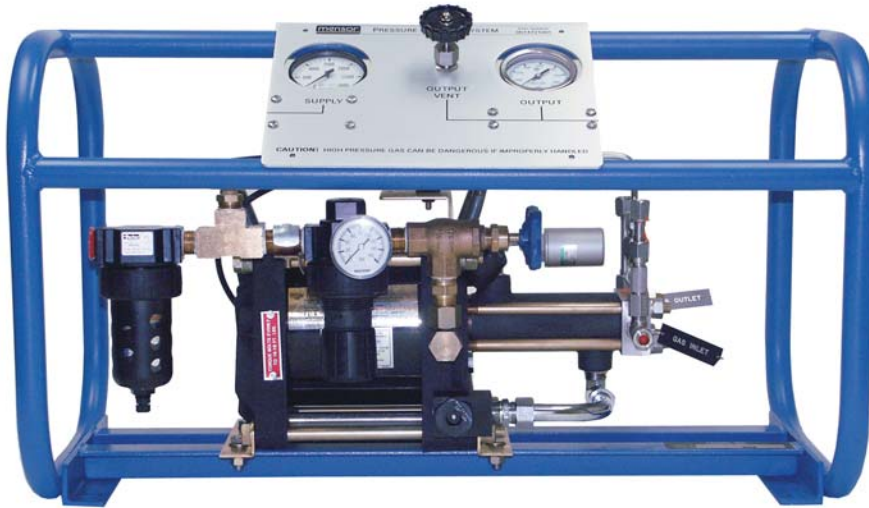




Operation Manual PRESSURE BOOSTER SYSTEM



Model 75

This Manual contains important information.
PLEASE READ PRIOR TO USE.

WARRANTY

All products manufactured by Mensor[®] Corporation are warranted to be free of defects in workmanship and materials for a period of one year from the date of shipment. No other express warranty is given, and no affirmation of Seller, by words or actions, shall constitute a warranty. SELLER DISCLAIMS ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSES WHATSOEVER. If any defect in workmanship or material should develop under conditions of normal use and service within the warranty period, repairs will be made at no charge to the original purchaser, upon delivery of the product(s) to the factory, shipping charges prepaid. If inspection by Mensor Corporation or its authorized representative reveals that the product was damaged by accident, alteration, misuse, abuse, faulty installation or other causes beyond the control of Mensor Corporation, this warranty does not apply. The judgment of Mensor Corporation will be final as to all matters concerning condition of the product, the cause and nature of a defect, and the necessity or manner of repair. Service, repairs or disassembly of the product in any manner, performed without specific factory permission, voids this warranty.

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WARNING!

PRESSURIZED VESSELS AND ASSOCIATED EQUIPMENT ARE POTENTIALLY DANGEROUS. THE APPARATUS DESCRIBED IN THIS MANUAL SHOULD BE OPERATED ONLY BY PERSONNEL TRAINED IN PROCEDURES THAT WILL ASSURE SAFETY TO THEMSELVES, TO OTHERS, AND TO THE EQUIPMENT. THE USERS, THROUGH THEIR OWN ANALYSIS AND TESTING, ARE RESPONSIBLE FOR ASSURING THAT ALL PERFORMANCE, SAFETY AND WARNING REQUIREMENTS ARE MET, AND FOR THE TRAINING OF THE USER PERSONNEL IN THE OPERATION OF HIGH PRESSURE SYSTEMS.

DO NOT EXCEED SAFE, MAXIMUM GENERATED PRESSURES AS DEFINED IN THIS MANUAL.

WHEN ANY MAINTENANCE IS PERFORMED, REMOVE ALL PRESSURE FROM BOOSTER.

ALWAYS USE REPLACEMENT PARTS SPECIFIED BY **MENSOR CORPORATION**.

CAUTION: DO NOT MIX FLUID TYPES.

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User's Notes:

A large rectangular area filled with a grid of small, dotted lines, intended for the user to take notes. The grid consists of approximately 20 columns and 30 rows of small squares.

