



INSTALLATION AND SERVICE INSTRUCTION
MODEL SERIES 771
I/P VALVE SERVICE TRANSDUCERS

SD771
Issue: 3
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MODEL 771S



MODEL 771B

INTRODUCTION

This Instruction covers the installation, operation, and maintenance of the Model Series 771 I/P Valve Service Transducers. The transducers are intended to be used for valve service. They provide a 3 to 15 psig output proportional to a 4 to 20 mA dc input. Two standard models are available for standard capacity and boosted outputs; see Model Designation.

Transducers with a model number suffix F1 or F2, see Model Designation, are Factory Mutual approved for installation in various National Electrical Code classified hazardous locations. Particular attention must be given to

the installation and maintenance of transducers whose model numbers have the suffix F1. These transducers are approved as part of an intrinsically safe system when installed and maintained according to the requirements given in this Instruction and in the energy limiting barrier manufacturer's instructions.

IMPORTANT

Save this Instruction and make it available for installation and maintenance of the transducer.

The transducers also meet the requirements of NEMA 4 enclosures. Consideration must be given to the exhaust alignment to maintain the enclosure requirements as stated in the Installation section of this Instruction.

MODEL DESIGNATION

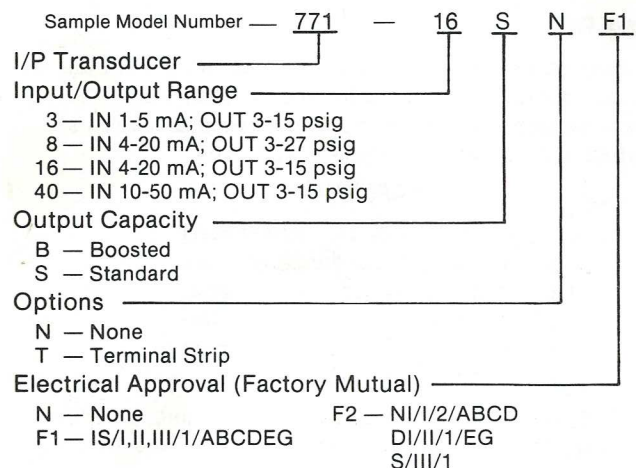
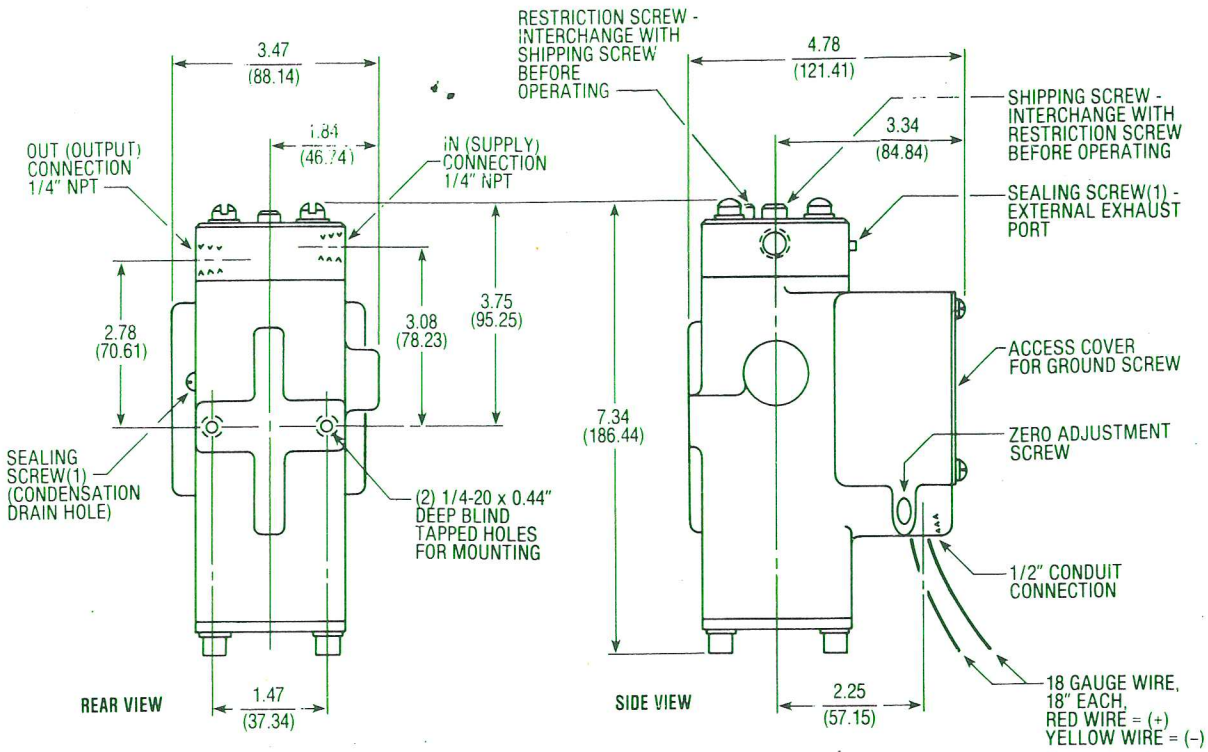


TABLE 1 Energy Limiting Barriers

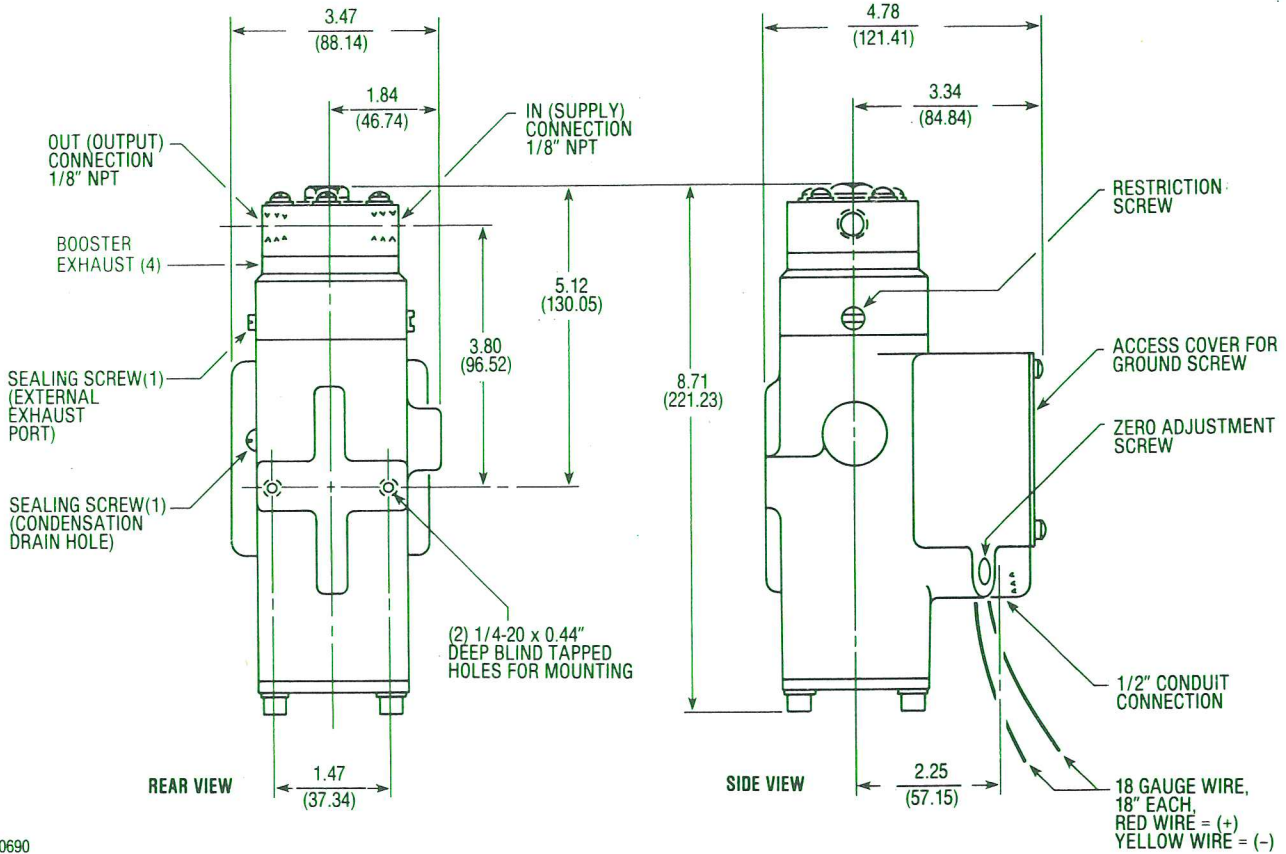
ENERGY LIMITING BARRIERS AND DEVICES		NATIONAL ELECTRICAL CODE HAZARDOUS AREA CLASSIFICATION		
MANUFACTURER	MODEL NUMBER	CLASS I, DIVISION 1 ¹ , GROUPS	CLASS II, DIVISION 1 ² , GROUPS	CLASS III, DIVISION 1 ³
FOXBORO	3A2-D2I CS-E/FGB-A	A, B, C, D	NONE	NO
	3A2-D3I CS-E/FGB-A	A, B, C, D	NONE	NO
	2AO-VAI-FGB	A, B, C, D	NONE	NO
	2AO-V3I-FGB	A, B, C, D	NONE	NO
	2AS-I3I-FGB	A, B, C, D	NONE	NO
HONEYWELL	38545-0000-0110-111-F5D5	C, D	NONE	NO
	38545-0000-0110-112-F5D5	C, D	NONE	NO
	38545-0000-0110-113-F5D5	A, B, C, D	NONE	NO
LEEDS AND NORTHROP	316569	A, B, C, D	NONE	NO
	316747	A, B, C, D	NONE	NO
MTL	MTL110+	A, B, C, D	E, F, G	YES
	MTL115+	A, B, C, D	E, F, G	YES
	MTL122+	A, B, C, D	E, F, G	YES
	MTL128+	A, B, C, D	E, F, G	YES
	MTL110-	A, B, C, D	E, F, G	YES
	MTL115-	A, B, C, D	E, F, G	YES
	MTL122-	A, B, C, D	E, F, G	YES
	MTL128-	A, B, C, D	E, F, G	YES
	MTL179+	A, B, C, D	E, F, G	YES
	MTL179-	A, B, C, D	E, F, G	YES
STAHL	8903/31-086/080/70	A, B, C, D	E, F, G	YES
	8903/31-126/050/70	A, B, C, D	E, F, G	YES
	8903/31-168-050/70	A, B, C, D	E, F, G	YES
	8903/31-191/050/70	A, B, C, D	E, F, G	YES
	8903/31-200/050/70	A, B, C, D	E, F, G	YES
	8903/31-263/050/70	A, B, C, D	E, F, G	YES
	8903/31-284/050/70	A, B, C, D	E, F, G	YES
	8903/31-315/050/70	A, B, C, D	E, F, G	YES
	8903/31-525/050/80	C, D	E, F, G	YES
	8903/30-086/080/70	A, B, C, D	E, F, G	YES
	8903/30-126/050/70	A, B, C, D	E, F, G	YES
	8903/30-168/050/70	A, B, C, D	E, F, G	YES
	8903/30-191/050/70	A, B, C, D	E, F, G	YES
	8903/30-200/050/70	A, B, C, D	E, F, G	YES
	8903/30-263/050/70	A, B, C, D	E, F, G	YES
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	8903/30-525/050/80	C, D	E, F, G	YES
	8903/51-200/050/70	A, B, C, D	E, F, G	YES
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	8901/31-086/150/70	A, B, C, D	NONE	NO
	8901/31-199/130/70	A, B, C, D	NONE	NO
	8901/31-280/070/70	A, B, C, D	NONE	NO
	8901/31-280/165/80	C, D	NONE	NO
	8901/30-086/150/70	A, B, C, D	NONE	NO
	8901/30-199/130/70	A, B, C, D	NONE	NO
	8901/30-280/070/70	A, B, C, D	NONE	NO
	8901/30-280/165/80	C, D	NONE	NO
	8901/33-092/000/79	A, B, C, D	NONE	NO
	8901/33-168/000/79	A, B, C, D	NONE	NO
	8901/33-293/000/79	A, B, C, D	NONE	NO
	8901/34-092/000/79	A, B, C, D	NONE	NO
	8901/34-168/000/79	A, B, C, D	NONE	NO
8901/34-293/000/79	A, B, C, D	NONE	NO	
TAYLOR	1130FF21000	C, D	E, F, G	YES
	1130FF22000	C, D	E, F, G	YES
	1135FF21000	C, D	E, F, G	YES
	1135FF22000	C, D	E, F, G	YES
	5850FL81100	A, B, C, D	E, F, G	YES
	5851FL81100	A, B, C, D	E, F, G	YES
	5850FL81200	C, D	E, F, G	YES
	5851FL81200	C, D	E, F, G	YES

