

# TB 9-6685-330-35

DEPARTMENT OF THE ARMY TECHNICAL BULLETIN

## CALIBRATION PROCEDURE FOR PRESSURE GAGES DIFFERENTIAL (GENERAL)

Headquarters, Department of the Army, Washington, DC  
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**SECTION I  
IDENTIFICATION AND DESCRIPTION**

**1. Test Instrument Identification.** This bulletin provides instructions for the calibration of Pressure Gages Differential (General). Calibration and Repair Requirement Worksheet, DA Form 3758, and various manufacturers' manuals were used as the prime data sources in compiling these instructions. This bulletin complies with ANSI B40.1-1980 specification for indicating dial type elastic element pressure gages. The equipment being calibrated will be referred to as the TI (test instrument) throughout this bulletin.

**a. Model Variations.** Variations among models are described in text.

**b. Time and Technique.** The time required for this calibration is approximately 2 hours, using the dc and low frequency technique.

**2. Forms, Records, and Reports**

**a.** Forms, records, and reports required for calibration personnel at all levels are prescribed by TB 750-25.

**b.** Figure 1 is a blank calibration data sheet used as a guide for keeping records, and can be reproduced locally.

**3. Calibration Description.** TI parameters and performance specifications which pertain to this calibration are listed in table 1.

Table 1. Calibration Description

Test instrument parameters	Performance specifications
Pressure	Range: 0 to 60 psi Accuracy: ±5% of reading

**SECTION II  
EQUIPMENT REQUIREMENTS**

**4. Equipment Required.** Table 2 identifies the specific equipment to be used in this calibration procedure. This equipment is issued with Secondary Transfer Calibration Standards Set AN/GSM-286. Alternate items may be used by the calibrating activity. The items selected must be verified to perform satisfactorily prior to use and must bear evidence of current calibration. The equipment must meet or exceed the minimum use specifications listed in table 2. The accuracies listed in table 2 provide a four-to-one ratio between the standard and TI.

**5. Accessories Required.** The accessories required for this calibration are common usage accessories issued as indicated in paragraph 4 above and are not listed in this calibration procedure.

Table 2. Minimum Specifications of Equipment Required

Common name	Minimum use specifications	Manufacturer and model (part number)
PNEUMATIC PRESSURE STANDARD	Range: 0 to 60 psi Accuracy: $\pm 1.25\%$	(MIS-30859)
WATER PUMP NITROGEN REGULATOR	Pneumatic, nitrogen use only	(MIS-10325TYPE2)

**SECTION III  
CALIBRATION PROCESS**

**6. Preliminary Instructions**

**a.** The instructions outlined in paragraphs 6 and 7 are preparatory to the calibration process. Personnel should become familiar with the entire bulletin before beginning the calibration.

**b.** Items of equipment used in this procedure are referenced within the text by common name as listed in table 2.

**c.** Unless otherwise specified, verify the result of each test and, whenever the test requirement is not met, take corrective action before continuing with the calibration. Adjustments required to calibrate the TI are included in the procedure. Additional maintenance information is contained in the manufacturers' manuals for this TI.

**d.** Unless otherwise specified all controls and control settings refer to the TI.

**7. Equipment Setup**

**NOTE**

Ensure that the 0-250 PSIA transducer on the PNEUMATIC PRESSURE STANDARD was zeroed within last 8 hours.

**NOTE**

The 0-20 PSIA transducer on the PNEUMATIC PRESSURE STANDARD will not be used.

**NOTE**

Ensure that the TI is free of all liquids and other contaminants.

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**NOTE**

TI should be mounted in the vertical position for testing.

**NOTE**

TI should be on same level with the PNEUMATIC PRESSURE STANDARD.

**a.** Fill in the general data on the top of the Differential Pressure Gage Calibration Data Sheet (fig. 1).

**b.** Connect equipment as shown in figure 2.

**WARNING**

To prevent injury to personnel or damage to equipment, make certain that all components are within the range of the unit to be calibrated and all connections are securely sealed prior to applying pressure to TI. Never attempt to tighten connections with pressure applied.

**c.** As shown in figure 2, connect the WATER PUMP NITROGEN REGULATOR to the NITROGEN TANK. Then from the WATER PUMP NITROGEN REGULATOR, connect to the first "T" FITTING. Then from the first "T" FITTING, connect to the INLINE VALVE. Then from the INLINE VALVE, connect to the second "T" FITTING. Then from the second "T" FITTING, connect to the 0-250 PSIA port of the PNEUMATIC PRESSURE STANDARD.

