
GALISO® PRESSTEST (P)-101
PILOT OPERATED HYDRACLOSE HYDROSTATIC TEST SYSTEM
OPERATION INSTRUCTIONS

GALISO® INCORPORATED

22 Ponderosa Court, Montrose, Colorado 81401
P.O. Box 1468, Montrose, Colorado 81402
(303) 249-0233 (800) 854-3789

FORM NUMBER : GSO8712-2A

ISSUE DATE : 10/19/89 lkc

TABLE OF CONTENTS

PART	DESCRIPTION	PAGE
1	Introduction	1
1a	Introduction, Hydrostatic Testing	2
2	Presstest System Components	4
3	Presstest Optional Components	7
4	Safety	8
4a	Operation Guidelines	10
5	Installation	11
6	Hydraclose Test Head Information	14
7	Cylinder Preparation	17
8	Calibrated Cylinder, Preparation and Care	19
9	Start-Up Procedure	20
10	Pump Speed Adjustment	21
11	Pressure & Expansion Calibration, Introduction	25
11a	Expansion Reading Check & Calibration	26
11b	Pressure Reading Check & Calibration	29
12	Operation Procedure, Hydrostatic Test	32
13	Maintenance	36
14	Specifications and Replacement Parts	38

ILLUSTRATIONS

FIG.	DESCRIPTION	PAGE
1	Presstest Test System Components	4
2	Test Head, Cross Section	5
3	Hydraclose Seal, Cylinder Neck	8
4	Cylinder Neck Thread Detail	9
5	Plumbing Installation, Presstest Control Console	12
6	Speed Seal Detail	14

Copyright 1989, Galiso, Incorporated.

EDITOR : Linda Carson

"Galiso", "Recortest", "Hydraclose", and "Turnair" are registered trademarks of Galiso, Incorporated.
"IBM" and "PC-XT" are registered trademarks of the International Business Corporation.

PART 1) INTRODUCTION

The Galiso Presstest is a pilot operated hydrostatic test system which is designed for rapid, accurate testing of compressed gas cylinders at pressures up to 10,000 PSI. Presstest systems combine the innovative features of our most advanced automated hydrostatic test systems with the simplicity and economy of our manually operated test systems to provide an efficient, reliable cylinder test system. Presstest is capable of testing up to 30 cylinders per hour when the system is equipped with two test jackets and manned by two operators.

The Presstest measures cylinder expansion electronically, providing a substantial improvement in accuracy over burette style expansion measuring systems. The Presstest features a patented electronic expansion measuring device, which rapidly measures expansion values up to 1,000 cc with an accuracy factor of plus or minus 0.1 cc. Expansion results are plainly shown on the LED display, there is no need to bend or squint to read expansion values from tiny burette gradations. The electronic expansion measuring system eliminates the time consuming act of re-zeroing the burette prior to each test.

The design of the Presstest system leaves room for growth. Future Presstest plans include interfacing an IBM PC-XT compatible with the Galiso Recortest III operating program and control card to provide automated control of test specifications and results.

PART 1a) INTRODUCTION, HYDROSTATIC TESTING

In accordance with D.O.T. regulations, certain cylinders must be periodically re-qualified and certified safe for use. The requalification procedure and regulations are discussed in detail in the Code Of Federal Regulation (CFR), Title 49, Section 173.34. Copies of the CFR may be obtained by writing to the following address:

**Superintendent of Documents
U.S. Government Printing Office
Washington, D.C. 20402**

The Galiso Presstest Test System will perform water-jacket (hydrostatic) testing. The specifications and procedure for hydrostatic testing are outlined in Compressed Gas Association Pamphlet C-1, "Methods for Hydrostatic Testing of Compressed Gas Cylinders". Copies of Compressed Gas Association Pamphlets are available by writing to the following address:

**Compressed Gas Association
1235 Jefferson Davis Highway,
Arlington, Virginia 22202
(703) 979-0900**

PART 1a) INTRODUCTION, HYDROSTATIC TESTING, (Continued)

In general, the water-jacket method for hydrostatic testing consists of loading a water filled cylinder into a sealed chamber (test jacket), which is also filled with water and is connected to a calibrated glass tube (burette). The Presstest uses a patented electronic expansion measuring device (Expansion Bowl) in place of the burette. The burette or Expansion Bowl is first zeroed, and the cylinder is then pressurized to 5/3 (see CFR 49, 173.34) of its DOT or ICC rating, which is stamped on the shoulder of the cylinder. This test pressure is held for thirty seconds.

As pressure is applied to the cylinder, the cylinder expands (much like a balloon inflating) and forces water out of the test jacket and up into the burette or expansion bowl. The burette or expansion bowl is then read to determine the "Total Expansion" (in cubic centimeters) of the cylinder under test pressure. After the thirty second test time has elapsed, the test pressure is released and the cylinder deflates. As the cylinder returns to its approximate original size, water goes back into the test jacket from the burette or expansion bowl. In most cases, the cylinder will not return to its original size, having been slightly stretched by the pressurization process. The amount of stretching incurred is called the "Permanent Expansion". The difference between the "Total Expansion" and the "Permanent Expansion" is called the "Elastic Expansion".

The "Percent Expansion" of the cylinder is determined by the following formula:

$$\text{Percent Expansion} = (\text{Permanent Expansion} / \text{Total Expansion}) \times 100$$

When the Percent Expansion exceeds 10% (see CRF 49, 173.34) the cylinder must be condemned and removed from service. A high percent expansion value is an indication that the cylinder metal has lost its elasticity, or that there has been excessive thinning of the cylinder wall and that the cylinder is no longer safe for use.

All test data, such as test pressure, cylinder serial number, expansion results, etc. must be recorded on a Hydraclose Test Log. The test log must then be filed and maintained for the life of the test, in the event that there is any future problem with the cylinder.

Cylinders which will receive a plus (+) stamp or a star (*) stamp require additional test specifications and calculations. Plus (+) stamping allows the cylinder to be filled to an additional 10 percent beyond the rating which is stamped on the cylinder shoulder. Star (*) stamping makes the cylinder eligible for an extended, ten year, retest interval. The procedure and requirements for plus stamping and star stamping are discussed in Compressed Gas Association Pamphlet C-5, "Cylinder Service Life, Seamless High Pressure Cylinders". CGA pamphlet C-5 is available from the Compressed Gas Association at the address that was indicated previously.

PART 2) PRESSTEST TEST SYSTEM COMPONENTS

The Presstest test system consists of four major components, which are shown below.

