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INSTALLATION, OPERATION AND MAINTENANCE INSTRUCTIONS

MODEL T505, T506 & T507

SKOTCH® *TRIFECTA®* OIL VALVE SYSTEMS

WARNING

Valves and valve actuators supplied by Engineered Valves, LLC 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.

Technical Manual No. IOT500P **Effective 8/31/2018**

REV LEVEL A

Record of Revisions

Revision	Description	Date
-	First Issue	08/27/99
A	Included Model T507 and revised manual.	08/31/18

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DRAWINGS

I. DESCRIPTION

The Model T505, T506 and T507 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, atomization and purging of downstream piping by providing three distinct valve positions.

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

The Model T505 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.

Due to the failure mode, Model T505 valve systems can never be Factory Mutual (FM) approved.

The Model T506 and T507 valve systems, which are the Fail Closed models, utilize 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.

Model T506 valves incorporating specific options may be Factory Mutual approved for Fuel Oil Safety Shutoff Valves per FM Approval Standard Class 7400. Valves meeting the requirements of FM are tagged as such.

Model T507 valves are not Factory Mutual listed with valve configuration.

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 or 116762 for AC/DC voltage with GO switches) for electrical terminals supplied inside the junction box.

A. Closed: Oil Flow Off, Purge and Atomizing Media Flow Off

In this position the atomizing valve plug is held against the atomizing seat by the actuator return spring, blocking flow of the atomizing 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 T505: Energizing both the fire and purge exhaust solenoids coils moves the system to the closed position.

Model T506 & T507: De-energizing both the fire and purge solenoids moves the system to the closed position.

B. Fire: Atomizing Media and Oil Flowing, Purge Off

Pressurizing the Actuator's Fire cylinder causes the atomizing stem to move downward towards the oil stem. As the atomizing 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 T505: Energizing the fire solenoid coil moves the system to the Fire position.

Model T506 & T507: 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 cylinders were not energized with the Fire cylinders the atomizing valve would close and then open back up for Purge. This will cause a momentary drop in atomizing pressure causing the flame to suck back or possibly extinguish before the remaining slug of oil is evacuated.

C. Purge: Atomizing and Purge Media Flowing, Oil Off

Energizing only the purge solenoid moves the atomizing stem to the purge position. In this position the atomizing plug is positioned between, but not in contact with the atomizing and purge seats. Accordingly, the atomizing stem is not in contact with the oil plug, therefore the oil valve remains in the closed position. The atomizing media flows from the atomizing inlet to both, the atomizing and oil outlets, 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". Atomizing steam then passes down both atomizing and fuel lines, 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 (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.

For Model T505: 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.

For Model T506 & T507: 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 atomizing 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 Series T500 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 atomizing 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 atomizing end flange joint on steam atomized 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 T500 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: 44612, T500 seat ring tool. This tool will remove all three seats (atomizing, purge and oil) from the oil valve body and is needed when servicing the atomizing side of the valve.

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. Atomizing/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: 44612) 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 36) holding Limit Switch Box (Item 13) to End Flange (Item 2). 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 2) to Body (Item 1), then remove End Flange (Item 2), Oil Stem (Item 12) and Body Gasket (Item 7). Insert Seat Ring Wrench in lugs of Oil Seat Ring (Item 26), and remove Oil Seat Ring and Seat Ring Gasket (Item 11).

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), Packing Washer (Item 28) 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 atomizing, oil and purge seat ring and the oil and atomizing 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 Springs (Item 5) in stuffing box making certain to orient them per the drawing. Install the Packing Washer (Item 28) on top of the Packing Springs (Item 5). 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) 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 03-006 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 26) 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 26), place the Seat Ring Gasket (Item 11) on the Oil Valve Seat Ring (Item 26) and thread into Body (Item 1). Torque to 110 Ft-Lbs (149.1 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 2), making sure not to damage the Packing (Item 4). Slide the Body Gasket (Item 7) over the End Flange subassembly (Item 2). 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), 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 15 Ft-Lbs (20.3 Nm), repeat using 25 Ft-Lbs (33.9 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 26). 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 2.19" (55.6 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 36) with Lock Washers (Item 35). Tighten these fasteners in a uniform manner, so the box is not cocked during assembly. Item 36 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. Atomizing/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 60 Ft-Lbs (81.2 Nm). Insert the Main Stem (Item 8) into the Valve Body (Item 1). Place the Seat Ring Gasket (Item 1) 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 110 Ft-Lbs (149.1 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 15 Ft-Lbs (20.3 Nm), repeat using 25 Ft-Lbs (33.9 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. Atomizing Seat

1. Place the valve in the Closed position.

2. The fuel inlet and outlet ports must be plugged so that test media cannot escape for these ports.

3. Pressurize the atomizing inlet to 50 PSIG (344.7 KPa) air while monitoring the leakage rate from the atomizing outlet. The leakage rate should not exceed ANSI Class IV limits or 527 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 atomizing 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 atomizing plug contacting the seat. If this occurs atomizing seat leakage will take place regardless of the plug and seat condition. The atomizing 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 atomizing outlet and fuel inlet should be plugged to keep the test media from escaping from these ports.

3. Pressurize the atomizing 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 226 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 atomizing inlet and outlet 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).

A. Limit Switches

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 0.08" (2 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 0.08" (2 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 0.05" (1.3 mm), so the end result is always 0.08" (2 mm).

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

7. Plug the atomizing inlet and outlet pipes.

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 (> 24 in^3/Hr or 400 cc/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 (< 24 in^3/Hr or 400 cc/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.

B. GO Switches

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 top of slot of POC box. This will typically move the switch past the target device.

4. Move the switch away from the end flange (down) until it trips. Try and keep the switch level. Continue to slide the switch for additional 1/32". Tighten switch to POC box and ensuring the distance between the end of switch and target is per manufacturer's recommendations.

5. Plug the atomizing inlet and outlet pipes.

6. 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 (> 24 in^3/Hr or 400 cc/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.

7. 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 (< 24 in^3/Hr or 400 cc/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 6 must be repeated.

8. Switches are properly set when both conditions in Step 6 and 7 are satisfied.

VII. MISCELLANEOUS INSTRUCTIONS FOR SPECIAL OPTIONS

Due to customer requirements, some T500 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 T500 Systems Spare Parts should be placed with

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

Phone: 717-509-2200
Fax: 800-348-9000

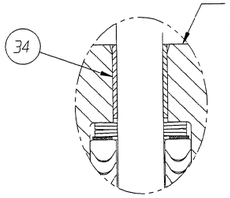
Please be advised that spare parts should be ordered directly from ITT Engineered Valves, as such materials are specially designed for Skotch Trifecta Valve Systems. Other replacement parts, although they may be similar in function, will void the FM rating. To maintain FM Approval, FM also requires technicians servicing/repairing the Skotch Trifecta Valve Systems to be trained by ITT Engineered Valves.

IX. REFERENCE INFORMATION

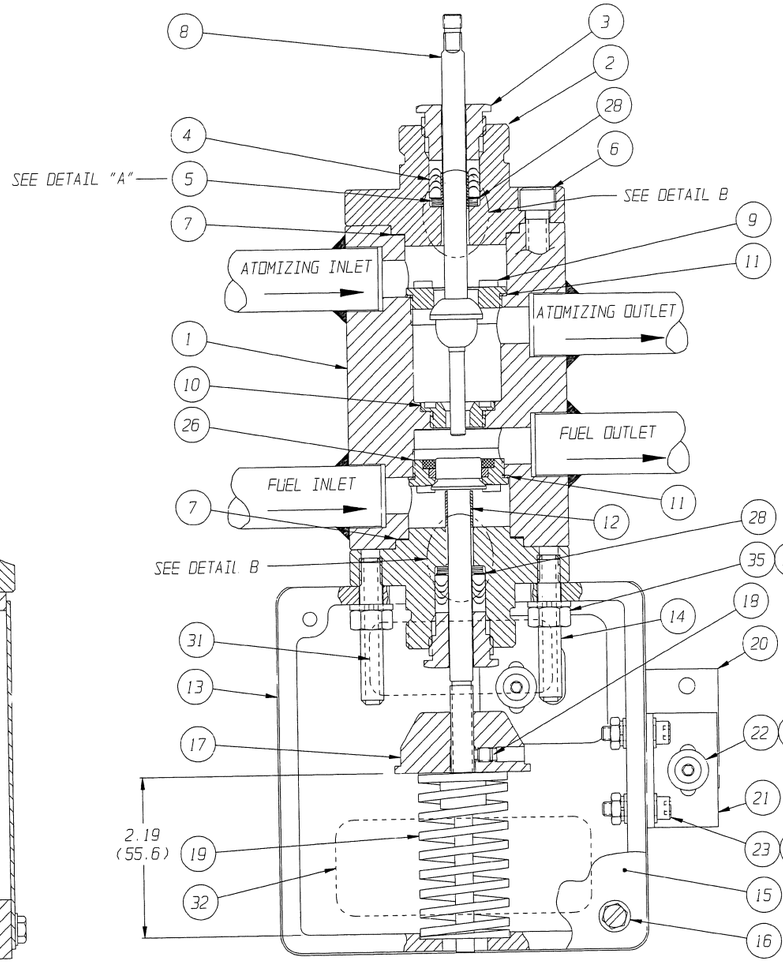
The following pages contain drawings and reference information alluded to in above sections.

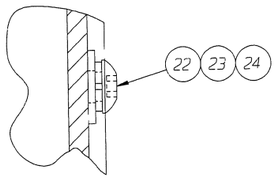
NOTES:
1) SEE ORDER SPECIFICATION FOR MAIN VALVE AND ACCESSORIES/OPTIONS SPECIFICATIONS.
2) VALVE IS SHOWN IN CLOSED POSITION.
3) VALVE SHOWN IS LEFT TO RIGHT FLOW. FOR RIGHT TO LEFT FLOW, INLETS/OUTLETS ARE REVERSED.
4) SPECIAL TOOL IS REQUIRED TO REMOVE SEATS. CONSULT FACTORY
5) * - DENOTES RECOMMENDED SPARE PART.
6) ASSEMBLE PER SPECIFICATION ES-A-0113.
7) LABEL, ITEM 33, TO BE PLACED ON TOP OF SWITCH HEAD.
(K) 8) ■ - DENOTES POC PROX SWITCH OPTION.