1. Class I, Division 1 can have only Groups A, B, C and D.
2. Class II, Division 1 can have only Groups E, F, and G.
3. Class III, Division 1 does not have any Groups.



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FIGURE 1 Installation, Standard Capacity Models



PA-0690

FIGURE 2 Installation, Boosted Models

- NOTES:
1. SEALING SCREW MUST NOT BE REMOVED IN ANY CLASS 2 HAZARDOUS LOCATION OR UNDER ANY NEMA 4 CONDITION.
 2. DIMENSIONS ARE SHOWN IN INCHES AND (MILLIMETERS).
 3. CLEARANCE OF AT LEAST 5" (127MM) MUST BE LEFT ABOVE THE TOP WHEN MOUNTING THE TRANSDUCER TO PERMIT REMOVAL OF SHIPPING AND RESTRICTION SCREWS AND TOP CAP (STANDARD CAPACITY MODELS).
 4. TRANSDUCER MUST BE INSTALLED SO THAT WATER CANNOT ENTER BOOSTER EXHAUST UNDER NEMA 4 CONDITIONS (BOOSTED MODELS).
 5. CLEARANCE OF AT LEAST 5" (127MM) MUST BE LEFT WHEN MOUNTING TRANSDUCER TO PERMIT REMOVAL OF RETAINING NUT (BOOSTED MODELS).

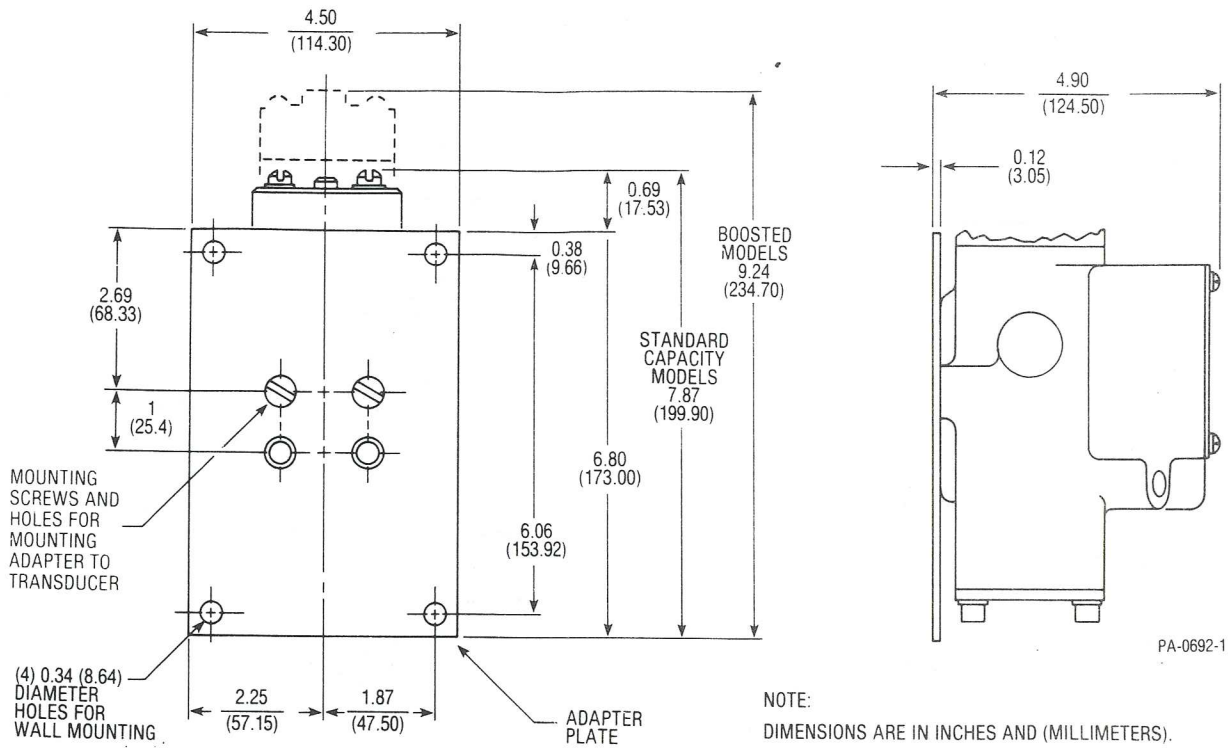


FIGURE 3 Optional Mounting Adapter Plate, All Models

INSTRUMENT AIR REQUIREMENTS

Connect the transducer to a source of clean, dry, oil-free instrument air. Failure to do so will increase the possibility of a malfunction or a deviation from specified performance.

The requirements for a quality air supply can be found in the Instrument Society of America's "Quality Standard for Instrument Air" (ISA-S7.3). Basically, this standard calls for the following:

- Particle Size** - The maximum particle size in the air stream at the instrument should be no larger than 3 microns.
- Dew Point** - The dew point - at line pressure - should be at least 10°C (18°F) below the minimum temperature to which any part of the instrument air system is exposed at any season of the year. Under no circumstances should the dew point - at line pressure - exceed 2°C (35.5°F).
- Oil Content** - The maximum total oil or hydrocarbon content, exclusive of noncondensibles, should not exceed 1 ppm under normal operating conditions.

CAUTION

Supply pressure in excess of 30 psig for standard capacity models and 50 psig for boosted models may cause damage.

PIPING

The supply (IN) and output (OUT) connections on the transducer are 1/4" NPT for standard capacity models and 1/8" NPT for boosted models. See Figures 1 and 2.

Quarter-inch OD tubing is recommended for piping to the transducer.

Blow out all piping before connections are made.

Use pipe sealant sparingly, and then only on the male threads of the tube fittings. A non-hardening sealant is strongly recommended.

There must be no leaks; especially in the output. Leak-test all fittings and tube connections.

SHIPPING AND RESTRICTION SCREWS

Standard capacity models have a factory installed shipping screw in the center of the top housing to protect the transducer nozzle during shipment. The restriction screw (stamped "R") is located just behind the shipping screw. These screws must be interchanged before placing the transducer into operation (see Figure 4). If the transducer is to be moved to another location, return the screws to their shipping positions.

EXHAUST ALIGNMENT

Transducers have two exhaust ports, one internal and one external, and a condensation drain as shown in Figure 5. Sealing screws are installed in the external exhaust port and the condensation drain at the factory. This configuration allows the transducer's exhaust to be used as an air purge of the electrical enclosure, conduit, and associated electronic enclosure (if used).

WARNING

Neither the exhaust sealing screw nor the condensation drain sealing screw may be removed in any Class 2 hazardous location or under any NEMA 4 condition.

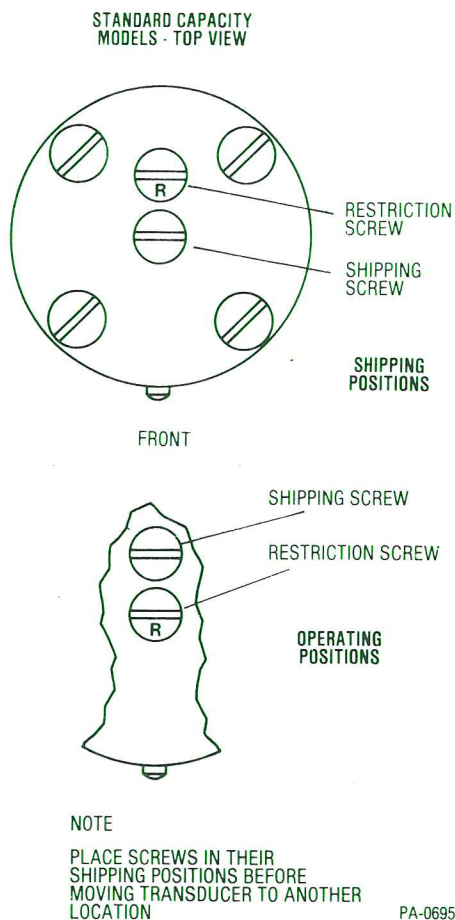
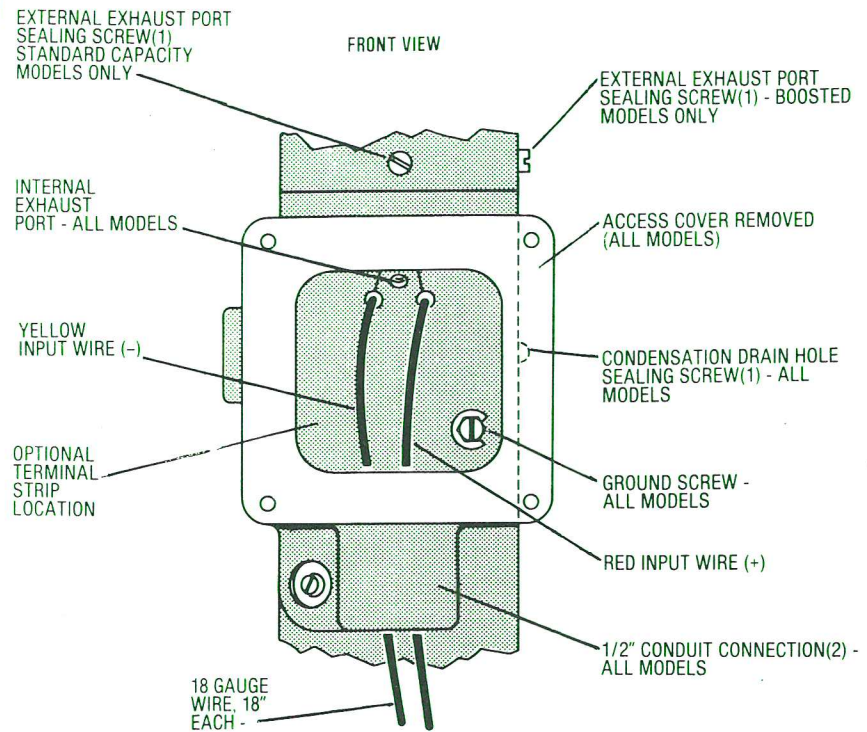


FIGURE 4 Shipping And Restriction Screws



NOTES:

1. SEALING SCREW MUST NOT BE REMOVED IN ANY CLASS 2 HAZARDOUS LOCATION OR UNDER ANY NEMA 4 CONDITION.
2. ALL WIRING MUST BE ROUTED THROUGH CONDUIT CONNECTION.

