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INSTALLATION, OPERATION AND MAINTENANCE INSTRUCTIONS

MODEL T4205C, T4206C & T4207C

Skotch® *Trifecta*® GAS VALVE SYSTEM

WARNING

Valves and valve actuators supplied by ITT 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 and use of products to handle caustic and/or hazardous substance when not design for that purpose.

If valve exhibits any indication of leakage, do not operate. Isolate valve and either repair or replace.

Technical Manual No. IOT4200C **Effective 8/31/2018**

REV LEVEL B

Record of Revisions

Revision	Description	Date
-	First Issue	07/21/03
A	Added model T4207C and revised format and text.	11/09/16
B	Revised Drawings	08/31/18

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DRAWINGS

119024	Valve Assembly - Model T4200C Systems
119122	Valve and Actuator Assembly
119125	POC Assembly (Optional)
119430	Wiring Diagram AC Solenoid
119431	Wiring Diagram DC Solenoid
119429	Pneumatic Schematic - Fail Closed
117624	Pneumatic Schematic - Fail In Last Position
119965	Junction Box (Optional)
60-021	Electrical Schematic - Fail-in-Last
60-022	Electrical Schematic - Fail-Closed

SAFETY NOTE:

	**The safety precautions in these operating instructions are specially marked with the standard symbol for danger when non-observance could result in personal injury, loss of life or property damage.**

CAUTION!	**Non-observance of these safety precautions can endanger the valve and its functions.**

I. DESCRIPTION

The Series T4200C Skotch® Burner Valve System provides all the isolation and venting functions necessary for automated operation of gas-fired burners in utility and industrial power plants. This includes double block of the main gas line and venting the chamber between blocks to atmosphere. Hence, the term "Double Block and Vent" or “Double Block and Bleed”. The vents are sized in accordance to IRI’s (Industrial Risk Insurers) and NFPA (National Fire Protections Association) recommended vent sizes. To satisfy code requirements, a Proof of Closure (POC) switch utilizing valve seal overtravel is supplied as standard to prove the valve is closed. Optional switches to monitor valve open position and a second Proof of Closure (POC) can offer added feedback for plant DCS systems.

The Model T4205C valve system, which is the Fail-in-Last Position model, utilizes a dual coil momentary contact pilot solenoid 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 T4205C valve systems can never be Factory Mutual (FM) approved.

Model T4206C & T4207C valve systems, which are the Fail Closed model, utilizes a single coil maintain contact spring return pilot solenoid for pneumatic operation and requires compressed air and electric power to open. The system closes on a loss of pneumatic or electric power.

Model T4206C valves incorporating specific configurations may be Factory Mutual approved for Natural Gas Safety Shutoff Valves per FM Approval Standard Class 7400. Valves configured for FM Approval are tagged as such.

Model T4207C valves incorporating specific options may not be Factory Mutual listed with valve configuration. Due to specific options these valves are not Factory Mutual (FM) approved.

Outside of the solenoid valve that controls the actuator all other aspects of the valve system are the same between the model numbers.

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 solenoid assembly nameplate or purchase order specifications to determine appropriate line voltage and type. Operation is in accordance with referenced drawings.

A. Open Block Valves (Close Vent)

T4205C, T4206C and T4207C valves follow similar opening protocol.

With pneumatic supply pressure regulated to a minimum of 60 psig and a maximum of 120 psig, apply line voltage across terminal points 1 and 2 for AC solenoids (Terminal points 18 and 19 for DC Solenoids). This energizes the pilot solenoid, allowing pneumatic pressure into the cylinder.

As pressure is admitted to the cylinder, the actuator return spring (for outlet valve) is compressed and the outlet valve plug moves out of its seat ring. Concurrently, the vent valve moves into its seat until first the soft seal and then a metal to metal backup seal is made closing the vent.

Upon vent closure, the piston continues to stroke. This pushes the inlet valve plug out of its seat ring, compressing the inlet valve return spring. Stroking stops when the actuator piston contacts a travel stop internal to the actuator. Flow commences only after the inlet plug clears its seat. Thus, no flow occurs until the vent is closed.

B. Close Block Valves (Open Vent)

How the valve is commanded Closed differs between different model numbers.

For T4205C valves:

Deleting voltage from terminals 1 and 2 and applying momentarily voltage across terminals 2 and 3 for AC solenoids (Terminals 20 and 21 for DC solenoids) energizes the exhaust coil and exhausts pneumatic pressure from the cylinder.

CAUTION!	**Note: Never energize both solenoid coils simultaneously. Doing so, will permanently damage the coils.**

For T4206C and T4207C valves:

Deleting voltage from terminals 1 and 2 for AC solenoids (Terminals 18 and 19) de-energizes the pilot solenoid and exhausts pneumatic pressure from the cylinder.

For all models:

Upon exhausting the cylinder, both inlet and actuator return spring (for outlet) move their respective plugs toward their seat rings. First the inlet valve soft seal makes, halting gas flow through the assembly, then its metal back-up. Next the vent moves off its seat, opening the vent and relieving downstream pressure. Finally, the outlet valve soft seal, followed by its metal back-up close, completing the cycle. Two independent blocks are formed between system inlet and outlet, with the chamber between the block valves ported to vent. The POC switch trips after the outlet valve soft seal starts into its seat.

C. Notes

For Model T4205C valves, the solenoid pilot valve is a dual coil momentary contact type, rated for continuous duty at the service voltage. **Note: Never energize both solenoid coils simultaneously. Doing so, will permanently damage the coils.**

For Model T4206C and T4207C valves, the solenoid pilot valve is a maintained contact type, rated for continuous duty at the service voltage.

A proof of closure (POC) switch is provided as standard for the outlet valve. The outlet valve POC is mounted to the side of the actuator yoke, just above the top of the valve. Logic is shown on the referenced wiring diagram. Some valves may be equipped with an optional open limit switch (mounted parallel to the outlet valve POC), and/or a second POC switch for the inlet, mounted to the special bracket on the bottom of the valve.

Note: Assemblies supplied with DPDT Switches provide all terminal points noted on Wiring Diagram. Valves supplied with SPDT switches have a reduce number of terminals. Reference drawing (119430 - AC, 119431 - DC) for details.

III. INSTALLATION

A. Unpacking

☑ Leave protective plastic plugs (in valve orifices) in place until ready to install.

☑ Only lift the valve using proper hoisting procedures; if using a sling, place it around the valve body.

 CAUTION!	**Note: Valve weighs over 160 lbf in base form. Use proper moving safety precautions for transporting the valve. Do not place the sling around the actuator, as damage can occur to the valve system.**

☑ Check valve to make sure all Warning and Visual Position Indication labels have remained properly adhered during shipping.

☑ If shipping packaging has been damaged, check for any signs of damage to the valve/actuation system. Consult factory if there is any signs of suspected damage.

B. Valve Installation

☑ Verify no debris or foreign objects are inside the valve.

☑ Purge the gas line prior to installing the valve.

CAUTION!	**Prior to installation and/or start-up, 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.**

☑ Verify proper pipe connections are available for the valve. Proper vent pipe sizing per NFPA 85 needs to be verified. The T4200C Skotch Trifecta Valve System is typically supplied with a female NPT vent connection and spigot inlet and outlet connections. (Note: Other end configurations available upon request.) Refer to order specification or purchase order specifications for type supplied. Valve installation should be in accordance with standard practices for end connection provided. Flanges are raised face carbon steel per ANSI B16.5. Threads are per ANSI B2.1. Ensure the weight of the system is properly supported to prevent excessive stresses. ***(Piping supports should be designed for a base valve weight slightly exceeding 160 lbf – options can add to this weight).*** Valve may be installed in any orientation. Ensure flow direction is appropriate for intended installation. Valves incorporating welded ends should follow special precaution to insure weld heat does not damage the valve seals and gaskets. Temperatures in these areas should be kept below 200° F.

CAUTION!	**Vent pipe size should be equivalent to the vent fitting size supplied. Reducing vent size may result in insufficient flow capacity. *Under NO circumstance should the vent be blocked or plugged.***

C. Pneumatic/Electrical Hook Up

Utilities required for operation are electrical power and clean dry compressed air. Wiring should be in accordance with referenced drawings and all applicable codes. Supply air should be filtered to 40 microns minimum and connected per referenced drawing.

☑ Purge all air lines prior to connecting solenoids.

CAUTION!	**Historically many problems at start-up are due to mishandling of the valve and poor purging of the fuel and pneumatic control lines.**

☑ Assure that pneumatic air supply to solenoid does not exceed 120 psig. A filtered, regulated supply air pressure between 60 and 120 psig needs to be provided for the valve for proper operation.

CAUTION!	**Failure to maintain proper pneumatic air line pressure could result in damage to the valve.**

☑ *Use suitable thread sealing compound only. Do not use PTFE tape.*

CAUTION!	***The exhaust side of the solenoid should not be restricted. This will slow the closing rate of the valve. Valve is supplied with an appropriate exhausting muffler that ensures proper closing rate. Please consult the factory for any solenoid replacement parts.***

Note: Some assemblies may include a filter regulator (Optional).

IV. COMMISSIONING

- ☑ Confirm that all valve connections have no leaks within appropriate pressure ranges.
- ☑ Confirm that upstream gas pressure has been properly regulated at or below valve maximum rated line pressure.
- ☑ Confirm that valve strokes properly when solenoid is energized, and that the visual indicator and switch/s are indicating correctly.
- ☑ Confirm that the valve strokes closed completely, and that visual indicator and switch/s are indicating as such.
- ☑ Confirm that the valve is properly supported.
- ☑ Confirm that the solenoid voltage is +0%, - 15% of pilot solenoid tag rating for continuous duty requirements.
- ☑ Verify that the valve has proper clearances top and bottom for any (in-line) disassembly needs in the future.

V. DISASSEMBLY AND MAINTENANCE INSTRUCTIONS

All T4200C Valve Systems may be completely disassembled without removal from the piping. However, it is recommended that it be rebuilt in a shop with suitable fixturing, hoisting equipment and tools.

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.

Refer to the Valve Assembly, and Valve Actuator Assembly drawings listed above. Item numbers, **(x),** refer to referenced drawings.

	**Ensure all manual isolation valves are closed and tagged out, all electrical circuits are de-energized and that the pneumatic supply and valve are isolated and depressurized before performing any work on the valves.**

IMPORTANT: Special tools are needed for disassembly and assembly. They should be procured before work begins.

Special tools include:

ITT P/N: 43026, Tool Seat Ring Wrench T4200C. Needed to remove the seat from the body.
ITT P/N: 43027, Tool Seal Assembly Tool T4200C. Needed to replace the inlet & outlet soft seals.
ITT P/N: 43028, Tool Seal Protector T4200C. Needed during installation of outlet valve stem.
ITT P/N: 43032, Tool Actuator Disassembly. Needed to safely disassemble/assemble actuator that is under compression spring pressure.

A. Disassembly

A clean dry area should be provided for valve disassembly.

1) Detach Actuation Assembly (reference drawing 119122)

Remove four screws (78) to remove lens cover (77). Set aside.

Loosen coupler set screw (57), and remove trip bracket (62) and hardware (63), (64), (65). Set aside trip bracket & mounting hardware. Unthread coupler (56) while holding valve stem with wrench. Care should be taken not to allow the stem to rotate. Allow the coupler to drop down on the attachment nut. Item (53) will be loose when removing coupler, set loose washer aside. While holding valve stem with a wrench, remove spherical nut (52) – this has a small amount of retaining Loctite on the threads.

Using a punch and hammer, loosen attachment nut (51), unthread until completely

loose.

Carefully pull the Yoke/Actuator subassembly up off the top of the valve. Set aside the attachment nut (51) and coupler (56). Examine the coupler washer (54) for wear around the ID. Replace if more than 0.010" has been worn away.

If rebuilding the actuator (59), please consult the factory to purchase the appropriate rebuild kit, and Actuator Disassembly Tool (P/N 43032). Instructions for rebuilding the actuator are contained in the rebuild kit. Unthread and remove coupler adapter (55), jam nut (58), and actuator stud nuts (60), lock washers (61), to remove actuator.

	**The actuator (as labeled) is under spring compression. Under no conditions should user disassemble actuator without appropriate tool from ITT. Failure to comply could result in bodily injury or death.**

2) Valve Disassembly (reference drawing 119024)

Unscrew the vent flange (32) from the body using a strap wrench. Remove o-ring (13), thrust washer (10), and vent shaft seal (11). **NOTE:** Care should be taken when vent connection is located on bottom, as Return Spring (5) will drop out with vent flange. The inlet block subassembly may also drop out with vent connection.

Remove return spring (5) and the inlet valve subassembly. Using seal assembly tool (P/N 43027) and appropriate adjustable wrench, disassemble the inlet disk (8) from the vent cap (7). Medium grade Loctite is used to retain the threads. Remove the inlet seal (9).

Reaching into the valve body, carefully slide the outlet valve subassembly out of the valve body. Using seal assembly tool (P/N 43027) and appropriate adjustable wrench, disassemble the outlet plug (19) from the outlet stem (22). Medium grade Loctite is used to retain the threads. Remove the outlet seal retaining washer (21) and outlet seal (20).

Remove vent seal capscrew (14), retaining washer (15). Slide off the vent seal retainer (17) and vent seal (16). Also slide off vent spring (18). Note: vent seal capscrew has a small amount of medium grade Loctite to retain threads.

Inspect the seat ring (3) for any signs of scratches, voids in the sealing area.

Remove for replacement as necessary using seat ring wrench (P/N 43026). Remove seat ring o-ring (4). Note: vent seal capscrew has a small amount of medium grade Loctite to retain threads.

Remove four cap screws (30) in top flange (23) and slide top flange out of valve body. Remove o-ring (31), and using snap ring pliers, remove retaining ring (24). Slide out flat washer (25), and stem u-cup seal (26). The valve is now fully disassembled.

3) Disassembly of Valve with Second POC Switch (reference drawing 119125)

Before beginning Section 2) above, loosen set screw (113) and allow switch Actuator (112) to drop loose. Using a punch and hammer loosen attachment nut (111) closest to body, and unthread. Drop the entire POC subassembly off the vent shaft.

Using snap ring pliers, remove retaining ring (121). Slide out flat washer (122), and stem u-cup seal (123) from the bottom POC flange (120). Remove the wiper seal (130) from the vent flange (32).

See Section 2) above for the remainder of the valve disassembly.

B. Valve Rebuilding

Reference the same drawings as above. For the most part, rebuilding will follow a reverse order of the above instructions. For rebuild kits, please contact the factory. Rebuild kits will include usual soft seal type parts. Metal components must be ordered separately.