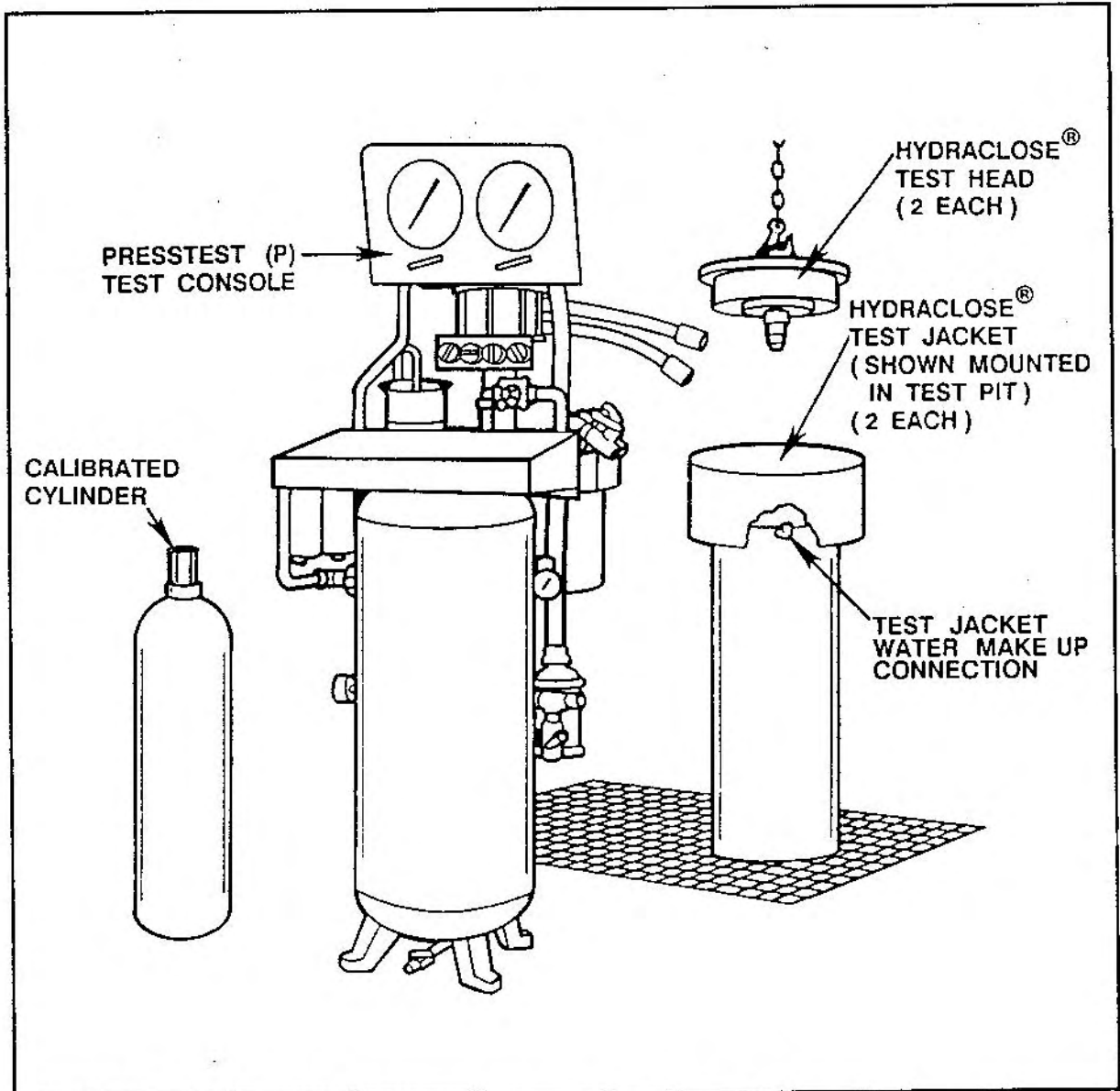


FIGURE 1) PRESSTEST TEST SYSTEM COMPONENTS

The advanced design of the Presstest Test System is the culmination of twenty five years of research and development in the field of hydrostatic test control. Each component of the Presstest Test System has been carefully designed to streamline the cylinder requalification procedure. Collectively, the components of the Presstest Test System work together to provide speed, accuracy and simplicity of operation. On the following pages, each of the components of the Presstest test system is discussed in detail.

(continued)

PART 2) PRESSTEST TEST SYSTEM COMPONENTS, (Continued)

1. **PRESSTEST CONTROL CONSOLE** : The control console includes the expansion measuring system, an air driven intensifier pump, a 30 gallon air pressure reservoir, air and water filtration systems, auxiliary air and water outlets, pressure gauges, and control valves. The intensifier pump supplies filtered water at pressures up to 10,000 PSI for use in the hydrostatic test procedure. The patented Expansion Bowl Assembly which electronically measures cylinder expansion, is also mounted on the Control Console. The Control Console features a convenient desk top shelf which provides a writing area for recording test data and results on the test log.
2. **HYDRACLOSE TEST HEAD** : The patented Hydraclose Test Head is a remote controlled closure for the test jacket that automatically seals itself within the test jacket and also seals the connection between the cylinder and the test head.

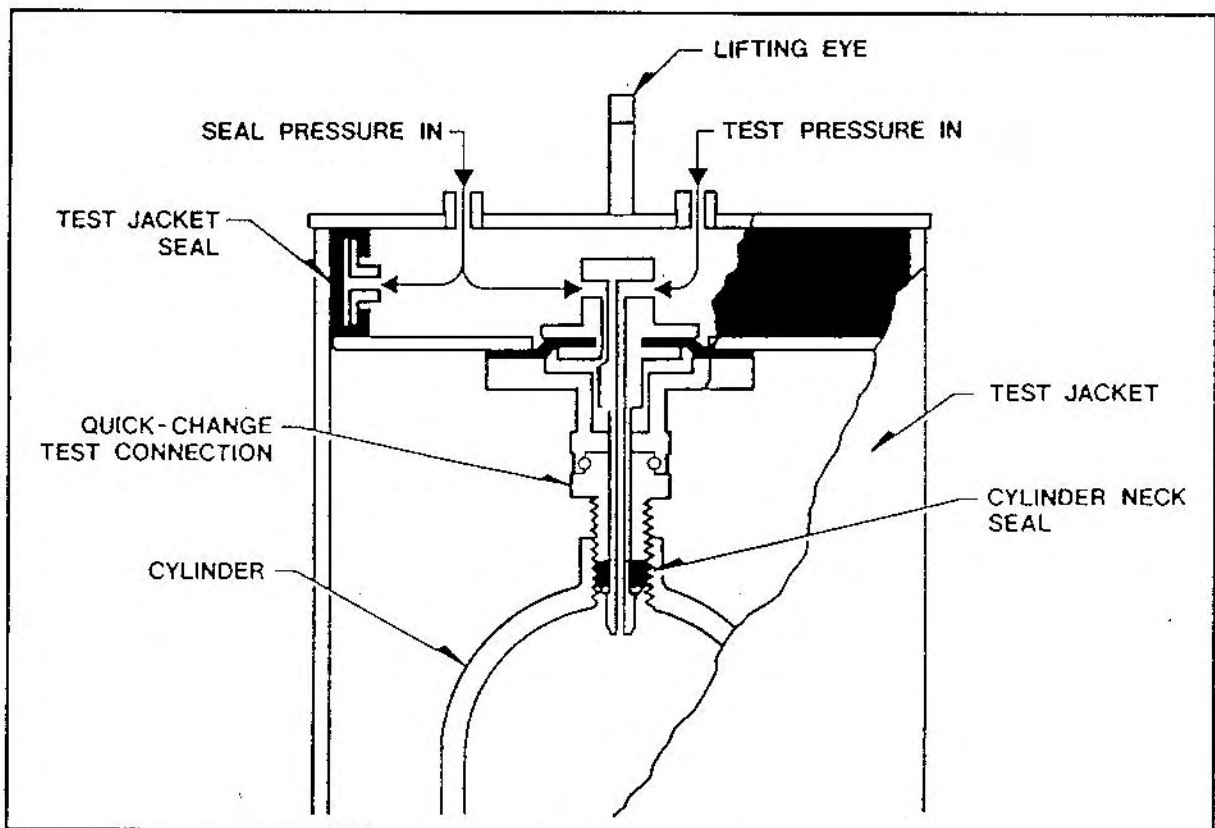


FIGURE 2) HYDRACLOSE TEST HEAD, CROSS SECTION

(continued)

PART 2) PRESSTEST TEST SYSTEM COMPONENTS, (Continued)

3. **HYDRACLOSE TEST JACKET** : The Hydraclose Test Jacket is used with the Hydraclose test head to provide an enclosure for the hydrostatic test. The test jacket includes a splash shield, burst disc, and drain valve as well as the plumbing components for connection to the Presstest Expansion Bowl.

4. **CALIBRATED CYLINDER** : The Calibrated Cylinder is a special steel calibration cylinder which is used for daily system calibration per D.O.T. specifications. Calibration points are stamped on the cylinder shoulder and a 3/4" NPT adapter is included to protect cylinder neck threads. The Calibrated Cylinder includes a calibration certificate which is an accurate record of the amount of expansion that can be expected at a given test pressure.

PART 3) OPTIONAL COMPONENTS FOR PRESSTEST TEST SYSTEM

The following optional equipment may be added to the Presstest test system to increase speed and efficiency of operation.

ACF AUTOMATIC WATER FILLING EQUIPMENT

The ACF speeds the test procedure by quickly filling the cylinder with water in preparation for the test. The ACF senses the water level in the cylinder and automatically shuts off when the cylinder is full, freeing the operator to perform other test related duties while the cylinder is filled automatically.

PCT-ADW AUTOMATIC CYLINDER DRAINING AND DRYING EQUIPMENT

The PCT-ADW will invert, drain, and dry the cylinder and return it to the upright position in less than three minutes. At the push of a button the PCT-ADW will automatically clamp and invert the cylinder and then inject air into the cylinder interior to rapidly flush out water that is left from the hydrostatic test. After the cylinder has been drained, the PCT-ADW sprays hot water into the cylinder to heat the interior in preparation for drying. Air is then injected into the heated cylinder to quickly dry the cylinder interior. The entire process takes only three minutes or less, depending on the size of the cylinder. The PCT-ADW also features a washing program which allows the PCT-ADW to wash the cylinder interior with a detergent solution. The PCT-ADW is available in single, dual, or quad cylinder configurations.

GHY HYDRACLOSE TEST HEAD YOKE ASSEMBLY

The GHY Hydraclose Head Yoke Assembly is ideal for test systems with two or more test jackets and weigh stations. The GHY is a special steel frame which links two Hydraclose Test Heads together, allowing the test operator to load or unload two test jackets at once. The tandem configuration of the Hydraclose Head Yoke enables a single hoist and I-beam assembly to do the work of two hoists. The GHY Hydraclose Head Yoke cuts cylinder handling time in half, reducing the time an operator spends moving cylinders.

The components of a complete Presstest installation are configured to meet the individual requirements of each customer. The Presstest system is designed to grow with your production requirements. Optional hardware may be added to the system at any time to expand system capabilities or to further speed the cylinder test procedure.

