

FAIRCHILD T5400 DIGITAL-PNEUMATIC TRANSDUCER

Installation, Operation and Maintenance Instructions

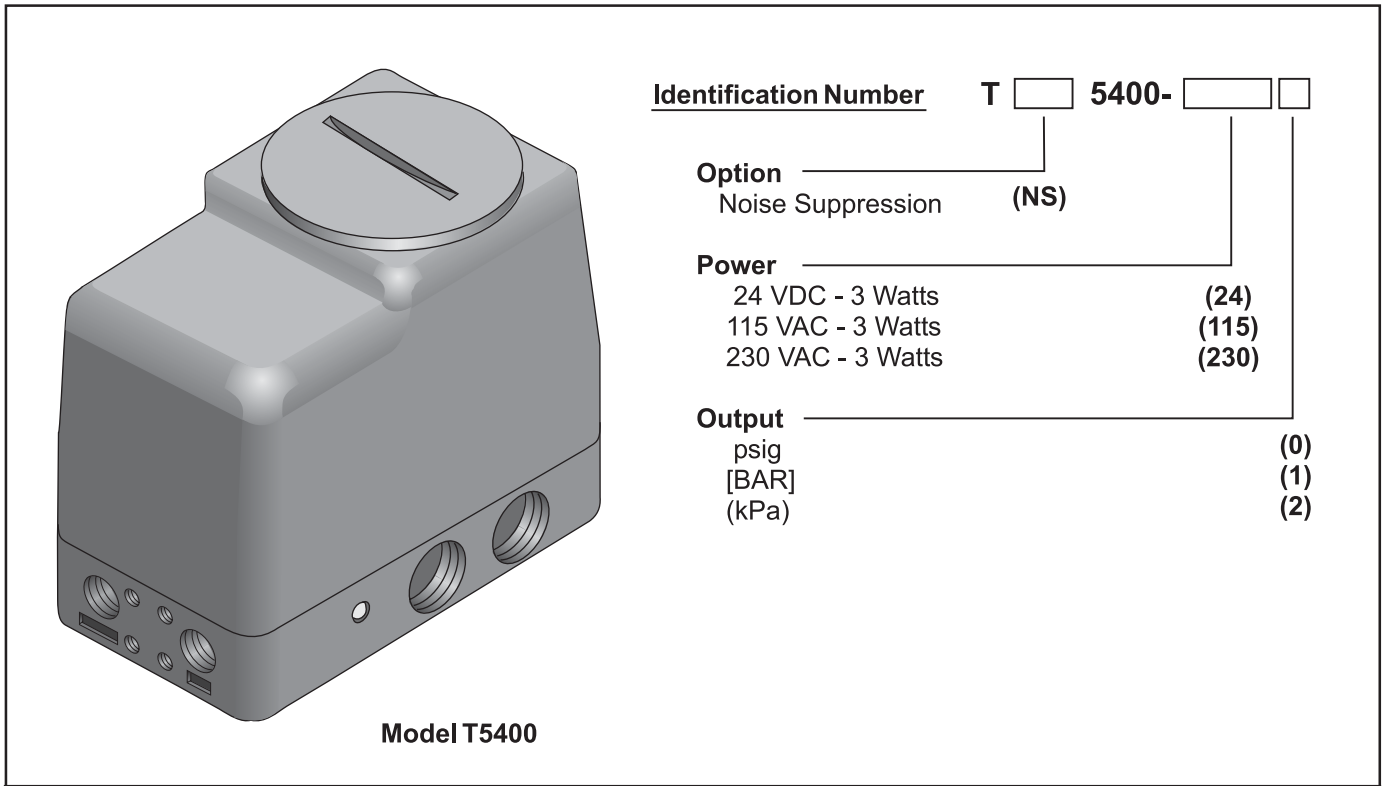


Figure 1. Model T5400 Transducer Identification Number System.

GENERAL INFORMATION

The Model T5400 Digital-Pneumatic Transducer provides a pneumatic output signal which is controlled by 8 bit digital data instructions from a central control room, a remote control location, or a local control station.

SPECIFICATIONS

Functional Specifications	
Output Range	3-15 psig [0.2-1.0 BAR], (20-100 kPa)
Supply Pressure	20 ± 2 psig [1.5 ± 0.15 BAR], (150 ± 15 kPa)
Air Consumption (SCFM)	0.16 (0.27 m ³ /HR) Maximum
Output Capacity (SCFM)	0.15 (0.26 m ³ /HR) Maximum
Voltage Requirement	115/230 VAC ± 10% 50-60 Hz 24 VDC ± 10%
Input ¹ Data	8 Bit Parallel, 1 Bit Enable (TTL or CMOS compatible)

¹ Data must be on line 0.5 microseconds before enable strobe & during enable period to start output pressure change.