1) Discarded components:

Seat ring o-ring (4)
Inlet seal (9)
Vent shaft seal u-cup (11)
Vent flange o-ring (13)
Vent seal (16)
Vent spring (18)
Outlet seal (20)
Outlet stem seal u-cup (26)
Top flange o-ring (31)
POC Bottom flange seal u-cup (123)
POC vent flange wiper seal (130)

2) Components to Inspect:

Inlet disk (8), and outlet plug (19) have metal-metal seating rounded surfaces. Inspect radius surfaces for wear or score marks. Replace as required.

Seat ring (3), and cap vent (7) have internal chamfer surfaces for metal-metal seating. Inspect chamfer surface for wear, voids, and deep scratches. Replace as required.

Inspect vent shaft (6) and outlet stem (22) outside diameters for heavy wear in the u-cup sealing areas. Wear that one can catch his finger on indicates replacement is necessary. Check bearing IDs for wear, and replace flange subassemblies as required.

As mentioned above, examine the coupler washer (54) for wear around the ID. Replace if more than 0.010" has been worn away.

3) Valve Reassembly (reference drawing 119024)

Wire brush and clean any threaded joints that were locked with Loctite.

Clean all re-usable metal components with good quality solvent.

Apply primer and Loctite 242 to threads on the seat ring (3). Apply a small amount of o-ring lube (such as Dow Corning 55) to the seat ring o-ring seal (4), and set in position shown on drawing on the seat ring (3). Carefully hand threads the seat ring subassembly into the body (1). Monitor o-ring position on the seat ring as it is threading in. If the o-ring moves out of the step on the seat ring while threading it in, reposition the o-ring, as damage may occur to the seal, and it will not provide the necessary seal.

Reassemble inlet valve subassembly by applying small amount of o-ring lube to inlet seal (9) mating surfaces. Set the seal in position on the inlet disk (8), apply primer and Loctite 242 to threads on cap vent (7). Using seal assembly tool (P/N 43027), thread inlet disk (8) & seal (9) onto the cap vent (7). NOTE: thread the inlet disk until it stops on metal shoulder of the cap vent. You will feel the metal-metal stop as it is threading.

Reassemble the outlet valve subassembly by applying small amount of o-ring lube to the outlet seal (20) mating surfaces. Set the seal in position on the outlet plug (19). Lay seal retainer washer (21) on top of seal (20), align center

hole. Apply primer and Loctite 242 to the threads of the outlet stem (22), and thread into plug using the seal assembly tool (P/N 43027) and wrench (on the outlet stem). As with inlet assembly above, thread the stem in until the retainer washer (21) has met the metal shoulder on the plug (19). You will feel the metal-metal stop while threading.

Turn over the subassembly. Stack the three separate vent wave springs (18) on top of one another, in a nested fashion. Slide the wave springs down over the boss on the outlet plug (19). Slide the vent washer retainer (17) on next, now in contact with wave spring (18). Lay the vent seal (16) into the well of the washer retainer (17). Make sure that the vent seal (16) does not sit outside the side walls of the retaining feature of the washer retainer. Sub-assemble the vent seal retainer (15) onto the capscrew (14), apply primer and Loctite 242 to the threads of the capscrew, and thread into the threaded hole on the boss of the outlet plug (19). Care must be taken not to pinch the vent seal (16). Capscrew should thread into outlet plug (19) & vent seal (16) expanded. Allow the vent seal to expand, but not touch the side wall of washer retainer (17). The outlet subassembly is now ready for final assembly.

Sub-assemble the top flange. Apply a small amount of o-ring lube to a new outlet stem u-cup seal (26) and insert into the top flange (23) as shown on drawing (U-cup opening to pressure side). Drop in the flat washer (25), and hold in place with the snap ring (24). Make sure the snap ring is correctly in position, and holds the subassembly together. Apply a small amount of o-ring lube to a new top flange o-ring seal (31). Assemble the o-ring (31) into its groove on the top flange (23). The top flange subassembly is now ready for final assembly.

Thread the protective sleeve (P/N 43028) onto the threaded end of the outlet stem (22). Set the top flange subassembly into the body (1) as shown on the drawing, care must be taken to not damage the o-ring seal. Place anti-sieze on the threads of the four top flange capscrews (30). Thread capscrews (30) into top flange with torque wrench set to 15 ft-lb. Torque in a criss-cross pattern. Re-torque to 25 ft-lb. in a criss-cross pattern.

Insert the outlet valve subassembly, stem first, into the valve body (1), and up through the top flange subassembly. Care must be taken when inserting the protective sleeve through the stem seal (26). Seat the assembly until the plug (19) goes metal-metal with the seat ring (3).

Insert the inlet block assembly into the valve body (1) as shown on the drawing (seal end first) until the cap vent goes metal-metal with the seat ring (3). Slide the return spring (5) down over vent shaft (6), and place thrust

washer (10) on top of spring. Apply a small amount of o-ring lube to a new vent shaft u-cup seal (11), and insert the u-cup onto the vent shaft (6) in direction as shown on the drawing (U-cup opening to pressure side). Apply a small amount of o-ring lube to a new vent flange o-ring seal (13),and set in position the body (1) as shown on the drawing. Prepare the vent flange (32) by applying a small amount of anti-seize on the threads. Align the vent shaft (6) with the bearing in the vent flange (32), and begin to hand thread the vent flange into the body (1). Continue vent flange threading with a strap wrench until metal-metal tight with the body (1). Assure that the o-ring did not get cut during the threading operation. Valve assembly is now complete.

4) Valve – Actuation Assembly (reference drawing 119122)

Lubricate the surface of the coupler washer (54) and bottom ID of the coupler (56) with appropriate lube. Place the washer (54) into position in the coupler (56) as shown in the drawing. Place yoke (50) with actuator (59) attached down over valve stem (22). Slide the attachment nut (51) down over valve stem, as well as the coupler subassembly from above. Thread on the attachment nut (51) to the top flange (23). Align yoke (50), lock in place with a punch and hammer. Assure that the yoke (50) does not rotate on the top flange when assembly is complete. Apply primer and a small amount of Loctite 242 to the valve stem threads (22). Thread on spherical nut (52) using appropriate wrenches to keep stem from rotating.

Lubricate the top surface of the spherical nut (52), and the spherical washer (53) with anti-sieze. Align all of the parts with the actuator stem/coupler adapter (55), and thread the coupler (56) by hand until it stops. Do not overtighten yet. With both hands clear of the yoke (50), apply air into the actuator to stroke the valve. When stem motion has ceased, continue to thread coupler (56) at least one complete turn using only hand wrenches, then align trip bracket mounting holes with the side slot in the yoke (50) where the switches are mounted. (A total of one – two thread turns will be completed). Check to see if valve stem still has very slight free axial motion to permit alignment float of the stems. Remove air from actuator, and allow valve to close completely.

	**Hands must be clear of the yoke box area before applying or relieving air to/from the actuator and moving the valve stem. Failure to comply could result in bodily injury.**

Lock the coupler (56) in position with set screw (57) as shown on the drawing. Attach the trip bracket (62) with mounting hardware (63) (64) (65). Attach lens (77) with screws (78). Valve-Actuator assembly is now complete. After reassembly, the valve and switches should be tested per the following procedures in Sections VI and VII.

5) Re -assembly of Valve with Second POC Switch (reference drawing 119125)

Apply o-ring lube to bottom flange u-cup seal (123), insert u-cup into bottom flange (120) as shown on drawing. Drop in flat washer (122), and secure in place with snap ring (121). Apply o-ring lube to vent flange wiper seal (130), and insert into vent flange (32) as shown on the drawing.

Start the POC subassembly up over the vent shaft (6) protruding from bottom of valve. Slide attachment nut (111) over vent shaft (6) once the bracket is started, and also slide the switch actuator onto the vent shaft as shown on drawing. Continue sub-assembling bracket to vent flange by threading on the attachment nut (111). Tighten attachment nut with punch and hammer.

Preset the switch actuator close to where the switch trips at the very end of the closing stroke, and also allows the vent shaft to move when valve is opening to full open position. Tight set screw (113). After reassembly, the valve and switches should be tested per the following procedures in Sections VI and VII.

C. Valve Maintenance

Periodic Inspection

☑ Periodic leak testing of both block valves and verification of proper operation of proof of closure switch is recommended per the time schedule in the applicable codes. See Section VI for leak testing and Section VII for switch setting techniques.

- ☑ Inspect solenoid and actuator breather vents for foreign debris that can clog the breathing surfaces. Clean thoroughly or replace as required.
- ☑ Check for proper position and adhesion of the visual indicator label, and caution labels.
- ☑ Inspect switch trip brackets for straightness, that they are not bent, giving false readings.
- ☑ Ensure that the clear lens is attached. Re-install if missing.
- ☑ "Snoop" all sealing joints to make sure there are no external valve leaks.
- ☑ Check actuator supply air line for proper pressure settings (60 –120 psig)
- ☑ Check condition of all wiring/conduit and fittings for electrical components.

Preventative Maintenance

Valve soft seals should be replaced every 4 – 5 years **UNLESS** regular leak test inspections indicate earlier need. See Section VI for leak testing. See Section IX for information on ordering replacement parts for your Skotch Safety Shutoff valve.

VI. LEAK TESTING

It is necessary to leak test each block valve and the vent valve individually to properly qualify the status of each seal. The valves are named in accordance to their position and function within the valve system.

A. Inlet Valve

1. Verify the valve is in the closed position.

2. Seal the outlet of the valve.

3. Pressurize inlet with 60 psig clean dry air while monitoring leak rate from the vent port. FM specifies a leak rate of 24 in^3/hr or less.

B. Outlet Valve

4. Verify the valve is in the closed position.

5. Seal the inlet side of the valve.

6. Pressurize the vent with 60 psig clean dry air while monitoring leak rate from the outlet. FM specifies a leak rate of 24 in^3/hr or less.

C. Vent Valve

1. Verify the valve is in the open position.

2. Seal the outlet port.

3. Pressurize the inlet with a maximum of 60 psig clean dry air, while monitoring the leak rate from the vent port. FM specifies a leak rate of 24 in^3/hr or less.

VII. PROOF OF CLOSURE SWITCH TESTING

The T4200C valve system is provided with one proof of closure switch as standard. It can be provided with an optional open switch. The valves can also be provided with a second (inlet block) POC switch as well. Check the order specification for configuration provided.

The intent of the POC switch is to trip during valve seal overtravel of the valve block. Valve seal overtravel is the additional travel the valve strokes after flow stops. For reference FM defines the point of valve closure when flow < 24 in^3/hr. The switches should only change contact state when there is no flow. For example: When going from open to close, gas flow should stop and then the POC switch trip. Conversely, when going from closed to open the POC switch should change contact states prior to flow starting.

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

1. Testing

a) Verify the valve is in the closed position and the normally closed contacts are made.

b) Plug the inlet port. Stroke the valve very slowly until the switch trips. At this point, stop movement of the actuator and verify flow has not commenced (< 24 in^3/hr) by pressurizing the vent port to 50 psig and measuring flow at the outlet. The actuator can be stroked slowly by regulating air pressure to the actuator.

c) If there is evidence of flow prior to the POC switch tripping, the POC switch needs to be adjusted.

2. Setting

a) Loosen the roller switch lever (Item 67 or 102).

b) Place a 0.100" shim between the switch actuator (Item 62 or 112) and the roller switch lever.

c) While holding the roller firmly against the actuator shaft, rotate the switch actuator shaft until the normally closed contacts of the

switch break. At this point securely fasten the lever to the switch actuator shaft.

d) Remove the spacer. The roller switch lever should be firmly resting on the switch shaft and the normally closed contacts made.

e) Check switch setting by stroking the valve to the open position. Pressurize the vent with 50 psig and monitor the flow at the outlet valve. If the switch trips before flow ceases, repeat but decrease shim thickness by 1/32". If the switch does not reset, increase the shim thickness by 1/32".

VIII. MISCELLANEOUS INSTRUCTIONS FOR SPECIAL OPTIONS

Due to customer requirements, some T4200C 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.

IX. SPARE PARTS ORDERING INFORMATION

Orders for T4200C Valve Systems Spare Parts, rebuild kits, and tools should be placed with:

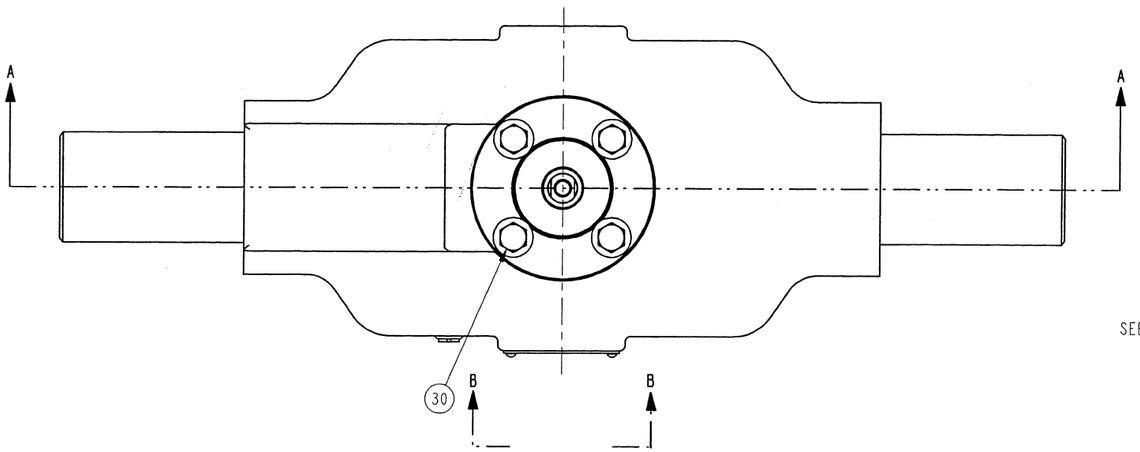
ITT Engineered Valves, LLC
33 Centerville Road
Lancaster, PA 17603-2064

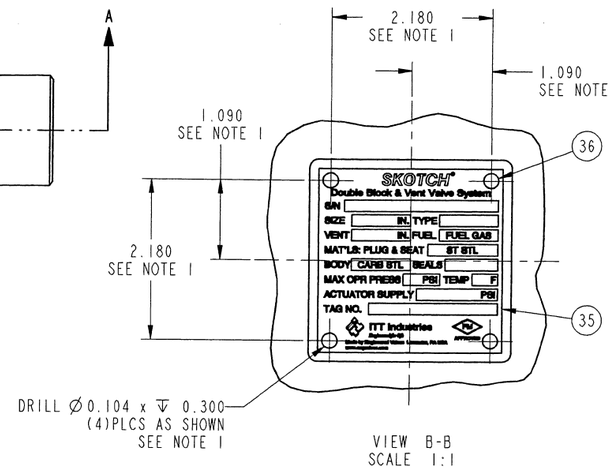
Phone: 717-509-2200
Fax: 800-348-9000

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.