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FIGURE 5 Exhaust Alignment And Electrical Connections

If air-tight conduit, conduit fittings, and electronic enclosures are to be used, move the external exhaust sealing screw to the internal exhaust port in the electrical enclosure; then remove the condensation drain sealing screw if desired. This allows the transducer exhaust to be vented to the atmosphere through the external exhaust port; it also allows any accumulated condensation from the instrument air supply to drain from the coil cavity.

WIRING

GENERAL

As shown in Figure 5, the transducers are provided with either 18" of 18 gauge wire or a terminal strip for each input connection. The red wire is the positive (+) lead; the yellow wire is the negative (-) lead. The access cover must be removed. All wiring must be routed through the 1/2" conduit connection.

No special considerations are required for wiring a non-intrinsically safe transducer. However, intrinsically safe models must be installed as detailed in the next section.

INTRINSICALLY SAFE MODELS

The F1 (suffix) models must be used in conjunction with the energy limiting barriers listed in Table 1 to constitute an approved intrinsically safe system. Systems using only

those transducers that carry nameplates with the FM logo and the words INTRINSICALLY SAFE are considered intrinsically safe. FIGURES 6, 7, and 8 are connection diagrams for the transducer installation with the required barrier.

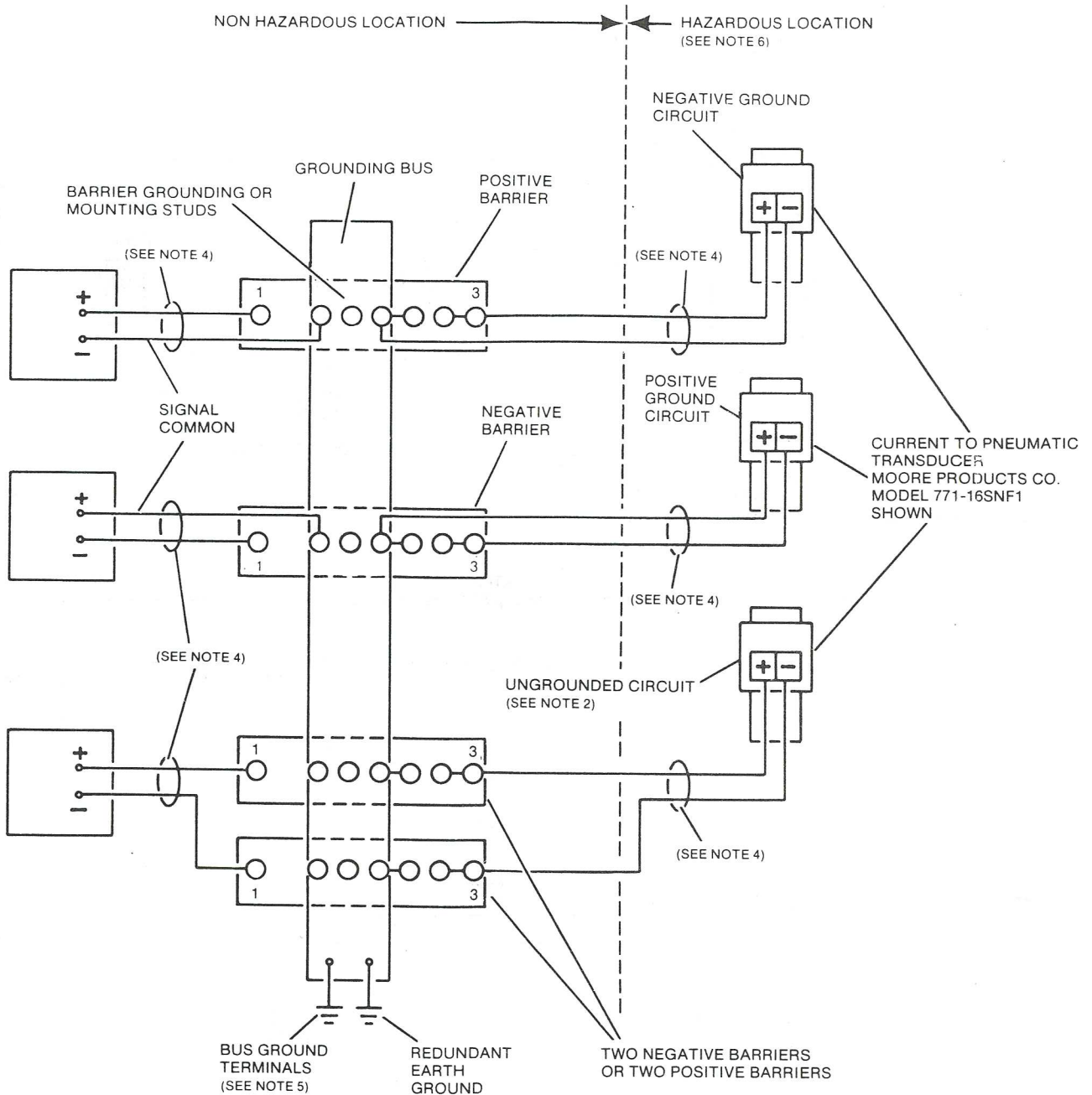
The following steps must be completed in strict compliance with the instructions furnished by the barrier manufacturer and the appropriate connection diagram FIGURE 6, 7, or 8.

WARNING

All wiring must be in compliance with the current edition of the National Electrical Code.

1. Install the required F1 (suffix) model transducers in the hazardous area(s) as detailed by this (Installation) section.
2. Install the required energy limiting barriers in the non-hazardous area(s). Refer to the barrier manufacturer's instructions and to the appropriate connection diagram in this Instruction.
3. Install the required wiring between the transducers and the barriers. Use shielded or unshielded multi-pair or single-pair cables. Ground the transducer body as required.

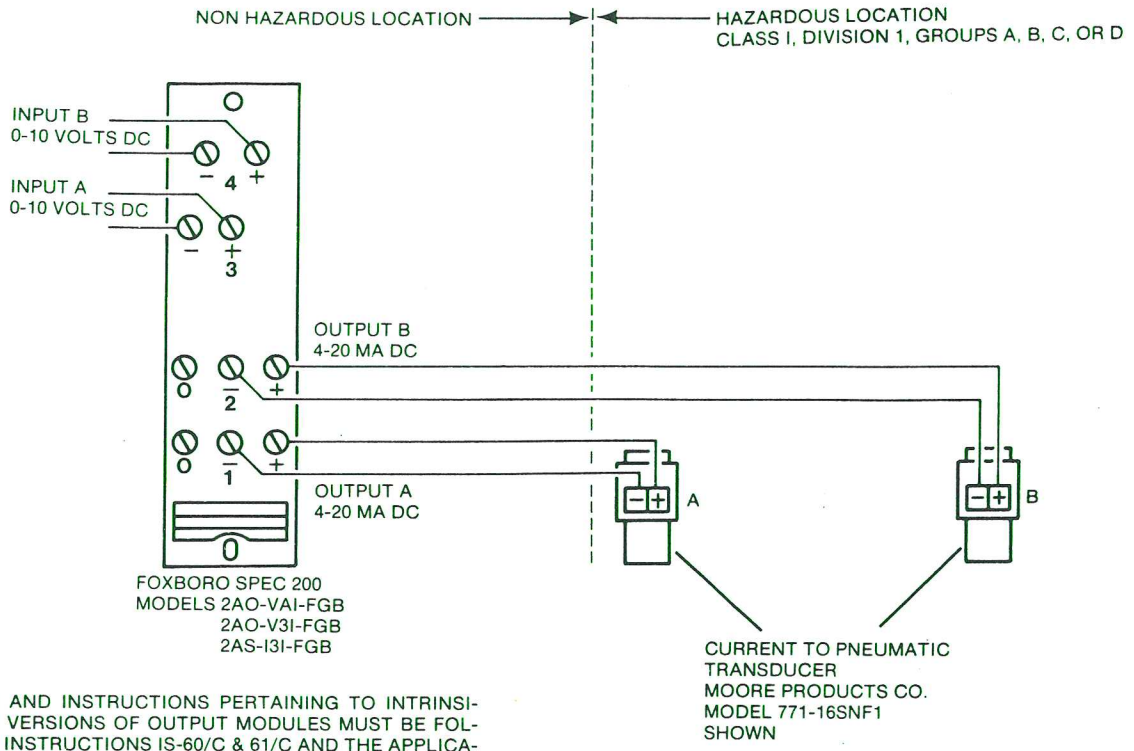
4. In a similar manner, install the required wiring between the barriers and the output terminals of the transducer driving devices.
5. Install the redundant ground system for the barrier installation as specified by the barrier manufacturer.
6. Check all signal and ground connections.
7. Check all pneumatic connections.
8. Check the calibration of all transducers as outlined in the Calibration section of this Instruction.



NOTES:

1. TYPICAL CONNECTIONS ARE SHOWN TO BARRIER TERMINAL 1. MAXIMUM FAULT VOLTAGE IN ANY CIRCUIT CONNECTED TO TERMINAL 1 MUST NOT EXCEED 250 VAC.
2. UNGROUNDED CIRCUIT MUST USE A PAIR OF POSITIVE BARRIERS OR A PAIR OF NEGATIVE BARRIERS. DO NOT MIX POLARITIES.
3. IF POSITIVE & NEGATIVE BARRIERS ARE USED IN SAME INSTALLATION, LEADS FROM TERMINAL 3 OF ALL POSITIVE BARRIERS MUST BE KEPT PHYSICALLY SEPARATE FROM LEADS FROM TERMINAL 3 OF ALL NEGATIVE BARRIERS.
4. WIRING SHOULD BE TWISTED PAIRS OF 20 GAGE (OR LARGER) WIRE, SOLID OR STRANDED. SHIELDING IS OPTIONAL.
5. RESISTANCE BETWEEN ANY BARRIER GROUNDING STUD & EARTH GROUND SHOULD NOT EXCEED 1 OHM.
6. CLASS I, DIVISION 1, GROUPS A, B, C, OR D
CLASS II, DIVISION 1, GROUPS E, F, OR G
CLASS II, DIVISION 1
7. BARRIERS MUST BE INSTALLED PER MANUFACTURER'S INSTRUCTIONS.