Specifications (continued)

Performance Specifications	
Terminal Based Linearity	± 0.50% Full Scale
Independent Linearity	± 0.25% Full Scale
Resolution	0.4% of Span
Hysteresis	within 0.2% Full Scale
Repeatability	within 0.2% Full Scale
Supply Pressure Effect	± 1% of span for a 2 psig, [0.14 BAR], (14 kPa) supply change.
Sinking Current	5 VDC Logic 0.5 mA per bit 15 VDC Logic 1.5 mA per bit
Ambient Temperature	-40° F to +150° F, (-40° C to +65.5° C)
Materials of Construction	Body and Housing Aluminum Ball and Orifice Sapphire Nozzle Stainless Steel

INSTALLATION

The Model T5400 can be mounted directly onto a flat surface using the two 10-32 tapped mounting holes in the base of the housing. For more information, see Figure 2. "T5400 Outline Dimensions" below.

The Model T5400 can be Panel Mounted using the mounting bracket supplied in Mounting Kit 15268. For more information, see Figure 3. below.

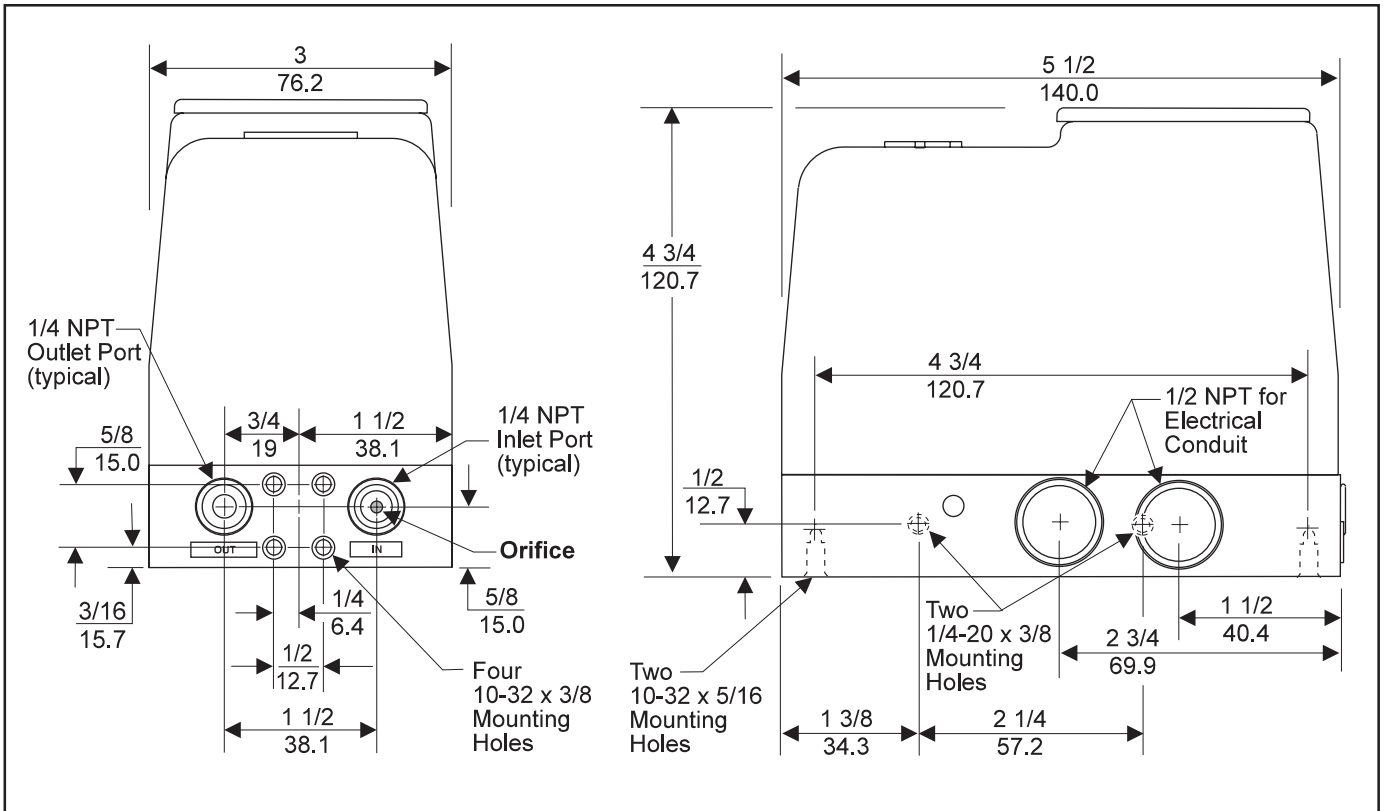


Figure 2. T5400 Outline Dimensions.