DETAIL "A"
DISC SPRING STACKING ARRANGEMENT

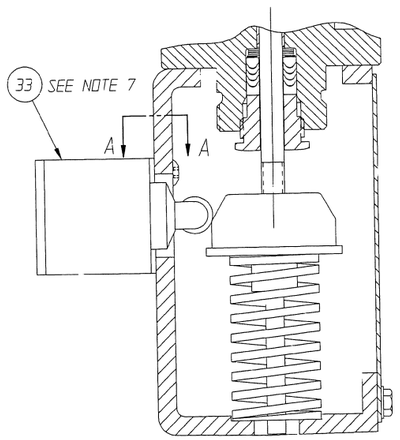


DETAIL B
SCALE 2:1



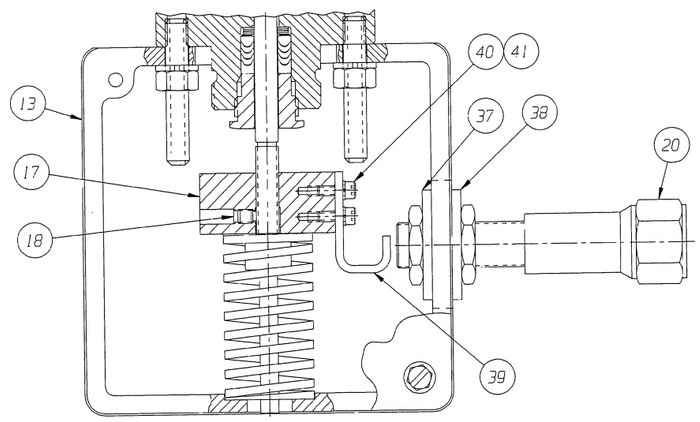


VIEW "A-A"



T500 LIMIT SWITCH (STANDARD)
OIL SIDE PROOF OF CLOSURE

T500 LIMIT SWITCH OPTION



(K) T500 PROX SWITCH OPTION
OIL SIDE PROOF OF CLOSURE

LIST OF PARTS

	ITEM	DWG. NO.	QTY.	DESCRIPTION
	1	02-034	1	VALVE BODY SUBASSEMBLY
	2	118082	2	END FLANGE
	3	01-051	2	PACKING NUT
*	4	39-004	2	PACKING SET
*	5	-	8	DISC SPRING
	6	-	8	0.31-18 X 1.00 LG. SOCKET HEAD CAP SCREW
*	7	40-003	2	BODY GASKET
*	8	02-013	1	MAIN STEM
*	9	01-052	1	SEAT RING
*	10	01-053	1	PURGE SEAT RING
*	11	40-005	2	SEAT RING GASKET
*	12	02-109	1	OIL STEM
	13	118073	1	LIMIT SWITCH BOX
(K) ■		120316	1	GO PROX SWITCH BOX
	14	-	2	STUD (0.31-18 UNC)
	15	01-016	1	LIMIT SWITCH BOX COVER
	16	-	2	12-24 X 0.50 LG. HEX WASHER HEAD SCREW
	17	01-219	1	SPRING SEAT T500
(K) ■		120302	1	SPRING SEAT T500 PROX
	18	-	1	10-32 X 0.25 LG. SOCKET HEAD SET SCREW
*	19	-	1	OIL VALVE RETURN SPRING
*	20	-	1	OIL VALVE PROOF OF CLOSURE SWITCH, LIMIT
(K) ■ *		-	1	OIL VALVE PROOF OF CLOSURE SWITCH, PROX
	21	01-234	1	SWITCH MOUNTING BRACKET (NEMA 4)
	22	-	2	10-32 X 0.50 LG. HEX SOC BTNHD CAP SCR
	23	-	6	#10 FLAT WASHER
	24	-	4	#10 LOCK WASHER
	25	-	2	10-32 HEX NUT
*	26	02-106	1	VALVE SEAT RING ASSY
	27	-	2	#10-32 X 0.75 LG. HEX SOCKET HD CAP SCREW
*	28	-	2	PACKING FOLLOWER WASHER
	29	-	-	-
	30	-	-	-
	31	117504	1	LABEL - CAUTION STEM PACKING
	32	90-018	1	LABEL - CAUTION SPRING
	33	117500	1	LABEL - PROOF OF CLOSURE
	34	-	2	BEARING
	35	-	2	0.31 LOCK WASHER
	36	-	2	0.31-18 HEX NUT
(K) ■	37	01-239	1	BRKT SWITCH GUIDE T1000 GO
(K) ■	38	01-240	1	BRKT PRXSW
(K) ■	39	120305	1	TRIP BRACKET T500
(K) ■	40	-	2	CAPSCR HEXSKT #6-32 X 0.38
(K) ■	41	-	2	LKWSHR SPR #6

THIS IS A FACTORY MUTUAL CONTROLLED DOCUMENT. CHANGES MUST BE APPROVED BY FM PRIOR TO IMPLEMENTING.

UNLESS OTHERWISE SPECIFIED, ALL DIMENSIONS IN BRACKETS ARE MILLIMETERS. PATTERN NO. -

ECN# 10632

THIRD ANGLE PROJECTION

UNLESS OTHERWISE SPECIFIED, ALL DIMENSIONS ARE IN INCHES

UNLESS OTHERWISE NOTED
INCH: X = ± 0.06; .X = ± 0.03; .XX = ± 0.02; .XXX = ± 0.005; X/X = ± 1/16; X° = ± 1°; .X° = ± .5°
MM: (X) = ± (.76); (.X) = ± (.53); (.XX) = ± (.12); .X° = ± .5°; X° = ± 1°
REMOVE ALL BURRS AND SHARP EDGES. MACHINED SURFACES TO BE 63 EXCEPT AS NOTED.

