**Series 7214D & 7314D Dwyer® Spirahelic® Gages**

**Specifications - Installation and Operating Instructions**

**Electrical Connections**

- **Connections**
  - Do observe the maximum VDC and VAC limits listed at left.
  - See drawing above. It is not necessary to observe polarity when making electrical connections to the Series 7214D & 7314D Spirahelic® Gages.

**Connections to the Electrical Terminal Strip**

- The electrical terminal strip on the rear of the case includes dual 1/4˝ NPT female ports for a choice of vertical or horizontal piping. Block includes an integral filter plug to prevent dirt or other foreign material from entering the gage.

**Installation**

1. Select a location free from excess vibration where the temperature limits of 20 to 120°F (-6.7 to 48.9°C) will not be exceeded. Mounting surface should be vertical to match the position in which all standard gages are calibrated. Avoid locations in direct sunlight which can cause accelerated discoloration of the clear acrylic lens or where exposure to oil mist or other airborne vapors could likewise result in lens damage. Make sure the case relief area on the rear is not obstructed. This hole is designed to direct pressure rearward in the event of a Bourdon tube failure. See complete safety recommendations on the back of this sheet.

2. Make a panel cutout of 6.5˝ (165.1mm) for Series 7214D gages. Make a panel cutout of 9˝ (229mm) for Series 7314D gages. See drawing above for bolt circle and a 4-1/2 digit liquid crystal display. A 316 SS connection block includes dual 1/4˝ NPT female ports for a choice of vertical or horizontal piping. Block includes an integral filter plug to prevent dirt or other foreign material from entering the gage.

3. Two 1/4˝ NPT female pressure connections are provided allowing a choice of vertical (below gage) or horizontal piping. Plug unused port. Use minimal amount of thread sealant. Too much could block the internal pressure passage.

**Caution:** When installing fittings or pipe, always use a second wrench on the 1˝ NPT female ports for a choice of vertical or horizontal piping. Do Not allow torque to be transmitted from the block to the gage case. Always use wrench on pressure block when tightening fittings. Never put stress on housing.

**Do Not**

- Magnetic fields or other service should be returned freight prepaid to:

**Accessories**

- (1) 1/4˝ NPT pipe plug.

**Specifications**

- **Series 7214D & 7314D Models and Ranges**
  - See complete safety recommendations on the back of this sheet.

**Models**

- 7214D-G100
- 7314D-G100
- 7214D-G200
- 7314D-G200
- 7214D-G300
- 7314D-G300
- 7214D-G600
- 7314D-G600
- Range, PSI
  - 0-100
  - 0-200
  - 0-300
  - 0-600

**Installation**

- Select a location free from excess vibration where the temperature limits of 20 to 120°F (-6.7 to 48.9°C) will not be exceeded. Mounting surface should be vertical to match the position in which all standard gages are calibrated. Avoid locations in direct sunlight which can cause accelerated discoloration of the clear acrylic lens or where exposure to oil mist or other airborne vapors could likewise result in lens damage. Make sure the case relief area on the rear is not obstructed. This hole is designed to direct pressure rearward in the event of a Bourdon tube failure. See complete safety recommendations on the back of this sheet.

- Make a panel cutout of 6.5˝ (165.1mm) for Series 7214D gages. Make a panel cutout of 9˝ (229mm) for Series 7314D gages. See drawing above for bolt circle diameters and bolt hole sizes.

- Two 1/4˝ NPT female pressure connections are provided allowing a choice of vertical (below gage) or horizontal piping. Plug unused port. Use minimal amount of thread sealant. Too much could block the internal pressure passage.

- **Caution:** When installing fittings or pipe, always use a second wrench on the 1˝ NPT female ports for a choice of vertical or horizontal piping. Do Not allow torque to be transmitted from the block to the gage case. Always use wrench on pressure block when tightening fittings. Never put stress on housing.

**Electrical Connections**

- **Caution:** Do not exceed specified supply voltage ratings.

- Permanent damage not covered by warranty will result.

- This unit is not designed for 120 or 240 VAC line operation.

**Electrical Connections to the Series 7214D & 7314D Spirahelic® Pressure Gage**

- With digital display are made to the electrical terminal strip on the rear of the case. See drawing above. It is not necessary to observe polarity when making electrical connections. Do observe the maximum VDC and VAC limits listed at left.

**Wetted Parts**

- Inconel® Alloy X-750 Bourdon tube, 316 SS connection block.

**Housing**

- Impact resistant mineral filled nylon.

**Position**

- Calibrated for mounting with scale in vertical position.

**Wetted Parts**

- Inconel® Alloy X-750 Bourdon tube, 316 SS connection block.

**Movement**

- Direct drive of pointer.

**Temperature Limits**

- 20 to 120°F (-6.7 to 48.9°C).

**Overpressure**

- 150% of full scale. Recommended operation should be between 25 and 75% of full scale.

**Finish**

- Black.