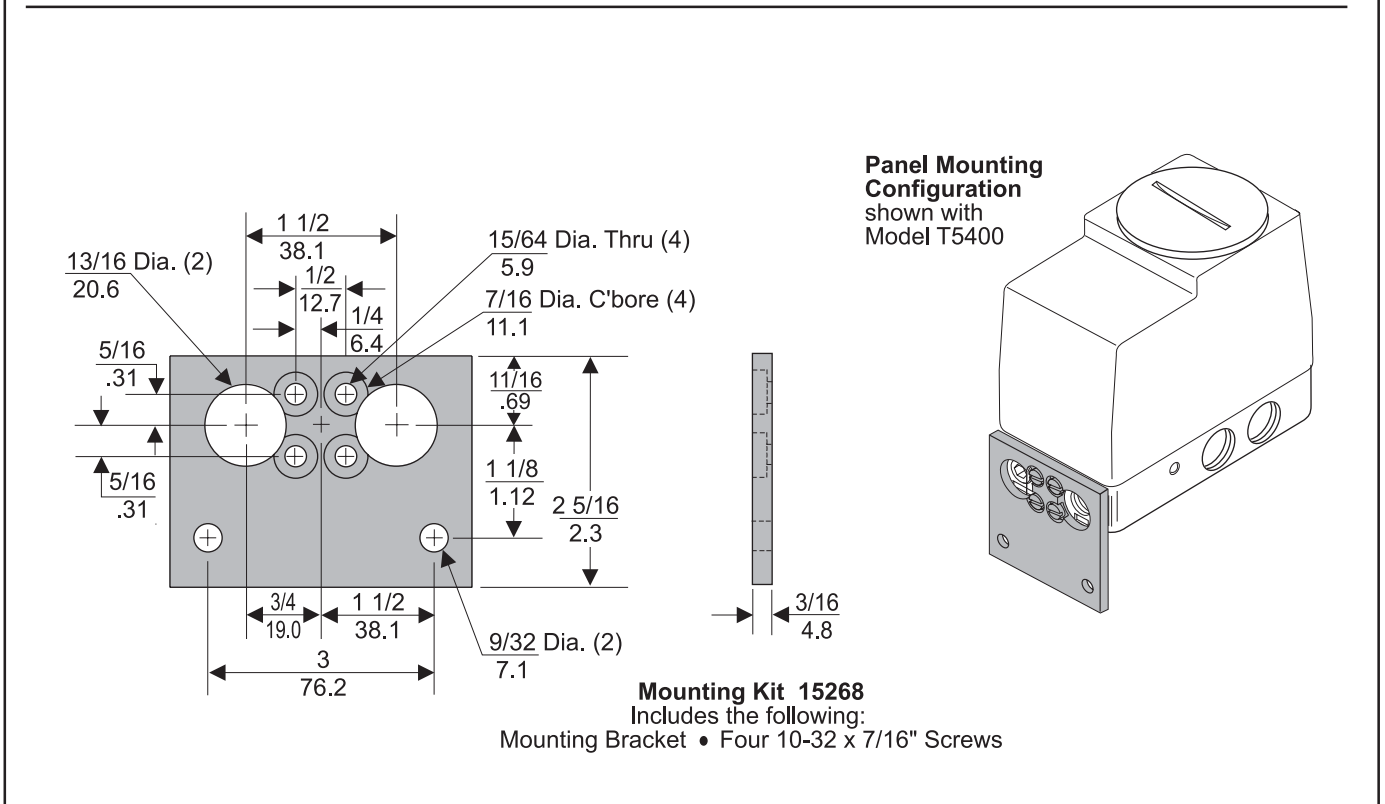


Figure 3. Mounting Kit 15268.

Installation (continued)

An Optional Mounting Kit 14596 is available when installing the unit on a 2" pipe. For more information, see Figure 4. below.

NOTE: If the T5400 Transducer is not mounted in an upright position, the Zero & Span Adjustments must be re-calibrated.