WEIGHT -
SCALE 1:1

	DATE	BY
DWN	11/30/06	DLK
CHKD	11/30/06	HLK
APVD	11/30/06	HLK

MAIN VALVE ASSEMBLY
SERIES T500
OIL BURNER VALVE SYSTEM
-
-
-

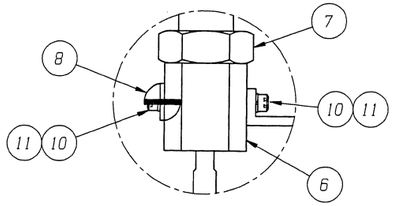
SUPERSEDES: -

ITT Engineered Valves Group Lancaster, PA USA

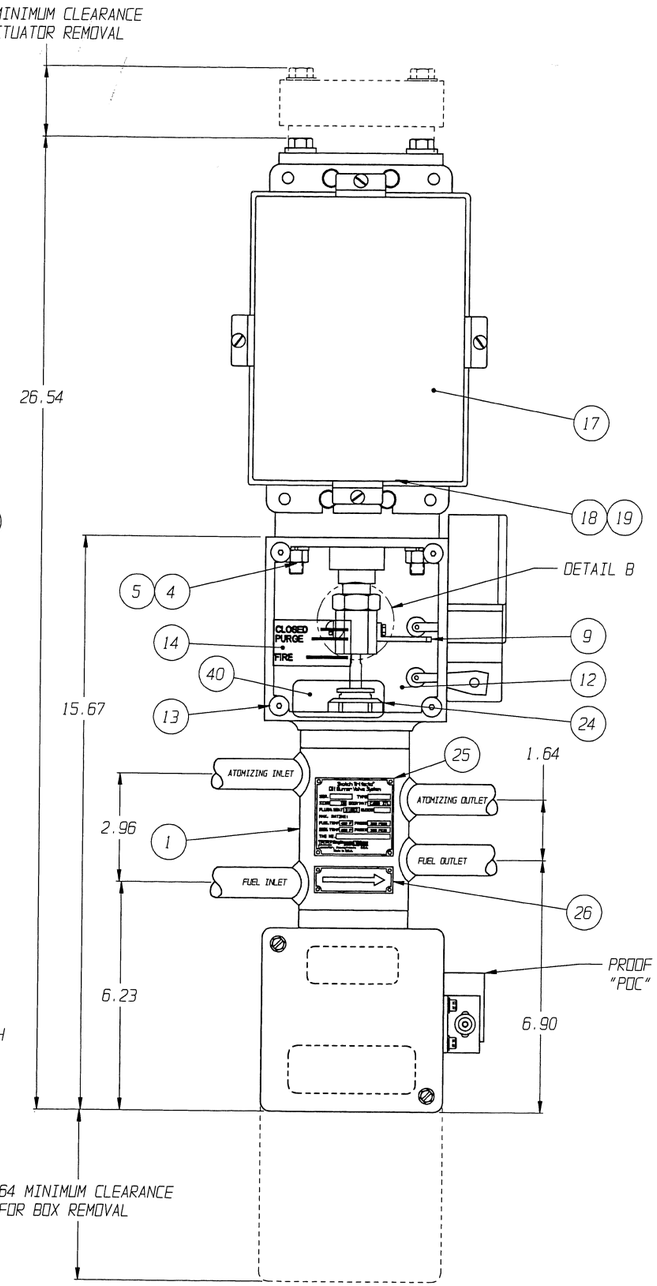
SIZE	DRAWING NUMBER	SHEET	REV
D	03-006	1 OF 1	K

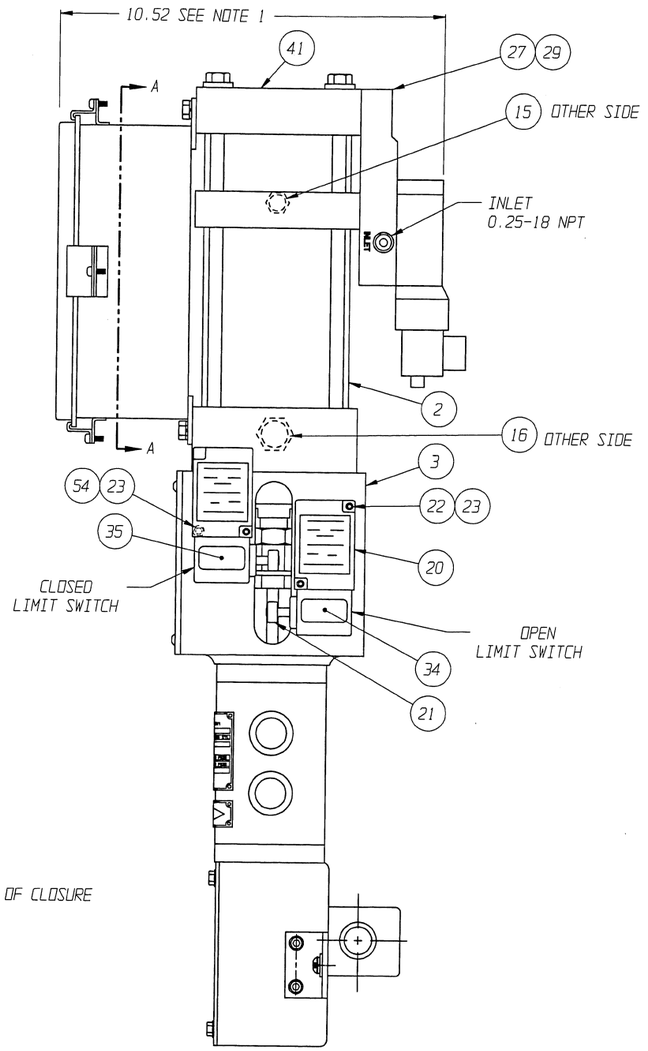
FILE COPY

Printed On: ~~8/31/2018 09:11:10~~



DETAIL B
SCALE 1:1





NOTES:
1. STAINLESS STEEL JUNCTION BOX DIMENSION APPROXIMATELY 11.00
2. CONDUIT NOT SHOWN FOR CLARITY
3. CONDUIT FITTINGS MAY BE ROTATED AS REQUIRED
4. SOME CONDUIT FITTINGS MAY NOT BE USED FOR SINGLE COIL SOLENOIDS
5. LABEL, ITEM 39, TO BE WRAPPED AROUND CONDUIT
6. ALL DIMENSIONS ARE FOR REFERENCE ONLY
7. RECOMMENDED SPARE PARTS ARE MARKED WITH AN ASTERISK (*) ON THE LIST OF PARTS
8. ITEM 57 TO BE USED WITH STAINLESS STEEL SWITCHES
Ⓖ 9. ITEMS MARKED [&] ARE NOT USED WITH PROXIMITY SWITCHES.
ITEMS MARKED WITH [□] ARE ONLY USED WITH PROXIMITY SWITCHES.

LIST OF PARTS

ITEM	DWG. NO.	QTY.	DESCRIPTION
1	-	1	VALVE BODY
* 2	117482	1	ACT PNEUM TANDEM CYLINDER
3	117601	1	YOKE
4	-	4	NUT HEX .38-24
5	-	4	LOCKWASHER SPRING 0.38
6	06-059	1	STEM CONNECTOR
7	-	1	NUT HEX JAM .75-16
8	06-077	1	INDICATOR VISUAL
Ⓖ & □ 9	06-060	1	BRACKET SWITCH, HDLS
	120192	1	BRACKET SWITCH, PROXIMITY
10	-	4	CAPSCR HEXSKT 6-32X0.38
11	-	4	LOCKWASHER SPRING #6
12	06-061	1	LENS YOKE
13	-	4	CAPSCR BUTHD 10-32X0.50
14	90-008	1	DECAL LENS
15	-	1	VENT BREATHER .25
16	-	1	VENT BREATHER .50
17	117481	1	BOX JUNCTION 8 X 6
18	-	4	CAPSCR HEX .25-20X0.38
19	-	4	LOCKWASHER EXT TOOTH 0.25
Ⓖ & * 20	-	2	SWITCH, HDLS
□ * 20	-	2	SWITCH, PROXIMITY
& 21	-	2	SWITCH LEVER
& 22	-	3	CAPSCR HEXSKT 10-32X2.00
& 23	-	4	LOCKWASHER SPRING HI-COLLAR #10
24	-	1	NUT YOKE LOCK
25	-	1	TAG
26	-	1	TAG FLOW
27	117484	1	MANIFOLD ADAPTER BLOCK
* 28	-	2	SOLENOID
* 29	-	2	O-RING #114
30	-	4	CAPSCR HEXSKT 0.25-20X1.00
31	-	4	LOCKWASHER SPRING HI-COLLAR 0.25
32	-	AR	CAPSCR HEXSKT #8-32X1.25
33	-	AR	LOCKWASHER SPRING HI-COLLAR #8
34	117498	1	LABEL - ACTUATOR OPEN SWITCH
35	117499	1	LABEL - ACTUATOR CLOSED SWITCH
36	117533	1	JUNCTION BOX SUBPLATE
37	117501	1	LABEL - FIRE SOLENOID
38	117502	1	LABEL - PURGE SOLENOID
39	117503	AR	LABEL - CAUTION CONDUIT
40	117504	1	LABEL - CAUTION STEM PACKING
41	90-018	1	LABEL - CAUTION SPRING
42	-	1	FLOW CONTROL PLATE
43	-	3	CAPSCR HEXSKT #8-32X1.75
44	-	AR	MOUNTING RAIL
45	-	AR	SCREW, TAPPING PAN HD #8X0.50
46	-	AR	TERMINAL CLIP
47	-	AR	TERMINAL
48	-	AR	END BARRIER
49	-	AR	FITTING CONDUIT 0.50 HUB
50	-	AR	FITTING CONDUIT 0.50 LGT 45
51	-	AR	FITTING CONDUIT 0.50 LGT 90
* 52	-	AR	VALVE CHECK INLET
53	-	AR	FITTING COUPLER 0.25FNPTX0.25FNPT
54	-	1	CAPSCR HEXSKT 10-32X0.50
* 55	-	1	MUFFLER
56	-	AR	VENT BREATHER #10-32
57	-	AR	HEX BUSHING, 0.75 X 0.50
Ⓖ □ 58	01-240	2	GUIDE BRACKET, PROXIMITY SWITCH
Ⓖ □ 59	01-239	2	MOUNTING BRACKET, PROXIMITY SWITCH

ECN# 10632

E9.0 08/30/16

UNLESS OTHERWISE SPECIFIED, ALL DIMENSIONS IN BRACKETS ARE MILLIMETERS. PATTERN NO. -

THIRD ANGLE PROJECTION

UNLESS OTHERWISE SPECIFIED, ALL DIMENSIONS ARE IN INCHES

UNLESS OTHERWISE NOTED
INCH: X = ± 0.06; X = ± 0.03; .XX = ± 0.02; .XXX = ± 0.005; X/X = ± 1/16; X° = ± 5°; X" = ± 1°
MM: [X] = ± [.76]; [.X] = ± [.5]; [.XX] = ± [.12]; X° = ± 5°; X" = ± 1°
REMOVE ALL BURRS AND SHARP EDGES. MACHINED SURFACES TO BE ✓ EXCEPT AS NOTED.

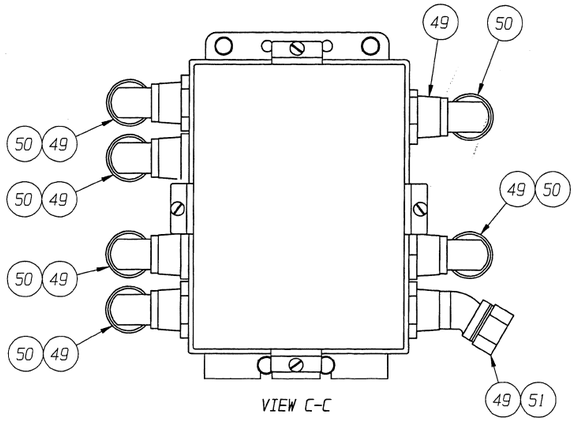
		DATE	BY
DWN		12/8/16	JH
CHKD		12/8/16	MLK
APVD		12/8/16	MLK

WEIGHT: -
SCALE: 1:2

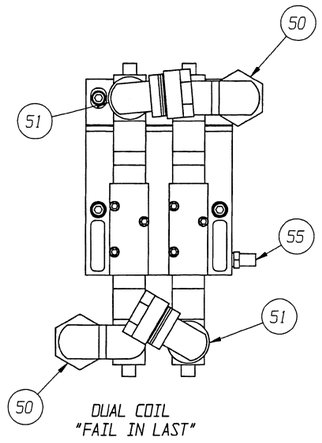
VALVE/ACTUATOR ASSEMBLY
T500
SUPERSEDES: -

ITT Engineered Valves Group Lancaster, PA USA

SIZE	DRAWING NUMBER	SHEET	REV
D	117478	1 OF 4	G

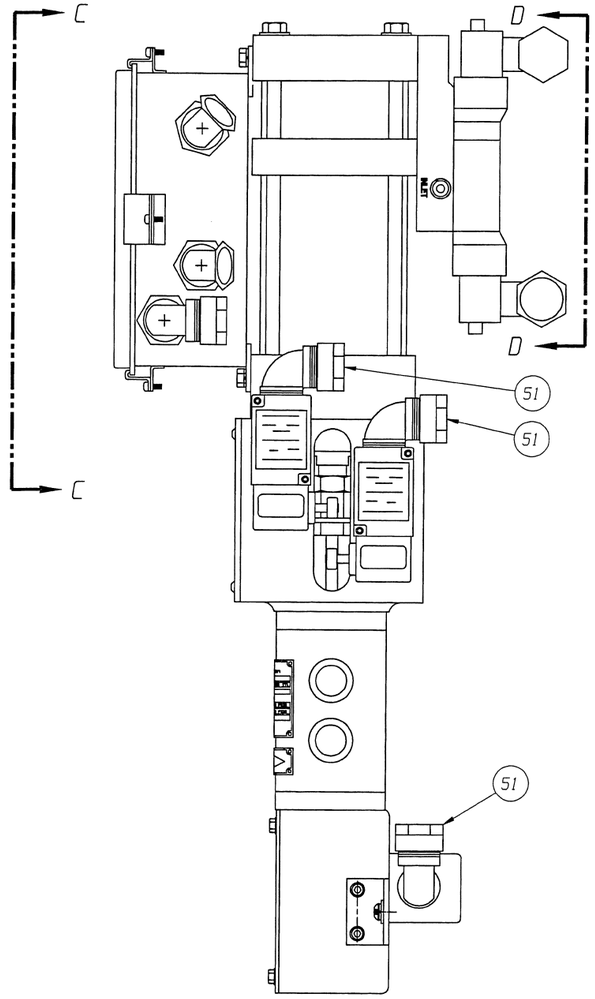


VIEW C-C

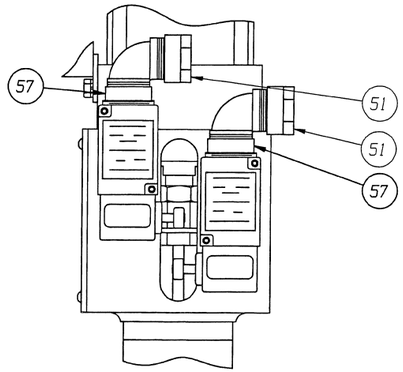


DUAL COIL
"FAIL IN LAST"

VIEW D-D



STANDARD



Ⓕ NEMA 4X

ECN# 10632

UNLESS OTHERWISE SPECIFIED, ALL DIMENSIONS IN BRACKETS ARE MILLIMETERS.