X. REFERENCE INFORMATION

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

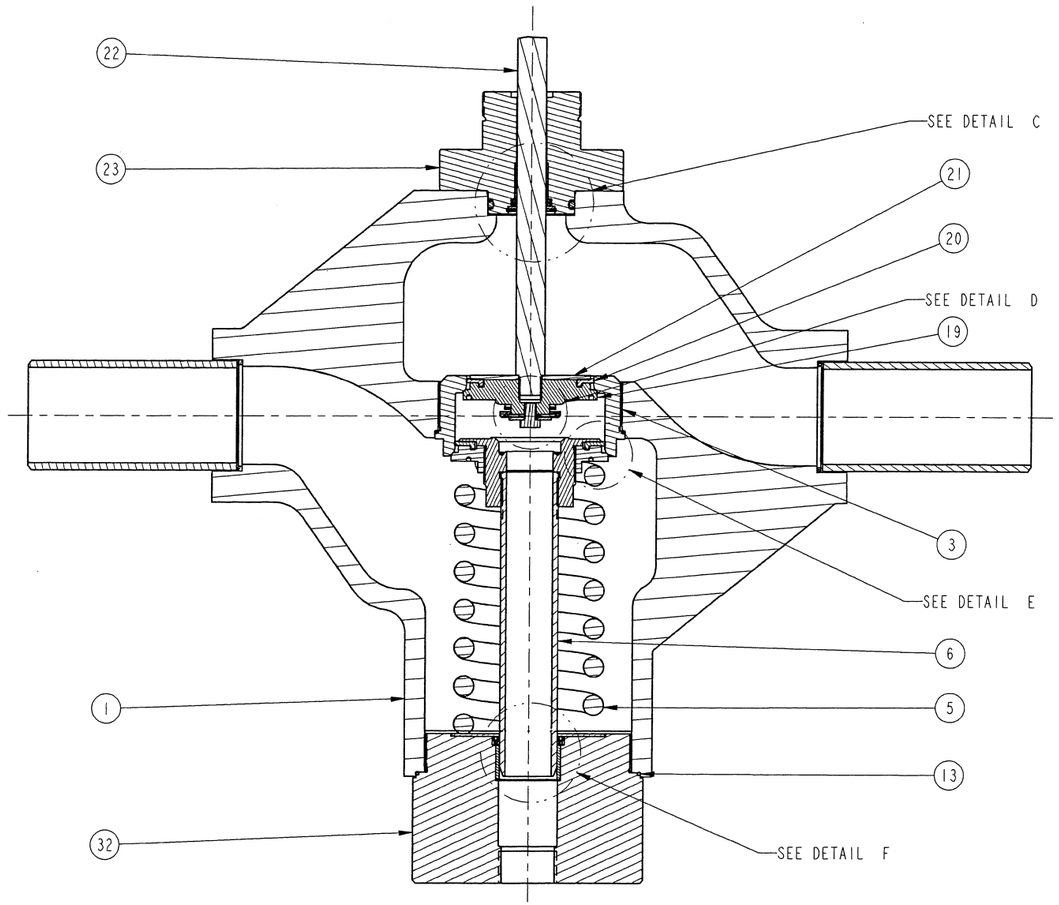




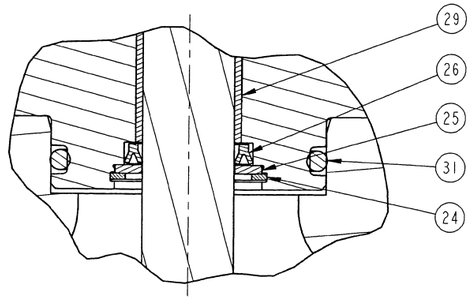
VIEW B-B
SCALE 1:1

LIST OF PARTS			
ITEM	DWG. NO.	QTY.	DESCRIPTION
1	119022	1	BODY ASSEMBLY
3	119025	1	RING-SEAT
#4	106308	1	O RING 045
#5	-	1	SPRING-INLET VALVE
6	119119	1	TUBE-VENT SHAFT
7	119023	1	CAP-VENT SHAFT
8	119026	1	DISC-INLET
#9	119045	1	SEAL-INLET
10	-	1	WASHER-THRUST 3.312 x 1.255 x 0.063
#11	-	1	U-CUP SEAL 84050125
12	-	1	BEARING 1.250 x 1.406 x 0.750
#13	106308	1	O RING 048
14	C2-2.1	1	CAPSCR-HEX 0.25-28 x 0.38
15	119117	1	RETAINER-VENT SEAL
#16	119104	1	SEAL-VENT
17	119116	1	WASHER-RETAINER
#18	-	3	WAVE-SPRING
19	119027	1	PLUG-OUTLET
#20	119044	1	SEAL-OUTLET
21	119114	1	RETAINER-OUTLET SEAL
22	119123	1	STEM-OUTLET
23	119115	1	FLANGE-TOP END
24	-	1	RING-RETAINING N5001-100ZD
25	119019	1	WASHER-FL 0.995 x 0.635 x 0.058 STN STL
#26	-	1	U-CUP SEAL 840400625
29	-	1	BEARING 0.623 x 0.719 x 0.750
30	C2-2.1	4	CAPSCR-HEX 0.38-16 x 1.00 STN STL
#31	106308	1	O RING 223 FDA
32	119120	1	FLANGE-VENT
35	119106	1	TAG-FM GAS
	119107	1	TAG-NON FM GAS
36	-	4	RIVET-#0 U-DRIVE 0.19 CS

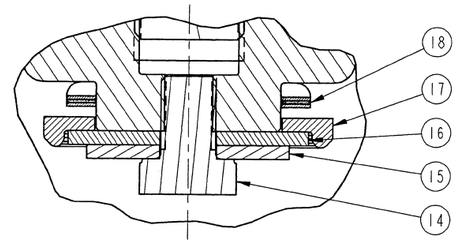
NOTES:
1. DRILL (4) HOLES TO DEPTH SHOWN ON RAISED PAD. ATTACH ITEM 35 WITH (4) ITEM 36.
#2. RECOMMENDED SPARE PARTS.



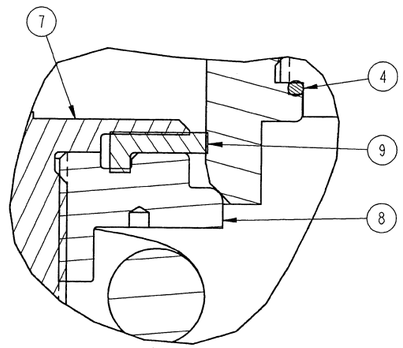
SECTION A-A



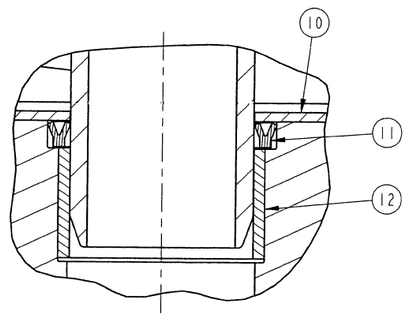
DETAIL C
SCALE 2:1



DETAIL D
SCALE 3:1



DETAIL E
SCALE 3:1



DETAIL F
SCALE 2:1

ECN# 6510

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; ANG ± 1°
MM: [X] ± [1.52]; [.X] ± [0.76]; [.XX] ± [0.13]; ANG ± 1°
REMOVE ALL BURRS AND SHARP EDGES. MACHINED SURFACES TO BE 63 EXCEPT AS NOTED.

WEIGHT	SCALE 63:100		
	DATE	BY	
DWN	11-29-05	JWP	
CHKD	4-27-06	HCL	
APVD	4/27/06	HCL	

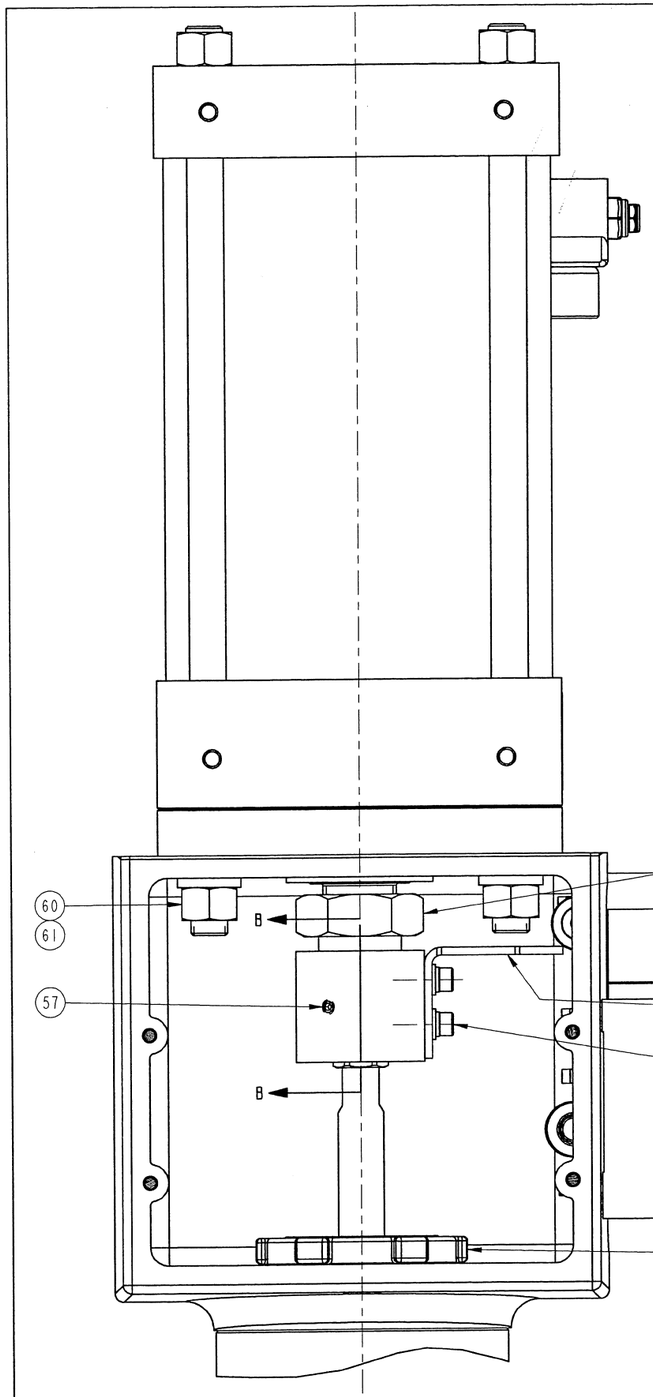
INLET VALVE ASSY
SKOTCH IGNITER
T4200C
-
-
SUPERSEDES:

ITT Industries
Engineered Valves
Lancaster, PA USA

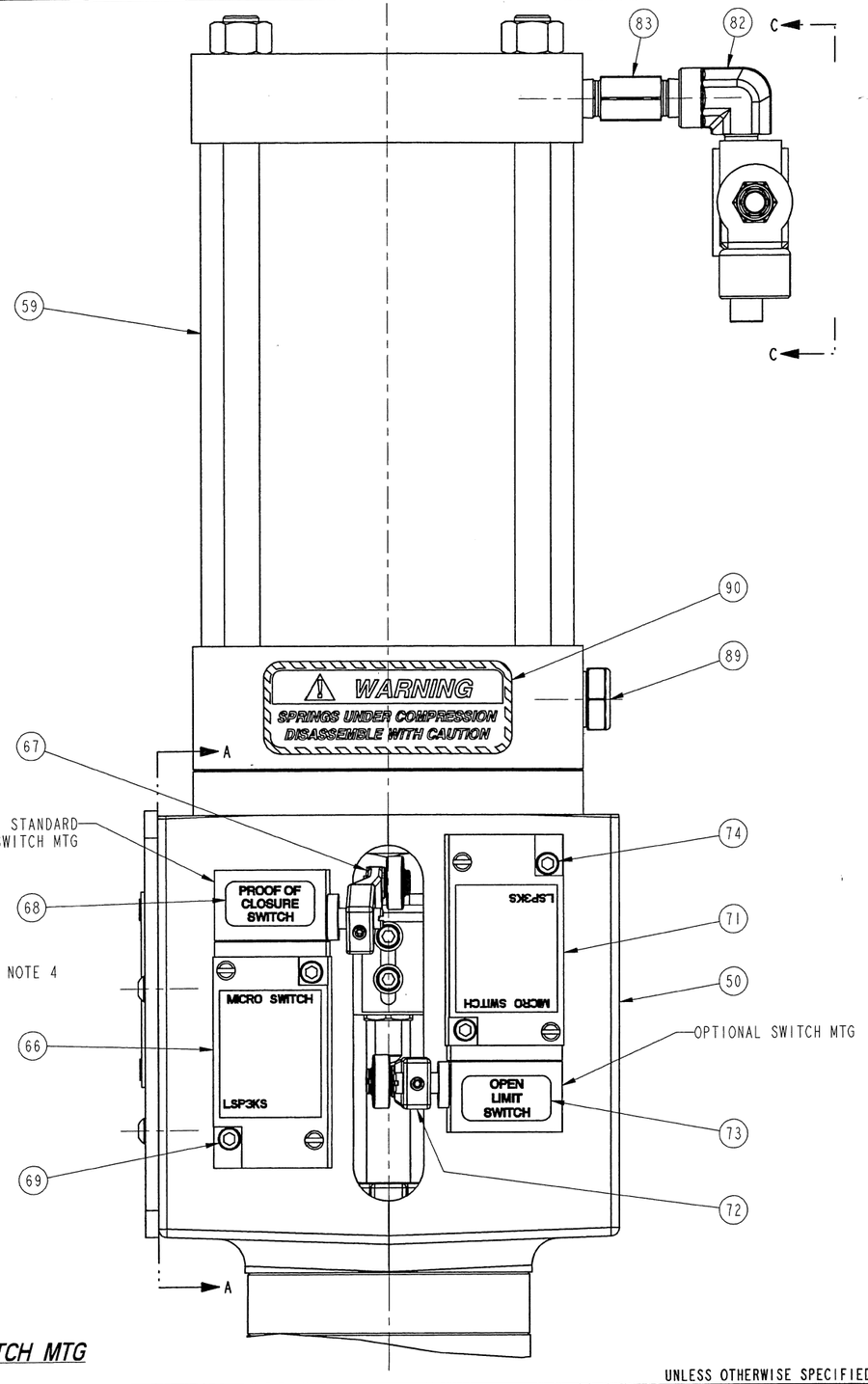
SIZE	DRAWING NUMBER	SHEET	REV
D	119024	1 OF 1	A

FILE COPY

EV_D 03/07/03



SECTION A-A



NEMA 4 & 4X SWITCH MTG

LIST OF PARTS			
ITEM	DWG. NO.	QTY.	DESCRIPTION
50	117602	1	YOKE
51	-	1	NUT-LOCK
52	-	1	NUT-SPHERICAL FLANGE 0.38-16
53	-	1	WASHER-SPHERICAL 0.38
54	119046	1	WASHER-FL 1.40 x 0.80 x 0.66
55	119011	1	ADAPTER-COUPLING
56	119013	1	HOUSING-COUPLING
57	C2-2.5	1	SETSCR-HXSK 10-32 x 0.38
58	C2-3.2	1	NUT-HEX JAM 1.00-14
59	119085	1	ACTUATOR
60	C2-3.1	4	NUT-HEX 0.50-20
61	C4-4.5	4	LOCKWASHER-SPRING 0.50
62	119012	1	BRACKET-SWITCH
63	C2-2.6	2	CAPSCR-HXSKT 10-32 x 0.38
64	C4-4.5	2	LOCKWASHER-SPRING 10
65	-	2	WASHER-PLAIN 10 TYPE B NAR
# 66	-	1	SWITCH-MICRO LSP3K (NEMA 4) SWITCH-MICRO LS2H4K3 (NEMA 4X) SWITCH-MICRO LSXP3K3 (NEMA 7)
67	-	1	LEVER-OPERATING LSZ59B (NEMA 4) LEVER-OPERATING LS2Z51B (NEMA 4X) LEVER-OPERATING LSZ59A (NEMA 7)
68	117500	1	LABEL-POC SWITCH
69	C2-2.6	2	CAPSCR-HEXSKT 10-32 x 2.00 CAPSCR-HEXSKT 10-32 x 1.25
70	-	2	LOCKWASHER-SPRING HI-COLLAR 10
# 71	-	1	SWITCH-MICRO LSP3K (NEMA 4) SWITCH-MICRO LS2H4K3 (NEMA 4X) SWITCH-MICRO LSXP3K3 (NEMA 7)
72	-	1	LEVER-OPERATING LSZ59B (NEMA 4) LEVER-OPERATING LS2Z51B (NEMA 4X) LEVER-OPERATING LSZ59A (NEMA 7)
73	117760	1	LABEL-OPEN LIMIT SWITCH
74	C2-2.6	2	CAPSCR-HEXSKT 10-32 x 2.00 CAPSCR-HEXSKT 10-32 x 1.25
75	-	2	LOCKWASHER-SPRING HI-COLLAR 10
77	06-017	1	LENS
78	-	4	CAPSCR-BTN HD 10-32 x 0.50
79	119031	1	DECAL-LENS
# 80	-	1	SOLENOID-VERSA VPCV-60
81	-	1	MUFFLER-VENT 0.25NPT
82	-	1	ELBOW-STREET 0.25NPT
83	-	1	NIPPLE-HEX LONG 0.25NPT x 2.00
84	-	1	VALVE-CHECK INLET 0.25NPT
89	-	1	FILTER-BREATHER VENT 0.50NPT
90	90-018	1	LABEL-WARNING
91	-	1	PLATE-ADAPTER NEMA 7 (POC)
92	-	2	CAPSCR-BTN HD 10-32 x 0.50 STN STL (POC)
93	-	1	PLATE-ADAPTER NEMA 7 (OSW)
94	-	2	CAPSCR-BTN HD 10-32 x 0.50 STN STL (OSW)

NOTES:
1. FOR INLET VALVE ASSEMBLY, SEE DRAWINGS:
   T4150C - 118967
   T4200C - 119024
2. RECOMMENDED SPARE PARTS.
3. POSITION INDICATOR LABEL LOCATED AFTER LENS ATTACHMENT, ALIGNED WITH SWITCH BRACKET IN CLOSED VALUE POSITION.
4. PAINT LEADING EDGE WITH RED PAINT FOR VISUAL INDICATION.

ECN# 6510

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; XX = ± 0.03; XXX = ± 0.005; X/X = ± 1/16; ANG = ± 1°
MM: [X] = ± [.76]; [.X] = ± [.51]; [.XX] = ± [.127]; ANG = ± 1°
REMOVE ALL BURRS AND SHARP EDGES. MACHINED SURFACES TO BE 125 EXCEPT AS NOTED.

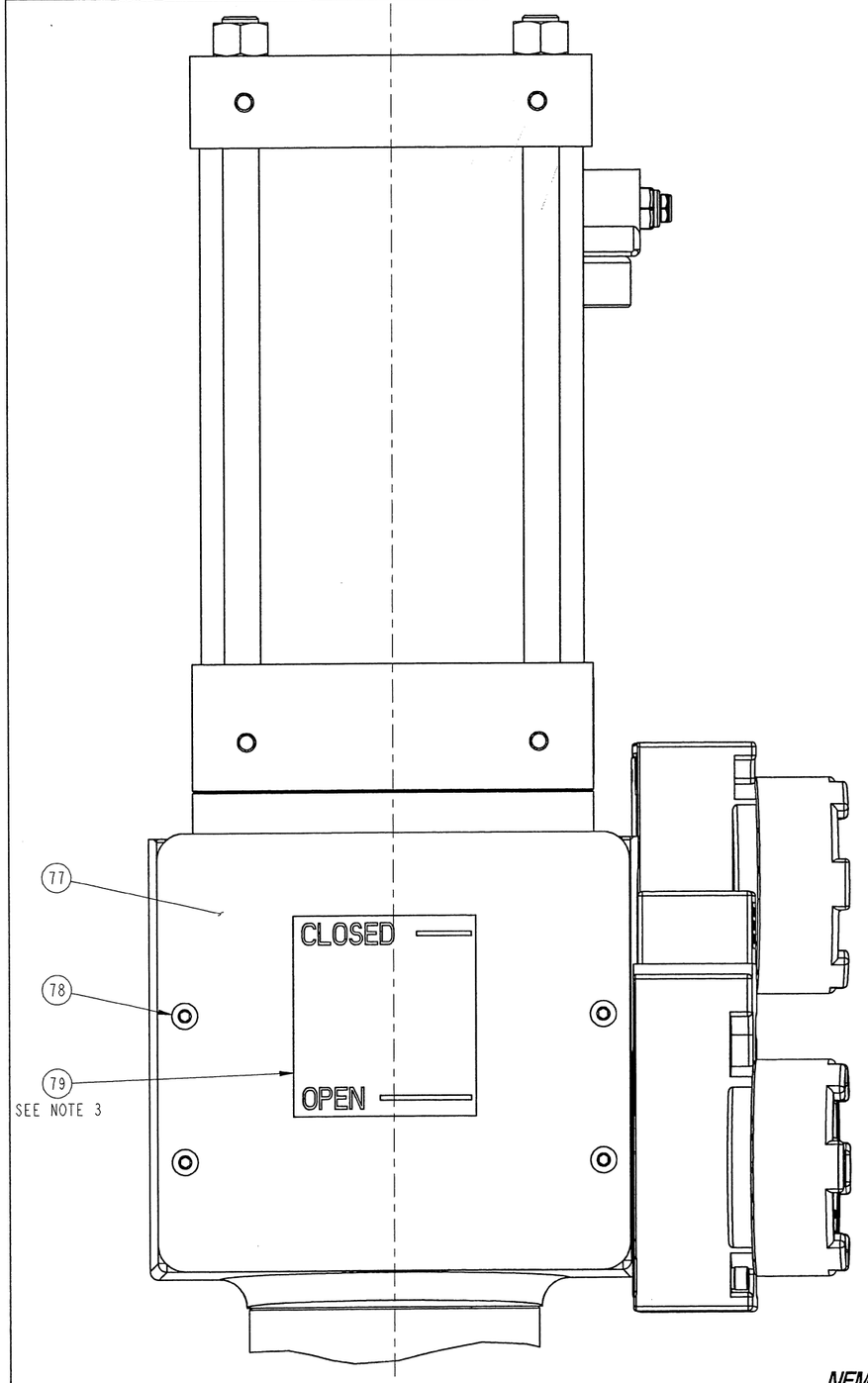
WEIGHT | SCALE 1:1
DATE | BY
DWN 5-20-03 JWP
CHKD 5/20/2003 TMM
APVD 5/21/2003 TMM
SUPERSEDES:

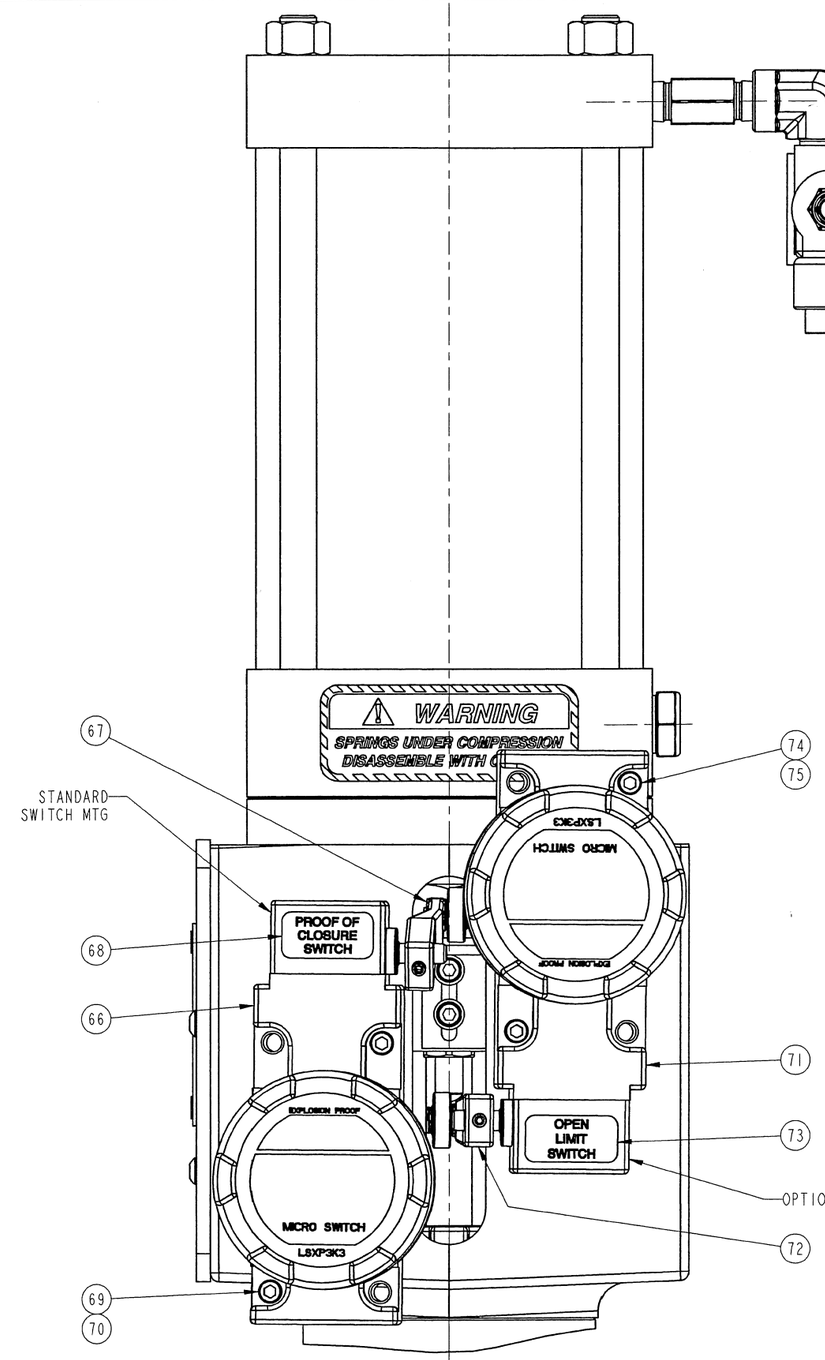
SWITCH ASSEMBLY
SKOTCH IGNITER
T4150C & T4200C
-
-

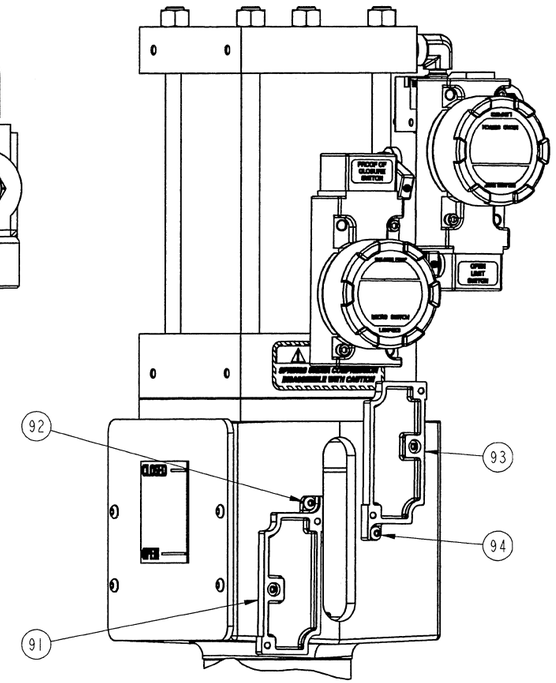
ITT Industries
Engineered Valves
Lancaster, PA USA

SIZE D | DRAWING NUMBER 119122 | SHEET 1 OF 3 | REV B

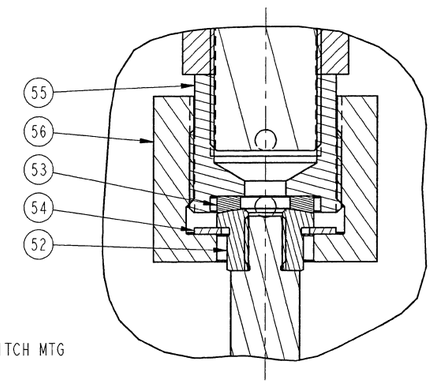
FILE COPY







EXPLODED VIEW
NEMA 7 SWITCHES
SCALE 1:2



SECTION B-B
SCALE 3:2

NEMA 7 SWITCH MTG

ECN# 6510

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/64 = ± 1/16, X° = ± 5°
MM: [X] = ± [.76], [.X] = ± [.51], [.XX] = ± [.12], X° = ± 5°
REMOVE ALL BURRS AND SHARP EDGES. MACHINED SURFACES TO BE 125 EXCEPT AS NOTED.