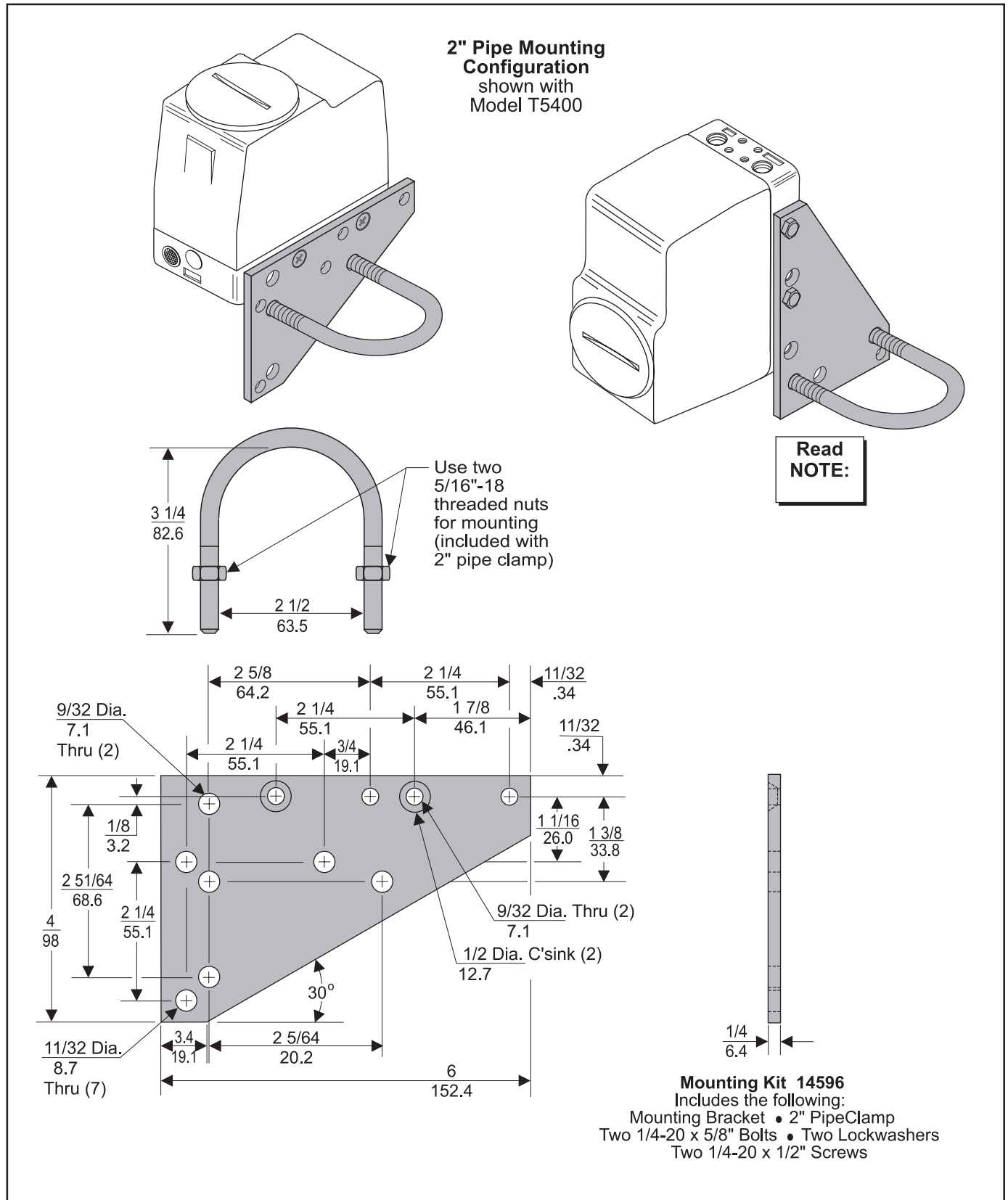


Figure 4. Optional Mounting Kit 14596.

Pneumatic Connections

Clean all pipelines to remove dirt and scale before installation.

Apply a minimum amount of pipe compound to the male threads of the fitting only. **Do Not use teflon tape as a sealant.** Start with the third thread back and work away from the end of the fitting to avoid the possibility of contaminating the transducer. Install the transducer in the air line.

The inlet and outlet ports are labeled on the end of the transducer. Tighten connections securely. Avoid undersized fittings that will limit the flow through the transducer and cause a pressure drop down stream. For more information, see Figure 2. "Outline Drawing" on page 3.

NOTES: Instrument quality air, per ISA Standards D7.3-1981, is required. Use a filter to remove dirt and liquid in the air line ahead of the transducer for correct performance. If an air line lubricator is used, it **MUST** be located downstream, beyond the transducer.

The user is responsible for insuring that the environment in which the unit will be installed, and the operating gas, are compatible with the materials in the transducer.

Electric Connection

For the T5400 Transducer, make connections to the Terminal Blocks through the two 1/2 NPT conduit holes as shown below in Figure 5. "Electrical Connections".