FIGURE 6 Typical Intrinsically Safe Installation

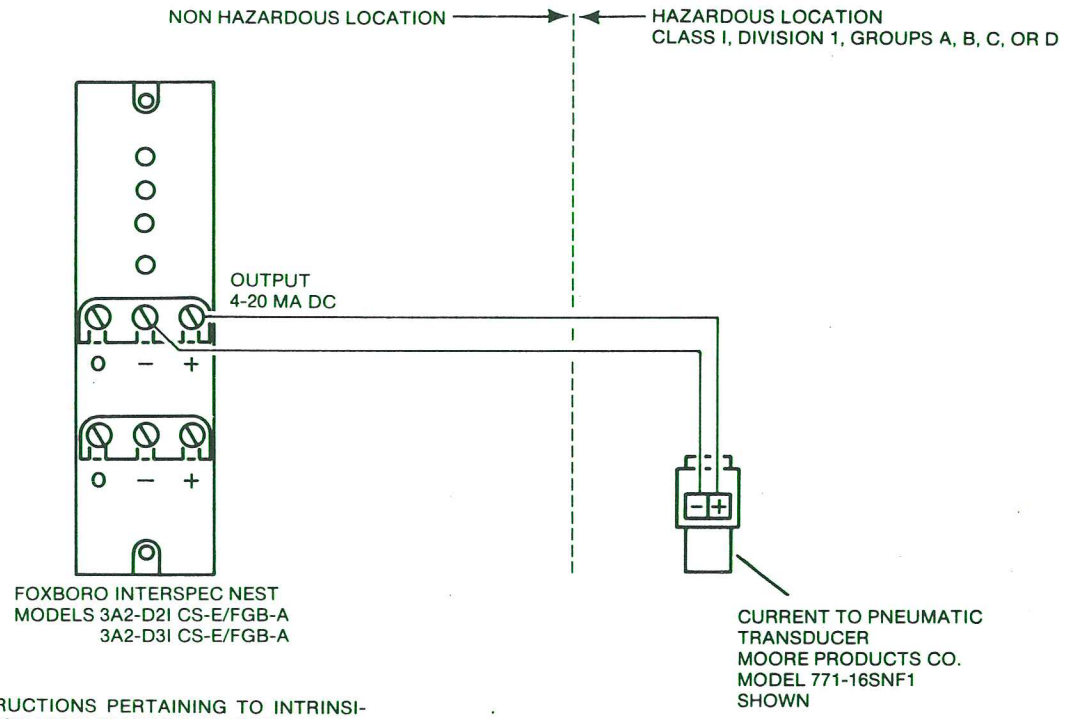


NOTES:

1. ALL WIRING AND INSTRUCTIONS PERTAINING TO INTRINSICALLY SAFE VERSIONS OF OUTPUT MODULES MUST BE FOLLOWED. SEE INSTRUCTIONS IS-60/C & 61/C AND THE APPLICABLE INDIVIDUAL INSTRUCTIONS FOR EACH MDOULE.
2. MAXIMUM SAFE AREA VOLTAGE NOT TO EXCEED 250 VAC.

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FIGURE 7 Foxboro SPEC 200 Output Modules



NOTES:

1. ALL WIRING AND INSTRUCTIONS PERTAINING TO INTRINSICALLY SAFE VERSIONS OF OUTPUT MODULES MUST BE FOLLOWED. SEE INSTRUCTIONS IS-88 AND THE APPLICABLE INDIVIDUAL INSTRUCTIONS FOR EACH MODULE.
2. MAXIMUM SAFE AREA VOLTAGE NOT TO EXCEED 250 VAC.

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FIGURE 8 Foxboro INTERSPEC NEST Output Modules

PRINCIPLE OF OPERATION

ALL MODELS

Refer to Figure 9 for standard capacity models; refer to Figure 10 for boosted models.

The input coil and float are attached to the center shaft and make a moving coil assembly which is free to move vertically. The float is submerged in silicone fluid and is sized so that the resultant buoyant force equals the weight of the assembly. This puts the assembly into a state of neutral buoyancy, and, together with the damping of the silicone fluid, makes the transducer insensitive to shock and vibration.

The permanent magnet provides a magnetic field which passes through the input coil. Current flowing through the coil reacts with the magnetic field which forces the assembly closer to the nozzle. The top end of the center shaft serves as the nozzle seat which restricts air flow from the nozzle.

Refer to the applicable section which follows for the continuation of each transducer principle of operation.

STANDARD CAPACITY MODELS

Air is supplied to the nozzle through the restriction; the restriction and nozzle form a pressure divided circuit. The nozzle backpressure varies according to the restrictive effect of the nozzle seat. The nozzle backpressure is the transducer output.

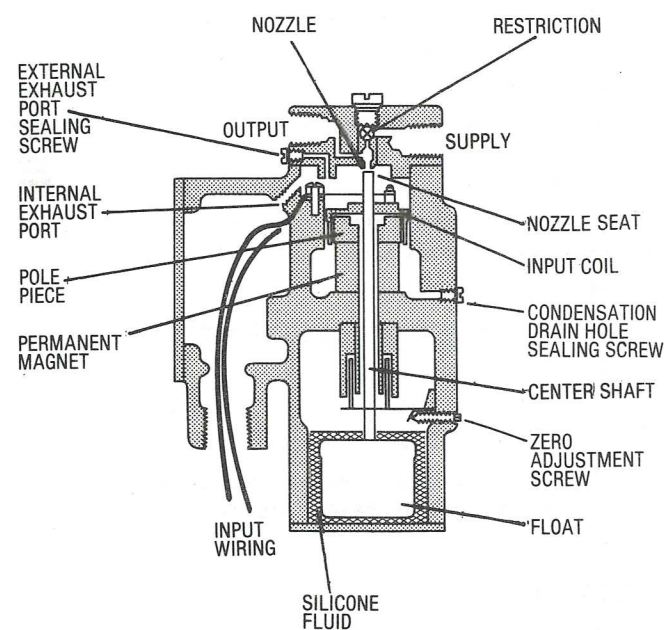
The nozzle forms a column of air which has a diameter equal to the nozzle diameter. The column of air acts on the

nozzle seat to oppose and equal the force produced by the coil. The force produced by the coil is continuously balanced by the nozzle backpressure so that the transducer output is at all times directly proportional to the coil current.

BOOSTED MODELS

Air is supplied directly to the supply port of the pilot valve. The transducer output is biased, then it is fed through the restriction to the nozzle. The nozzle backpressure varies according to the restrictive effect of the nozzle seat. The nozzle forms a column of air which has a diameter equal to the nozzle diameter. This column of air acts on the nozzle seat to oppose and equal the force produced by the coil current.

The nozzle backpressure is the input to the booster diaphragm assembly (lower side) and it is directly proportional to the coil current. An increase in nozzle backpressure operates the diaphragm assembly which moves the pilot valve to open the supply port and increase the booster (transducer) output. A decrease in nozzle backpressure, due to a decrease in coil current, operates the diaphragm assembly to open the exhaust port and decrease the output. The output is directly proportional to the nozzle backpressure; it acts on the upper side of the diaphragm assembly to balance the nozzle backpressure acting on the lower side. Note that the restriction tube serves as a circuit stabilizer.



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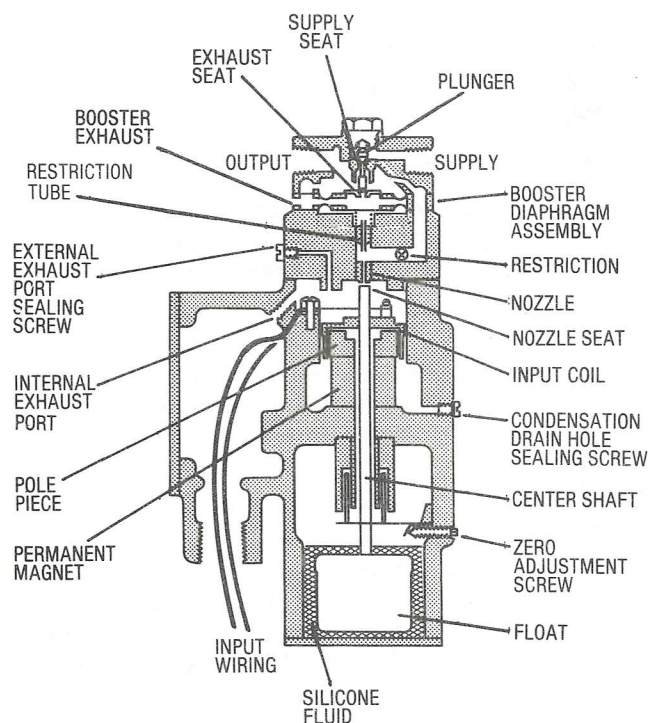


FIGURE 9 Schematic, Standard Capacity Models

FIGURE 10 Schematic, Boosted Models

CALIBRATION

PREPARATION

The following equipment is required for transducer calibration. Note that calibration test equipment should be at least twice as accurate as the instrument being calibrated.

1. Adjustable DC Milliamp Source
2. Digital Multimeter: Accuracy to 0.1% of reading
3. Test Gauge: Range, 0-15 psig; Accuracy, 0.6% of full scale
4. Supply Air Source: 20 psig

The transducer must be calibrated in an upright position within ten degrees of vertical. If the transducer has been lying on its side, allow it to stand approximately fifteen minutes in its calibration position before proceeding.

Connect the test equipment to the transducer as follows:

1. Refer to Figure 1 for standard capacity models and to Figure 2 for boosted models:
 - a. Connect test gauge to output connection.
 - b. Connect supply air source to supply connection; turn on and set supply air at 20 psig.
2. Refer to Installation, Shipping And Restriction Screws and make transducer ready for operation (standard capacity models).
3. Refer to Figure 5 and connect adjustable milliamp source and digital multimeter to input wiring.

PROCEDURE

The transducer has a zero adjustment only, which is shown in Figures 1 and 2. Clockwise turning of the zero screw raises the output pressure.

1. Set milliamp source at 4mA.
2. Adjust zero screw for 3 psig on output test gauge.
3. Exercise milliamp source from 4mA to 20mA to 4mA; output should be 3 psig, if not, repeat steps 2 and 3.

MAINTENANCE

This section provides detailed procedures for cleaning, troubleshooting, and coil assembly and float replacement. All maintenance procedures require a transducer to be removed from service.

WARNING

Improper service and/or substitution of components may impair the electrical safety of this instrument.

PREVENTIVE

Most problems associated with pneumatic instruments can be avoided by use of clean, dry, oil-free instrument air. The Instrument Society of America publishes a "Quality Standard for Instrument Air (ISA-S7.3)". A brief description of this standard is contained in the Installation section of this Instruction.