PART 4) SAFETY

1. Read all instructions before attempting to install or operate the Presstest test system. GALISO, INC. CANNOT BE RESPONSIBLE FOR DAMAGE OR INJURY CAUSED BY UNSAFE USE, MAINTENANCE OR APPLICATION OF THIS MACHINE. Please contact Galiso for guidance when you are in doubt as to the proper safety precautions to be taken when installing or operating this machine.
2. Take care to keep the work area around the Presstest clean, dry and free of debris. This will decrease the chance of operator injury due to slips or falls.
3. When connecting a cylinder to the test head, make certain that the cylinder neck threads are properly engaged with the test spud (see Figure 3 below). Before testing each cylinder, inspect the cylinder neck threads. Cylinders with excessively worn neck threads must be re-tapped or condemned. The test spud must engage with three (3) to five (5) neck threads in order for the cylinder to be safely tested. If the cylinder is not properly attached to the test head (3 - 5 turns), the cylinder may be blown off of the test head during pressurization causing possible injury and/or damage to the equipment. If you have any doubts about the connection between the cylinder neck and the test head, do not test the cylinder.

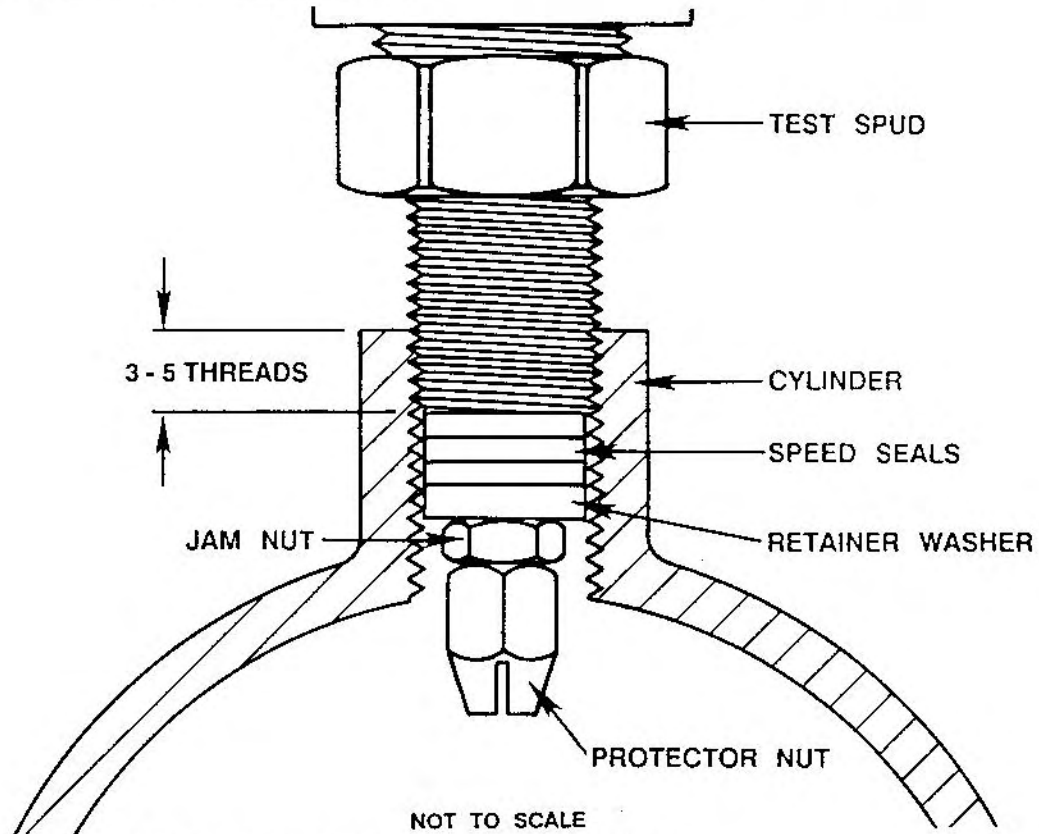


FIGURE 3) HYDRACLOSE SEAL, CYLINDER NECK

PART 4) SAFETY, (Continued)

4. Make certain that you are using a test spud that is appropriate for the neck threads of the cylinder that is being tested (see Figure 4 below). Certain types of cylinders (such as cylinders with oversize neck threads or double tapered neck threads) will appear firmly attached when screwed on to an incorrect test spud, without properly engaging the threads of the test spud. If you have any questions concerning the appropriate test spud to be used with a particular type of cylinder, contact Galiso.

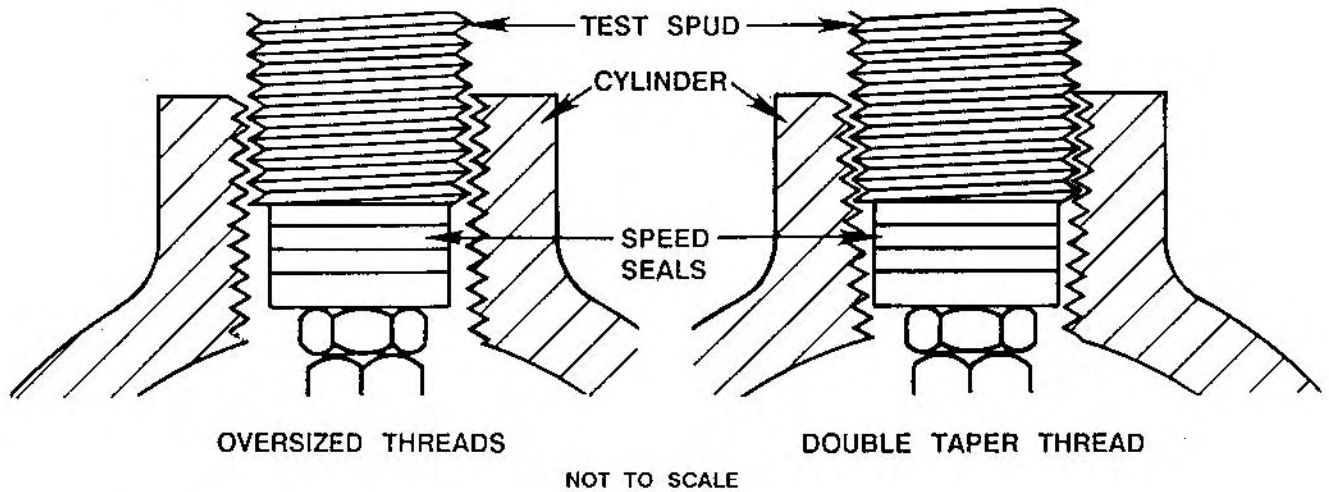


FIGURE 4) CYLINDER NECK THREAD DETAIL

5. In the event that you must replace the Test Jacket Burst Disk, make certain that you use a replacement burst disk from Galiso. Never operate the test system with an improper burst disk in place. The burst disk is designed to rupture at a specific pressure to prevent the test head from being blown out of the test jacket in the event that an improperly mounted cylinder comes off of the test spud while under test pressure.
6. Take care to keep the expansion scale dry and clean. If water is spilled onto the scale, immediately unplug the scale and thoroughly dry it before reconnecting the scale to electric power.
 - A. After reconnecting the scale to electrical power, the scale must be recalibrated as described in Part 11a, Expansion Reading Calibration.
7. Wear eye protection and gloves when operating the Presstest test system.
8. Don't stand over the test jacket while pressurizing.
9. Always double check the rated pressure of the cylinder (stamped on shoulder) to accurately determine the test pressure (see CFR 49, 173.34). **NEVER OVERPRESSURIZE A CYLINDER.**

PART 4a) OPERATION GUIDELINES

The following operation guidelines describe procedures that should be followed in order to insure maximum accuracy and efficiency of the Presstest test system.

1. Take care not to disturb the Expansion Bowl Assembly, located on the top of the Presstest test console. Excessive force to the Expansion Bowl can seriously damage the Load Cell Assembly.
2. Do not lean on the Presstest Control Console or Test Jackets while the test is in progress. Weight applied against the side of the control console, can cause the Expansion Bowl to sway and effect the accuracy of expansion readings.
3. The water supply should be turned off if the air supply to the system is turned off. The water supply to the system should also be turned off when the system is not in use.
4. The Presstest Control Console must be bolted or clipped to the floor at the time of installation. Use a bubble level to assure that the console is level before it is secured to the floor. The control console must be leveled using washers or shims.
5. The Presstest Control Console should not be installed in a location that is subject to direct sunlight or breezes. Constant exposure to sunlight will heat the control console and test jackets and effect the accuracy of the test. Breezes or drafts will cause the Expansion Bowl to move and affect the accuracy of the expansion reading.

PART 5) INSTALLATION

REFER TO INSTALLATION BLUEPRINTS

1. Read all instructions and familiarize yourself with the installation drawings before attempting to install or operate the Presstest Test System.
2. Carefully uncrate the Presstest and remove all banding and packing materials.
3. Select an area to install the Presstest system in. The installation location should allow sufficient drainage to prevent water from accumulating around the test system. Refer to the installation drawings supplied with this manual.
 - A. The system must be installed in a location that does not allow direct sunlight to shine on the Control Console or Jackets. The installation location must also be sheltered from breezes, which could move the Expansion Bowl and affect the accuracy of test results.
 - B. The installation location must be flat and level.
4. Construct a suitable test pit as described in the installation drawings.
5. Install the Hydraclose Test Jackets in the test pit as described in the installation drawings. Bolt the test jackets to the floor of the test pit.
6. Move the Presstest Control Console to the installation location. Use a bubble level to check that the control console has been leveled. If the control console is not level, use washers or shims to level the console. Bolt or clip the control console to the shop floor.
7. Install the Expansion Scale on the Presstest control console. Use the bubble levels at the base of the scale to check the levelness of the scale platform. Adjust the expansion scale feet to level the scale.
8. Install the bowl on the expansion scale platform. Slip the bowl under the expansion probe and center the bowl on the scale platform.
9. Install the I-beam and hoist assembly as shown in the installation blueprints. Hydraclose Test Heads (Optional): Connect the Head Yoke Assembly to the hoist chain. Attach the Hydraclose Test Heads.
10. Connect the air and water supply lines to the control console as shown in Figure 5 (see following page). Make certain that both the Air In valve and the Water In valve are closed.