CAUTION: Do Not tie *Data Return* from TB2 and *Case Ground* from TB1 together. The *Data Return* **MUST** be taken back to the microprocessor or manual entry device ground to prevent ground loop problems.

For signal lines of six feet or less, use 22 gage wire. For longer signal lines, use 18 gage wire due to voltage drop considerations. Shielded cable **Must Be Used** for the signal lines for noise immunity.

NOTES: To prevent ground loop problems, shield must be connected at the controller end **ONLY**.

The power supply is internally grounded to the transducer housing. The housing should be connected to a good earth ground.

24 VDC Board

For 5 Volt Logic Operation, cut jumper W1. For 15 Volt Logic Operation, remove the Voltage Regulator VR3 only. For more information, see Figure 5. "Electrical Connections".

115/230 VAC Board

For 5 Volt Logic Operation, cut jumper W4. For 15 Volt Logic Operation, remove the Voltage Regulator VR3 only. For more information, see Figure 5. "Electrical Connections".

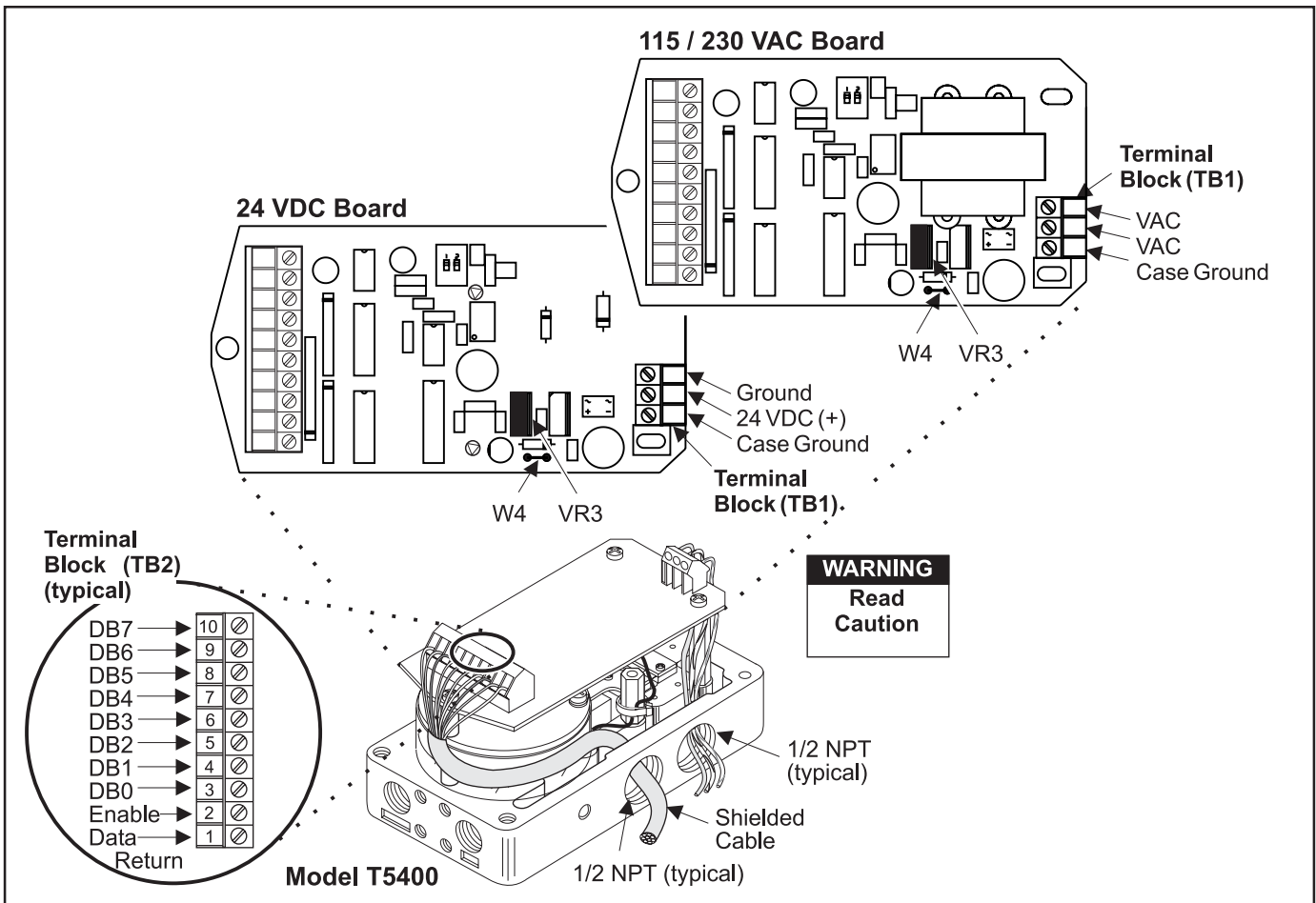


Figure 5. Electrical Connections.