PATTERN NO. -

THIRD ANGLE PROJECTION

UNLESS OTHERWISE SPECIFIED, ALL DIMENSIONS ARE IN INCHES

UNLESS OTHERWISE NOTED

INCH	MM
X = ± 0.06	
.X = ± 0.03	(.X) = ± (.76)
.XX = ± 0.02	(.XX) = ± (.51)
.XXX = ± 0.005	(.XXX) = ± (.127)
X/X = ± 1/16	
.X° = ± .5°	.X° = ± .5°
.Y° = ± 1°	.Y° = ± 1°

REMOVE ALL BURRS AND SHARP EDGES. MACHINED SURFACES TO BE 125 EXCEPT AS NOTED.

	WEIGHT	SCALE
	-	1:2

	DATE	BY
DWN	12/8/04	-
CHKD	12/8/04	-
APVD	12/8/04	-

VALVE/ACTUATOR ASSEMBLY
T500

SUPERSEDES: -

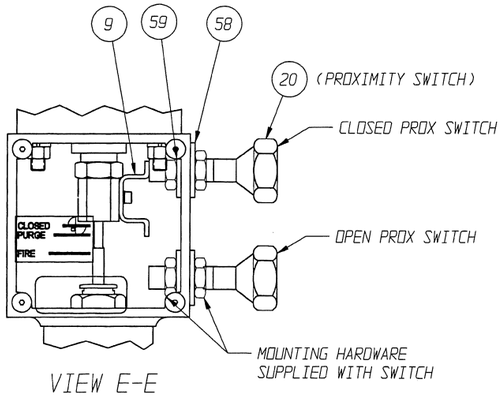
ITT Engineered Valves Group Lancaster, PA USA

SIZE	DRAWING NUMBER	SHEET	REV
D	117478	3 OF 4	G

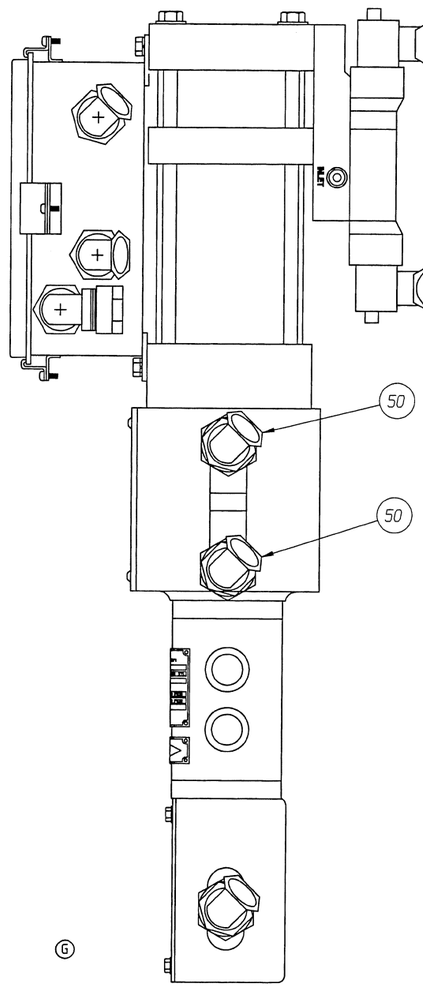
EVO 08/29/05

Printed On: 8/31/2018 09:19:56

FILE COPY



VIEW E-E
GO PROXIMITY ACTUATOR
SWITCH MOUNTING



PROXIMITY SWITCH

ECN# 10632

EVO 08/28/08

UNLESS OTHERWISE SPECIFIED, ALL DIMENSIONS IN BRACKETS ARE MILLIMETERS. PATTERN NO. -

THIRD ANGLE PROJECTION

UNLESS OTHERWISE SPECIFIED, ALL DIMENSIONS ARE IN INCHES

UNLESS OTHERWISE NOTED
INCH | MM
X = ± 0.06 | [X] = ± [.76]
.X = ± 0.03 | [.X] = ± [.5]
.XX = ± 0.02 | [.XX] = ± [.13]
.XXX = ± 0.005 | [.XXX] = ± [.127]
X/X = ± 1/16
X° = ± 5°
X' = ± 1°
.X" = ± .5"
X" = ± 1"
REMOVE ALL BURRS AND SHARP EDGES. MACHINED SURFACES TO BE ✓ EXCEPT AS NOTED.

WEIGHT: -
SCALE: 1:2

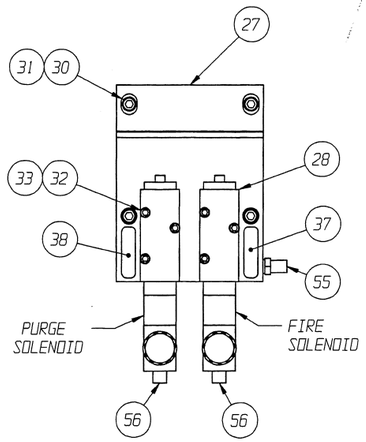
	DATE	BY
DWN	4/8/06	GT
CHKD	12/8/06	HCR
APVD	12/8/06	HCR

VALVE/ACTUATOR ASSEMBLY
T500

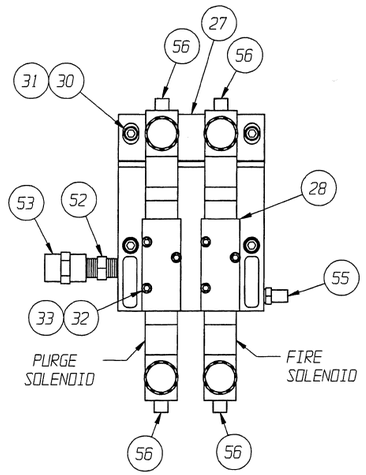
SUPERSEDES: -

ITT Engineered Valves Group Lancaster, PA USA

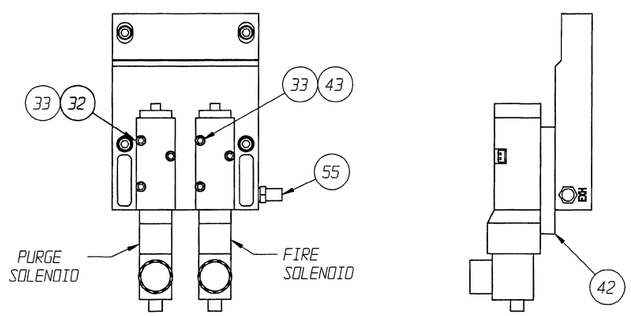
SIZE	DRAWING NUMBER	SHEET	REV
D	117478	4 OF 4	G



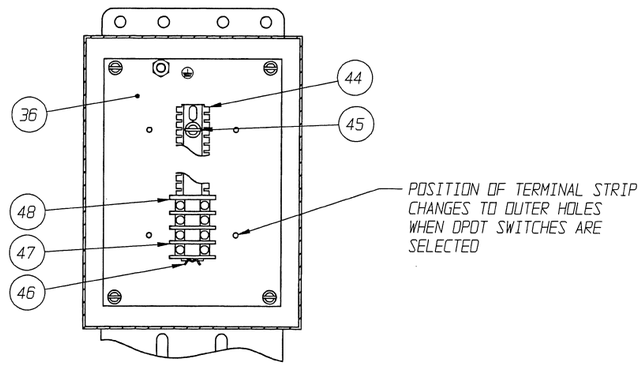
SINGLE COIL
"FAIL CLOSED"



DUAL COIL
"FAIL IN LAST"



OPTIONAL SPEED CONTROL



SECTION A-A
JUNCTION BOX
INTERNAL DETAIL

ECN# 10632

UNLESS OTHERWISE SPECIFIED, ALL DIMENSIONS IN BRACKETS ARE MILLIMETERS. PATTERN NO. -

THIRD ANGLE PROJECTION

UNLESS OTHERWISE SPECIFIED, ALL DIMENSIONS ARE IN INCHES

UNLESS OTHERWISE NOTED
INCH: X = ± 0.06; .X = ± 0.03; .XX = ± 0.02; .XXX = ± 0.005; X/X = ± 1/16; "X" = ± .5°; "X" = ± 1°
MM: (X) = ± (.76); (.X) = ± (.5); (.XX) = ± (.12); "X" = ± .5°; "X" = ± 1°
REMOVE ALL BURRS AND SHARP EDGES. MACHINED SURFACES TO BE 63 EXCEPT AS NOTED.