(continued)

PART 5) INSTALLATION, (Continued)

REFER TO INSTALLATION BLUEPRINTS

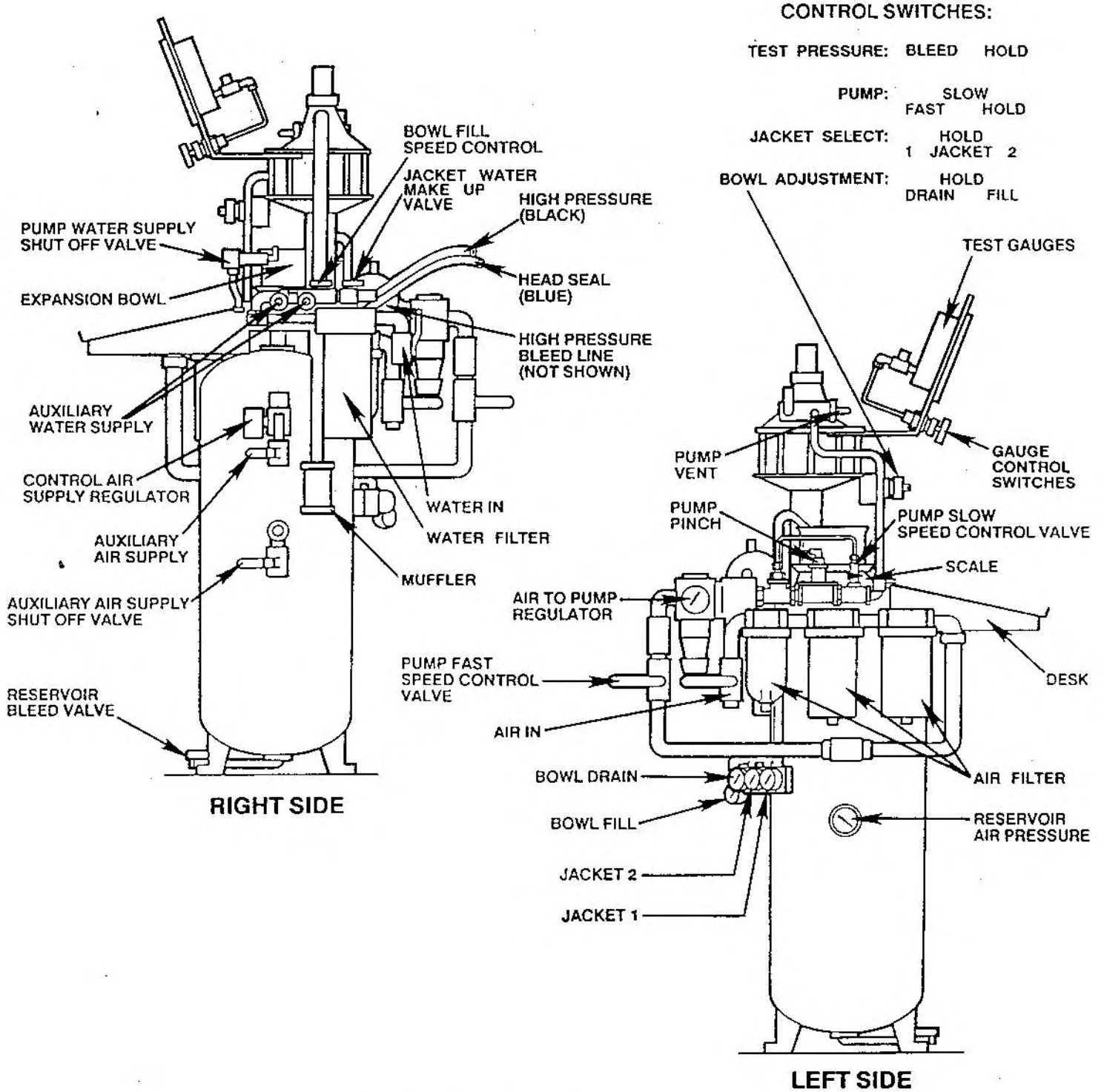


FIGURE 5) PLUMBING INSTALLATION PRESSTEST-(P) CONTROL CONSOLE

PART 5) INSTALLATION, (Continued)

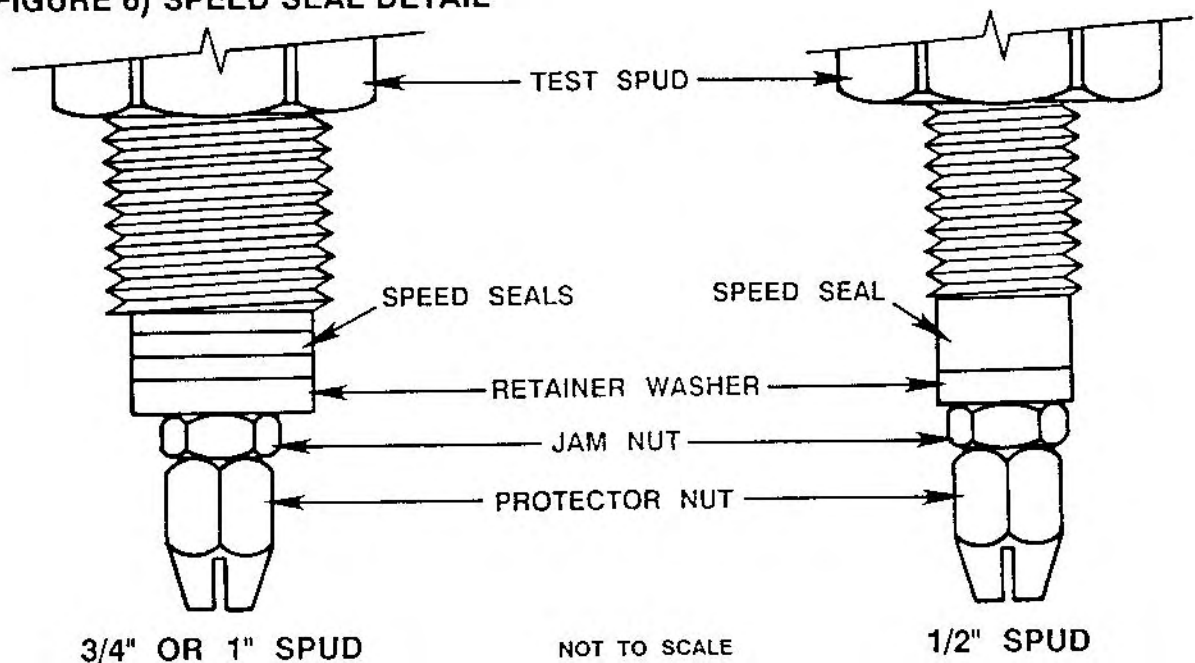
REFER TO INSTALLATION BLUEPRINTS

11. Connect the Jacket Water Make Up Line from the control console to the Test Jackets as shown in Figure 1. Since the Presstest test system includes two test jackets, a "T" must be installed in the Jacket Water Make Up Line and connected to both jackets.
12. Connect a bleed line to the high pressure bleed port on the control console, using the supplied stainless /or copper tubing (see Figure 5). The bleed line should be run to the test pit or drain to prevent water from draining on to the shop floor.
13. Connect the Jacket 1 Expansion Line and the Jacket 2 Expansion Line from the control console to the corresponding test jackets (see Figure 5).
14. Connect the plastic drain line supplied with unit, to the Bowl Drain Port. The other end of the drain line should be run into the test pit or floor drain to prevent water from draining onto the shop floor.
15. Fill the test jackets and the Calibrated Cylinder with water.
16. Install the Test Pit Grating.
17. Plug the scale power cord into a 120 volt AC power source. Allow ample warm-up time (approx. 30 minutes) before attempting to calibrate the unit.
18. Turn on the air supply to the system. The air supply should provide 90 PSI clean filtered, lubricated air.
19. Turn on the water supply to the system.
 - A. **CAUTION:** The water supply should be turned off if the air supply to the system is turned off. The water supply to the system should also be turned off when the system is not in use.
20. Use the Bowl Control Switch to fill the expansion bowl. The water level in the expansion bowl should be approximately 1/4" above the tip of the expansion probe.