**d.** Connect the VENT VALVE (fig. 2) to the first "T" FITTING (fig. 2).

**e.** Cap off the open "T" FITTING (fig. 2) prior to connecting the TI.

**f.** Recheck all connections



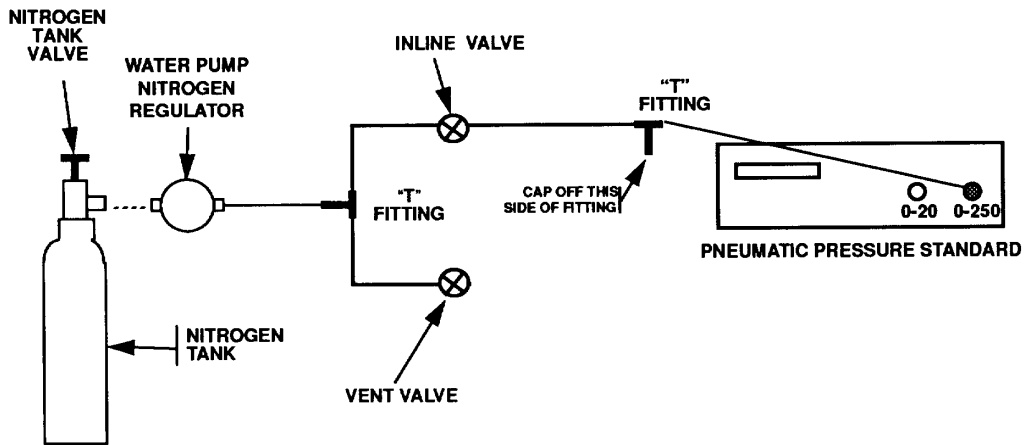


Figure 2. Leak check - equipment setup.

**NOTE**

All connections should either use a crush washer or Teflon tape to assure a properly sealed connection.

**g.** Position controls on PNEUMATIC PRESSURE STANDARD (fig. 2) as indicated in (1) through (7) below:

- (1) Set power switch to **ON** and allow approximately 30 minutes for warm up.
- (2) Press **SOURCE** pushbutton to **INT**.
- (3) Set **UNITS DISPLAYED** switch to **PSIA**.
- (4) Press **RANGE** pushbutton to **0-250**.
- (5) Press **SENSITIVITY** pushbutton to **HIGH**.
- (6) Press **RESET** pushbutton.
- (7) Press **ZERO** pushbutton.

**h.** Adjust WATER PUMP NITROGEN REGULATOR (fig. 2) fully ccw.

**i.** Open the INLINE VALVE (fig. 2); close the VENT VALVE (fig. 2).

**j.** Carefully open NITROGEN TANK VALVE (fig. 2) and adjust WATER PUMP NITROGEN REGULATOR (fig. 2) for 75 psia displayed on the digital display panel of the PNEUMATIC PRESSURE STANDARD.

**k.** Close the INLINE VALVE (fig. 2) and monitor the system for approximately 5 minutes to assure that there is no loss of pressure in the system.

**NOTE**

A solution of soap and water can be applied to each fitting to check for leaks if they are persistent.

**1.** If there is no loss of pressure, turn off NITROGEN TANK VALVE (fig. 2) and release the pressure via the VENT VALVE (fig. 2).

**m.** Remove the cap from the “T” fitting.

**8. High Pressure**

**a. Performance Check**

(1) Connect equipment as shown in figure 3.

(2) Connect TI to the system, only connect the HIGH PRESSURE SIDE (fig. 3) of the TI and leave the LOW PRESSURE SIDE (fig. 3) open to the atmosphere.

(3) Open the INLINE VALVE (fig. 3) going to the HIGH PRESSURE SIDE (fig. 3) and close the VENT VALVE (fig. 3).

(4) Adjust WATER PUMP NITROGEN REGULATOR (fig. 3) fully ccw.

(5) Open NITROGEN TANK VALVE (fig. 3) and adjust WATER PUMP NITROGEN REGULATOR (fig. 3) to pressurize the system to 75 PERCENT OF FULL SCALE, then carefully adjust WATER PUMP NITROGEN REGULATOR (fig. 3) for FULL SCALE indication on the TI.

(6) Close the INLINE VALVE (fig. 3) going to the HIGH PRESSURE SIDE (fig. 3) of the TI and monitor the TI for leaks.