	WEIGHT	SCALE
	-	1:2

	DATE	BY
DWN	12/8/16	GJF
CHKD	12/8/16	HEL
APVD	12/8/16	HEL

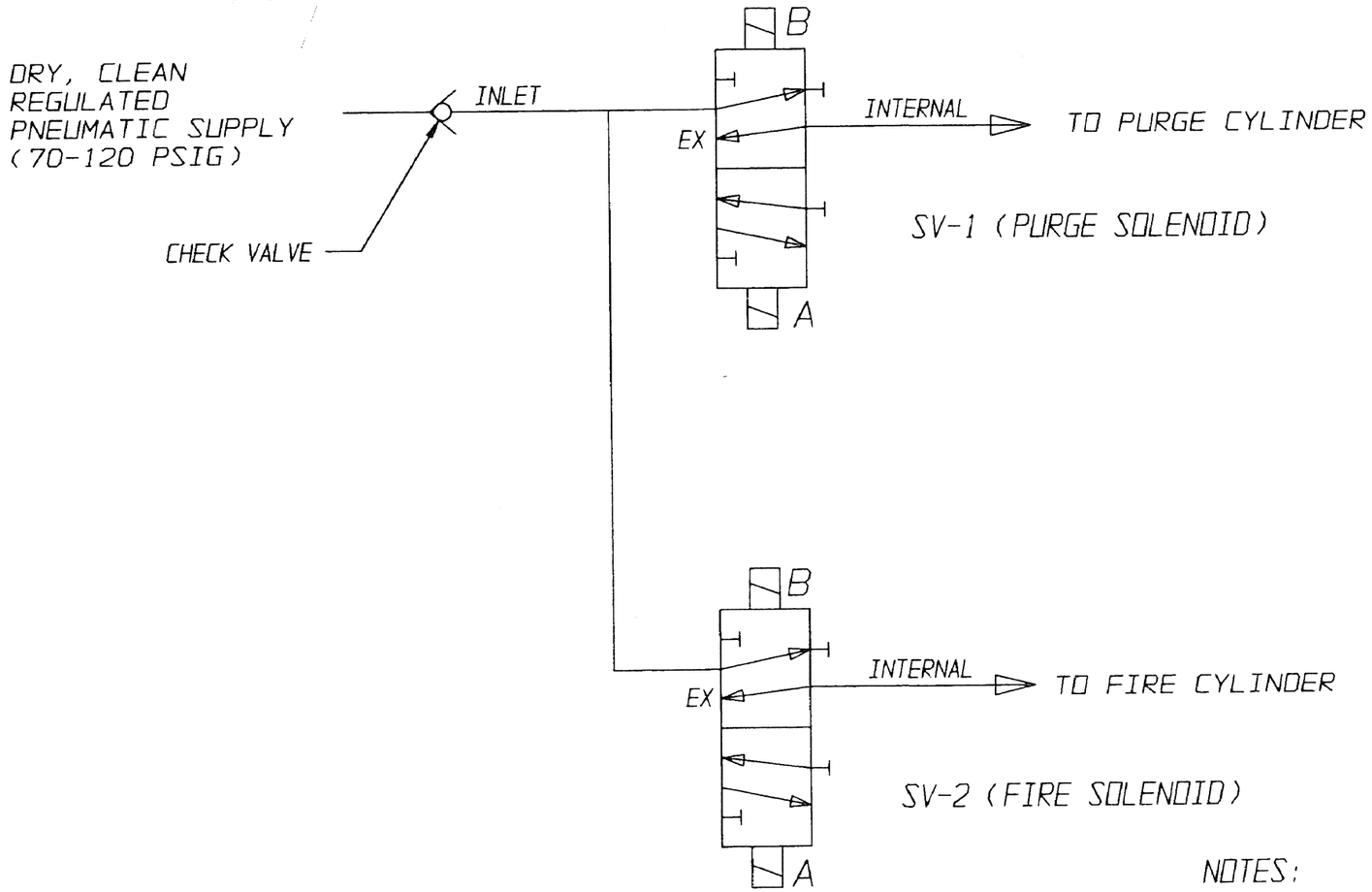
VALVE/ACTUATOR ASSEMBLY
T500

SUPERSEDES: -

ITT Engineered Valves Group Lancaster, PA USA

SIZE	DRAWING NUMBER	SHEET	REV
D	117478	2 OF 4	G

EVD 08/28/15



NOTES:
1. SV-1 AND SV-2 ARE MANIFOLDED, DUAL COIL, MOMENTARY CONTACT SOLENOID VALVES.
2. VALVES SHOWN WITH COIL "B" LAST ENERGIZED.
3. PORT IDENTIFICATION REFERENCES MANIFOLD BLOCK

ECN#3158

PART NO. -

PATTERN NO. -

TOLERANCES EXCEPT AS NOTED
DECIMALS
.XX ± .02
.XXX ±.005
ANGLES ±0.50°
REMOVE ALL BURRS AND SHARP EDGES
ALL MACHINED SURFACES TO BE 125 EXCEPT AS NOTED

WEIGHT	SCALE
-	-

	DATE	BY
DWN	11/6/97	JDW
CHKD	11/21/98	
APVD	11/21/98	

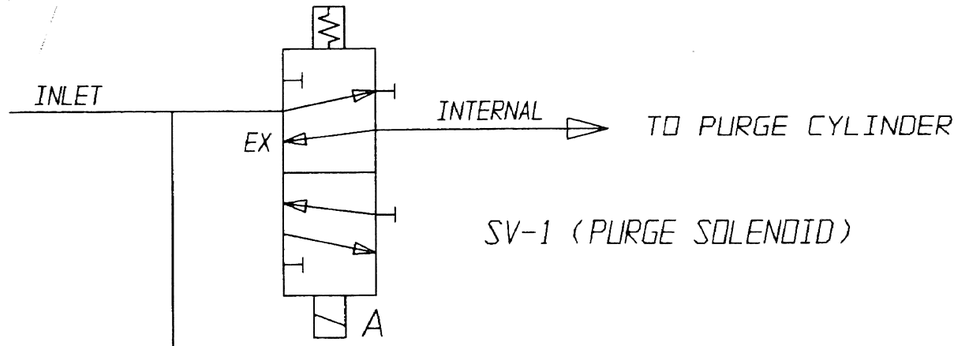
PNEUMATIC SCHEMATIC
OIL BURNER VALVE
FAIL IN LAST POSITION
-
-
-

SUPERSEDES: -

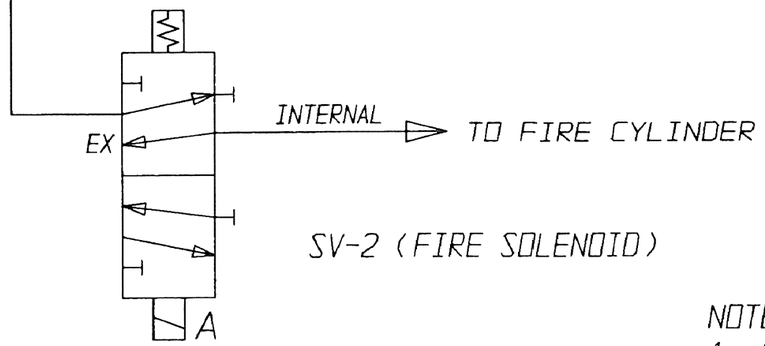
ITT Engineered Valves
ITT Fluid Technology Corporation
Lancaster, Pa
SHEET 1 OF 1

SIZE	DRAWING NUMBER	REV
B	117485	-

DRY, CLEAN
REGULATED
PNEUMATIC SUPPLY
(70-120 PSIG)



SV-1 (PURGE SOLENOID)



SV-2 (FIRE SOLENOID)

NOTES:
1. SV-1 AND SV-2 ARE MANIFOLDED, SINGLE COIL, SPRING RETURN MAINTAINED CONTACT SOLENOID VALVES.
2. VALVES SHOWN WITH COIL "A" DE-ENERGIZED.
3. PORT IDENTIFICATION REFERENCES MANIFOLD BLOCK

THIS IS A FACTORY MUTUAL CONTROLLED DOCUMENT. CHANGES MUST BE APPROVED BY FM PRIOR TO IMPLEMENTING.

ECN#3158

PART NO. -

PATTERN NO. -

TOLERANCES
EXCEPT AS NOTED
DECIMALS
.XX ± .02
.XXX ±.005
ANGLES ±0.50°
REMOVE ALL BURRS
AND SHARP EDGES
ALL MACHINED
SURFACES TO BE
125 EXCEPT AS
NOTED