	WEIGHT	SCALE	
		1:1	
	DATE		BY
DWN	5-20-03		JJHP
CHKD			-
APVD			-

SUPERSEDES:

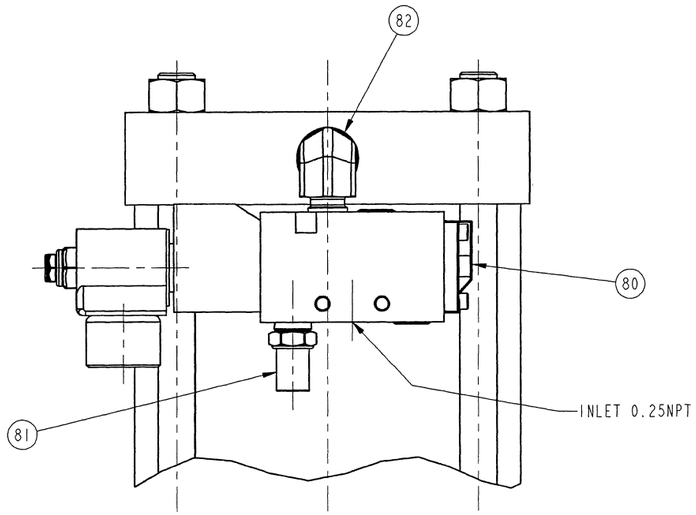
SWITCH ASSEMBLY
SKOTCH IGNITER
T4150C & T4200C

ITT Industries
Engineered Valves
Lancaster, PA USA

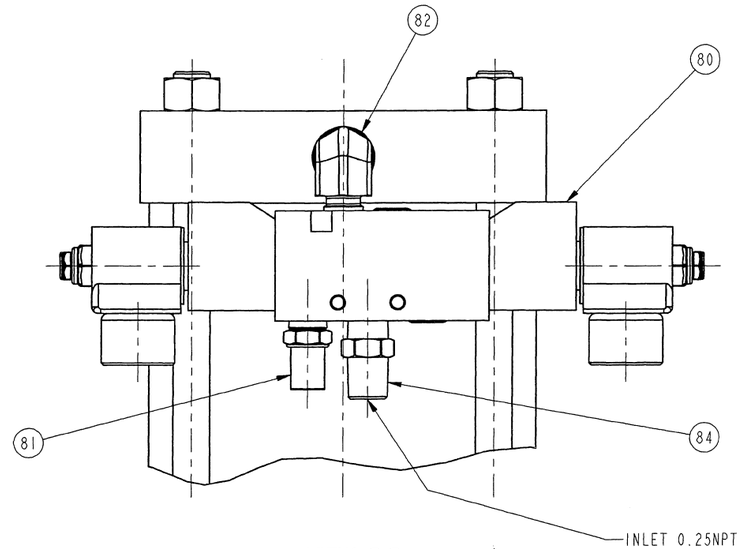
SIZE	DRAWING NUMBER	SHEET	REV
D	119122	2 OF 3	B

FILE COPY

EV-D 03/07/03



VIEW C-C
FAIL CLOSE SOLENOID SUBASSEMBLY
SCALE 1:1



VIEW C-C
FAIL IN LAST POSITION SOLENOID
SUBASSEMBLY
SCALE 1:1

ECN# 6510

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] = ± [.51]
.XX = ± 0.02	[.XX] = ± [.13]
.XXX = ± 0.005	[.XXX] = ± [.127]
X/X = ± 1/16	
X° = ± 5°	X° = ± 5°
.X° = ± 1°	.X° = ± 1°

REMOVE ALL BURRS AND SHARP EDGES. MACHINED SURFACES TO BE 63 EXCEPT AS NOTED.

WEIGHT	SCALE 1:1		
	DATE	BY	
DWN	5-20-03	JWP	
CHKD	Stephens	Phil	
APVD	Stephens	Phil	

SWITCH ASSEMBLY
SKOTCH IGNITER
T4150C & T4200C
-
-

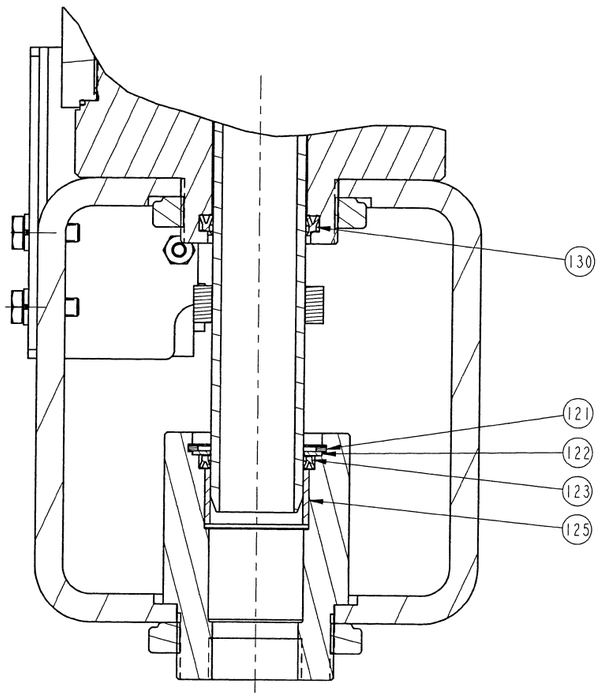
SUPERSEDES:

ITT Industries
Engineered Valves
Lancaster, PA USA

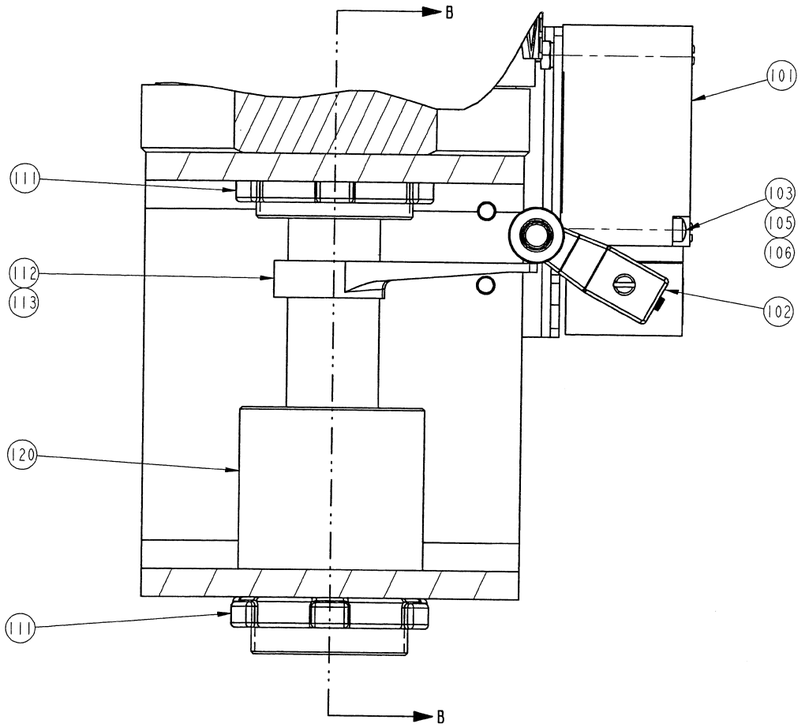
SIZE	DRAWING NUMBER	SHEET	REV
D	119122	3 OF 3	B

FILE COPY

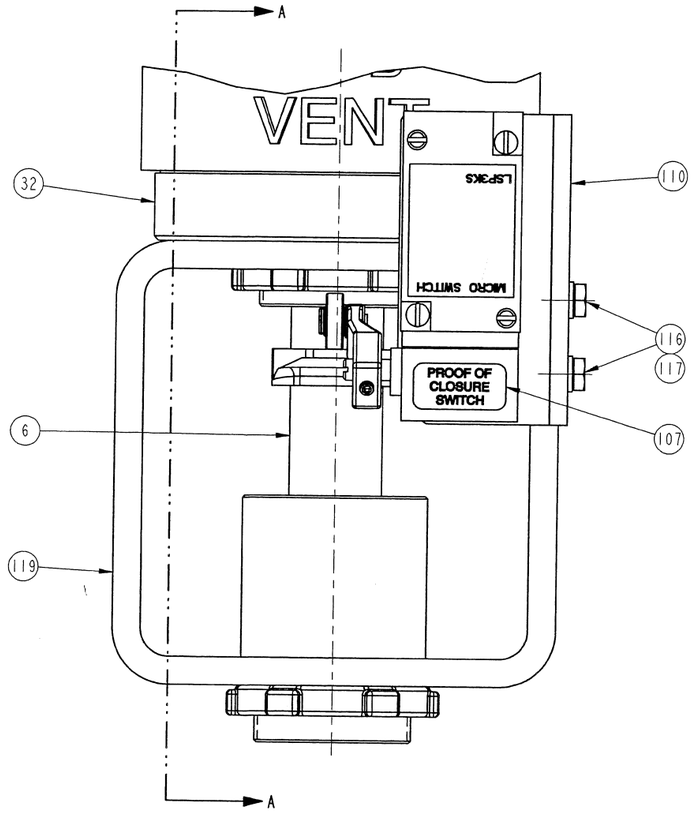
EV.D 03/07/03
Printed On: 2/7/2018 01:45:13



SECTION B-B



SECTION A-A



NEMA 4 & 4X SWITCH MTG

ECN# 6510

EV.D 03/07/03

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	(.X) ± (.51)
.XXX ± 0.005	(.XX) ± (.12)
X/X ± 1/16	
ANG ± 1°	.X ± .5°

REMOVE ALL BURRS AND SHARP EDGES. MACHINED SURFACES TO BE 63 EXCEPT AS NOTED.

	DATE	BY
WEIGHT	SCALE 1:8	
DWN	5-2-03	JWP
CHKD	5-2-03	MCL
APVD	5-2-03	MCL

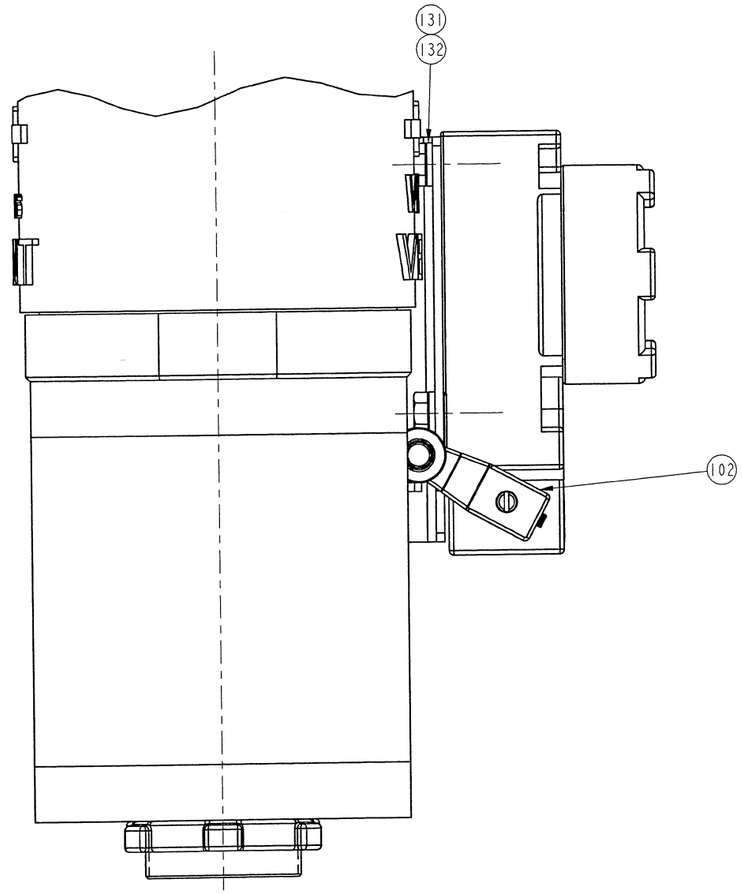
POC ASSEMBLY
SKOTCH IGNITER
T4200C
-
-

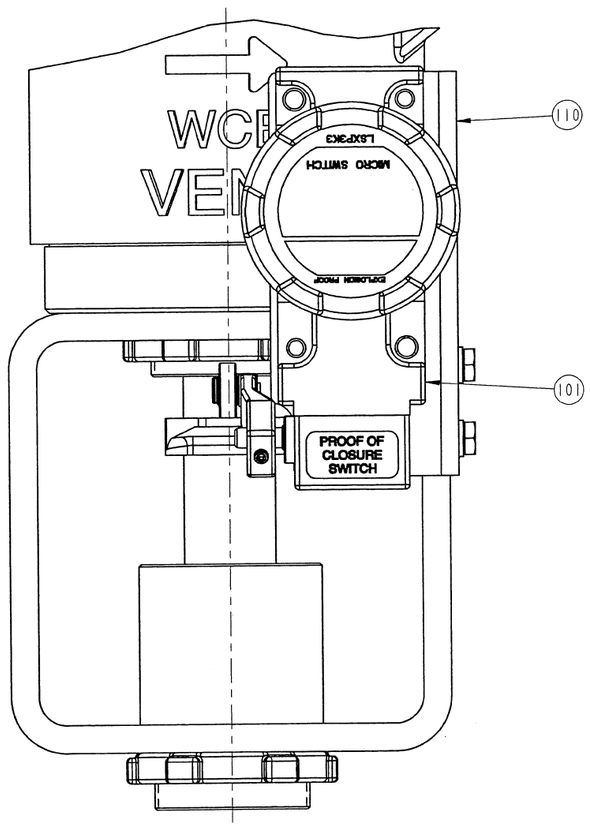
SUPERSEDES:

ITT Industries
Engineered Valves
Lancaster, PA USA

SIZE	DRAWING NUMBER	SHEET	REV
D	119125	1 OF 2	A

FILE COPY





LIST OF PARTS			
ITEM	DWG. NO.	QTY.	DESCRIPTION
6	119119	1	TUBE-VENT SHAFT POC
32	119126	1	FLANGE-VENT UPPER
#101	-	1	SWITCH-MICRO LSP3K (NEMA 4) SWITCH-MICRO LS2H4K3 (NEMA 4X) SWITCH-MICRO LSXP3K3 (NEMA 7)
102	-	1	LEVER-OPERATING LSZ59B (NEMA 4) LEVER-OPERATING LS2Z51B (NEMA 4X) LEVER-OPERATING LSZ59A (NEMA 7)
103	-	2	MCHSCR-FIL 10-32 x 2.00
105	C4-4.5	2	LOCKWASHER-SPRING 10
106	-	2	NUT-HEX MACH 10-32
107	117500	1	LABEL-POC SWITCH
110	119042	1	BRACKET-POC HDLS (NEMA4 & NEMA 4X)
	119111	1	BRACKET-POC HDLS (NEMA 7)
111	-	2	NUT-LOCK
112	119105	1	ACTUATOR-SWITCH
113	C2-2.5	1	SETSCR-HXSK 0.25-28 x 0.25
116	C2-2.1	2	CAPSCR-HEX 0.25-28 x 0.75
117	C4-4.5	2	LOCKWASHER-SPRING 0.25
119	119096	1	YOKE-POC
120	119131	1	FLANGE-VENT LOWER
121	-	1	RING-RETAINING N5001-175
122	119130	1	WASHER-SEAL POC
#123	-	1	U-CUP SEAL 840501250
125	-	1	BEARING 1.250 x 1.406 x 0.750
#130	-	1	U-CUP SEAL 860001250
131	C2-2.1	2	CAPSCR-HEX 0.31-18 x 0.75
132	C4-4.5	2	LOCKWASHER-SPRING 0.31

NOTES:
1. FOR INLET VALVE ASSEMBLY, SEE DRAWING 119024.
#2. RECOMMENDED SPARE PARTS.