CALIBRATIONS / ADJUSTMENTS

Equipment Required for Calibration:

- Pneumatic Supply capable of delivering up to 50 psig.
- Pressure Gage capable of a digital readout up to 50 psig with an accuracy of 0.1%.

FULL RANGE OPERATION

NOTE: Turn Power off, disconnect data inputs, enable and data return lines.

Forward Acting Mode Adjustment

1. Connect Air Supply and Power Supply to the transducer.
- Forward Acting Calibration-Zero
 2. Set switch SW1-1 to the OPEN position and set switch SW1-2 to the CLOSED position. **Turn Power On.**
 3. Adjust the Zero screw for minimum output pressure. Turn screw counterclockwise to increase pressure and clockwise to decrease pressure.
- Forward Acting Calibration-Span
 4. Set switch SW1-1 to the CLOSED position and set switch SW1-2 to the CLOSED position.
 5. Adjust the Span on the potentiometer for maximum output pressure. Turn screw clockwise to increase pressure and counterclockwise to decrease pressure.
 6. Repeat steps 2-5 until desired output range is obtained.

7. Set switch SW1-1 to CLOSED position and SW1-2 to OPEN position. Unit is now set for high logic input on all channels for maximum output pressure.

Reverse Acting Mode Adjustment

8. Reverse the coil wire connections on the underside of the PC Board as shown in Figure 6. below.
- Reverse Acting Calibration-Zero
 9. Set switch SW1-1 to the OPEN position and set switch SW1-2 to the CLOSED position.
 10. Adjust the Zero screw for maximum output pressure. Turn screw counterclockwise to increase pressure and clockwise to decrease pressure.
- Reverse Acting Calibration-Span
 11. Set switch SW1-1 to the CLOSED position and set switch SW1-2 to the CLOSED position.
 12. Adjust the Span on the potentiometer for minimum output pressure. Turn screw clockwise to increase pressure and counterclockwise to decrease pressure.
 13. Repeat steps 9-12 until the desired output range is obtained.
 14. Set switch SW1-1 to CLOSED position and SW1-2 to OPEN position. Unit is now set for high logic input on all channels for minimum output pressure.