WEIGHT	SCALE
-	-

	DATE	BY
DWN	11/6/97	JDN
CHKD	11/21/98	
APVD	11/21/98	

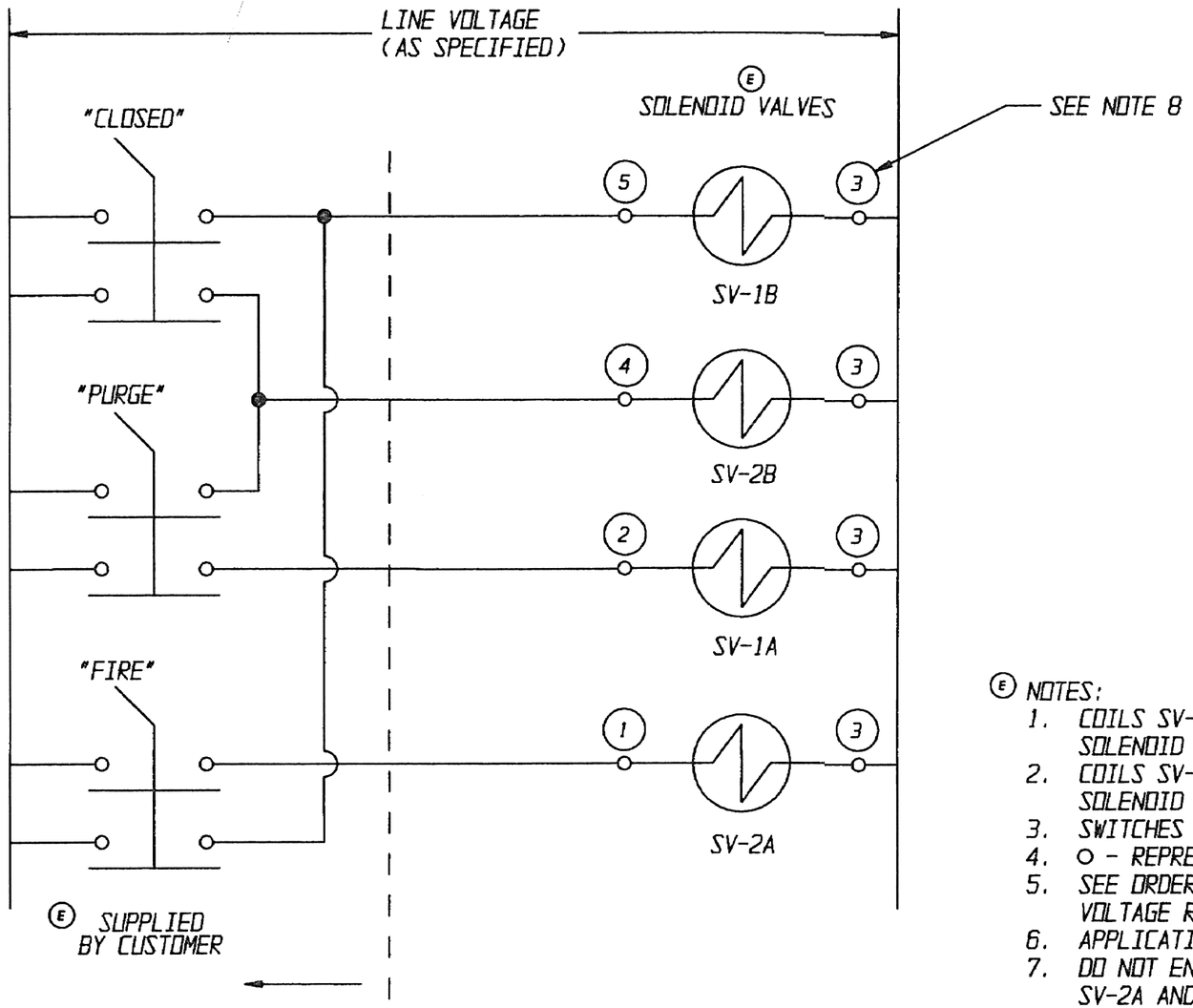
PNEUMATIC SCHEMATIC
OIL BURNER VALVE
FAIL CLOSED
-
-
-

SUPERSEDES: -

ITT Engineered Valves
ITT Fluid Technology Corporation
Lancaster, Pa
SHEET 1 OF 1

SIZE	DRAWING NUMBER	REV
B	117486	-

Printed On: 11/8/2017 03:04:15



(E) NOTES:

1. COILS SV-1A AND SV-1B FORM A DUAL COIL SOLENOID VALVE CONTROLLING PURGE FLOW.
2. COILS SV-2A AND SV-2B FORM A DUAL COIL SOLENOID VALVE CONTROLLING FUEL FLOW.
3. SWITCHES ARE MOMENTARY CONTACT TYPE.
4. O - REPRESENTS A WIRE NUMBER.
5. SEE ORDER SPECIFICATION FOR SOLENOID VOLTAGE RATING.
6. APPLICATION: ALL FAIL IN LAST OIL VALVES.
7. DO NOT ENERGIZE SOLENOID COILS SV-1A AND SV-1B OR SV-2A AND SV-2B SIMULTAINEOUSLY OR SOLENOID DAMAGE CAN OCCUR.
8. WIRE MARKER NUMBERS SHOWN ARE FOR AC SOLENOIDS. SEE DRAWING 60-009 FOR DC WIRE MARKER NUMBERS.

FILE COPY

WR# -

PART NO. -

PATTERN NO. -

REV	DATE	W.R. NBR	BY	CHKD	APVD
-	-	-	-	-	-
-	-	-	-	-	-
-	-	-	-	-	-
E	4/27/95	-	ZSS	MM	MM
D	10/90	-	JRB	-	-

TOLERANCES EXCEPT AS NOTED
DECIMALS
.XX ± .02
.XXX ± .005
ANGLES ±0.50°
REMOVE ALL BURRS AND SHARP EDGES
ALL MACHINED SURFACES TO BE 125 EXCEPT AS NOTED

WEIGHT -
SCALE -

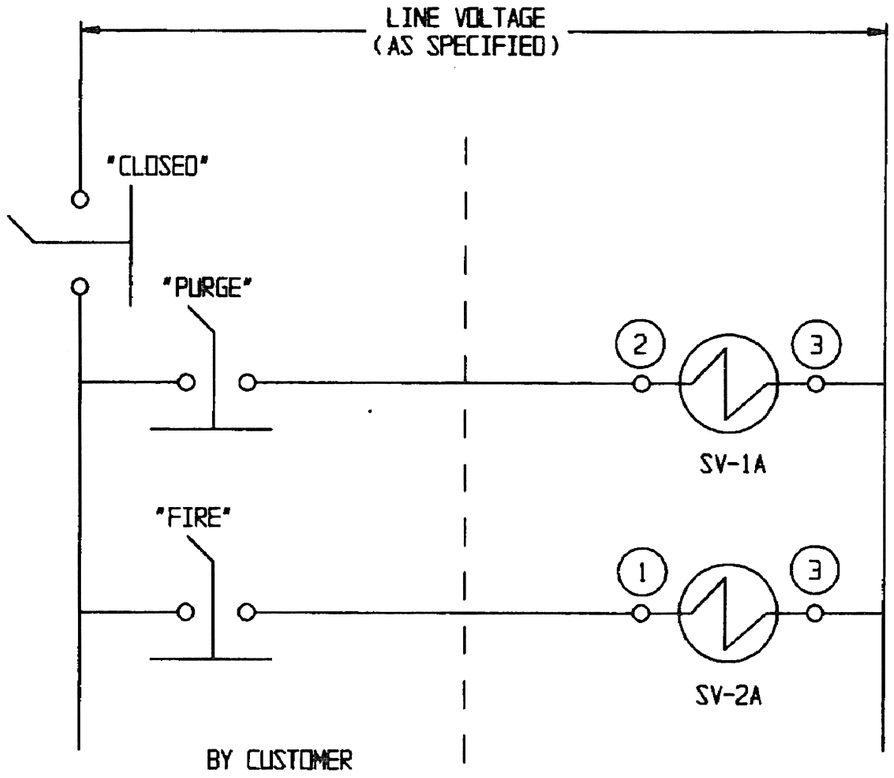
	DATE	BY
DWN	10/90	GCS
CHKD	10/90	JRB
APVD	.	.

ELECTRICAL SCHEMATIC
OIL BURNER VALVE
PNEUMATIC - FAIL IN LAST
-
-
-

SUPERSEDES: -

ITT Engineered Valves
ITT Fluid Technology Corporation
Lancaster, Pa
SHEET 1 OF 1

SIZE	DRAWING NUMBER	REV
B	60-003	E



NOTES:
1) SV-1A AND SV-2A ARE MANIFOLDED SINGLE COIL SPRING RETURN SOLENOID VALVES.
2) SWITCHES ARE MAINTAINED CONTACT TYPE.
3) ○ REPRESENTS A WIRE NUMBER.
4) WIRE NUMBERS ARE FOR A.C. SOLENOIDS. SEE 60-009 FOR D.C. SOLENOID WIRE NUMBERS.
5) SV-1A CONTROLS PURGE FLOW. SV-2A CONTROLS FUEL OR FUEL AND ATOMIZING FLOW.
6) SEE ORDER SPECIFICATION FOR SOLENOID VOLTAGE RATING.

(A) THIS IS A FACTORY MUTUAL CONTROLLED DOCUMENT, CHANGES MUST BE APPROVED BY FM PRIOR TO IMPLEMENTING.

WR# -

PART NO. 60-004 PATTERN NO. -

REV	DATE	ECN NBR	BY	CHKD	APVD
-	-	-	-	-	-
-	-	-	-	-	-
-	-	-	-	-	-
-	-	-	-	-	-
A	11/03/94	1057	MEH	MJO	MJO

TOLERANCES EXCEPT AS NOTED
DECIMALS
.XX ± .02
.XXX ±.005
ANGLES ±0.50°
REMOVE ALL BURRS AND SHARP EDGES
ALL MACHINED SURFACES TO BE 125 EXCEPT AS NOTED

WEIGHT	SCALE
N/A	N/A

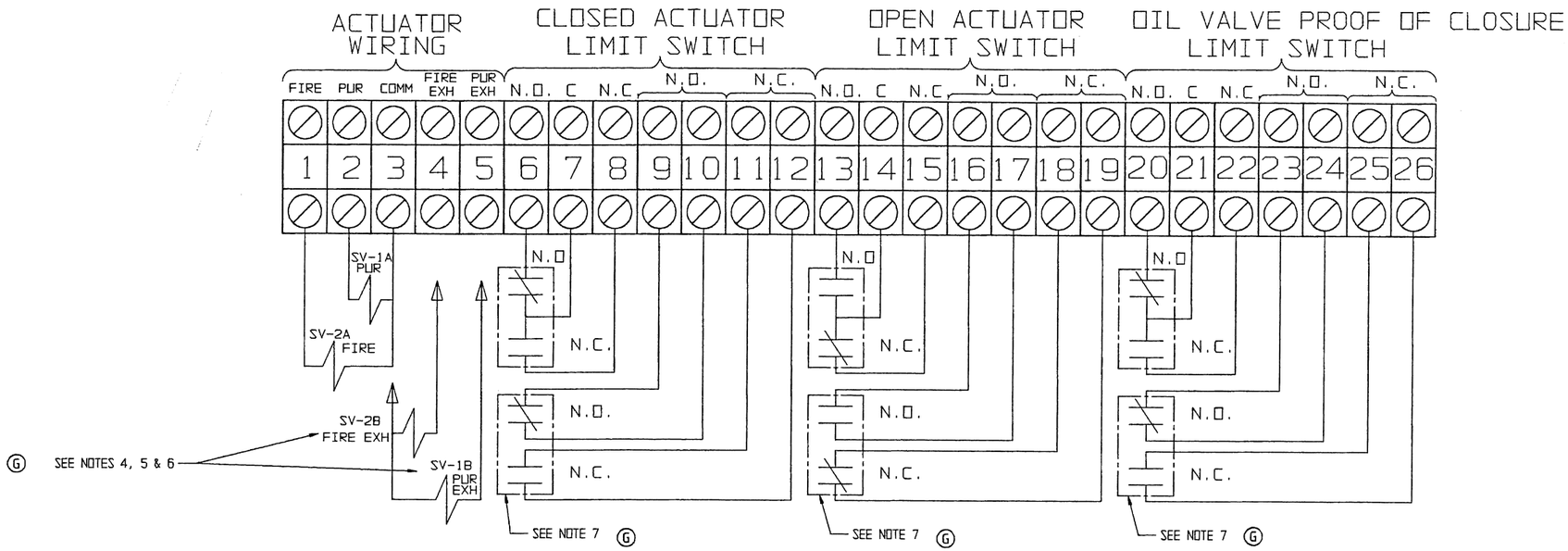
	DATE	BY
DWN	10/90	GCS
CHKD	10/90	JRB
APVD	.	.