CLEANING

STANDARD CAPACITY MODELS

The items which may require cleaning on a periodic basis

are the filter screens, the restriction screw, the nozzle, and the nozzle seat. All are located in the top housing; refer to the parts list at the end of this Instruction for disassembly and assembly. The transducer must be taken out of service to clean any of these parts.

Filter Screens

A filter screen is located in the IN (supply) port and in the OUT (output) port. Clean the screens as follows.

1. Remove top housing.
2. Blow screens down in reverse direction:
 - a. Remove restriction screw (turn counterclockwise with screwdriver).
 - b. Cover nozzle opening with finger.
 - c. Blow compressed air into restriction screw port.
 - d. If dirt does not dislodge from screens, loosen it mechanically or with solvent and blow down again.

If a screen is damaged or cannot be cleaned, it must be replaced. The screen is retained in its port by a fiber washer. Have an extra washer(s) on hand if a screen is to be replaced.

3. If nozzle and nozzle seat and/or restriction screw are to be cleaned at this time, go to the following applicable section.
4. Install restriction screw into top housing.
5. Install top housing.

Restriction Screw

1. Remove restriction screw (stamped R) from top housing (turn counterclockwise with screwdriver).
2. Clean restriction screw with solvent; it may be necessary to let screw soak in solvent a few minutes.

If solvent does not clean the restriction, run a 0.021" drill blank through (from tip of screw).
3. Inspect o-ring on restriction screw; replace if damaged.
4. Install restriction screw into top housing.

Nozzle And Nozzle Seat

The nozzle is part of the top housing; the nozzle seat is the top of the center shaft. Clean as follows.

1. Remove top housing.
2. Clean nozzle and nozzle seat with solvent.
3. Install housing.

BOOSTED MODELS

The items which may require cleaning on a periodic basis are located in the pilot base, exhaust ring, and nozzle housing.

PILOT BASE

1. Supply air filter screen
2. Valve plunger
3. Supply seat
4. Exhaust seat

EXHAUST RING

1. Pilot air filter screen

NOZZLE HOUSING

1. Restriction screw
2. Nozzle
3. Nozzle seat
4. Restriction tube

Pilot Base

The supply air filter screen, valve plunger, supply seat, and exhaust seat can be cleaned by removing the retaining nut in the pilot base.

1. Remove the retaining nut with a 9/16" wrench.
2. Remove valve plunger and supply air filter screen (these should fall out along with the plunger spring).
3. Clean the valve plunger with solvent.
4. Blow compressed air through the supply air filter screen. If this does not dislodge the dirt, loosen it mechanically or with solvent and blow down again.

NOTE

If the screen is damaged or cannot be cleaned, it must be replaced.

5. Clean the supply seat (in the pilot base) with solvent or with a tobacco pipe cleaner.
6. Clean the exhaust seat (in the booster diaphragm assembly) with a tobacco pipe cleaner.

Exhaust Ring

Pilot air filter screen cleaning requires that the pilot base and exhaust ring be removed from the transducer.

1. Remove pilot base and exhaust ring.

2. Separate exhaust ring from pilot base.
3. Blow down screen in reverse direction with compressed air. If dirt does not dislodge from screen, loosen it mechanically or with solvent and blow down again.

NOTE

If the screen is damaged or cannot be cleaned, it must be replaced.

Nozzle Housing

The restriction screw can be cleaned without removal of the pilot base, exhaust ring, or nozzle housing. Nozzle, nozzle seat, and restriction tube cleaning requires that the pilot base, exhaust ring, and nozzle housing be removed.

1. Remove restriction screw (stamped R) from nozzle housing (turn counterclockwise with screwdriver).
2. Clean restriction screw with solvent; it may be necessary to let screw soak in solvent for a few minutes.
If solvent does not clean restriction, run a 0.028" drill blank through it (from tip of screw).
3. Inspect o-ring on restriction screw; replace if damaged.
4. Remove pilot base and exhaust ring (six screws and lockwashers).
5. Remove nozzle housing (four socket head screws and lockwashers).
6. Clean nozzle housing in solvent; blow through nozzle and restriction tube with compressed air.
7. Clean nozzle seat (end of center shaft) with solvent.
8. Install nozzle housing.
9. Install exhaust ring and pilot base.

TROUBLESHOOTING

Refer to the Trouble Analysis Table and use it as an aid in troubleshooting the transducer.

TROUBLE ANALYSIS TABLE

SYMPTOM	POSSIBLE CAUSE	REMEDY
No output	No supply air	Set supply air to 20 psig
	Input leads reversed	Make proper connections per Installation, Wiring section
	Loss of silicone fluid NOTE Loss of silicone fluid does not occur unless bottom cover has been loosened or removed for maintenance.	Replace fluid per Maintenance, Float Replacement section
	Clogged filter screen(s)	Clean screen(s) per Maintenance, Cleaning section
Output oscillates - standard capacity models	Insufficient volume in output tubing	Add volume to output equal to 2 to 3 feet of standard 1/4" OD tubing
Erratic output during input change	Misaligned coil	Align coil per Maintenance, Coil Assembly Replacement section
	Foreign object interfering with coil movement	Remove top housing per Maintenance, Cleaning section and clean out coil chamber
Output above full scale and will not reduce	Shipping screw not in its operating position	Place shipping screw in its operating position
	Blocked exhaust port	Clear exhaust port
Output will not increase to full scale	Inadequate supply air	Set supply air to 20 psig
	Leak in output line or fittings	Repair leak
	Clogged filter screen	Clean screen per Maintenance, Cleaning section
	Zero out of adjustment	Calibrate transducer per Calibration section
	Misaligned coil	Align coil per Maintenance, Coil Assembly Replacement section
	Foreign object interfering with coil movement	Remove top housing per Maintenance, Cleaning section and clean out coil chamber
	Loss of silicone fluid - see note under "No output"	Replace fluid per Maintenance, Float Replacement section

SYMPTOM	POSSIBLE CAUSE	REMEDY
Output will not decrease to start of scale	Zero out of adjustment	Calibrate transducer per Calibration section
	Misaligned coil	Align coil per Maintenance, Coil Assembly Replacement section
	Foreign object interfering with coil movement	Remove top housing per Maintenance, Cleaning and clean out coil chamber
Heavy exhaust, output will not increase to full scale - boosted models	Valve plunger exhaust seat held open by thread shaving, chip, scale, etc.	Clean valve plunger and seats per Maintenance, Cleaning section

COIL ASSEMBLY REPLACEMENT

REMOVAL

Care must be taken to prevent metal chips, dirt, etc. from getting into the coil chamber. These foreign objects can interfere with coil movement or change the magnetic field.

Refer to the parts list at the rear of this Instruction, and use the following procedure:

- 1A. Standard capacity models - Remove top housing
- 1B. Boosted Models - Remove pilot base, exhaust ring, and nozzle housing
2. Remove brass clamping plate which is held in place with a single screw.
3. Remove Teflon washers.
4. Slide bowed "E" retaining ring off center shaft.

IMPORTANT

To prevent bending of the center shaft, support it while removing the retaining ring.

5. The coil assembly can now be removed by gently lifting it off of center shaft.

INSTALLATION

Refer to the parts list at the rear of this Instruction and use the following procedure.

IMPORTANT

The coil assembly and coil chamber must be free of metal chips, dirt and corrosion before installing the coil.

1. Lower coil assembly onto center shaft and at same time guide leaf springs onto contact posts.
2. Install bowed "E" retaining ring on center shaft - bowed center up.
3. Install Teflon washers (small diameter up), clamping plate, and clamping plate screw. Do not tighten screw at this time; it must be loose until coil is aligned. Use the following procedure.

ALIGNMENT

The coil must be centered so that it does not rub against the transducer housing or the pole piece under the coil. It

must also be positioned so that the leaf springs do not buckle or snap.

Make three, cardboard or paper shims: 0.13" thick; 1-1/2" long; and 3/8" wide. These can be made from a matchbook cover.

Refer to Figure 11 and use the following procedure.

1. If not already accomplished, loosen spring clamping plate screw.
2. Insert shims between coil and housing at points shown in Figure 11. Insert shims until their ends are flush with top surface of housing; then, raise coil to a higher point on shims by pulling center shaft up.
3. Rotate coil on center shaft so that leaf springs are perpendicular to clamping plate and equidistant from center shaft.
4. Tighten clamping plate screw.
5. Remove shims.
6. Move coil up and down via center shaft. Treat center shaft as though it were a feeler gauge being used to check a point gap. Coil must not rub against housing or pole piece, and leaf springs must not buckle or snap.
 - a. If rubbing is detected, repeat alignment procedure.
 - b. If a leaf spring snaps to a different curvature, the coil is rotated a little too far to the left or right. Repeat the alignment procedure.