PART 6) HYDRACLOSE TEST HEAD INFORMATION

1. The top end of the test spud must be securely attached to the Hydraclose Test Head.
 - A. With GHH-6H and GHH-6B Hydraclose Test Heads, Teflon tape should be used to seal the connection between the threaded test spud and the spud plate on the bottom of the Test Head.
 - B. With GHH-6G Hydraclose Test Heads, the "Quick Change" test spud snaps in place on the Hydraclose Test Head. Before attaching the GHH-6G Hydraclose Test Head to the cylinder, grasp the "Quick Change" Test Spud and check to make sure that it is securely attached to the Test Head.
 - C. Do not overtighten the test spud into the test head.
2. Install the proper size "Speed Seals" on the end of the test spud. Next, the Retainer Washer fits over the "Speed Seals" to hold them in place, followed by the Jam Nut and then the Brass Protector Nut, as shown in Figure 6. The "Speed Seals" and Retainer Washer must be of the proper size to match the Test Spud and cylinder neck that they are being used with, otherwise the spud seal may leak and the head sealing mechanism may be damaged.

FIGURE 6) SPEED SEAL DETAIL



3. The 1/2 inch spud requires only one 1/2 inch "Speed Seal". The 1/2 inch "Speed Seal" is manufactured as one unit since 1/2 inch cylinder neck threads are generally shorter than 3/4 inch and one inch neck threads.

(continued)

PART 6) HYDRACLOSE TEST HEAD INFORMATION, (Continued)

4. The 3/4" and 1" spuds require three "Speed Seals" to properly seal. If the cylinder neck threads are short, the spud can be sealed with two or even one "Speed Seal", providing that spacer washers of the appropriate diameter are used adjacent to the Retainer Washer to maintain the proper stack-up.
5. Change the "Speed Seals" when they become excessively thin or ragged to avoid leakage and damage to the sealing mechanism.
6. Inspect the threads on the bottom of the test spud regularly, if the threads become excessively worn, replace the test spud.
7. Lock the Jam Nut and the Brass Protector Nut together so they will not unscrew. Do not use the test head without the Brass Protector Nut in place, the stem threads will be damaged, resulting in unnecessary repairs.
8. Protect the Spud Stem from being bent or twisted. A bent or twisted Spud Stem will interfere with sealing action.
9. Protect the Head Boot from cuts and gouges that could damage the sealing surface. If the head boot is properly cared for, it should last for years. If the test head is damaged, it can either be sent to the factory for repairs or you can repair it yourself with Galiso replacement parts. Service heads are available from Galiso, for a minimal service charge, to allow you to continue testing while your Test Head is being repaired.
10. The Quick Connect Fittings should be inspected for wear periodically and replaced as needed. The hose couplers should fit snugly on the Quick Connect Fittings.
11. The "O"-Ring seal in the Quick Connect Fittings should be changed when wear prevents proper sealing.
12. The metal surfaces of the Hydraclose Test Head should be kept clean and free of corrosion. Metal surfaces should be painted with a high quality, cold galvanizing, metal primer. The inside upper 12 inches of the test jackets should be painted with cold galvanizing metal primer to protect the sealing area.
13. **NEVER** pressurize the Test Head without providing an adequate constraint for the "Speed Seals" and the test boot. The "Speed Seals" can be constrained by screwing them into a cylinder neck or appropriate test blank (available from Galiso). The test boot can be constrained with either the test jacket or with a snug fitting metal band at least 2" wide and 1/16" thick which is slipped over the head boot to prevent rupturing. At 50 PSI sealing pressure, there is over 3000 pounds force exerted by the sealing boot.

PART 6) HYDRACLOSE TEST HEAD INFORMATION, (Continued)

14. The test jacket terminal block is equipped with a safety relief valve for seal pressure set at 100 PSI to prevent overpressurization of the sealing apparatus.
15. **CAUTION:** The Hydraclose Test Head must be securely engaged with three (3) to five (5) threads in the cylinder neck in order to safely seal (see Part 4, Figure 3). All cylinders should be inspected before testing to insure that the neck threads are not excessively worn or damaged. Cylinders with inadequate neck threads should be re-tapped or condemned.
16. Make certain that you are using a test spud that is appropriate for the neck threads of the cylinder that is being tested (see Part 4, Figure 4). Certain types of cylinders (such as Linde cylinders with oversize neck threads or Airco cylinders with double tapered neck threads) will appear firmly attached when screwed on to an incorrect test spud, without properly engaging the threads of the test spud. If you have any questions concerning the appropriate test spud to be used with a particular type of cylinder, contact Galiso.
17. In the event that you must replace the Test Jacket Burst Disk, make certain that you use a replacement burst disk from Galiso. Never operate the Presstest test system with an improper burst disk in place. The burst disk is designed to rupture at a specific pressure to prevent the test head from being blown out of the test jacket in the event that an improperly mounted cylinder comes off of the test spud while under pressure.
18. Following is a brief description of the operation procedure for the Hydraclose Test Head.
 - A. The Hydraclose Test Head is screwed into the cylinder neck, engaging with three (3) to five (5) neck threads (see number 15 above).
 - B. A hoist is attached to the Hydraclose Test Head and the test head with attached cylinder are loaded into the Hydraclose Test Jacket.
 - C. After the test head is in place in the test jacket, the Test Pressure Hose and the Head Seal Pressure Hose are attached.

PART 7) CYLINDER PREPARATION

Following is a description of the cylinder preparation procedure for requalification of compressed gas cylinders.

1. Cylinders to be tested must be subjected to an external visual examination in accordance with CGA pamphlet C-6, "Standards for Visual Inspection of Compressed Gas Cylinders".
 - A. The inspector should check the entire exterior surface, including the bottom of the cylinder, for any damage such as dents, arc or torch burns, bulges, serious corrosion or any other damage that could appreciably weaken the cylinder.
 - B. Any cylinders that do not pass the inspection should be removed from further service. It is not necessary to test obviously defective cylinders.
2. **CAUTION:** The Hydraclose Test Head must be securely engaged with three (3) to five (5) threads in the cylinder neck in order to safely seal. All cylinders should be inspected before testing to insure that the neck threads are not excessively worn or damaged. If the cylinder has inadequate neck threads, either the neck threads should be re-tapped or the cylinder should be condemned. There is no need to test an obviously defective cylinder.
3. Prior to hydrostatic testing, each cylinder should be tapped with a 1/2 pound machinist's hammer. If the cylinder has a dull or dead ring, it should be internally cleaned by tumbling or other suitable means. If the dull or dead ring persists after the cylinder has been internally cleaned, the cylinder must be condemned.
 - A. Internal cleaning of the cylinder should be performed prior to hydrostatic testing. Internal cleaning methods such as tumbling with abrasives or shot blasting can appreciably weaken the cylinder wall.
4. Remove the cylinder valve and tag it with the cylinder serial number so that the valve may be reinstalled in the same cylinder. Cylinder valves generally conform to the particular neck threads of the cylinder in which the valve is first installed and may not seal as well in cylinders with a slightly different neck thread configuration.
5. If the cylinder has contained a flammable gas it must be washed prior to internal visual inspection. Either fill the cylinder with water and then dump it out, or purge the cylinder with clean, dry air or Nitrogen.

(continued)

PART 7) CYLINDER PREPARATION, (Continued)

6. Use a Galiso Opti-Lite, fiber optic inspection light or low voltage bulb (to prevent the possibility of electrical shock) to inspect the interior of the cylinder per CGA pamphlet C-6, "Standards for Visual Inspection of Compressed Gas Cylinders". Carefully check the interior of the cylinder for excessive corrosion, dirt, scale or sludge which must be removed prior to hydrostatic testing.

7. Cylinders that pass visual inspection should be filled with clean, filtered water and allowed to stand for at least three (3) hours to enable trapped air bubbles to escape and to allow the temperature of the water in the cylinder to stabilize.
 - A. The Galiso ACF Automated Water Filling Station rapidly fills the cylinder with water and shuts off when the cylinder is full.
 - B. Add water as needed to completely fill the cylinder before testing.
 - C. The temperature of the water in the cylinder should be within five (5) degrees Fahrenheit of the temperature of the water in the test jacket. A large variation of the two water temperatures will cause inaccurate test results.

8. The exterior of each cylinder should be cleaned of dirt, scale, grease, oil and any other contamination before the cylinder is loaded into the test jacket. The test jacket should be cleaned periodically to remove any accumulation of dirt or debris as needed, or at least once every three months.

PART 8) CALIBRATED CYLINDER, PREPARATION AND CARE

1. Fill the Calibrated Cylinder with clean, filtered water and allow it to stand for at least three (3) hours before using, to enable trapped air bubbles to escape and to allow the temperature of the water in the cylinder to stabilize. Add water as needed to completely fill the cylinder before testing.
2. Water should be left in the Calibrated Cylinder at all times. If the cylinder is emptied, it should be dried immediately to prevent corrosion.
3. The Calibrated Cylinder should be protected from freezing temperatures, the force generated by the freezing water can permanently damage the calibration of the cylinder and possibly rupture the cylinder wall.
4. Keep a copy of the Cylinder Calibration Report close to the system to be used during calibration of the test pressure reading.
5. Do not exceed the pressure range of the Calibrated Cylinder. Overpressurization of the calibrated cylinder can permanently stretch the cylinder and void the calibration points. Calibrated Cylinders that have been overpressurized must be returned to Galiso for recalibration.