ELECTRICAL SCHEMATIC
OIL BURNER VALVE
PNEUMATIC - FAIL CLOSED
-
-
-

SUPERSEDES:-

ITT Engineered Valves
ITT Fluid Technology Corporation
Lancaster, Pa
SHEET 1 OF 1

SIZE	DRAWING NUMBER	REV
A	60-004	A



SWITCH LOGIC

SWITCH TYPE	CLOSED ACTUATOR (SPDT)		CLOSED ACTUATOR (DPDT)				OPEN ACTUATOR (SPDT)		OPEN ACTUATOR (DPDT)				P.O.C. (SPDT)		OIL VALVE P.O.C. (DPDT)			
TERMINALS	6-7	7-8	6-7	7-8	9-10	11-12	13-14	14-15	13-14	14-15	16-17	18-19	20-21	21-22	20-21	21-22	23-24	25-26
POSITION: CLOSE	⊣⊢	⊣/⊢	⊣⊢	⊣/⊢	⊣⊢	⊣/⊢	⊣/⊢	⊣⊢	⊣/⊢	⊣⊢	⊣/⊢	⊣⊢	⊣⊢	⊣/⊢	⊣⊢	⊣/⊢	⊣⊢	⊣/⊢
POSITION: PURGE	⊣/⊢	⊣⊢	⊣/⊢	⊣⊢	⊣/⊢	⊣⊢	⊣/⊢	⊣⊢	⊣/⊢	⊣⊢	⊣/⊢	⊣⊢	⊣⊢	⊣/⊢	⊣⊢	⊣/⊢	⊣⊢	⊣/⊢
POSITION: FIRE	⊣/⊢	⊣⊢	⊣/⊢	⊣⊢	⊣/⊢	⊣⊢	⊣⊢	⊣/⊢	⊣⊢	⊣/⊢	⊣⊢	⊣/⊢	⊣/⊢	⊣⊢	⊣/⊢	⊣⊢	⊣/⊢	⊣⊢

NOTES:

1. *SOLENOID VOLTAGE IS A.C.*
2. *ALL SWITCHES SHOWN WITH MAIN VALVE IN CLOSED POSITION.*
3. *SEE ORDER SPECIFICATION FOR SOLENOID VOLTAGE RATING.*
4. *FOR T506, T1006 & T2006 DELETE SV-1B & SV-2B.*
5. *FOR T505, T1005 & T2005 INCORPORATE SV-1B & SV-2B.*
6. G *FOR T1007 INCORPORATE SV-2B, DELETE SV-1B.*
7. G *WIRING SHOWN FOR DPDT SWITCHES. FOR SPDT SWITCHES, DELETE WIRE NO.'S 9, 10, 11, 12, 16, 17, 18, 19, 23, 24, 25 & 26.*
8. G *FOR PURGE INDICATION, WIRE N.C. CONTACTS OF OPEN ACTUATOR AND CLOSED ACTUATOR LIMIT SWITCHES IN SERIES.*
9. G *PUR = PURGE.*

THIS IS A FACTORY MUTUAL CONTROLLED DOCUMENT, CHANGES MUST BE APPROVED BY FM PRIOR TO IMPLEMENTING.

ECN#8319

UNLESS OTHERWISE SPECIFIED, ALL DIMENSIONS IN BRACKETS ARE MILLIMETERS. PATTERN NO. -

EV_C 02/28/03

THIRD ANGLE PROJECTION

UNLESS OTHERWISE SPECIFIED, ALL DIMENSIONS ARE IN INCHES

UNLESS OTHERWISE NOTED
INCH: X = ± 0.06; .X = ± 0.03; .XX = ± 0.02; .XXX = ± 0.005; X/X = ± 1/16; .X° = ± 5°; .X° = ± 1°
MM: [X] = ± [.76]; [.X] = ± [.5]; [.XX] = ± [.12]; .X° = ± 5°; .X° = ± 1°
REMOVE ALL BURRS AND SHARP EDGES. MACHINED SURFACES TO BE 125 EXCEPT AS NOTED.

WEIGHT	SCALE
-	NTS

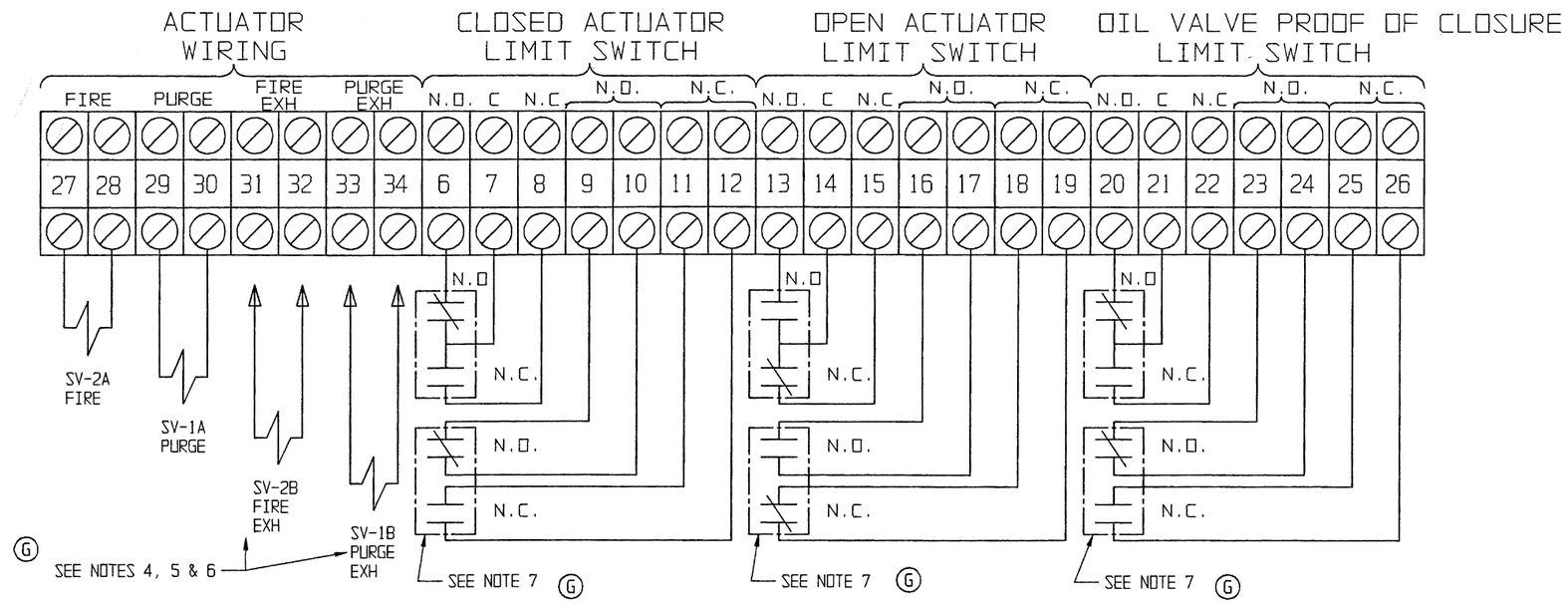
	DATE	BY
DWN	3-17-04	MS
CHKD	3-18-04	KCA
APVD	3-18-04	KCA

WIRING DIAGRAM
OIL BURNER VALVE
PNEUMATIC - AC SOLENOIDS
-
-
SUPERSEDES:-

ITT Industries
Engineered Valves
Lancaster, PA USA

SIZE	DRAWING NUMBER	SHEET	REV
C	60-008	1 OF 1	G

FILE COPY



SWITCH LOGIC

SWITCH TYPE	CLOSED ACTUATOR (SPDT)		CLOSED ACTUATOR (DPDT)				OPEN ACTUATOR (SPDT)		OPEN ACTUATOR (DPDT)				P.O.C. SPDT		OIL P.O.C. (DPDT)			
TERMINALS	6-7	7-8	6-7	7-8	9-10	11-12	13-14	14-15	13-14	14-15	16-17	18-19	20-21	21-22	20-21	21-22	23-24	25-26
POSITION: CLOSE	⊣⊢	⊣ ⊢	⊣⊢	⊣ ⊢	⊣⊢	⊣ ⊢	⊣ ⊢	⊣⊢	⊣ ⊢	⊣⊢	⊣ ⊢	⊣⊢	⊣⊢	⊣ ⊢	⊣⊢	⊣ ⊢	⊣⊢	⊣ ⊢
POSITION: PURGE	⊣ ⊢	⊣⊢	⊣ ⊢	⊣⊢	⊣ ⊢	⊣⊢	⊣ ⊢	⊣⊢	⊣ ⊢	⊣⊢	⊣ ⊢	⊣⊢	⊣⊢	⊣ ⊢	⊣⊢	⊣ ⊢	⊣⊢	⊣ ⊢
POSITION: FIRE	⊣ ⊢	⊣⊢	⊣ ⊢	⊣⊢	⊣ ⊢	⊣⊢	⊣⊢	⊣ ⊢	⊣⊢	⊣ ⊢	⊣⊢	⊣ ⊢	⊣ ⊢	⊣⊢	⊣ ⊢	⊣⊢	⊣ ⊢	⊣⊢

NOTES:

1. SOLENOID VOLTAGE IS D.C.
2. ALL SWITCHES SHOWN WITH MAIN VALVE IN CLOSED POSITION.
3. SEE ORDER SPECIFICATION FOR SOLENOID VOLTAGE RATING.
4. FOR T506, T1006 OR T2006, FAIL CLOSED, SV-1B & SV-2B (EXHAUST COILS) ARE NOT SUPPLIED. SOLENOIDS REQUIRE MAINTAINED CONTACT SWITCHES.
5. FOR T505, T1005 OR T2005, FAIL IN LAST POSITION, SV-1B & SV-2B (EXHAUST COILS) ARE SUPPLIED. SOLENOIDS REQUIRE MOMENTARY CONTACT SWITCHES.
6. (G) FOR T1007, FAIL IN LAST FIRE, FAIL CLOSED PURGE, SV-1B (EXHAUST COIL) IS NOT SUPPLIED. PURGE SOLENOID REQUIRES MAINTAINED CONTACT SWITCH, FIRE SOLENOID REQUIRES MOMENTARY CONTACT SWITCH.
7. (G) WIRING SHOWN FOR DPDT SWITCHES FOR SPDT SWITCHES DELETE WIRE NO'S 9, 10, 11, 12, 16, 17, 18, 19, 23, 24, 25, 26.
8. (G) FOR PURGE INDICATION. WIRE N.C. CONTACTS OF OPEN ACTUATOR AND CLOSED ACTUATOR LIMIT SWITCHES IN SERIES.