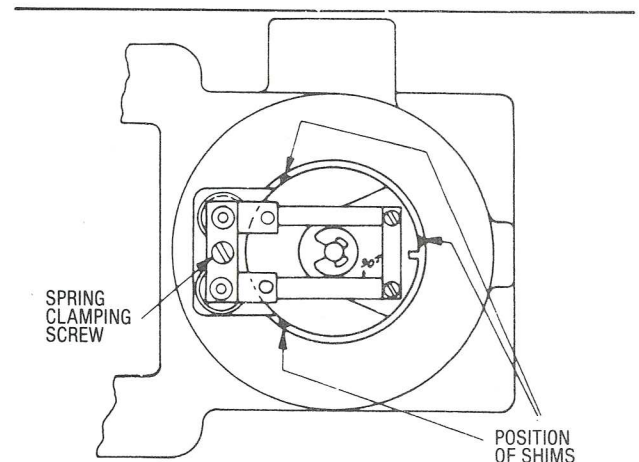


FIGURE 11 Coil Alignment, All Models

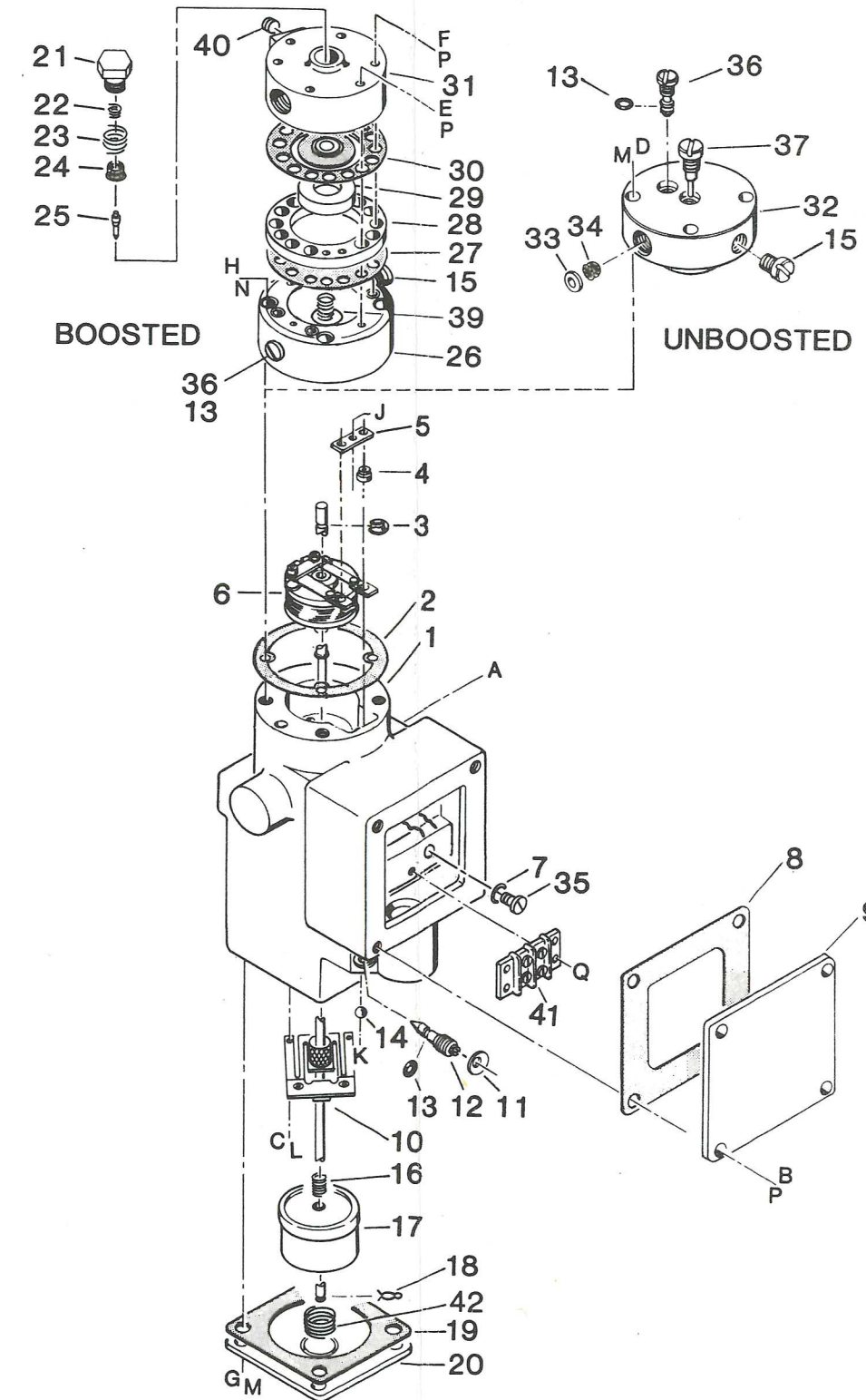


MODEL SERIES 771
I/P VALVE SERVICE TRANSDUCERS

Drawing No. 15791PL

Symbol	Part No.	Description	Req'd.	
			BOOSTED	UNBOOSTED
1	----	Transducer Housing Assy. (Incl. Items 7, 11, 12, 13, 14, 35)	1	1
* 2	12334-121	Gasket	1	1
* 3	12334-62	Bowed "E" Ring	1	1
* 4	10660-225	Washer	2	2
* 5	10660-211	Clamping Plate	1	1
* 6	----	Coil Assembly. See Table	1	1
7	12334-138	Terminal Washer	1	1
* 8	12334-173	Cover Gasket	1	1
9	12334-162	Cover Nameplate	1	1
10	12334-61	Center Rod	1	1
11	10660-191	Retaining Washer	1	1
12	12334-59	Zero Screw	1	1
* 13	2938-5	"O" Ring	2	2
* 14	12349-1	Nylon Ball	1	1
* 15	2900-23	Sealing Screw	1	1
16	2419-21	Spring	1	1
17	12334-30	Float	1	1
* 18	12352-1	Cotter	1	1
* 19	10660-132	Gasket	1	1
20a	12334-171	Bottom Cover	1	1
20b	12334-201	Bottom Cover (Reverse Acting Only)	1	1
* 21	6750-138	Retaining Nut	1	—
* 23	6750-139	Spring	1	—
* 24	6750-137	Screen	1	—
* 25	6750-21	Pilot Plunger	1	—
26	12334-235	Nozzle Housing	1	—
* 27	12334-187	Diaphragm	1	—
28	12334-176	Exhaust Ring	1	—
29	6750-14	Spacer	1	—
* 30	6750-18	Diaphragm Assy.	1	—
31	12334-234	Pilot Base	1	—
32	12334-177	Top Housing Assy. (Incl. Items 33 & 34)	—	1
* 33	7115-44	Retaining Washer	—	2
* 34	7115-43	Filter Screen	—	2
35	—	#10-32 x 3/8 Lg. Grounding Screw	1	1
* 36a	12334-182	Restriction Screw	1	—
* 36b	10660-44	Restriction Screw	—	1
37	12334-15	Shipping Screw	—	1
* 38	12334-43	Dow Corning 200 Fluid (not shown)	1	1
39	12334-188	Bias Spring	1	—
40	3240	Pipe Plug	1	—
41	7418-259	Terminal Block (T Models Only)	1	1
42	12624-4	Spring (Reverse Acting)	1	1
A	1-2310	#10-32 x 3/16 Lg. Rd. Hd. Screw	1	1
B	1-2373	#10-32 x 3/8 Lg. Rd. Hd. Screw	4	4
C	1-0137	#2-56 x 1/8 Lg. Fill. Hd. Screw	2	2
D	1-3465	1/4-20 x 1-1/4 Lg. Fill. Hd. Screw	—	4
E	1-2665	#10-32 x 1-1/4 Lg. Fill. Hd. Screw	1	—
F	1-2740	#10-32 x 1-3/4 Lg. Fill. Hd. Screw	5	—
G	1-3251	1/4-20 x 1/2 Lg. Soc. Hd. Screw	4	4
H	1-3430	1/4-20 x 1 Lg. Soc. Hd. Screw	4	—
J	1-0742	#4-40 x 7/16 Lg. Bind Hd. Screw	1	1
K	1-0742	#8-32 x 3/16 Lg. Soc. Hd. Screw	1	1
L	1-5649	#2 Lockwasher	2	2
M	1-7303	1/4 Lockwasher	4	8
N	1-7297	1/4 Lockwasher Hi Col.	4	—
P	1-7445	#10 Flatwasher	10	4
Q	1-0980	5-40 x 3/8 Rd. Hd. (T Models Only)	2	2

B/M	MODEL
15791-11S7	771-16SNF1
15791-21S10	771-16BNF1
15792-11S9	771-16SNF2
15792-13S3	771-40SNF2
15792-21S12	771-16BNF2
15792-22S4	771-40BNF2



*Recommended On-Hand Spare Parts. Always Specify Range, Serial No., or Other Nameplate Information When Ordering Spare Parts.

TABLE. Coil Assembly Part Numbers

Symbol	Part No.	RANGE INPUT (mA) OUTPUT (PSIG)			
		1-5 mA 3-15 PSIG	4-20 mA 3-27 PSIG	4-20 mA 3-15 PSIG	10-50 mA 3-15 PSIG
6	INTRINSICALLY SAFE MODEL (F1)	12334-78	12334-112	12334-103	----
	NON-INCENDIVE MODEL (F2)	12334-20	12725-7	12392-2	12451-2



SDA771-1
Issue: 1
March 1993

HAZARDOUS AREA INSTALLATIONS

INSTRUCTION INVOLVED

SD771 Installation And Service Instruction, Model Series 771, I/P Valve Service Transducers

DISCUSSION

This addendum amends information provided in preceding sections of this Instruction.

A Transducer may be installed in a hazardous area if approval for this type of installation is stated on its nameplate. FM approval categories are in the General Specifications section. CSA certification categories are given below.

INTRINSICALLY SAFE:

- Class I, Division 1, Groups A, B, C, and D
- Class II, Division 1, Groups E, F, and G
- Class III, Division 1, when installed in accordance with drawing 15032-7704
- Temperature code T3A (for IS units only)

SUITABLE FOR:

- Class I, Division 2, Groups A, B, C, and D
- Class II, Division 2, Group G
- Class III, Division 1

ENCLOSURE TYPE 4

The following drawings provide hazardous area (FM and CSA) installation information. Refer to these drawings for barrier and wiring requirements.

IMPORTANT

Before installing, applying power to, or servicing a Transducer, refer to the Transducer's nameplate, this addendum, and the Model Designation section of this Instruction for hazardous area certification.

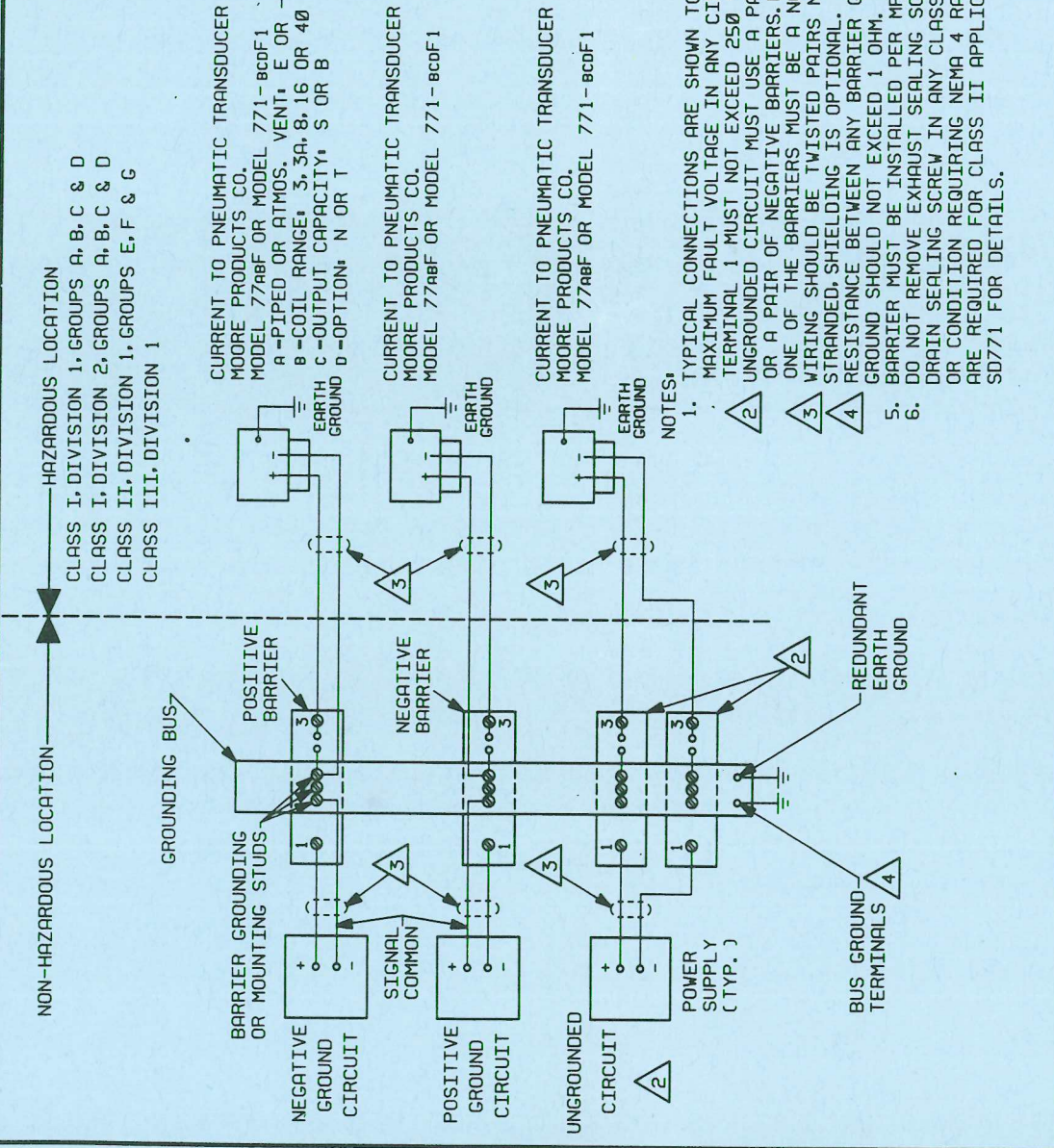
NO.	ISSUE	APPRO.
1.	EC15771 9-1-87	JS
	ADD NOTE 6 SH 18 NOTE 3 SH 2 EC15889	
2.	4-11-88	JS
	REV CSA PARA- METERS & NOTE 2 EC15889	
3.	4-27-88	JS