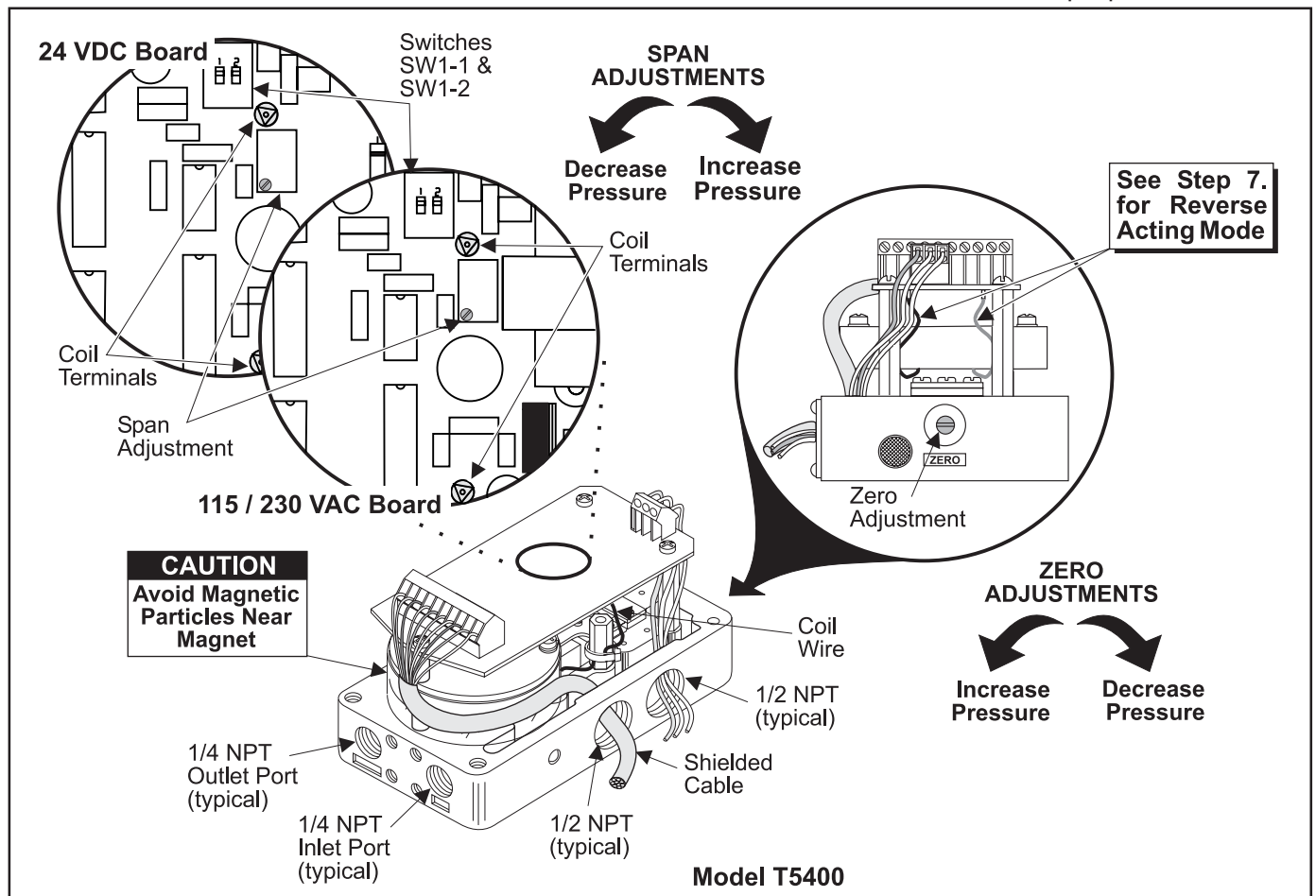


Figure 6. T5400 Calibration Configuration.

MAINTENANCE

To clean the Orifice, use the following procedure:

1. Shut off the valve that is supplying air to transducer. **Remove the Air Line and Fitting from Inlet Port.**
2. Remove the Orifice Assembly (2) from the unit by threading a 1/4-20" Screw into the orifice housing and pulling it out through the inlet port. For more information, see Figure 7. "Exploded Drawing" below.
3. Clean with alcohol and dry with compressed air.
NOTE: Parts must be completely dry before reassembling.

To replace PC Board, use the following procedure:

1. Disconnect wires from TB1 and TB2 on PC Board (7).
2. Remove Coil Wires from underside of PC Board (7).
3. Remove Screws (8) and (9) and Standoff (5) holding PC Board (7) to Transducer (1). For more information, see Figure 7. "Exploded Drawing" below.
4. Replace PC Board (7) with the appropriate PC Board from Table 3. on page 7.

To clear problems caused by Magnet malfunction, use the following procedure:

1. Shut off the valve that is supplying air to transducer. **It is not necessary to remove the Transducer from air line.**
2. Remove Screws (8) and (9) holding Standoff (5) and PC Board (7) to Transducer (1).
3. Remove two Screws (6) holding Magnet (4) to Transducer (1).
4. Remove Magnet (6) and clean gap of any foreign material with masking tape. For more information, see Figure 7. "Exploded Drawing" below.
5. Place Magnet (4) over Coil (3) and tighten with two Screws (6).
6. Using a non-metallic rod, raise up on the arm to make sure Coil (3) is free to move in Magnet (4).

NOTE: If Coil is sticking or dragging, loosen Screws and reposition Magnet. Tighten Screws and repeat step 5.