PART 9) START-UP PROCEDURE

The following Start-Up procedure should be performed before attempting to operate the Presstest test system for the first time after installation or any time after the water pressure to the unit has remained shut off for a prolonged period of time. The purpose of the Start-Up procedure is to flush trapped air from the test system.

1. Read all instructions before attempting to operate the Presstest test system.
2. Turn on the air, water, and electrical supply to the system.

NOTE: always turn on the air supply before turning on the water supply to the system.

3. Turn the Jacket Control Switch to the "Jacket 1" position. This will enable Test Jacket 1.

NOTE: If a cylinder has been loaded into the Jacket, the Head Seal Hose must be disconnected from the Test Head.

4. Purge the trapped air from the Jacket 1 Expansion circuit.
 - A. Turn the Bowl Control Switch to the "Fill" position.
 - B. After the trapped air has been forced from the expansion circuit, approximately 15 - 20 seconds, turn the Jacket Control Switch and the Bowl Control Switch to their respective "Hold" positions.
5. Repeat Steps 3 through 4 to enable Jacket 2.
6. Check the water level in the expansion bowl. The water level in the bowl should be approximately 1/4" above the tip of the expansion probe. Use the Bowl Control Switch to correct the water level in the expansion bowl.
7. Slightly open the Jacket Water Make Up Valve so that a small trickle of water is constantly flowing into the test jacket. This is to replenish the water that is lost as each cylinder is removed from the test jacket. The Jacket Water Make Up Valve should be closed when the system is shut down at the end of the day or shift and reopened at the beginning of the next day or next shift.
8. Check the calibration of the Pressure and Expansion Reading as described in Parts 11a and 11b.

PART 10) PUMP SPEED ADJUSTMENT

The air driven intensifier pump, which is mounted on top of the Presstest control console, supplies filtered water at pressures up to 10,000 PSI for use in the hydrostatic test process. In order to enable the test operator to accurately control pressurization of the cylinder, the pump speed must be correctly adjusted to compensate for the cylinder test pressure, size, and volume. As a rule, the pump speed must be readjusted whenever there is a change in the size of cylinders being tested.

Adjustment of the pump speed is especially critical when the system is being used to test small cylinders. Due to their small volume, small cylinders will require only a few strokes of the pump in order to achieve test pressure, therefore the pump speed must be slowed down to prevent overpressurization of the cylinder. When testing larger cylinders, adjustment of the pump speed is less critical. The larger volumes require a longer pressurization time, allowing more latitude in control of the pump. For large cylinders the pump speed should be set fast enough to rapidly pressurize the cylinders without overshooting the desired test pressure.

The Pump Control Switch allows the operator to choose between two pump speeds in order to more accurately control pressurization of the cylinder. Both the Pump Fast speed and the Pump Slow speed must be correctly adjusted in order for the system to operate properly.

- A. **PUMP FAST** : When the Pump Control Switch is set in the "Pump Fast" position, the pump runs as fast as possible to provide the bulk of the pressure used in the hydrostatic test. The operator should stop the Pump Fast Mode when the pressure is 200 PSI short of the desired test pressure. The "Pump Fast Speed Control Valve" controls the speed at which the pump runs during the Pump Fast Mode.

- B. **PUMP SLOW** : When the Pump Control Switch is set in the "Pump Slow" position, the pump runs slowly to allow the operator to more accurately control pressurization of the cylinder. The "Pump Slow Speed Control Valve" controls the speed at which the pump runs during the Pump Slow Mode.

PART 10) PUMP SPEED ADJUSTMENT (Continued)

If accurate control of pressurization is difficult or if an unusually long period of time is required to pressurize the cylinder, the Pump Speed probably needs to be adjusted. To adjust pump speed, proceed as follows:

1. Attach a suitable cylinder to the Hydraclose Test Head and load it into the Test Jacket.
 - A. The cylinder which is loaded into the test jacket for pump speed adjustment should be representative of the type of cylinder that will be tested. For example, if the system is being prepared to test small Medical "E" cylinders, small Medical "E" cylinders should be used for pump speed adjustment. Likewise, if system the is being prepared to test large cylinders, large cylinders should be used for pump speed adjustment.

NOTE: The cylinder used to set the pump speed should be one that was already tested, since Testing Regulations prohibit pressurizing a cylinder over 90% of it's test pressure prior to the actual test. If a cylinder is pressurized to within 90% of it's test pressure, or if a test aborts, the cylinder may be retested at a pressure 10% over test pressure, or 100 PSI over the test pressure, whichever is less.

- B. Attach the water filled cylinder to the test head (see Part 6, Hydraclose Test Head Information) and load the cylinder and test head into the test jacket.
 - C. Attach the Test Pressure Hose and Seal Pressure Hose to Test Head in "Jacket 1".
2. Turn the Jacket Control Switch to the "Jacket 1" position.
3. Check the water level in the expansion bowl. The water level in the expansion bowl should be approximately 1/4" above the tip of the expansion probe. Use the Bowl Control Switch to correct the water level in the expansion bowl.
4. Locate the "Air To Pump Regulator" on the Presstest control console (see Figure 5). Adjust the Air To Pump Regulator to allow the pump to achieve the appropriate pressure.
 - A. The intensifier pump will supply water at a pressure that is 100 times greater than the regulated input air pressure. For example, if the Air To Pump Regulator is set at 50 PSI, the pump will be capable of attaining pressures up to 5,000 PSI.

PART 10) PUMP SPEED ADJUSTMENT (Continued)

- B. Note that the Air To Pump Regulator should be set to allow the pump to attain a pressure that is slightly higher than the desired test pressure. For example, if a test pressure of 6,000 PSI is desired, the Air To Pump Regulator should be set at approximately 65 PSI, this will allow the pump to achieve pressures up to 6,500 PSI.
5. Close the "Pump Fast Speed Control Valve" and the "Pump Slow Speed Control Valve" on the Presstest Control Console (see Figure 5).
6. Adjust the Pump Fast speed.
 - A. Turn the Pump Control Switch to the "Pump Fast" position.
 - B. Slowly open the Pump Fast Speed Control Valve until the pressurization speed is approximately 200-500 PSI per second.
 - C. When the pressure reaches 500 PSI below the desired test pressure, turn the Pump Control Switch to the "Hold" position to stop the pump. Take care not to overpressurize the cylinder.
 - D. Turn the Bleed Control Switch to the "Bleed" position to release all pressure from the cylinder. When all pressure has escaped from the cylinder, return the Bleed Control Switch to the "Hold" position. It may be necessary to repeat steps 5 through 6d several times before the Pump Fast speed is properly adjusted.
 - E. When the Pump Fast speed has been adjusted to approximately 200-500 PSI per second, turn the Pump Control Switch to the "Hold" position to stop the pump.

(continued)

PART 10) PUMP SPEED ADJUSTMENT (Continued)

7. Adjust the Pump Slow speed.
 - A. With the cylinder pressurized to 500 PSI below the desired test pressure, turn the Pump Control Switch to the "Pump Slow" position.
 - B. Slowly open the Pump Slow Speed Control Valve until the pressurization speed is approximately 20 PSI per second.
 - C. When the pressure reaches the desired test pressure, turn the Pump Control Switch to the "Hold" position to stop the pump. Take care not to overpressurize the cylinder.
 - D. Turn the Bleed Control Switch to the "Bleed" position to release all pressure from the cylinder. When all pressure has escaped from the cylinder, return the Bleed Control Switch to the "Hold" position. It may be necessary to repeat steps 7a through 7d several times before the Pump Slow speed is properly adjusted.
 - E. When the Pump Slow speed has been adjusted to approximately 20 PSI per second, turn the Pump Control Switch to the "Hold" position to stop the pump.
 - F. Turn the Bleed Control Switch to the "Bleed" position, release all pressure from the cylinder, and then return the Bleed Control Switch to the "Hold" position.

8. Make certain that all pressure has been released from the cylinder and then remove the Test Pressure Hose and the Seal Pressure Hose from the test head. Remove the cylinder and test head from the test jacket and remove the test head from the cylinder.

PART 11) PRESSURE & EXPANSION CALIBRATION, INTRODUCTION

The purpose of the Calibration Procedure is to check and, if necessary, adjust the accuracy of the pressure and expansion readings shown on the Presstest control console. The calibration of the system should be checked at the beginning of each work day or shift, using the calibrated cylinder.

For the purpose of clarity, the Calibration Procedure is divided into two procedures; Expansion Calibration and Pressure Calibration. Note that the expansion reading must be checked and calibrated before the pressure reading may be checked. Expansion Calibration is discussed in Part 11a and Pressure Calibration is discussed in Part 11b.

In accordance with D.O.T. regulations, the calibration of the expansion reading and pressure reading must be checked at the beginning of each work day or shift. Normally, the calibration check procedure will show that the system is reading accurately and the system will not need to be adjusted. However, if the calibration check indicates that the pressure and expansion readings are not accurate, the expansion reading may be adjusted by following the calibration procedure. When the test pressure gauge is not reading accurately, the gauge must be returned to Galiso for Calibration.