PRESSURE BOOSTER SYSTEM

GENERAL

The Pressure Booster System (PBS) uses low pressure shop air to drive a dual piston booster to compress a supply gas to 75 times the drive pressure. The high pressure gas is then output to an external load.

SAFETY FIRST



CAUTION: HIGH PRESSURE GAS CAN BE EXTREMELY DANGEROUS IF IMPROPERLY HANDLED.

Please re-read the above caution. The hazards of improperly handling high pressure gas or air cannot be overstated. It is the operator's responsibility to assure that the tubing and fittings used in the system meet the following conditions:

- must have a working pressure rating equal to or greater than the maximum required pressure
- must be in good mechanical condition, i.e., good threads on fittings, tubing free of kinks or nicks, etc.
- must be properly installed and tightened

When designing the overall pressure system, minimize the total volume external to the PBS as much as possible. Larger volumes take longer to vent, whether due to an intentional shutdown or a catastrophic failure of some pressure seal or other component. The danger posed by the failure of a system with a larger volume is that it will increase the time it takes for the pressure to fully vent to atmosphere. The venting gas from the PBS can pose several hazards:

1. The gas used will most likely be an inert gas such as nitrogen. Under conditions of high exhaust flow and confined spaces the oxygen in the immediate vicinity of the exhaust may be displaced, leading to fatigue or even death to those breathing such oxygen deprived atmosphere.

2. Small articles exposed to the escaping gas can be propelled at ballistic speeds to the endangerment of nearby personnel and equipment.
3. Under certain conditions, the noise level created by the gas exiting equipment under high pressure can become dangerously high.

PORTS

There are three pressure ports on the PBS: Drive, Supply, and Output. All three ports require 7/16-20 MS (o-ring) fittings. The fittings to adapt these ports to 1/4 inch stainless steel tubing are provided with the PBS. Other types of fittings are available. Refer to Figure 1 for the locations of the following three ports:

Drive Pressure Port

Usually, the Drive port is connected to 'shop air' which may be as high as 150 psig. The recommended pressure is 100 psig. The Output Pressure will be 75 times higher than the pressure appearing on the Drive Pressure Gauge.

Supply Pressure Port

Provide this port with a clean, dry, inert gas such as nitrogen, at a pressure which may range from as low as 300 psig to as high as 3000 psig. This port has a built-in 20 micron sintered metal filter to prevent particulates of any significant size from entering the booster unit. Otherwise there could be damage to the PBS valve seats which would cause the Output Port pressure to leak back to the Supply Port.

Output Pressure Port

This port outputs the supply gas media raised to 75 times the pressure setting of the Drive Pressure Regulator. The output pressure is set by adjusting the Drive Pressure Regulator until the output pressure dial gauge reads the desired output pressure.

CONTROLS AND ADJUSTMENTS

There are several controls and adjustments available to the user. Refer to Figure 1 for the locations of the following items:

Drive Pressure Regulator

The Drive Pressure Regulator is a hand adjustment to set the output pressure. This regulator is mounted on the Drive Pressure Manifold, directly under the Control Panel. The PBS is shipped with the Drive Pressure Regulator set to zero pressure. To change this value first unlock the knob at the base of the regulator by pulling down firmly, then adjust the knob for

the desired value. It is recommended that the knob be relocked after adjustment by pushing up firmly.

Drive Speed Valve

The Drive Speed Valve is used to vary the driving speed of the booster piston. This control is located immediately to the right of the Drive Pressure Regulator, and when shipped, the Drive Speed Valve is fully open for maximum speed. Additional information on setting the drive speed is provided under the heading 'Operation'.

Output Pressure Relief Valve

The Output Pressure Relief Valve (not shown in Figure 1) is located on the underside of the control panel. To set the cracking pressure of the relief valve to a different pressure loosen the jam-nut portion of the valve's lower body, then insert a 3/8 inch Allen wrench in the hole in the bottom of the valve. Turn the wrench in either direction to raise or lower the cracking pressure. The relief valve is factory set to 7000 psi.