**Weight**

- 7214D-21 oz. (595 grams)
- 7314D-1 lb, 11 oz. (765 grams)

**Accessory**

- (1) 1/4˝ NPT pipe plug.

**Electrical**

- Power Supply: 10-35 VDC; 16-26 VAC.

**Warm-Up Time**

- 10 minutes.

**Current Consumption**

- DC: 38 mA max.; AC: 76 mA max.

**Calibration Test**

- To check calibration, use a dead weight tester or certified test gage with accuracy of 0.1% or better for ASME Grade 3A gages. The test gage range should be comparable to the range of the Dwyer® Spirahelic® gage being tested. Connect lines from the two instruments to a tee and a third line from the tee to a controllable source of pressure. Apply pressure slowly so pressure can equalize throughout the system. Compare readings. If gage being tested is found to need calibration, return it freight prepaid to the address below.

**Maintenance**

- No lubrication or periodic servicing is required. Keep case exterior and lens clean. Use only cleaners compatible with acrylic plastic.

**Repairs**

- Field repair is not recommended and can void warranty. Gages needing calibration or other service should be returned freight prepaid to:

**Dwyer Instruments, Inc.**

- Attn: Repair Department
- 102 Indiana Highway 212
- Michigan City, IN 46360

**Specifications**

- Size: 6” (7214D), 8.5” (7314D). Size conforms to ASME B40.1.

- Accuracy: ASME Grade 3A (1/4% of full scale).

- Pressure Connections: 1/4˝ NPT female, duplicated back and bottom.

- **ASME Specifications:** Conforms to ASME B40.1.

- Housing: Impact resistant mineral filled nylon.

- Position: Calibrated for mounting with scale in vertical position.

- **ASME Specifications:**
  - Conforms to ASME B40.1.

- **Housing:**
  - Impact resistant mineral filled nylon.

- **Position:**
  - Calibrated for mounting with scale in vertical position.

- **Electrical Connections**
  - **Caution:** Do not exceed specified supply voltage ratings.

- **Permanent damage not covered by warranty will result.**

- **This unit is not designed for 120 or 240 VAC line operation.**

- **Electrical Connections to the Series 7214D & 7314D Spirahelic® Pressure Gage**
  - With digital display are made to the electrical terminal strip on the rear of the case. See drawing above. It is not necessary to observe polarity when making electrical connections. Do observe the maximum VDC and VAC limits listed at left.

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fatigue cracks usually release the media fluid slowly so case pressure buildup is reduced by providing pressure relief openings in the gauge case. However, in high pressure systems, the stress of the elastic element approaches the ultimate strength of the material, fatigue failure may resemble explosive failure.

4.2.6 Elastic element assembly failure will not reduce pressure surges and restrict fluid flow into the partially open Bourdon tube.

4.2.7 Overpressure Failure. Overpressure failure is caused by the application of internal pressure greater than the rated limits of the elastic element and can occur when a low pressure gauge is installed in a high pressure port of system. The effects of overpressure failure, usually more critical in compressed gas systems than in liquid filled systems, are unpredictable and may cause parts to be propelled in any direction. Cases with pressure relief openings will not always retain expelled parts.

- Placing a restrictor in the pressure gauge inlet will not reduce the immediate effect of failure, but will help control flow of escaping fluid following rupture and reduce potential of secondary effects.

It is generally accepted that solid front cases with pressure relief back will reduce the possibility of parts being projected forward in the event of failure. The window alone will not provide adequate protection against internal case pressure buildup, and can be the most hazardous component.

4.2.7.3 Corrosion Failure. Corrosion failure occurs when the elastic element becomes subject to corrosion. The attack by corrosive chemicals present in either the media inside or the environment outside the gauge case may occur as pit-hole leakage through the elements walls or early fatigue failure due to stress cracking brought about by chemical deterioration of the material. A chemical (diaphragm) seal should be considered for use with pressures that may have a corrosive effect on the elastic element.

4.2.7.4 Explosive Failure. Explosive failure is caused by the pressure generated by a chemical reaction such as with adiabatic compression of explosive gases without the presence of hydrocarbons. It is generally accepted that there is no known means of predicting the magnitude or effects of this type of failure. For this reason, failures where there is no interchangeability between the elastic element and the window will not necessarily prevent explosive pressure projection. See recommendations in para. 3.3.4.

4.2.8 Pressure Connection. See recommendations in para. 3.3.4.

4.3 Safety Recommendations.

4.3.1 Oxygen Systems. The pressure gauge selected should have a full scale pressure such that the operating pressure approaches the middle half (25 to 75%) of the scale. The full scale pressure of the gauge selected should be approximately two times the intended operating pressure. Should it be necessary for the operating pressure to exceed 75% of full scale, contact the supplier for recommendations.

- This does not apply to test, retarded, or suppressed scale gauges.