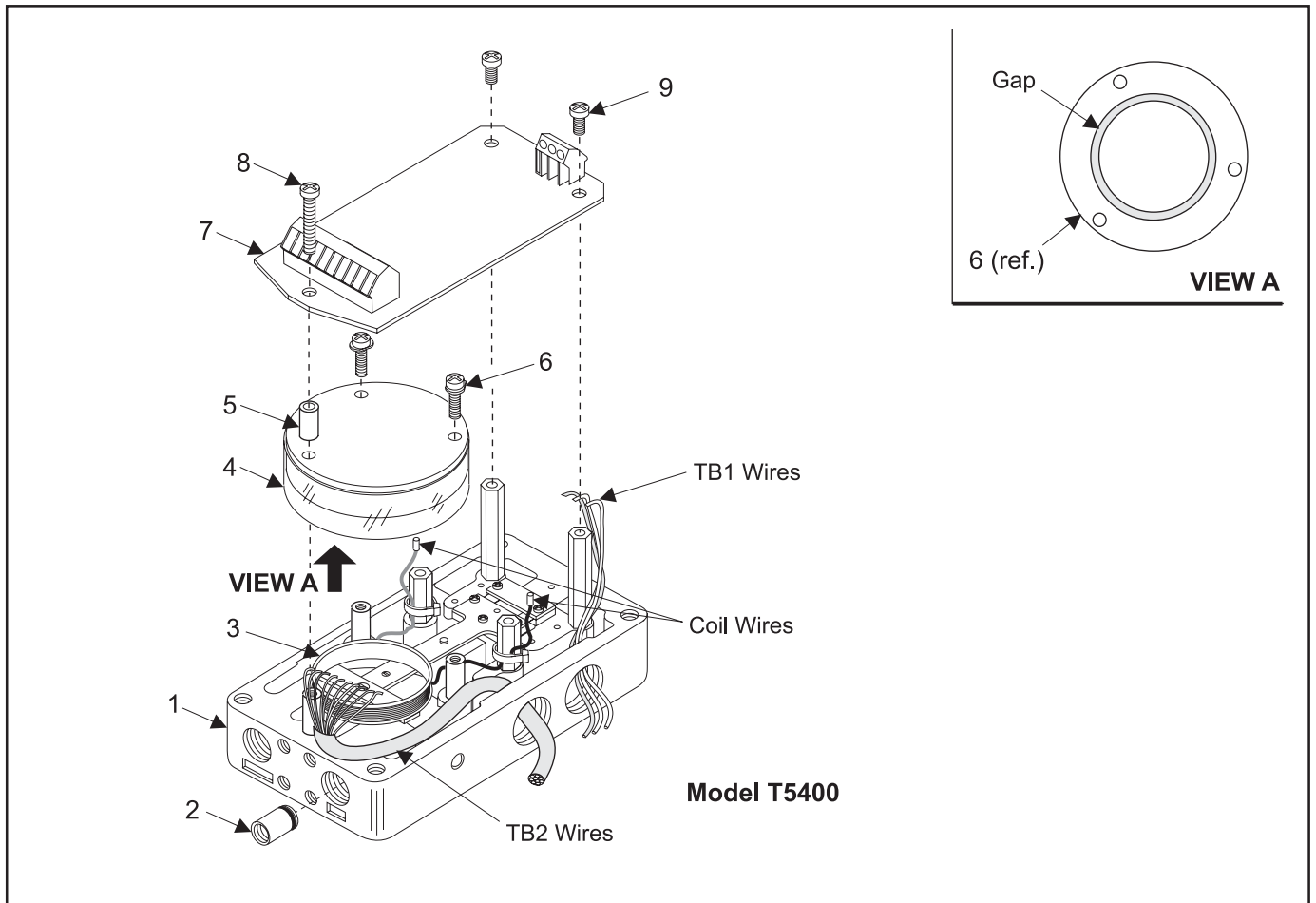


Figure 7. Exploded Drawing.

Maintenance (continued)

Item	Qty.	Part No.	Description
1	1	NS	Transducer
2	1	NS	Orifice
3	1	NS	Coil
4	1	NS	Magnet
5	1	NS	Standoff
6	2	NS	Screw
7	1	14186-1	1 24 VDC PC Board
7	1	14179-11	1 115 VAC PC Board
7	1	14179-12	1 230 VAC PC Board
8	1	NS	Screw
9	2	NS	Screw

¹ For T5400 Units Only.

NS: (Not Serviceable) In the Part No. column, NS indicates that the part is not available for field replacement.

TROUBLE-SHOOTING

Problem	Solution (check)
No Output	Supply Pressure Clogged Orifice Power Supply
Leakage	Pneumatic Connections
Low or Improper Span Adjust	Zero and Span Adjust Supply Pressure Low Output Leakage
Erratic Operation	DC Signal Loose Wires or Connections Liquid in Air Supply Dirt in Magnet Gap
Unit Does Not Operate	Replace PC Board

OPERATION LOGIC

After completion of Trouble-shooting, perform the Operation Logic Procedure in Table 5 and 6. For Forward Acting Output Pressure options refer to Table 5. below.

	High Logic Level Input (SW1-1 Closed)	Low Logic Level Input (SW1-1 Open)	
Input Data Bits	Psig	[BAR]	(kPa)
DB6	6	0.4	40
DB7	9	0.6	60
DB6 & DB7	12	0.8	80
DB7 thru DB0	15	1.0	100

NOTE: For continuous enable apply ground to enable line or close SW1-2.

For Reverse Acting Output Pressure options refer to Table 6. below.

NOTE: Coil wires on underside of PC board **MUST** be reversed for reverse acting mode.

	High Logic Level Input (SW1-1 Closed)	Low Logic Level Input (SW1-1 Open)	
Input Data Bits	Psig	[BAR]	(kPa)
DB6	12	0.8	80
DB7	9	0.6	60
DB6 & DB7	6	0.4	40
DB7 thru DB0	3	0.2	20

NOTE: For continuous enable apply ground to enable line or close SW1-2.



**ISO 9001:2000
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