PART 11a) EXPANSION READING CHECK AND CALIBRATION

1. A precision laboratory weight (Calibration Weight) is required to calibrate the Presstest expansion reading. The calibration weight must weigh exactly 1 Kilogram (1,000 grams). A calibration weight is supplied with the unit.
2. Turn on the power to the expansion scale and allow it to warm up for at least 30 minutes.
3. Turn the Bowl Control Switch to the "Drain" position to drain the expansion weigh bowl. When the bowl stops draining, turn the Bowl Control Switch to the "Hold" position. Note that the bowl will not drain completely, some water will be left in the bottom of the bowl. Residual water must be drained from the bowl with a siphon tube.
4. Remove the empty bowl from the scale platform. Carefully slip the bowl past the expansion probe and set it aside. Wipe the bowl clean with a cloth or sponge to remove any accumulation of dirt or residue, also remove the Splash Plate.
5. Check the calibration of the scale (expansion reading) as follows:
 - A. Press the "RE-ZERO" key on the scale to tare the scale reading.
 - B. Place the calibration weight (1 Kg.) on the scale platform.
 - C. Check the scale display. The display should read exactly 1,000 grams.
 - D. If the scale display does not read 1,000 grams, calibrate the expansion reading as described in step 6.
 - E. If the scale display reads correctly, reinstall the Splash Plate and the Expansion Bowl and re-zero the platform as described in steps 8 through 12 of this chapter.

(continued)

PART 11a) EXPANSION READING CHECK AND CALIBRATION, (Continued)

6. If the calibration check shows that the scale requires calibration, calibrate the scale as shown below.
 - A. Make certain that the scale display is reading in the Gram Mode.
 - B. Make certain that all weight is removed from the scale platform and then slide the Calibration Switch to the "ON" position. The calibration switch is located underneath the cover plate on the right hand side of the scale base.
 - C. The message "CAL O" should appear on the scale display. Wait for the reading to stabilize and then press the "RE-ZERO" key on the scale.
 - D. After a brief pause, the message "CAL F" will appear on the scale display. Place the calibration weight (1 Kg) supplied with the unit on the scale platform.
 - E. Press the "RE-ZERO" key on the scale, after a pause, the message "END" will appear on the scale display.
 - F. Remove the calibration weight from the scale platform and then press the "MODE" key to exit the calibration mode. Slide the calibration switch on the scale to the "Off" position.
 - G. **NOTE :** If the message "CAL E" or "-CAL E" appears on the scale display, there has been an error in the calibration procedure, repeat step 6 above.

7. Recheck the calibration of the expansion scale.
 - A. Press the "RE-ZERO" key on the scale to tare the scale reading.
 - B. Place the calibration weight (1 Kg.) on the scale platform.
 - C. Check the scale display. The display should read exactly 1,000 grams.
 - D. If the scale does not read correctly, repeat the calibration procedure as described in step 6 above. If the scale continues to read incorrectly after recalibration, contact Galiso.

(continued)

PART 11a) EXPANSION READING CHECK AND CALIBRATION, (Continued)

8. Replace the Splash Plate and the Expansion Bowl on the scale platform. Slide the bowl under the expansion probe and center the bowl on the scale platform.
9. Purge the trapped air from the Jacket 1 Expansion circuit.
 - A. Turn the Bowl Control Switch to the "Fill" position.
 - B. Remove the Head Seal Hose.
 - C. After trapped air has been forced from the expansion circuit, water will flow from the expansion probe. Turn the Bowl Control Switch to the "Hold" position.
10. Use the Bowl Control Switch to adjust the water level in the expansion bowl. The water level should be approximately 1/4" above the tip of the expansion probe.
11. With the Expansion Bowl in place and the water level of the bowl adjusted, press the "RE-ZERO" key on the scale to tare the weight of the water filled expansion bowl.
12. After the expansion reading has been calibrated, proceed to check the pressure reading as described in Part 11b.

PART 11b) PRESSURE READING CHECK & CALIBRATION

1. The expansion reading must be calibrated before the pressure reading may be checked. Check the calibration of the expansion reading and adjust if necessary as described in Part 11a.
2. Prepare the Calibrated Cylinder as described in Part 8, Calibrated Cylinder Preparation.
3. Load the water filled Calibrated Cylinder into Test Jacket 1.
 - A. If the Calibrated Cylinder is not yet loaded into the test jacket, attach the water filled Calibrated Cylinder to the test head (see part 6, Hydraclose Test Head Information) and load the cylinder and test head into the test jacket.
 - B. Attach the Test Pressure Hose 1 and the Head Seal Pressure Hose 1 to the Hydraclose Test Head 1.
4. Turn the Jacket Control Switch to the "Jacket 1" position.
5. Examine the Gauge Calibration Sheet which is included with this manual. The Gauge Calibration Sheet is supplied by the gauge manufacturer to provide a record of the accuracy of the gauge at selected pressures.
 - A. The Gauge Calibration Sheet lists a series of paired pressure values, each pair includes an Indicated Pressure Value which is matched with an Applied Pressure Value.
 - B. The Indicated Pressure Value is the pressure which is read from the gauge.
 - C. The Applied Pressure Value is the actual pressure applied to the gauge to achieve the Indicated Pressure reading. The gauge manufacturer determines the Applied Pressure Value by pressurizing the gauge and comparing the gauge with a standardized pressure measuring device.
 - D. Each Indicated Pressure Value should match the corresponding Applied Pressure Value within one percent.

(continued)

PART 11b) PRESSURE READING CHECK & CALIBRATION, (Continued)

6. Examine the Cylinder Calibration Sheet which is included with this manual.
 - A. The Cylinder Calibration Sheet lists the expansion of the calibrated cylinder at a series of calibration pressure points.
 - B. When the calibrated cylinder is pressurized to the calibration point, the cylinder will expand to the volume that matches the calibration pressure listed on the calibration sheet.

7. Select a calibration pressure from the Cylinder Calibration Sheet and a matching applied pressure value from the Gauge Calibration Sheet. For example, the 4,000 PSI calibration pressure from the Cylinder Calibration Sheet is matched with the 4,000 PSI Applied Pressure Value from the Gauge Calibration Sheet. Note that during actual calibration, a calibration pressure should be selected which is close as possible to the test pressure.
 - A. The Cylinder Calibration Sheet lists the calibration pressure (for example 4,000 PSI), paired with an expansion value (for example 130 cc's).
 - B. The Gauge Calibration Sheet lists the Applied Pressure Value (for example 4,000 PSI), paired with the Indicated Pressure Value (for example 3,975 PSI) which is displayed by the gauge at the applied pressure.

8. Use the Pump Control Switch to pressurize the Calibrated Cylinder to the Indicated Pressure Value which was selected above (in this example, 3,975 PSI). When the test pressure gauge reaches the Indicated Pressure Value (i.e. 3,975), turn the Pump Control Switch to the "Hold" position to stop the pump.
 - A. Hold the Indicated Pressure Value for approximately 30 seconds and then check the expansion reading which is shown on the Expansion Scale Display.
 - B. When the Calibrated Cylinder is pressurized to the Indicated Pressure Value (i.e. 3,975), the expansion reading on the scale should match the Calibration Expansion Value (i.e. 130 cc's) which corresponds with the Actual Pressure Value (i.e. 4,000 PSI). The scale expansion reading must match the Calibration Expansion Value within one percent.
 - C. **CAUTION** : Do not exceed the pressure range of the calibrated cylinder. Over pressurization of the calibrated cylinder will permanently stretch the cylinder and void all calibration points. Calibrated cylinders that have been overpressurized or otherwise damaged must be returned to Galiso for recalibration.

PART 11b) PRESSURE READING CHECK & CALIBRATION, (Continued)

9. Turn the Bleed Control Switch to the "Bleed" position and allow the pressure to escape from the calibrated cylinder. When all pressure has been released, return the Bleed Control Switch to the "Hold" position.
 - A. The Bleed Control Switch must be left in the "Bleed" position until the gauge has returned to Zero.
 - B. The Expansion Reading must also return to Zero. If the expansion does not return to Zero, follow the Start-Up Procedure in Part 9 to purge trapped air, check your speed seals, and then repeat steps 7 through 9.

10. Repeat Steps 7 and 8 above several times using a different calibration pressure and corresponding expansion value each time. When the test gauge shows the Indicated Pressure Value, the scale expansion reading must match the calibration expansion value (which corresponds with the Applied Pressure Value) within one percent. If the test gauge does not match the calibration pressure value within one percent, then the gauge is in need of calibration.
 - A. Normally the expansion reading on the scale will match the calibration expansion value within one percent and calibration of the gauge will not be required. However, if the gauge has been overpressurized or otherwise damaged, the calibration may not match and the gauge will require calibration.
 - B. If the test gauge requires recalibration, it must be checked against a master gauge or dead weight type gauge tester. The test gauge should be returned to Galiso for recalibration.