4.3.2 Use of Gauges Near Zero Pressure. The use of gauges near zero pressure is not recommended because the accuracy is very low and the accuracy of the applied pressure. If, for example, a 0/100 psi Grade B gauge is used to measure 6 psi, the accuracy of the measurement will be approximately 10%. In addition, the scale of a gauge is often laid out with take-up, which can reduce the accuracy when measuring pressures that are a small percentage of the gauge span.

For the same reasons, gauges should not be used for the purpose of indicating that the pressure in a tank, autoclave, or other similar unit has been completely exhausted to atmospheric pressure. Depending on the accuracy and the span of the gauge and the possibility that takeup is incorporated into the range of the gauge, hazardous pressure may remain in the tank even though the gauge is indicating zero pressure. A venting device must be used to completely reduce the pressure before unlocking cover, removing fittings, or performing other similar activities.

4.3.3 Compatibility With the Pressure Medium. The elastic element is generally a thin walled member, which is subject to a wide range of pressure, stress conditions, and must, therefore, be carefully selected for compatibility with the pressure medium. None of the common element materials is impervious to every type of chemical attack. The potential for corrosive attack is established by many factors, including the concentration, temperature, and contamination of the medium. The user should inform the manufacturer of the installation conditions so that the appropriate element materials can be selected.

4.4 Reuse of Pressure Gauges

4.4.1 Several considerations must be taken into account before gauges are reused, in order to ensure that the system is not damaged by re-use of gauges. The gauge may bear the inscription ACETYLENE on the dial. It may also include the equivalent saturation temperature scale markings on the dial.

4.4.2 Acetylene Gauges. A gauge designed to indicate acetylene pressure. It shall be constructed using materials that are compatible with commercially available acetylene. The gauge may bear the inscription AMMONIA on the dial. It may also include the equivalent saturation temperature scale markings on the dial.

4.4.3 Corrosion. Corrosion of the pressure element can occur in the first installation through chemical attack or early failure in the second installation.

4.4.4 Other Considerations.

4.5.1 Oxygen Systems. The pressure gauge selected should have a full scale pressure such that the operating pressure approaches the middle half (25 to 75%) of the scale. The full scale pressure of the gauge selected should be approximately two times the intended operating pressure. Should it be necessary for the operating pressure to exceed 75% of full scale, contact the supplier for recommendations.

- This does not apply to test, retarded, or suppressed scale gauges.

4.5.2 Use of Gauges Near Zero Pressure. The use of gauges near zero pressure is not recommended because the accuracy is very low and the accuracy of the applied pressure. If, for example, a 0/100 psi Grade B gauge is used to measure 6 psi, the accuracy of the measurement will be approximately 10%. In addition, the scale of a gauge is often laid out with take-up, which can reduce the accuracy when measuring pressures that are a small percentage of the gauge span.

For the same reasons, gauges should not be used for the purpose of indicating that the pressure in a tank, autoclave, or other similar unit has been completely exhausted to atmospheric pressure. Depending on the accuracy and the span of the gauge and the possibility that takeup is incorporated into the range of the gauge, hazardous pressure may remain in the tank even though the gauge is indicating zero pressure. A venting device must be used to completely reduce the pressure before unlocking cover, removing fittings, or performing other similar activities.

4.5.3 Compatibility With the Pressure Medium. The elastic element is generally a thin walled member, which is subject to a wide range of pressure, stress conditions, and must, therefore, be carefully selected for compatibility with the pressure medium. None of the common element materials is impervious to every type of chemical attack. The potential for corrosive attack is established by many factors, including the concentration, temperature, and contamination of the medium. The user should inform the manufacturer of the installation conditions so that the appropriate element materials can be selected.

4.5.4 Reuse of Pressure Gauges

4.5.5 Ammonia Gauge. A gauge designed to indicate ammonia pressure and to withstand the corrosive effects of ammonia. The gauge may bear the inscription AMMONIA on the dial. It may also include the equivalent saturation temperature scale markings on the dial. See para. 6.1.2.1.

4.5.6 Oxygen Gauge. A gauge designed to indicate oxygen pressure.

4.5.7 Pressure Gauges

4.5.8 Reuse of Pressure Gauges

4.5.9 Corrosion. Corrosion of the pressure element can occur in the first installation through chemical attack or early failure in the second installation.

4.5.10 When a new gauge is selected, it should not be moved from one application to another. Should it be necessary, however, the following must be considered.

4.6.1 Chemical Compatibility. The consequences of incompatibility can range from simple corrosion failure to explosive failure. For example, moving an oil service gauge to oxygen service will result in oil decomposition.

4.6.2 Partial Fatigue. The first installation may involve pressure pulsation that has expended most of the gauge life, resulting in early fatigue in the second installation.

4.6.3 Corrosion. Corrosion of the pressure element assembly in the first installation may cause early failure in the second installation.

When obtaining a new gauge, all guidelines covered in the Standard relative to application of gauges should be followed in the same manner as when a new gauge is selected.