(7) If the TI appears to lose pressure, check all fittings for leaks. If no leaks are detected, the TI has a leak and should be replaced.

(8) If TI maintains a FULL-SCALE indication, fill in the calibration data sheet.

**b. Adjustments.** No adjustments can be made.

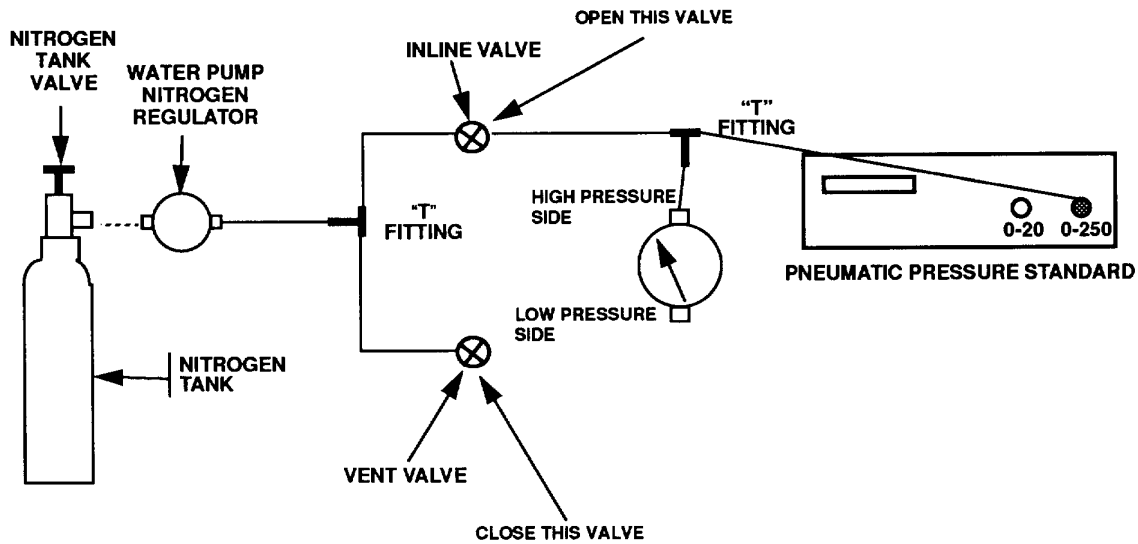


Figure 3. High pressure check - equipment setup.

## 9. Dial Accuracy Calibration

### a. Performance Check

#### NOTE

It is possible that the TI has been in storage prior to installation. Prior to actual operation of the TI, it is advised that the TI be exercised to ensure correct indication. To exercise the unit, sequentially apply maximum and minimum differential pressure to the high side of the TI for at least 10 cycles.

- (1) Zero the TI at atmospheric pressure and connect PNEUMATIC PRESSURE STANDARD (fig. 3) to the HIGH PRESSURE SIDE (fig. 3) of the TI.
- (2) The LOW PRESSURE SIDE (fig.3) of the TI is vented to the atmosphere.
- (3) Adjust WATER PUMP NITROGEN REGULATOR (fig. 3) fully ccw.
- (4) Carefully open NITROGEN TANK VALVE (fig. 3).
- (5) Adjust WATER PUMP NITROGEN REGULATOR (fig. 3) to apply 25, 50, 75, 100, and 110 PERCENT OF FULL SCALE pressure to the high side of TI.



**NOTE**

Always approach the desired scale reading from the low end of the scale. If you exceed the desired scale reading and drop back down to the reading, your procedure will be incorrect.

(6) After the TI readings have been recorded from the up-scale calibration check, the TI should then be pressurized to 110 PERCENT OF FULL SCALE.

(7) From 110 PERCENT OF FULL SCALE, decrease the pressure to 100, 75, 50, 25, and 0 PERCENT OF FULL SCALE and record the DOWN-SCALE readings.

(8) This error should not exceed one-half of the specified accuracy tolerance (see table 1).

**NOTE**

It is suggested that when taking readings from the TI, the TI should be lightly tapped to reduce the error that a slight amount of friction could cause.

**b. Adjustments.** Refer to the manufacturers' literature and manuals. Some differential pressure gages may be calibrated by adjusting the scale; if not, the differential pressure gage must be replaced.

**10. Final Procedure**

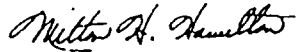
- a.** Deenergize and disconnect all equipment.
- b.** Annotate and affix DA label/form in accordance with TB 750-25.

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By Order of the Secretary of the Army:

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Distribution:

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