is not adjusted correctly it is possible for the actuator to reach its home position without the main plug contacting the seat. If this occurs main seat leakage will take place regardless of the plug and seat condition. The main seat and plug should limit the actuator travel in the Closed position.

B. Purge Seat

1. Stroke the valve to the Fire position using a control pressure between 70 and 120 PSIG (482.6 - 827.4 KPa).

2. The fuel inlet should be plugged to keep the test media from escaping from this port.

3. Pressurize the purge inlet to 50 PSIG (344.7 KPa) air while monitoring the fuel outlet port for leakage. The allowable leakage rate per ANSI Class IV is 439 cc/min.

4. If leakage is excessive, stroke the valve 10 to 20 times to allow the metal seat to wear in with the metal plug and retest the valve. If valve leakage is still excessive, the main stem and purge seat should be replaced and the valve retested.

C. Oil Seat

1. The valve should be in fully closed position.

2. The purge inlet should be plugged.

3. Pressurize the fuel inlet port to 50 PSIG (344.7 KPa) air while measuring the leakage rate from the fuel outlet. The allowable leakage rate is one bubble per minute or Class VI.

4. If leakage is excessive, stroke the valve 10 to 20 times to allow the soft seal in the oil seat to wear in with the metal plug and retest the valve. If valve leakage is still excessive the oil seat and/or stem should be replaced and the valve retested.

VI. PROOF OF CLOSURE (POC) SWITCH TESTING

The POC switches should be tested after the valve has been leak tested.

The intent of the Proof of Closure (POC) switch is to prove the valve is in the closed position. To accomplish this, the oil valve is designed with valve seal over-travel. That is, the seal will stop the flow of oil and continue to move in the valve seat bore until the metal seat is made. During this portion of valve stroke the oil valve is effectively sealed, the POC switch contacts must change state. That is, the POC Switch changes state before oil flows regardless of whether the valve moves from the Closed position to Fire or Fire to Closed (Purge).

1. Ensure the valve is in the closed position.

2. Wire the switch to a test device.

3. Loosen switch and push it towards the end flange (up - orientation assumes the valve actuator is on top) to edge of slot or until switch boot hits the edge of the

hole. This will typically move the switch roller actuator past the tripping device.

4. Move the switch away from the end flange (down) until it trips. Try and keep the switch level.

5. Mark the limit switch box 0.14" (3.6 mm) from the switch surface opposite the end flange (bottom surface), for the entire length of the switch. This can be accomplished by placing a 0.14" (3.6 mm) thick metal plate on the switch and marking along the edge. Caution with how close the mark is to the plate. If the marking device is always 0.03" (0.8 mm) higher, the plate should then be 0.11" (2.8 mm), so the end result is always 0.14" (3.6 mm).

6. Move switch to the line and tighten the two screws to prevent movement.

7. Plug the purge inlet pipe.

8. With the oil valve fully closed, pressurize the oil inlet to 10 to 20 PSIG (68.9 - 137.9 KPa). While monitoring the outlet for leakage, slowly open the valve. The normally open contacts of the switch should change state before flow commences (> 1 Ft^3/Hr or 0.03 M^3/Hr). If it does not, loosen the screws, securing the switch and move the switch downward 0.015" (0.4 mm). Tighten retaining screws and repeat test.

9. Pressurize the oil valve inlet between 10 and 20 PSIG (68.9 - 137.9 KPa) while monitoring the outlet for leakage. Stroke the valve to open position. Slowly close the valve while monitoring the normally open switch contacts. Flow should cease (< 1 Ft^3/Hr or 0.03 M^3/Hr) before contacts change state. If it does not, loosen the screws, securing the switch and move the switch upward 0.015" (0.4 mm). Tighten retaining screws and repeat test. If any adjustments are made during this step, step 8 must be repeated.

10. Switches are properly set when both conditions in Step 8 and 9 are satisfied.

VII. MISCELLANEOUS INSTRUCTIONS FOR SPECIAL OPTIONS

Due to customer requirements, some T2000 Systems incorporate special options. Any special procedures not covered in the above material can be found in the Reference Section of this manual as addenda.

VIII. SPARE PARTS ORDERING INFORMATION

Orders for T2000 Systems Spare Parts should be placed with

ITT Engineered Valves
33 Centerville Road
Lancaster, PA 17603-2064

Please be advised that such items as solenoids and switches should not be ordered directly from their manufacturers, as materials may be specially designed for Skotch Trifecta System service. Other replacement parts, although they may be similar in function, will void the FM rating. ***To ensure FM rating and/or proper operation, replacement components should be purchased through ITT Engineered Valves***.

IX. REFERENCE INFORMATION

The following pages contain drawings and reference information alluded to in above sections.