Output Vent Valve

The Output Vent Valve is located on the control panel. This valve is used to relieve the output pressure from the Output Pressure Port, but only after the supply pressure has been shut off. If the vent valve is opened while there is pressure on the supply port, the supply pressure will pass through the booster to the output port. Do not disconnect the supply and output lines until both the supply and output dial gauges read zero.



CAUTION: THE OUTPUT VENT VALVE VENTS THE HIGH PRESSURE MEDIA TO THE ATMOSPHERE IN THE IMMEDIATE VICINITY! SAFETY PRECAUTIONS MUST BE OBSERVED.

Air Pilot Switch

There is an Air Pilot Switch (not shown in Figure 1) which will shut down the Pressure Booster if there is less than 300 psig pressure on the supply gas. It is not necessary to provide a pressure regulator on the supply line since the booster will function with any supply gas pressure from 300 to 3000 psig. There are no adjustments to the Air Pilot Switch.

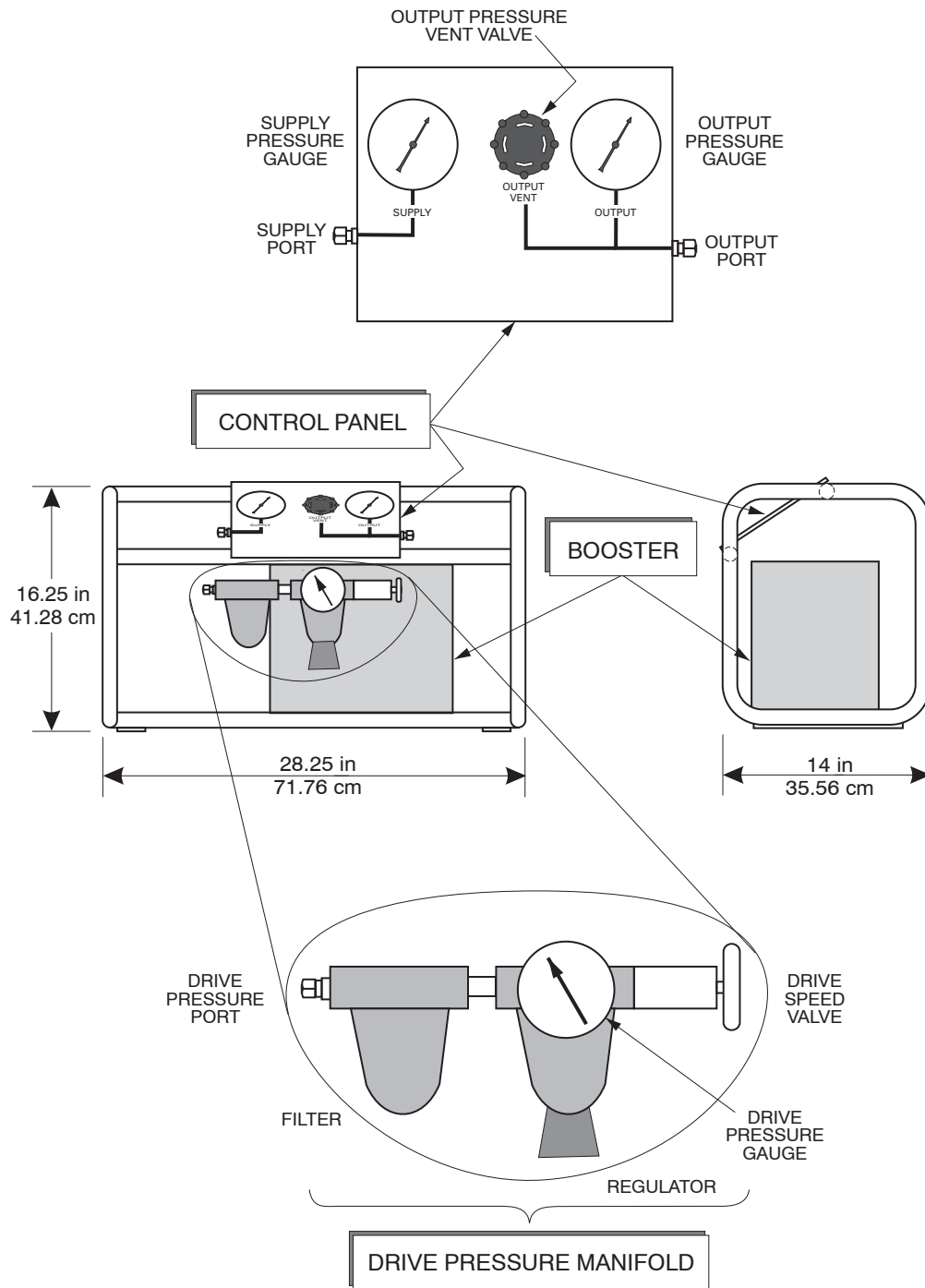


Figure 1 - PBS Mechanical Views

OPERATION

While operation of the PBS is quite simple, high pressure gas is dangerous. Operation of this unit must be by fully qualified personnel only. To use the PBS:

1. Connect a low pressure supply such as shop air (approximately 100 psig) to the Drive Pressure port.
2. Connect the Output Pressure Port to the load which will be pressured by the booster. Be careful to use tubing rated for the boosted working pressure.
3. Connect the proper supply gas (from 300 to 3000 psig) to the Source Pressure Port.

For operation with a Mensor Model 410 High Pressure Control Unit (HPCU), as well as with similar applications, booster piston temperature will not be a problem. However, if a particular application causes the booster piston to operate frequently the high pressure end of the booster cylinder may overheat. Temperatures in the cylinder above 300 degrees F will considerably shorten life of the piston seal.

There are two main factors in booster temperature:

1. The ratio of output pressure to supply pressure. A ratio of about three to one (3:1), or less, will help to minimize this temperature.
2. The drive speed. The Drive Speed Valve can be closed to the point of the slowest drive speed that will still maintain the required output pressure.

If the drive cylinder temperature appears to be a continuing problem install a thermocouple about one inch from the discharge port of the booster unit. Then monitor the temperature whenever the booster is in operation. When the temperature gets excessive either adjust the Output/Supply pressure ratio, adjust the Drive Speed Valve, or shut down the operation until the booster cools down.

DISCONTINUE OPERATION

To discontinue operation of the PBS:

1. Valve off the supply pressure. Disconnect the supply gas if desired.
2. With the supply pressure cut off, vent the Output Pressure with the hand valve on the control panel. Wait for the Supply Pressure Gauge and the Output Pressure Gauge both to read 0 psig. The load may now be disconnected.
3. The Drive Pressure can be left on, or valved off and disconnected, as desired.

MAINTENANCE

Booster Unit

The Control Valve and the Pilot Valves may need an occasional re-lubrication on units experiencing a high amount of use. Instructions and a special lubricant are available upon request.

Drive Pressure Filter

Inspect the filter mounted on the Drive Pressure Manifold on a regular basis. Drain any accumulated moisture or sludge through the drain petcock on the base of the filter.

Occasionally clean the internal filter element inside the Drive Filter sediment bowl. To access the element, first disconnect all pressures from the system. Unscrew the filter bowl ring nut by hand and remove the bowl and filter element screw.

Clean the bowl with either soapy water or kerosene. Clean the element with a cleaning solvent. Dry all the parts and reassemble. Make sure that the o-ring seal for the bowl is properly positioned, replace the bowl and tighten the ring nut by hand.