NEMA 7 SWITCH MTG

ECN# 6510

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; ANGLES ± 1°
MM: (X) ± (.76); (.X) ± (.51); (.XX) ± (.127); ANGLES ± 1°
REMOVE ALL BURRS AND SHARP EDGES. MACHINED SURFACES TO BE 63 (125) AS NOTED.

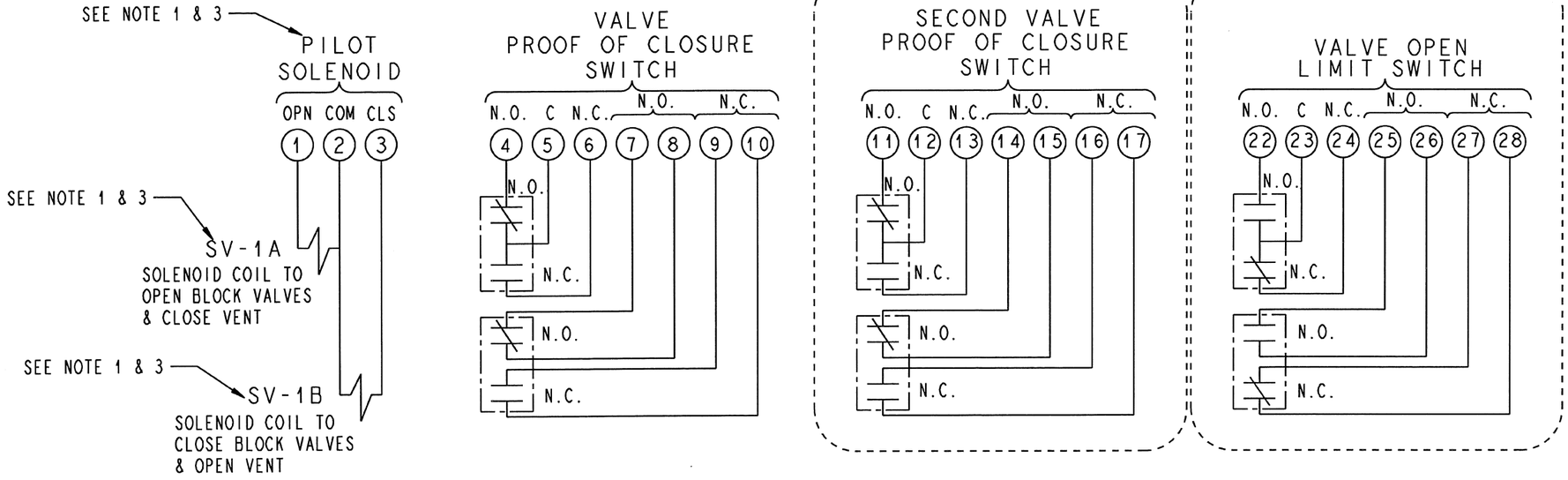
WEIGHT	SCALE	
	1:1	
	DATE	BY
DWN	5-2-03	SMP
CHKD	5-2-03	HCL
APVD	5-2-03	
SUPERSEDES:		

POC ASSEMBLY
SKOTCH IGNITER
T4200C
-
-

ITT Industries
Engineered Valves
Lancaster, PA USA

SIZE	DRAWING NUMBER	SHEET	REV
D	119125	2 OF 2	A

FILE COPY



SWITCH LOGIC

SWITCH TYPE	VALVE P.O.C. SWITCH				SECOND VALVE P.O.C. SWITCH				VALVE OPEN LIMIT SWITCH			
TERMINALS	4-5	5-6	7-8 *	9-10 *	11-12	12-13	14-15 *	16-17 *	22-23	23-24	25-26 *	27-28 *
BLOCK VALVES CLOSED VENT OPEN	⊣/⊢	⊣⊢	⊣/⊢	⊣⊢	⊣/⊢	⊣⊢	⊣/⊢	⊣⊢	⊣⊢	⊣/⊢	⊣⊢	⊣/⊢
BLOCK VALVES OPEN VENT CLOSED	⊣⊢	⊣/⊢	⊣⊢	⊣/⊢	⊣⊢	⊣/⊢	⊣⊢	⊣/⊢	⊣/⊢	⊣⊢	⊣/⊢	⊣⊢

* THESE TERMINALS ONLY PROVIDED ON ORDERS SUPPLIED WITH DPDT SWITCH CONTACT CONFIGURATION.

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

(B) NOTES:

1. SOLENOID VOLTAGE IS AC. CONSULT ORDER SPECIFICATION OR SOLENOID NAMEPLATE FOR SOLENOID VOLTAGE RATING.
2. ALL SWITCHES SHOWN WITH BLOCK VALVES IN CLOSED POSITION & VENT OPEN.
3. SV-1A & SV-1B REPRESENT THE MAGNETIC COILS ON THE SOLENOID. FOR FAIL CLOSED VALVES (MODEL 4156C, 4157C, 4206C, 4207C), ONLY SV-1A IS SUPPLIED. THIS IS A MAINTAINED CONTACT SOLENOID. WHEN ENERGIZED THE VALVE OPENS. FAIL-IN-LAST VALVES (MODEL 4155C, 4205C), SV-1B IS USED IN ADDITION TO SV-1A. THESE REQUIRE MOMENTARY CONTACTS IN THIS APPLICATION. BOTH COILS CANNOT BE ENERGIZED SIMULTANEOUSLY OR DAMAGE WILL OCCUR.
4. WIRING SHOWN FOR DPDT SWITCHES. FOR SPDT DELETE WIRE NUMBERS 7,8,9,10,14,15,16,17,25,26,27 AND 28. SEE ORDER SPECIFICATION FOR TYPE AND RATING.
5. NOT NORMALLY SUPPLIED.

PATTERN NO. -

ECN# 17150

THIRD ANGLE PROJECTION

UNLESS OTHERWISE SPECIFIED, ALL DIMENSIONS ARE IN INCHES, IN BRACKETS [] ARE MILLIMETERS

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

WEIGHT	SCALE
-	-

	DATE	BY
DWN	02/02/18	DJS
CHKD	02/02/18	HCL
APVD	02/02/18	HCL

WIRING DIAGRAM
GAS IGNITER VALVE
PNEUMATIC - AC SOLENOIDS
-

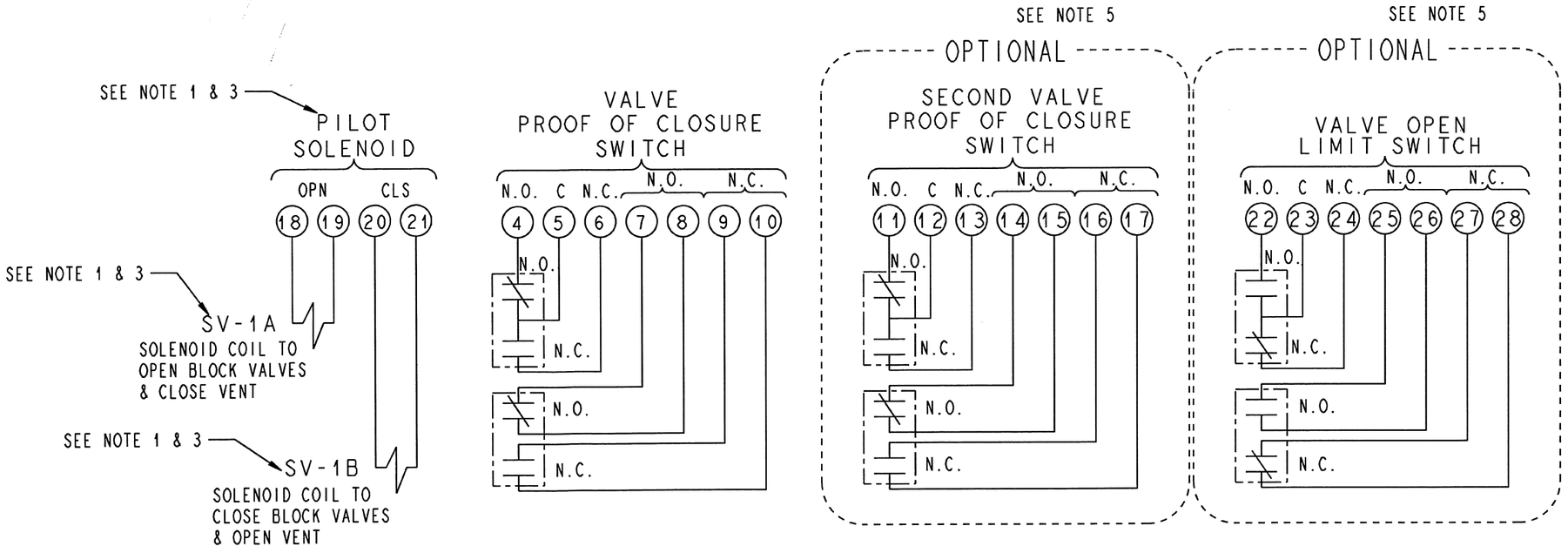
SUPERSEDES: -

ITT LANCASTER, PA USA

SIZE	DRAWING NUMBER	SHEET	REV
C	119430	1 OF 1	B

LN_C 09/21/17

Printed On: 2/7/2018 01:14:07



SWITCH LOGIC

SWITCH TYPE	VALVE P.O.C. SWITCH				SECOND VALVE P.O.C. SWITCH				VALVE OPEN LIMIT SWITCH			
TERMINALS	4-5	5-6	7-8 *	9-10 *	11-12	12-13	14-15 *	16-17 *	22-23	23-24	25-26 *	27-28 *
BLOCK VALVES CLOSED VENT OPEN	⊣/⊢	⊣⊢	⊣/⊢	⊣⊢	⊣/⊢	⊣⊢	⊣/⊢	⊣⊢	⊣⊢	⊣/⊢	⊣⊢	⊣/⊢
BLOCK VALVES OPEN VENT CLOSED	⊣⊢	⊣/⊢	⊣⊢	⊣/⊢	⊣⊢	⊣/⊢	⊣⊢	⊣/⊢	⊣/⊢	⊣⊢	⊣/⊢	⊣⊢

* THESE TERMINALS ONLY PROVIDED ON ORDERS SUPPLIED WITH DPDT SWITCH CONTACT CONFIGURATION.

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

(B) NOTES:

1. SOLENOID VOLTAGE IS DC. CONSULT ORDER SPECIFICATION OR SOLENOID NAMEPLATE FOR SOLENOID VOLTAGE RATING.
2. ALL SWITCHES SHOWN WITH BLOCK VALVES IN CLOSED POSITION & VENT OPEN.
3. SV-1A & SV-1B REPRESENT THE MAGNETIC COILS ON THE SOLENOID. FOR FAIL CLOSED VALVES (MODEL 4156C, 4157C, 4206C, 4207C), ONLY SV-1A IS SUPPLIED. THIS IS A MAINTAINED CONTACT SOLENOID. WHEN ENERGIZED THE VALVE OPENS.
   FAIL-IN-LAST VALVES (MODEL 4155C, 4205C), SV-1B IS USED IN ADDITION TO SV-1A. THESE REQUIRE MOMENTARY CONTACTS IN THIS APPLICATION. BOTH COILS CANNOT BE ENERGIZED SIMULTANEOUSLY OR DAMAGE WILL OCCUR.
4. WIRING SHOWN FOR DPDT SWITCHES. FOR SPDT DELETE WIRE NUMBERS 7,8,9,10,14,15,16,17,25,26,27 AND 28. SEE ORDER SPECIFICATION FOR TYPE AND RATING.
5. NOT NORMALLY SUPPLIED.

ECN# 17150

PATTERN NO. -

THIRD ANGLE PROJECTION

UNLESS OTHERWISE SPECIFIED, ALL DIMENSIONS ARE IN INCHES, IN BRACKETS [] ARE MILLIMETERS

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

WEIGHT	SCALE
-	-

	DATE	BY
DWN	02/02/18	DJS
CHKD	02/02/18	HCL
APVD	02/02/18	HCL

WIRING DIAGRAM
GAS IGNITER VALVE
PNEUMATIC - DC SOLENOIDS
-

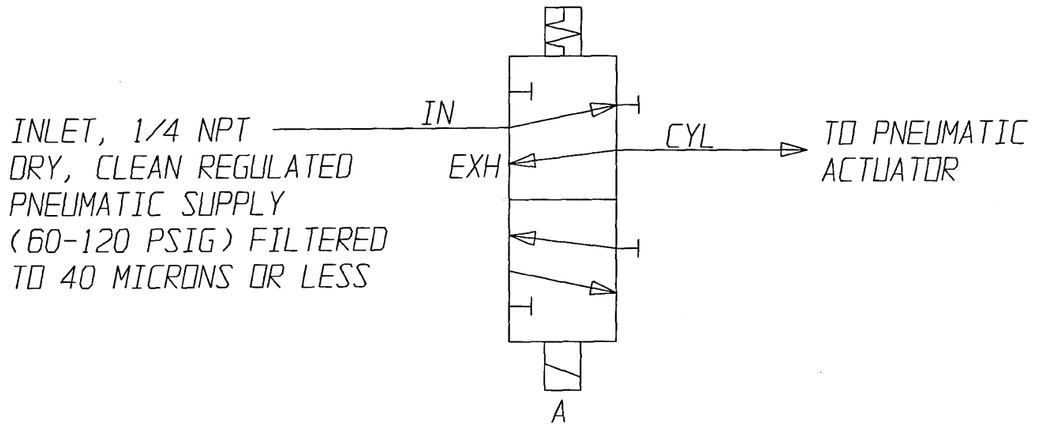
SUPERSEDES: -

ITT LANCASTER, PA USA

SIZE	DRAWING NUMBER	SHEET	REV
C	119431	1 OF 1	B

LN_C 09/21/17

Printed On: 2/7/2018 01:16:22



NOTES:

1. SV-1A IS A SINGLE COIL SPRING RETURN SOLENOID OPERATED PILOT VALVE, MAINTAINED CONTACT TYPE, WHICH CONTROLS THE MAIN VALVES POSITION.
2. PILOT VALVE SHOWN IS IN DE-ENERGIZED STATE.