THIS IS A FACTORY MUTUAL CONTROLLED DOCUMENT. CHANGES MUST BE APPROVED BY FM PRIOR TO IMPLEMENTING.

ECN#8319

EV_C 02/28/03

THIRD ANGLE PROJECTION

UNLESS OTHERWISE SPECIFIED, ALL DIMENSIONS ARE IN INCHES

UNLESS OTHERWISE NOTED

INCH	MM
X = ± 0.06	[X] = ± [.76]
.X = ± 0.03	[.X] = ± [.5]
.XX = ± 0.02	[.XX] = ± [.12]
.XXX = ± 0.005	
X/X = ± 1/16	
X° = ± .5°	X° = ± .5°
X° = ± 1°	

REMOVE ALL BURRS AND SHARP EDGES. MACHINED SURFACES TO BE 125 EXCEPT AS NOTED.

UNLESS OTHERWISE SPECIFIED, ALL DIMENSIONS IN BRACKETS ARE MILLIMETERS. PATTERN NO. -

	WEIGHT -	SCALE NTS	
		DATE	BY
DWN	3.17.04		MS
CHKD	3-18-04		MA
APVD	3-18-04		MA

WIRING DIAGRAM
OIL BURNER VALVE
PNEUMATIC - DC SOLENOIDS
-
-
-

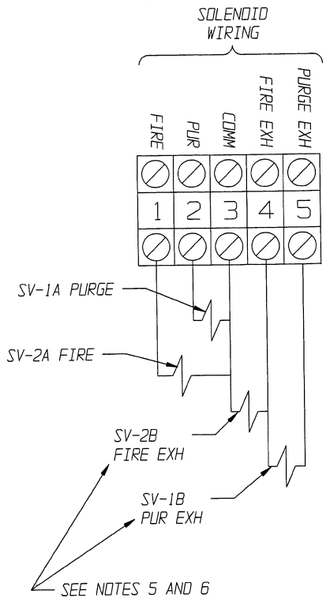
SUPERSEDES: -

ITT Industries
Engineered Valves
Lancaster, PA USA

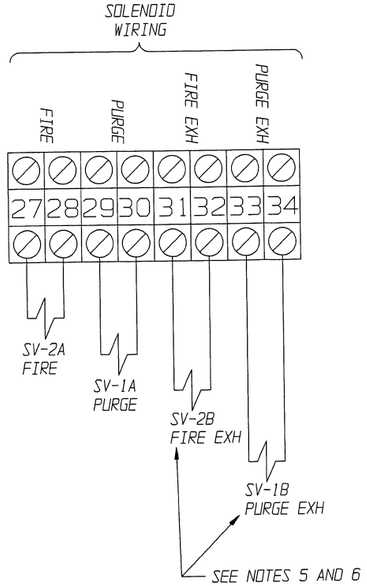
SIZE	DRAWING NUMBER	SHEET	REV
C	60-009	1 OF 1	G

FILE COPY

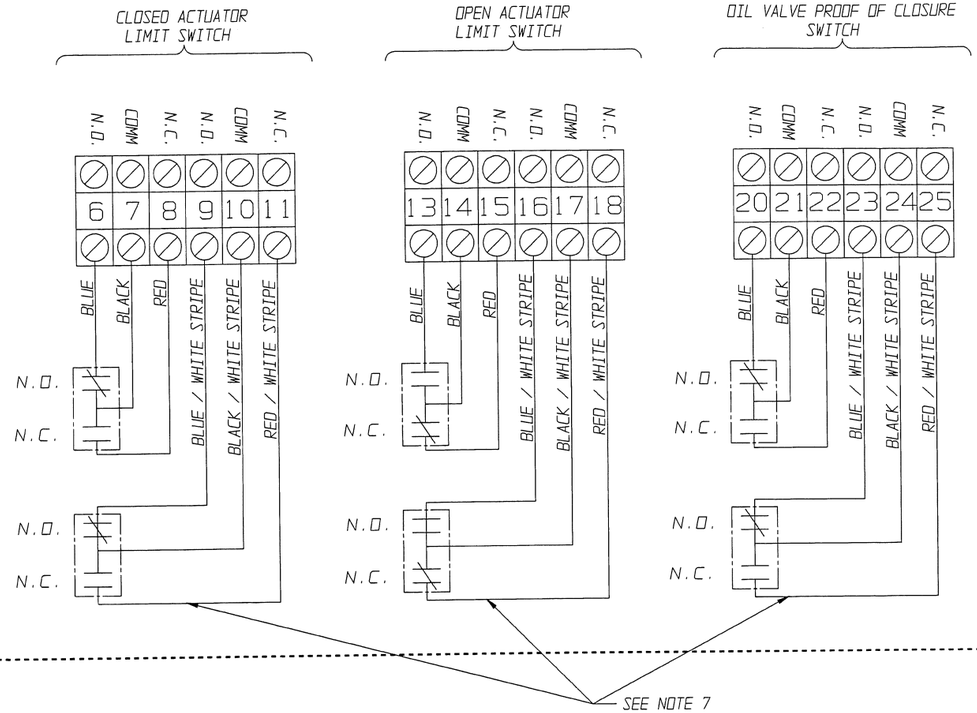
AC SOLENOID VOLTAGE WIRING DIAGRAM



DC VOLTAGE SOLENOID WIRING DIAGRAM



SWITCH WIRING DIAGRAM (B)



NOTES:
1. ALL SWITCHES SHOWN WITH MAIN VALVE IN CLOSED POSITION.
2. SEE ORDER SPECIFICATION FOR SOLENOID VOLTAGE RATING.
3. SEE ORDER SPECIFICATION FOR SWITCH TYPE AND RATING.
4. FOR PURGE INDICATION, WIRE N.C. CONTACTS OF OPEN ACTUATOR AND CLOSED ACTUATOR LIMIT SWITCHES IN SERIES.
5. FOR FAIL CLOSED OIL VALVE, SV-1B & SV-2B (EXHAUST COILS) ARE NOT SUPPLIED. SOLENOIDS REQUIRE MAINTAINED CONTACT SWITCHES.
6. FOR FAIL IN LAST POSITION OIL VALVES, SV-1B & SV-2B (EXHAUST COILS) ARE SUPPLIED. SOLENOIDS REQUIRE MOMENTARY CONTACT SWITCHES. DO NOT ENERGIZE BOTH COILS (IE; SUPPLY AND EXHAUST) FOR EACH SOLENOID SIMULATANEOUSLY OR DAMAGE WILL OCCUR.
7. THESE CONTACTS ARE NOT SUPPLIED FOR SPOT SWITCHES.

SWITCH LOGIC - SPDT

SWITCH TYPE	CLOSED ACTUATOR (SPDT)		OPEN ACTUATOR (SPDT)		OIL VALVE P.O.C. SWITCH (SPDT)	
TERMINALS	6-7	7-8	13-14	14-15	20-21	21-22
POSITION: CLOSE	⊣/	⊣⊢	⊣⊢	⊣/	⊣/	⊣⊢
POSITION: PURGE	⊣⊢	⊣/	⊣⊢	⊣/	⊣/	⊣⊢
POSITION: FIRE	⊣⊢	⊣/	⊣/	⊣⊢	⊣⊢	⊣/

SWITCH LOGIC - DPDT (B)

SWITCH TYPE	CLOSED ACTUATOR (DPDT)				OPEN ACTUATOR (DPDT)				OIL VALVE PROOF OF CLOSURE SWITCH (DPDT)			
TERMINALS	6-7	7-8	9-10	10-11	13-14	14-15	16-17	17-18	20-21	21-22	23-24	24-25
POSITION: CLOSE	⊣/	⊣⊢	⊣/	⊣⊢	⊣⊢	⊣/	⊣⊢	⊣/	⊣/	⊣⊢	⊣/	⊣⊢
POSITION: PURGE	⊣⊢	⊣/	⊣⊢	⊣/	⊣⊢	⊣/	⊣⊢	⊣/	⊣/	⊣⊢	⊣/	⊣⊢
POSITION: FIRE	⊣⊢	⊣/	⊣⊢	⊣/	⊣/	⊣⊢	⊣/	⊣⊢	⊣⊢	⊣/	⊣⊢	⊣/

UNLESS OTHERWISE SPECIFIED, ALL DIMENSIONS IN BRACKETS ARE MILLIMETERS. PATTERN NO. -

ECN# 10632

THIRD ANGLE PROJECTION

UNLESS OTHERWISE SPECIFIED, ALL DIMENSIONS ARE IN INCHES

UNLESS OTHERWISE NOTED
INCH: X = ± 0.06; .X = ± 0.03; .XX = ± 0.02; .XXX = ± 0.005; X/X = ± 1/16; .X° = ± .5°; X° = ± 1°
MM: (X) = ± (.76); (.X) = ± (.51); (.XX) = ± (.12); .X° = ± .5°; X° = ± 1°
REMOVE ALL BURRS AND SHARP EDGES. MACHINED SURFACES TO BE ▽ EXCEPT AS NOTED.

WEIGHT	SCALE
-	-

	DATE	BY
DWN	12/5/16	JH
CHKD	12/5/16	MCH
APVD	12/5/16	MCH

SUPERSEDES: -

WIRING DIAGRAM
OIL BURNER VALVE
WITH GO PRX SWITCHES
AC & DC SOLENOIDS
-
-

ITT Engineered Valves Group Lancaster, PA USA

SIZE	DRAWING NUMBER	SHEET	REV
D	116762	1 OF 1	B