BARRIER PARAMETERS:
CANADIAN STANDARDS ASSOC.
CERTIFIED PARAMETERS
GROUP A, B, C OR D:

V MAX	V MIN	V MAX	V MIN
10	50	28	300
15	100		
23	150		

PLUS STAHL SERIES 8903
68MA 20.41V MAX
GROUP C OR D ONLY:
28V MAX 175V MIN

FACTORY MUTUAL SYSTEMS
APPROVED BARRIERS:
SEE SHEET 3



- NOTES:**
1. TYPICAL CONNECTIONS ARE SHOWN TO BARRIER TERMINAL 1. MAXIMUM FAULT VOLTAGE IN ANY CIRCUIT CONNECTED TO TERMINAL 1 MUST NOT EXCEED 250 VAC.
 2. UNGROUNDING CIRCUIT MUST USE A PAIR OF POSITIVE BARRIERS OR A PAIR OF NEGATIVE BARRIERS. DO NOT MIX POLARITIES. ONE OF THE BARRIERS MUST BE A NON-RETURN BARRIER.
 3. WIRING SHOULD BE TWISTED PAIRS NO 20 OR LARGER, SOLID OR STRANDED, SHIELDING IS OPTIONAL.
 4. RESISTANCE BETWEEN ANY BARRIER GROUNDING STUD & EARTH GROUND SHOULD NOT EXCEED 1 OHM.
 5. BARRIER MUST BE INSTALLED PER MFG'S INSTRUCTIONS. DO NOT REMOVE EXHAUST SEALING SCREW OR CONDENSATION DRAIN SEALING SCREW IN ANY CLASS II HAZARDOUS LOCATION OR CONDITION REQUIRING NEMA 4 RATING. DUST TIGHT SEALS ARE REQUIRED FOR CLASS II APPLICATIONS. SEE SD77 OR SD771 FOR DETAILS.
 - 6.

FM/CSA CONTROL DWG.
AGENCY APPROVAL REQUIRED
BEFORE ANY REVISION

PRINT FILE	1	2	4	5	9	K
ENC						

MOORE PRODUCTS CO.
SPRING HOUSE, PA. 15477 U.S.A.

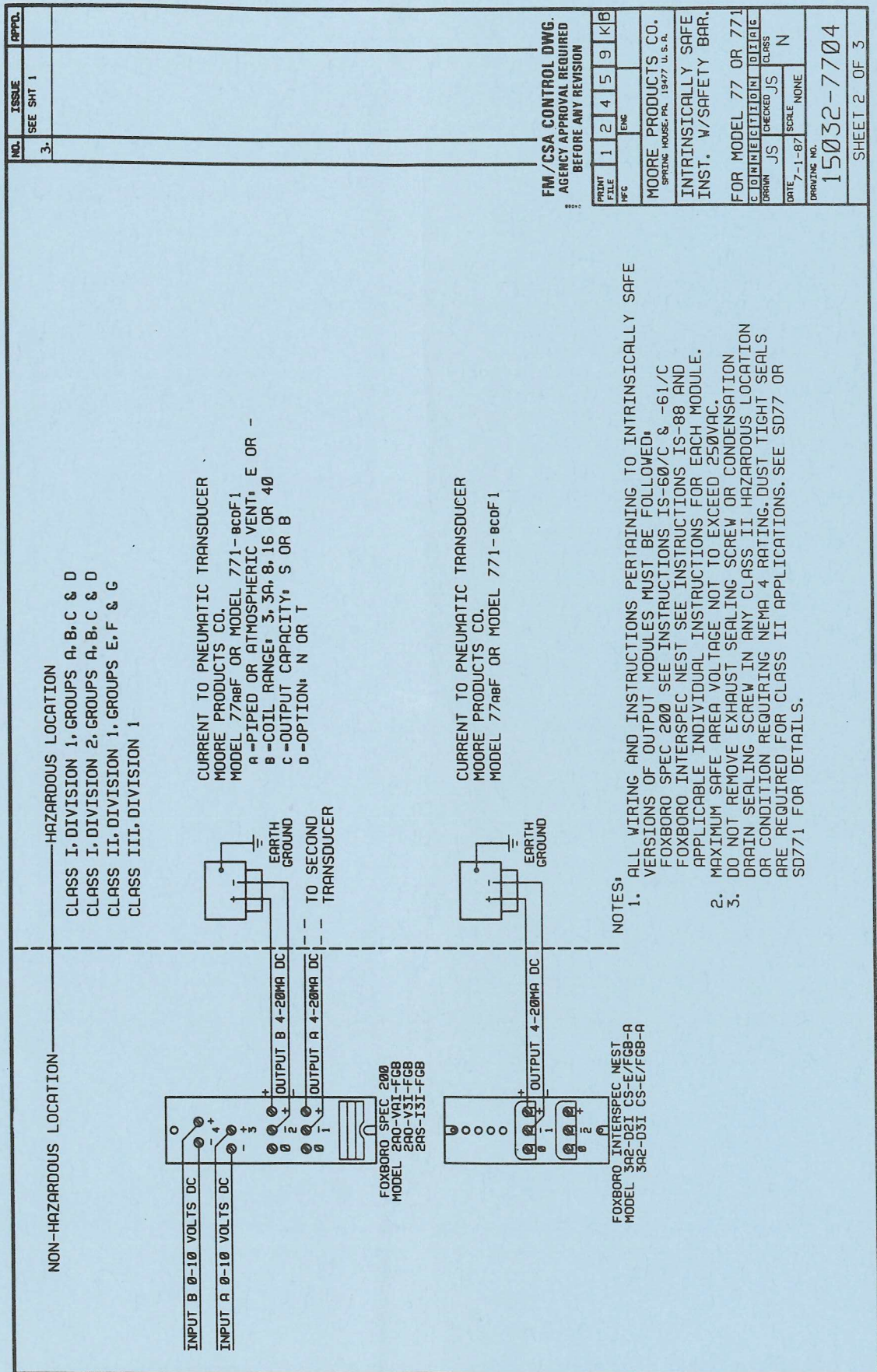
**INTRINSICALLY SAFE
INST. W/SAFETY BAR.**

FOR MODEL 77 OR 771

DESIGN	CLASS	DATE	SCALE	NOTE
JS	JS	7-1-87	NONE	N

DRAWING NO.
15032-7704

SHEET 1 OF 3



Intrinsically Safe Installation, Model 77 or 771 with Foxboro Spec 200 or Interspec Nest

FM APPROVED BARRIERS

MANUFACTURER • MTL

MODEL	CLASS I	CLASS II	CLASS III
MTL110+	ABCD	EFG	YES
MTL115+	ABCD	EFG	YES
MTL122+	ABCD	EFG	YES
MTL128+	ABCD	EFG	YES
MTL110-	ABCD	EFG	YES
MTL115-	ABCD	EFG	YES
MTL122-	ABCD	EFG	YES
MTL128-	ABCD	EFG	YES
MTL179+	ABCD	EFG	YES
MTL179-	ABCD	EFG	YES
MTL187+	ABCD	EFG	YES
MTL187-	ABCD	EFG	YES

MANUFACTURER • TAYLOR

1130FF21000	CD	EFG	YES
1130FF22000	CD	EFG	YES
1135FF21000	CD	EFG	YES
1135FF22000	CD	EFG	YES
5850FL81200	CD	EFG	YES
5851FL81200	CD	EFG	YES
5850FL81100	ABCD	EFG	YES
5851FL81100	ABCD	EFG	YES

MANUFACTURER • HONEYWELL

38545-0000-0110-111-F505	CD	EFG	YES
38545-0000-0110-112-F505	CD	EFG	YES
38545-0000-0110-113-F505	ABCD	EFG	YES

MANUFACTURER • LEEDS & NORTHROP

316569	ABCD	EFG	YES
316747	ABCD	EFG	YES

MANUFACTURER • STAHL

MODEL	CLASS I	CLASS II	CLASS III
8903/31-086/080/70	ABCD	EFG	YES
8903/31-126/050/70	ABCD	EFG	YES
8903/31-168/050/70	ABCD	EFG	YES
8903/31-191/050/70	ABCD	EFG	YES
8903/31-200/050/70	ABCD	EFG	YES
8903/31-263/050/70	ABCD	EFG	YES
8903/31-284/050/70	ABCD	EFG	YES
8903/31-315/050/70	ABCD	EFG	YES
8903/31-525/050/80	CD	EFG	YES
8903/30-086/080/70	ABCD	EFG	YES
8903/30-126/050/70	ABCD	EFG	YES
8903/30-168/050/70	ABCD	EFG	YES
8903/30-191/050/70	ABCD	EFG	YES
8903/30-200/050/70	ABCD	EFG	YES
8903/30-263/050/70	ABCD	EFG	YES
8903/30-284/050/70	ABCD	EFG	YES
8903/30-315/050/70	ABCD	EFG	YES
8903/30-525/050/80	CD	EFG	YES
8903/51-200/050/70	ABCD	EFG	YES
8903/50-200/050/70	ABCD	EFG	YES
8901/31-086/150/70	ABCD	EFG	YES
8901/31-199/150/70	ABCD	EFG	YES
8901/31-280/070/70	ABCD	EFG	YES
8901/31-280/165/80	CD	EFG	YES
8901/30-086/150/70	ABCD	EFG	YES
8901/30-199/150/70	ABCD	EFG	YES
8901/30-280/070/70	ABCD	EFG	YES
8901/30-280/165/80	CD	EFG	YES
8901/33-092/000/79	ABCD	EFG	YES
8901/33-168/000/79	ABCD	EFG	YES
8901/33-293/000/79	ABCD	EFG	YES
8901/34-092/000/79	ABCD	EFG	YES
8901/34-168/000/79	ABCD	EFG	YES
8901/34-293/000/79	ABCD	EFG	YES

NO.	ISSUE	APPD.
3.	SEE SHIT 1	

FM/CSA CONTROL DWG.
AGENCY APPROVAL REQUIRED
BEFORE ANY REVISION

PRINT FILE	1	2	4	5	9	K	B
ENG							

MOORE PRODUCTS CO.
SPRING HOUSE, PA. 19477 U.S.A.