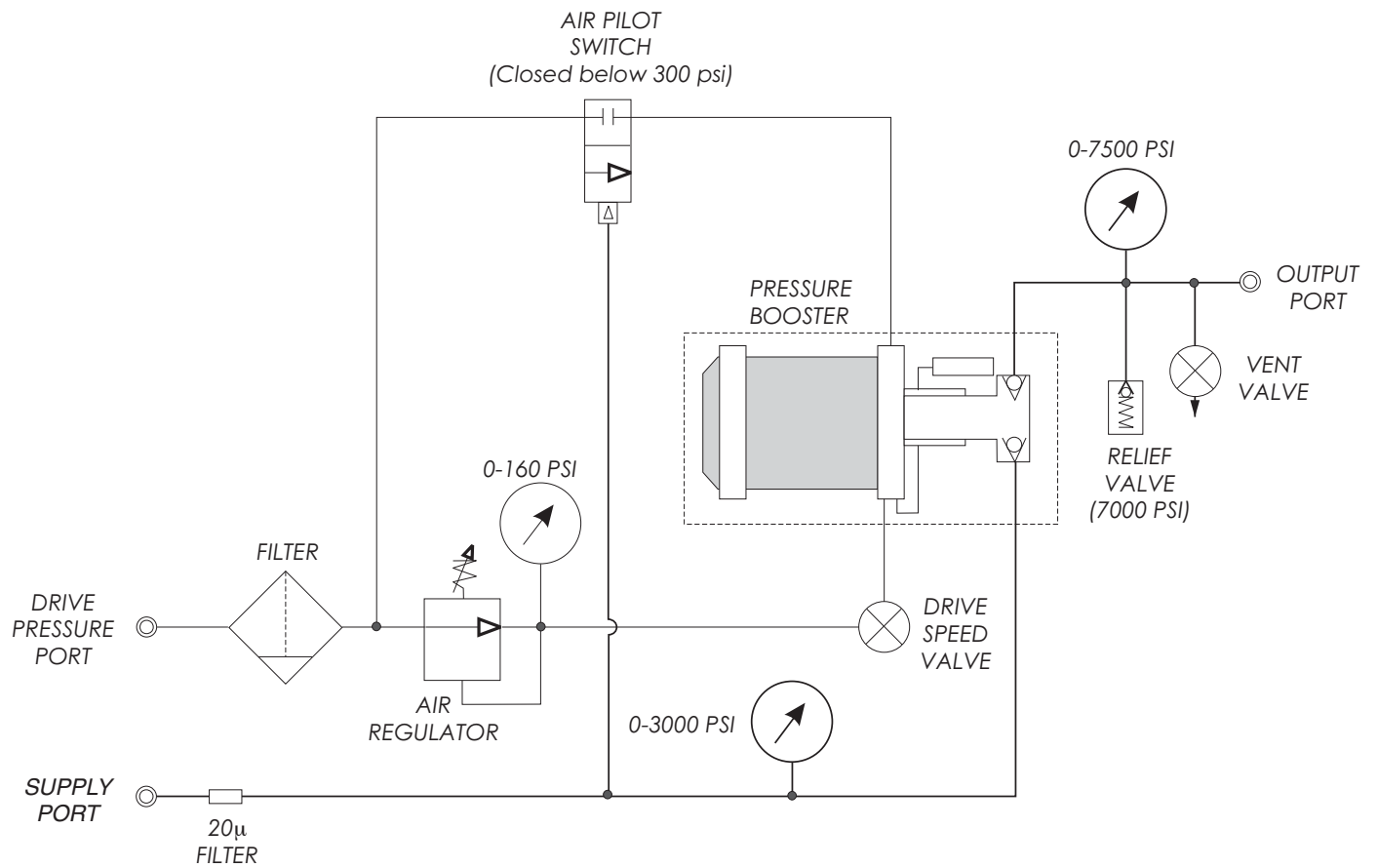


Figure 2 - Pneumatic Schematic



MENSOR CORPORATION
201 BARNES DRIVE
SAN MARCOS, TEXAS 78666-5994

Phone: 512.396.4200

Fax: 512.396.1820

Web site: www.mensor.com

E-mail: sales@mensor.com

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