ECN#6510

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

EV_B 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°	X° = ± 1°	

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

	WEIGHT	SCALE
	-	-

	DATE	BY
DWN	05/20/2003	JMG
CHKD	05/20/2003	MKd.
APVD	05/20/2003	MKd

PNEUMATIC SUPPLY
GAS IGNITER VALVE
T4150C, T4200C
VERSA SINGLE COIL
-
-

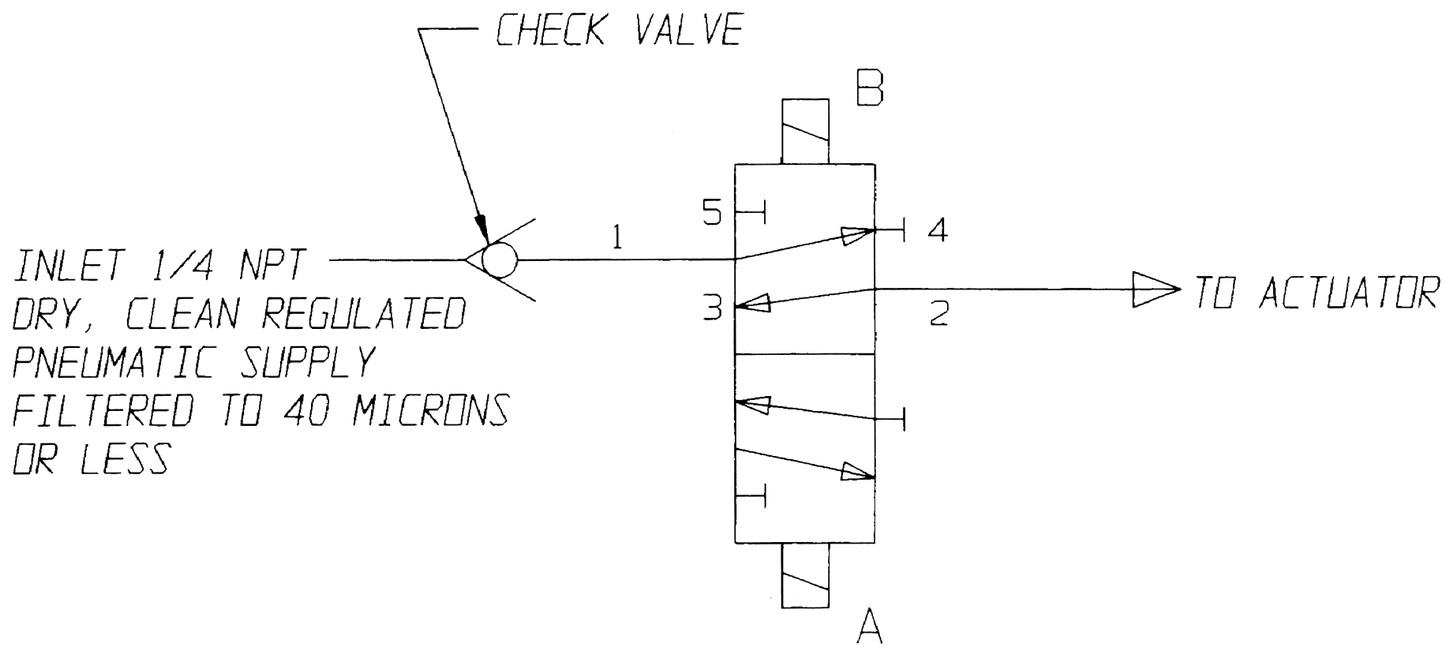
SUPERSEDES: -

ITT Industries
Engineered Valves
Lancaster, PA USA

SIZE	DRAWING NUMBER	SHEET	REV
B	119429	1 OF 1	-

FILE COPY

PORTS		
SUPPLY	1	IN
ACTUATOR	2	A
CYL EXH	3	EA
PLUG	4	B
PLUG	5	EB



NOTES:
1. VALVE SHOWN WITH COIL B LAST ENERGIZED.

ECN#3575

PART NO. -

PATTERN NO. -

TOLERANCES	WEIGHT	SCALE		
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	-	NTS		
		DATE	BY	
	DWN	4/22/98	JDW	
	CHKD	4/22/98		
	APVD	4/22/98		

PNEUMATIC SUPPLY
GAS BURNER VALVE
T4100
FAIL IN LAST
-
-

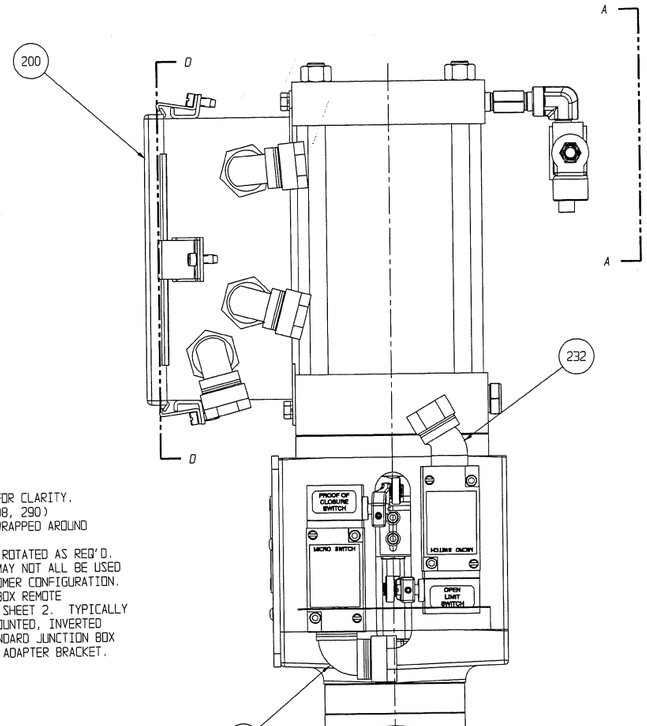
SUPERSEDES:-

ITT Engineered Valves

ITT Fluid Technology Corporation
Lancaster, Pa

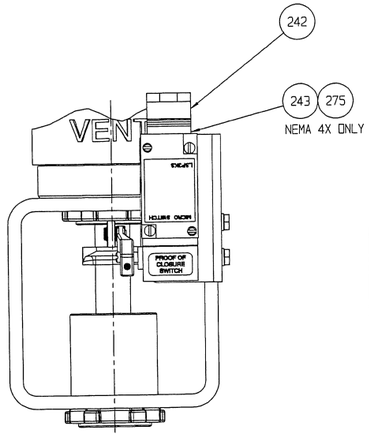
SHEET 1 OF 1

SIZE	DRAWING NUMBER	REV
A	117624	-



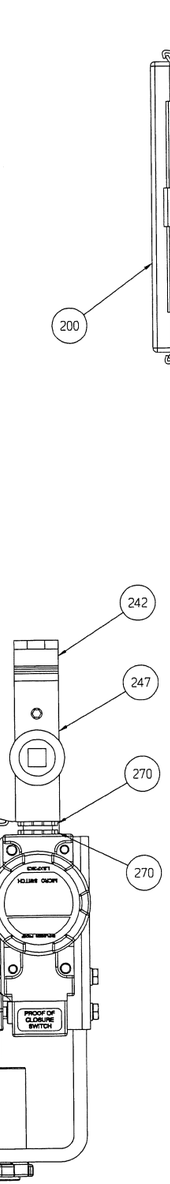
NOTES:

1. CONDUIT RUNS NOT SHOWN FOR CLARITY. (ITEMS 205, 206, 207, 208, 290)
2. LABEL, ITEM 290, TO BE WRAPPED AROUND ITEM 205 (CONDUIT)
3. CONDUIT FITTINGS MAY BE ROTATED AS REQ'D. CONDUIT FITTINGS SHOWN MAY NOT ALL BE USED DEPENDING ON EXACT CUSTOMER CONFIGURATION.
4. FOR ALTERNATE JUNCTION BOX REMOTE MOUNTING, SEE DETAIL ON SHEET 2. TYPICALLY TO BE USED FOR A RACK MOUNTED, INVERTED VALVE SYSTEM ONLY. STANDARD JUNCTION BOX ATTACHED VIA U-BOLT AND ADAPTER BRACKET.

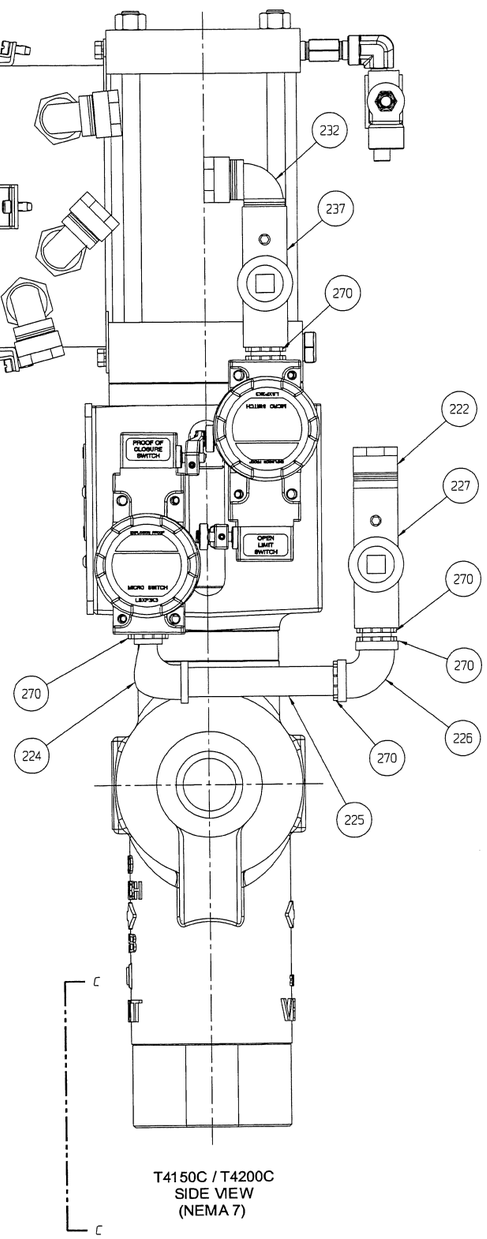


VIEW B-B
INLET POC OPTION
(NEMA 4, 4X)

T4150C / T4200C
SIDE VIEW
(NEMA 4)



VIEW C-C
INLET POC OPTION
(NEMA 7)



T4150C / T4200C
SIDE VIEW
(NEMA 7)

LIST OF PARTS			
ITEM	DWG. NO.	QTY.	DESCRIPTION
200	117563	1	JCT BOX A-806NF MOD (8.0 X 6.0)
	119895	1	JCT BOX A-806CHNF MOD T500 (8.0 X 6.0)
	117563	1	JCT BOX A-806NFAL MOD (8.0 X 6.0)
	-	1	-
201	-	4	CAPSCR HEX .25X0.38 SS
202	-	4	LKWSHR EXT TOOTH 0.25 SS
203	117533	1	JCT BOX SUBPLATE MOD A-8P6
205	-	A/R	CONDUIT LGTGHT 0.50 TYPE HTUA
206	-	A/R	WIRE 16 AWG MTW OR TFFN OIL RES
207	-	A/R	TERM RING LUG 14-16 #10
208	-	A/R	TERM RING LUG INS 14 - 16 #8 (FULL RING)
	-	A/R	-
209	-	A/R	TERM BLOCKS 300V WIRE CLMP (BARE ENDS)
	-	A/R	TERM BLOCKS 300V W/#6 SCR (LUG ENDS)
	-	A/R	-
210	-	A/R	TERM MTG CHANNEL
211	-	A/R	TPGSCR PAN 8-32X0.50
212	-	A/R	TERM RTN CLIPS
213	-	A/R	TERM END BARRIER
217	-	A/R	FTG CNDT 0.50 PLUG J-BOX
220	-	1	FTG CNDT 0.50 CHM-50T HUB
221	-	1	FTG CNDT 0.50 LGT 90
	-	1	FTG CNDT 0.50 LGT 45
222	-	1	FTG CNDT 0.50 LGT 90
	-	1	FTG CNDT 0.50 LGT 45
	-	1	FTG CNDT 0.50 LGT STR
223	-	1	HEX BSHG .75 X .50 SS
224	-	1	FTG CNDT 0.50 90 MXF CL1
225	-	1	CONDUIT NIPPLE 0.50X5.00 GLV
226	-	1	FTG CNDT 0.50 90 FXF CL1
227	-	1	FTG CNDT 0.50 SEAL FXM V/H CL1
230	-	1	FTG CNDT 0.50 CHM-50T HUB
231	-	1	FTG CNDT 0.50 LGT 90
	-	1	FTG CNDT 0.50 LGT 45
232	-	1	FTG CNDT 0.50 LGT 45
	-	1	FTG CNDT 0.50 LGT 90
233	-	1	HEX BSHG .75 X .50 SS
237	-	1	FTG CNDT 0.50 SEAL FXM V/H CL1
240	-	1	FTG CNDT 0.50 CHM-50T HUB
241	-	1	FTG CNDT 0.50 LGT 90
	-	1	FTG CNDT 0.50 LGT 45
242	-	1	FTG CNDT 0.50 LGT STR
243	-	1	HEX BSHG .75 X .50 SS
247	-	1	FTG CNDT 0.50 SEAL FXM V/H CL1
250	-	1	FTG CNDT 0.50 CHM-50T HUB
251	-	1	FTG CNDT 0.50 LGT 90
	-	1	FTG CNDT 0.50 LGT 45
252	-	1	FTG CNDT 0.50 LGT 45
	-	1	FTG CNDT 0.50 LGT 90
	-	1	FTG CNDT 0.50 LGT STR
255	-	1	FTG CNDT 0.50 CHM-50T HUB
256	-	1	FTG CNDT 0.50 LGT 90
	-	1	FTG CNDT 0.50 LGT 45
257	-	1	FTG CNDT 0.50 LGT 45
	-	1	FTG CNDT 0.50 LGT 90
	-	1	FTG CNDT 0.50 LGT STR
270	-	A/R	FTG CNDT 0.50 LOCKNUT
275	-	A/R	FTG CNDT 0.50 SEAL RING LGT
290	-	A/R	LABEL CONDUIT WARNING

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

ECN# 9329

THIRD ANGLE PROJECTION

UNLESS OTHERWISE SPECIFIED, ALL DIMENSIONS ARE IN INCHES

UNLESS OTHERWISE NOTED
INCH: X = ± 0.06, .XX = ± 0.03, .XXX = ± 0.02, .X" = ± .5°, X° = ± 1°
MM: [X] = ± [.76], [.XX] = ± [.51], [.XXX] = ± [.13]
REMOVE ALL BURRS AND SHARP EDGES. MACHINED SURFACES TO BE 125 EXCEPT AS NOTED.