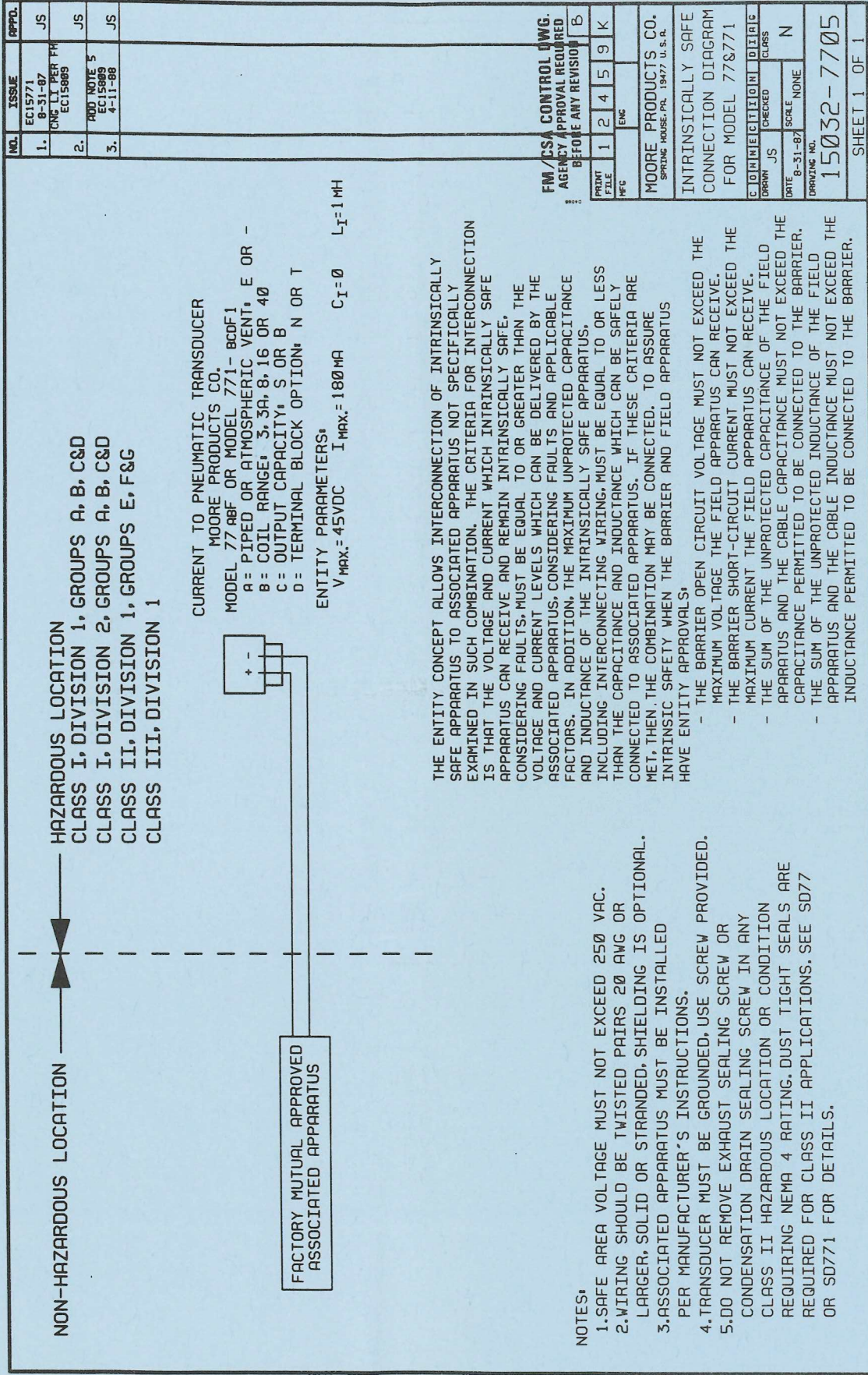
INTRINSICALLY SAFE
INST. W/SAFETY BAR.

FOR MODEL 77 OR 771

CLASS	CLASS	CLASS	CLASS
CSA	INTRINSICALLY SAFE	INTRINSICALLY SAFE	INTRINSICALLY SAFE
CLASS	CLASS	CLASS	CLASS
CSA	INTRINSICALLY SAFE	INTRINSICALLY SAFE	INTRINSICALLY SAFE

DRAWING NO.
15032-7704

SHEET 3 OF 3



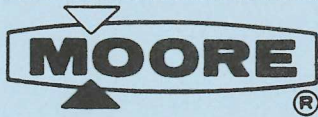
NO.	ISSUE	APPD.
1.	EC15771 8-31-87 CNC LT PER FH EC15889	JS
2.	ADD NOTE 5 EC15889 4-11-88	JS
3.		JS

FM/CSA CONTROL DWG.	
AGENCY APPROVAL REQUIRED BEFORE ANY REVISION	
1	2 4 5 9 K
ENC	
MOORE PRODUCTS CO. SPRING HOUSE, PA. 19477 U.S.A.	
INTRINSICALLY SAFE CONNECTION DIAGRAM FOR MODEL 77&771	
DATE 8-31-87	SCALE NONE
DRAWN JS	CHECKED N
DRAWING NO. 15032-7705	
SHEET 1 OF 1	

THE ENTITY CONCEPT ALLOWS INTERCONNECTION OF INTRINSICALLY SAFE APPARATUS TO ASSOCIATED APPARATUS NOT SPECIFICALLY EXAMINED IN SUCH COMBINATION. THE CRITERIA FOR INTERCONNECTION IS THAT THE VOLTAGE AND CURRENT WHICH INTRINSICALLY SAFE APPARATUS CAN RECEIVE AND REMAIN INTRINSICALLY SAFE, CONSIDERING FAULTS, MUST BE EQUAL TO OR GREATER THAN THE VOLTAGE AND CURRENT LEVELS WHICH CAN BE DELIVERED BY THE ASSOCIATED APPARATUS, CONSIDERING FAULTS AND APPLICABLE FACTORS. IN ADDITION, THE MAXIMUM UNPROTECTED CAPACITANCE AND INDUCTANCE OF THE INTRINSICALLY SAFE APPARATUS, INCLUDING INTERCONNECTING WIRING, MUST BE EQUAL TO OR LESS THAN THE CAPACITANCE AND INDUCTANCE WHICH CAN BE SAFELY CONNECTED TO ASSOCIATED APPARATUS. IF THESE CRITERIA ARE MET, THEN THE COMBINATION MAY BE CONNECTED. TO ASSURE INTRINSIC SAFETY WHEN THE BARRIER AND FIELD APPARATUS HAVE ENTITY APPROVALS:

- THE BARRIER OPEN CIRCUIT VOLTAGE MUST NOT EXCEED THE MAXIMUM VOLTAGE THE FIELD APPARATUS CAN RECEIVE.
- THE BARRIER SHORT-CIRCUIT CURRENT MUST NOT EXCEED THE MAXIMUM CURRENT THE FIELD APPARATUS CAN RECEIVE.
- THE SUM OF THE UNPROTECTED CAPACITANCE OF THE FIELD APPARATUS AND THE CABLE CAPACITANCE MUST NOT EXCEED THE CAPACITANCE PERMITTED TO BE CONNECTED TO THE BARRIER.
- THE SUM OF THE UNPROTECTED INDUCTANCE OF THE FIELD APPARATUS AND THE CABLE INDUCTANCE MUST NOT EXCEED THE INDUCTANCE PERMITTED TO BE CONNECTED TO THE BARRIER.

- NOTES:
1. SAFE AREA VOLTAGE MUST NOT EXCEED 250 VAC.
 2. WIRING SHOULD BE TWISTED PAIRS 20 AWG OR LARGER, SOLID OR STRANDED, SHIELDING IS OPTIONAL.
 3. ASSOCIATED APPARATUS MUST BE INSTALLED PER MANUFACTURER'S INSTRUCTIONS.
 4. TRANSDUCER MUST BE GROUNDED, USE SCREW PROVIDED.
 5. DO NOT REMOVE EXHAUST SEALING SCREW OR CONDENSATION DRAIN SEALING SCREW IN ANY CLASS II HAZARDOUS LOCATION OR CONDITION REQUIRING NEMA 4 RATING. DUST TIGHT SEALS ARE REQUIRED FOR CLASS II APPLICATIONS. SEE SD77 OR SD771 FOR DETAILS.



**Addendum a la notice d'installation et de depannage.
Précautions relatives aux emplacements
dangereux définis par la CSA**

INTRODUCTION

Cet addendum indique les précautions, relatives aux emplacements dangereux définis par la CSA, que doit prendre l'utilisateur lors de l'installation ou du dépannage de l'appareil décrit dans la notice ci-jointe. Ces directives complètent celles qui sont données dans la notice ci-jointe.

AVERTISSEMENT

Si les précautions suivantes ne sont pas prises, il pourrait résulter un danger d'explosion.

PRÉCAUTIONS

Emplacements dangereux de classe I, division 1 et classe I, division 2:

Les pièces de rechange doivent être autorisées par l'usine. Les substitutions peuvent rendre cet appareil impropre à l'utilisation dans les emplacements dangereux.

Emplacements dangereux de division 2:

Lorsque l'appareil décrit dans la notice ci-jointe est installé sans barrières de sécurité, on doit couper l'alimentation électrique à la source (hors de l'emplacement dangereux) avant d'effectuer les opérations suivantes:

- branchement ou débranchement d'un circuit de puissance, de signalisation ou autre.
- remplacement d'un fusible, d'une carte de circuit imprimé ou de tout autre élément connecté au circuit électrique.

Ceci termine la section Précautions.



**INSTALLATION AND SERVICE
INSTRUCTION ADDENDUM
CSA HAZARDOUS LOCATIONS PRECAUTIONS**

SDA-CSA1
Issue: 1
Date: 11/88

INTRODUCTION

This addendum provides CSA hazardous location precautions that should be observed by the user when installing or servicing the equipment described in the accompanying Instruction. These statements supplement those given in the accompanying Instruction.

WARNING

Failure to observe the following precautions could result in an explosion hazard.

PRECAUTIONS

For Class I, Division 1 and Class I, Division 2 hazardous locations:

- Use only factory authorized replacement parts. Substitution of components can impair the suitability of this equipment for hazardous locations.

For Division 2 hazardous locations:

When the equipment described in the accompanying Instruction is installed without safety barriers, the following precautions should be observed. Switch off electrical power at its source (in non-hazardous location) before:

- Connecting or disconnecting power, signal, or other wiring
- Replacing a fuse, circuit board, or any other component connected to the electrical circuit.

This completes the precautions.

Service Publications Group