11. When the calibration procedure is complete, turn the Bleed Control Switch to the "Bleed" position, allow all pressure to escape from the cylinder, and then return the Bleed Control Switch to the "Hold" position.
 - A. Remove the connection hoses from Test Head 1 and use the hoist to lift the calibrated cylinder and Hydraclose test head out of the test jacket.
 - B. Remove the Hydraclose test head from the calibrated cylinder.

PART 12) OPERATION PROCEDURE, HYDROSTATIC TEST

During the hydrostatic test, the cylinders are sealed inside the test jackets and pressurized to 5/3 (see CFR 49, 173.34) of their DOT or ICC rated pressure. The total expansion of the cylinders under pressure is then measured and recorded. Finally, the pressure is released and the permanent expansion, percent expansion, and elastic expansion are determined.

In order to achieve maximum testing speed and efficiency, the entire operation procedure must be carefully planned. The equipment operators should be thoroughly acquainted with hydrostatic testing and the work flow should be set up so the cylinders flow smoothly from one work station to the next.

Following is a description of the operation process for the Presstest test system.

1. Prepare the cylinders for the test as described in Part 7, Cylinder Preparation.
2. Prior to the hydrostatic test, the cylinders must be completely filled with clean, filtered water. The Galiso ACF Water Filling System speeds the filling process by automatically filling the cylinder and shutting off the water flow when the cylinder is full.
 - A. After filling, cylinders should be allowed to sit for at least three hours to enable the temperature to stabilize and to allow trapped air bubbles to escape.
3. Record each cylinder serial number, DOT rating, service, and other pertinent information on the Hydraclose Test Log.
4. Slightly open the Jacket Water Make Up Valve to allow a constant trickle of water to flow into both of the test jackets. This will replenish water that is lost as each cylinder is loaded and removed from the test jackets.
 - A. **CAUTION** : Close the Jacket Water Make Up Valve at the end of the work day to prevent the jackets from over filling. Readjust the Jacket Water Make Up Valve at the beginning of the next work period.

(continued)

PART 12) OPERATION PROCEDURE, HYDROSTATIC TEST, (Continued)

5. Load a water filled cylinder into one of the two Hydraclose test jackets.
 - A. Attach a cylinder to one of the Hydraclose test heads as described in Part 6, Hydraclose Test Head Information. Attach a hoist to the lifting eye on the top of the head (or head yoke) and load a cylinder with attached test head into one of the two test jackets.
 - B. Connect Head Seal Pressure Hose and Test Pressure Hose to Test Head 1. When the Seal Pressure Hose is connected, the Hydraclose head seal will automatically activate.
 - C. **CAUTION!** : When connecting a cylinder to the Hydraclose Test Head, make certain that the cylinder neck threads are properly engaged with the test spud. Before testing each cylinder, inspect the cylinder neck threads. See Safety Instructions in Part 4.
 - D. The test spud should engage with three (3) to five (5) neck threads in order for the cylinder to be safely tested. Cylinders with excessively worn neck threads should be re-tapped or condemned.
 - E. If the cylinder is not properly attached to the Hydraclose Test Head, the cylinder may be blown off of the test head during pressurization.
 - F. If you have any doubt concerning the connection between the Test Head and the cylinder, do not test the cylinder.
6. Turn the Jacket Control Switch to the "Jacket 1" position. This will enable the jacket for testing.
7. Press the "RE-ZERO" key on the expansion scale to re-zero the scale reading.

(continued)

PART 12) OPERATION PROCEDURE, HYDROSTATIC TEST, (Continued)

8. Use the Pump Control Switch to pressurize the cylinder to the correct test pressure. See Pump Speed Adjustment in Part 10.
 - A. Turn the Pump Control Switch to the "Pump Fast" position and pressurize the cylinder to within 200 PSI of the desired test pressure. Note that the test gauge on the front of the Presstest test console indicates the pressure in one test cylinder only.
 - B. When the pressure reaches a point 200 PSI below the test pressure, turn the Pump Control Switch to the "Pump Slow" position. Add the final 200 PSI to the cylinder in the "Pump Slow" mode.
 - C. When the test pressure is reached turn the Pump Control Switch to the "Hold" position and hold the pressure for 30 seconds.
9. At the end of the thirty second pressure hold time, read the scale display to determine the Total Expansion for the cylinder. Record the Total Expansion for the cylinder on a Hydraclose Test Log and then turn the Bleed Control Switch to the "Bleed" position to release pressure from the cylinder.
10. After all pressure has been released from the cylinder, read the scale display to determine the amount of Permanent Expansion (if any) for the cylinder.
 - A. Determine the Elastic Expansion and the Permanent Expansion as described in Part 1a.
 - B. Record the Permanent Expansion, Elastic Expansion, and Percent Expansion for the cylinder on a Hydraclose Test Log.
11. When all pressure has escaped from the cylinder, return the Bleed Control Switch to the "Hold" position in preparation for the next test.

(continued)

PART 12) OPERATION PROCEDURE, HYDROSTATIC TEST, (Continued)

12. Remove the cylinder from the Test Jacket.
 - A. Disconnect the Test Pressure Hose and the Head Seal Pressure Hose from the Hydraclose Test Head.
 - B. Connect a hoist to the lifting eye on the top of the Hydraclose test head (or head yoke) and lift the test head and cylinder out of the test jacket.
 - C. Remove the cylinder from the Hydraclose Test Head.
13. Immediately after the hydrostatic test the cylinder should be stamped with the test date and your DOT registration number as required by DOT Regulations.
14. Load the cylinder into a Galiso PCT-ADW cylinder inverter to rapidly drain and dry the cylinder interiors. The PCT-ADW also features a convenient washing option, which injects a detergent solution into the cylinders to efficiently wash the cylinder interiors.
15. Use a Galiso Turnair Valving Machine to reinstall the original valve in the cylinder neck.

PART 13) MAINTENANCE

1. PRESSTEST CONTROL CONSOLE

- A. Keep the Control Console clean and dry and free of dirt and debris.
- B. Regularly inspect the plumbing components of the Control Console for leaks. Also inspect the lines which connect the Control Console to the test jackets for leaks.
- C. Regularly inspect the Expansion Bowl Assembly, if dirt and residue have accumulated in the Expansion Bowl, carefully drain and remove the bowl as described in Part 11a, Expansion Calibration. Clean the expansion bowl and reinstall it on the scale platform. Use the Bowl Fill Control Switch to adjust the level of the water in the expansion bowl to approximately 1/4" above the bottom tip of the probe.
- D. Water and Air Filters must be changed every six (6) months. If the water filters are not replaced they can cause the pump to seize up. When air filters are not replaced they can cause the muffler assembly to become clogged with oil and debris.

2. HYDRACLOSE TEST HEADS

- A. Change the "Speed Seals" when they become excessively worn or ragged to avoid leakage and damage to the sealing mechanism.
- B. Regularly Inspect the threads on the bottom of the test spud, if the threads become excessively worn or damaged, replace the test spud.
- C. The Quick Connect Fittings should be inspected periodically for wear and replaced as needed. The hose couplers should fit snugly on the Quick Connect Fittings.
- D. The "O"-Ring seal in the Quick Connect Fittings should be changed when wear prevents proper sealing.
- E. The metal surfaces of the Hydraclose Test Head should be kept clean and free of rust and corrosion. Metal surfaces should be painted with a high quality, cold galvanizing metal primer.

(continued)

PART 13) MAINTENANCE, (Continued)

4. HYDRACLOSE TEST JACKETS

- A. The inside upper 12 inches of the test jacket should be painted with cold galvanizing metal primer to protect the sealing area.
- B. The Test Jacket should be cleaned periodically to remove any accumulation of dirt or debris as needed or at least once every three months.
- C. Test jacket water that has become stagnant or brackish it should be drained from the test jacket and replaced with fresh water.
- D. In the event that you must replace the Test Jacket Burst Disk, make certain that you use a replacement burst disk from Galiso. Never operate the Presstest system with an improper burst disk in place. The burst disk is designed to burst at a specific pressure to prevent the test head from being blown out of the test jacket in the event that an improperly mounted cylinder comes off of the test spud while under pressure.

5. CALIBRATED CYLINDER

- A. The water filled Calibrated Cylinder must be protected from freezing temperatures, the force generated by the freezing water can permanently damage the calibration of the cylinder and possibly rupture the cylinder wall.

PART 14) SPECIFICATIONS AND REPLACEMENT PARTS

SPECIFICATIONS

Electrical Requirements : 120 Volt AC Power

Air Requirements : 150 PSI at 80 CFM

Water Requirements : City Water Pressure

Air Output Purity : Grade D (Breathing Quality)

Water Filter : 125 Micron

Maximum Test Pressure : 10,000 PSI

Load Cell Capacity : 1 Kg.

REPLACEMENT PARTS

- 80-11-0051 Air Filter Element, .01 Micron Coalescing**
- 80-11-0052 Air Filter Element, .01 Micron Coalescing**
- 80-11-0053 Air Filter Element, 5 Micron**
- 80-11-4010 Water Filter Element, 125 Micron**
- 80-11-4009 Water Filter Element, 5 Micron is also available**
- 80-11-7001 Air Exhaust Muffler, 3/4"**