WEIGHT: -
SCALE: -

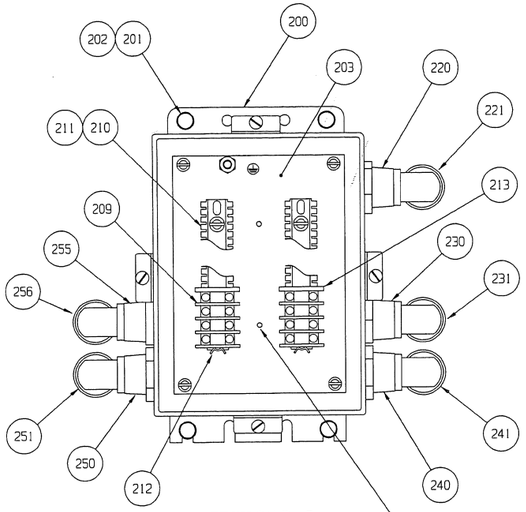
	DATE	BY
DWN	1/27/05	KCS
-		
-		
CHKD	1/27/05	KCS
APVD	1/27/05	KCS

JUNCTION BOX OPTION
T4150C / T4200C ASSY
-
-
-
SUPERSEDES: -

ITT Industries
Engineered Valves Group
Lancaster, PA USA

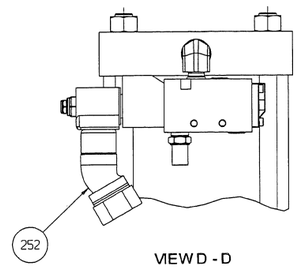
SIZE	DRAWING NUMBER	SHEET	REV
D	119965	1 OF 2	-

ev 0 03/25/04

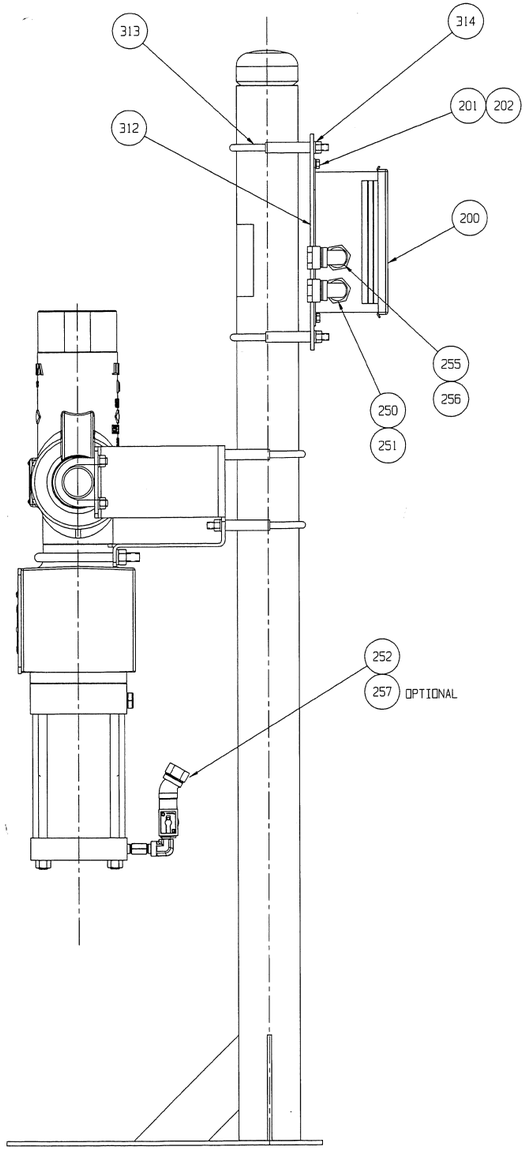


SECTION D - D
JUNCTION BOX
INTERNAL / EXTERNAL DETAIL

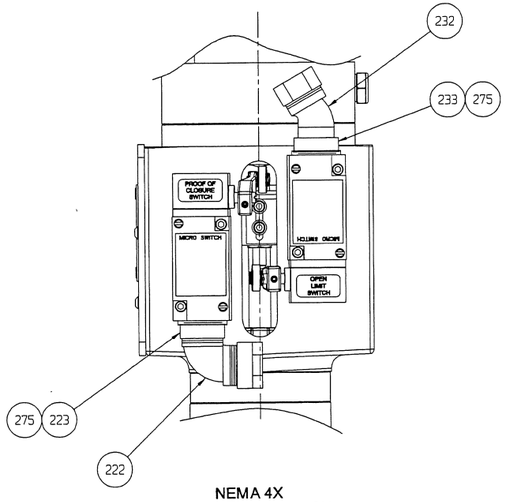
FOR SPOT SWITCHES
ONLY ONE TERMINAL STRIP
USED, MOUNTED IN CENTER



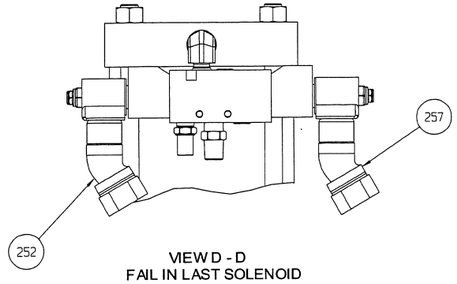
VIEW D - D
FAIL CLOSE SOLENOID



ALTERNATE RACK MOUNTED
JUNCTION BOX OPTION
SCALE 0.5 (SEE NOTE 4)



NEMA 4X
POC & OPEN SWITCH



VIEW D - D
FAIL IN LAST SOLENOID

ECN# 9329

BY_D 03/25/04

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); (.XX) = ± (.51); (.XXX) = ± (.13); .X° = ± .5°; .X° = ± 1°
REMOVE ALL BURRS AND SHARP EDGES. MACHINED SURFACES TO BE 63 EXCEPT AS NOTED.

	WEIGHT	SCALE
	-	-

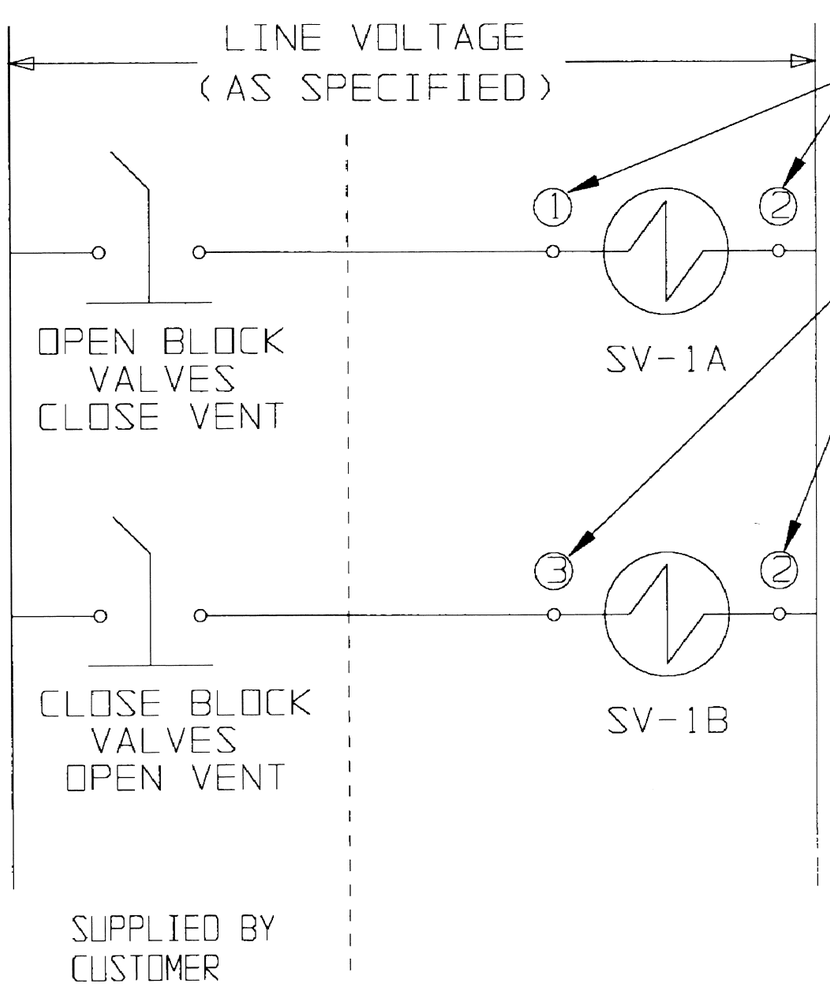
	DATE	BY
DWN	1/27/05	KCS
CHKD	1/27/05	KCS
APVD	1/27/05	KCS

JUNCTION BOX OPTION
T4150C / T4200C ASSY

SUPERSEDES: -

ITT Industries
Engineered Valves Group
Lancaster, PA USA

SIZE	DRAWING NUMBER	SHEET	REV
D	119965	2 OF 2	-



NOTES:

1. SV-1A AND SV-1B FORM A DUAL COIL SOLENOID VALVE CONTROLLING GAS FLOW.
2. SWITCHES ARE MOMENTARY CONTACT TYPE.
3. ○ - REPRESENTS A WIRE #.
4. WIRE #'S SHOWN ARE FOR AC SOLENOIDS. FOR DC VOLTAGE, SUBSTITUTE WIRE #18 FOR #1, WIRE #19 FOR SV-1A COIL WIRE #2, WIRE #20 FOR #3, AND WIRE #21 FOR SV-1B COIL WIRE #2.
5. (C) SEE ORDER SPECIFCATION FOR SOLENOID VOLTAGE RATING.
6. APPLICATION - ALL T4X05 SYSTEMS ("X" DENOTES LINE SIZE).

WR# -

PART NO. -

PATTERN NO. -

REV	DATE	ECN NBR	BY	CHKD	APVD
-	-	-	-	-	-
-	-	-	-	-	-
C	10/24/94	1035	JRB	MJS	MJS
B	10/90	-	JRB	-	-
A	1/89	-	JRB	-	-

TOLERANCES
EXCEPT AS NOTED
DECIMALS
.XX ± .02
.XXX ±.005
ANGLES ±0°-30'
REMOVE ALL BURRS AND SHARP EDGES
ALL MACHINED SURFACES TO BE 125 EXCEPT AS NOTED

WEIGHT	SCALE
-	-

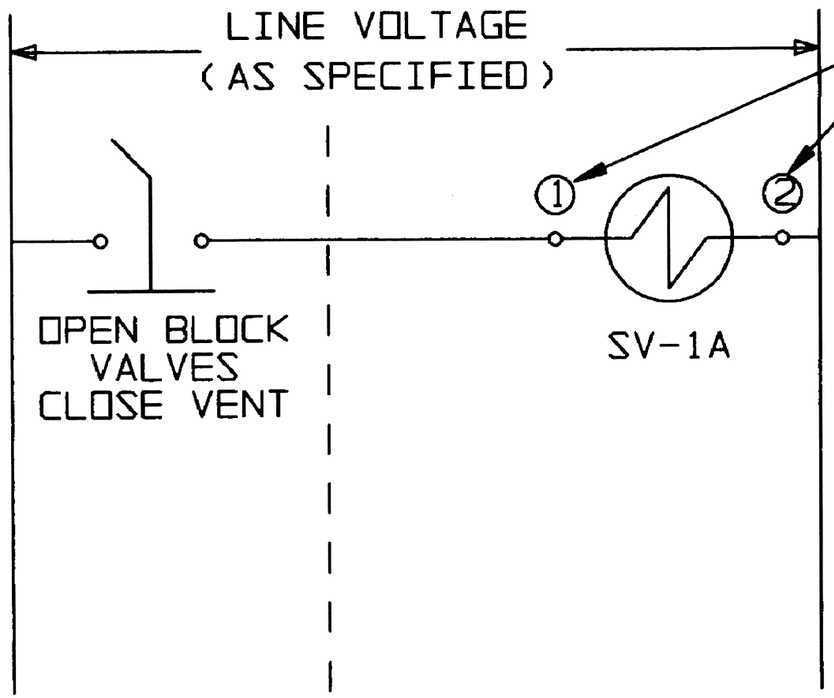
	DATE	BY
DWN	1/89	GCS
CHKD	1/89	JRB
APVD		

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

SUPERSEDES: -

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

	A	60-021	REV C



NOTES:
1. SV-1A IS A SINGLE COIL SPRING RTN SOLENOID VALVE CONTROLLING GAS FLOW.
C 2. SWITCHES ARE MAINTAINED CONTACT TYPE.
3. □ - REPRESENTS A WIRE NUMBER.
4. WIRE #'S SHOWN ARE FOR AC SOLENOIDS. FOR DC VOLTAGE, SUBSTITUTE WIRE #18 FOR #1, WIRE #19 FOR #2.
C 5. SEE ORDER SPECIFICATION OR SOLENOID NAMEPLATE FOR SOLENOID VOLTAGE RATING.
6. APPLICATION - ALL T4x06 SYSTEMS ("x" DENOTES LINE SIZE).

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

WR#-

PART NO.-

PATTERN NO. -

REV	DATE	ECN NBR	BY	CHKD	APVD
-	-	-	-	-	-
-	-	-	-	-	-
C	10/11/94	1002	DJL	MPO	MPO
B	10/90	-	JRB	-	-
A	1/89	-	JRB	-	-

TOLERANCES
EXCEPT AS NOTED
DECIMALS
.XX ± .02
.XXX ±.005
ANGLES ±0°-30'
REMOVE ALL BURRS AND SHARP EDGES
ALL MACHINED SURFACES TO BE 125/ EXCEPT AS NOTED

WEIGHT	SCALE
-	-

	DATE	BY
DWN	1/89	GCS
CHKD	1/89	JRB
APVD	.	.

ELECTRIC SCHEMATIC
GAS BURNER VALVE
PNEUMATIC - FAIL CLOSED
-
-
-

SUPERSEDES:-

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

.	A	60-022	REV C