FIGURE 5.28
Air Fill Control Panel With Fill Hoses

SYSTEMS

For some scientific surface-supplied diving operations, a high-pressure air storage system may be better than a low-pressure compressor system. In some cases, the size of the surface support platform dictates the type of gas supply system to use. A high-pressure system can be tailored conveniently to the requirements of a particular operation, and offers the additional advantage of reduced noise and improved communication. The planning factors that influence the configuration of a high-pressure air storage system include:

- Depth of the planned dive
- Number of divers to be supplied and the anticipated exertion level
- Type of breathing apparatus (free flow or demand)
- Size of the surface support platform

A complete system includes high-pressure cylinders (200–350 standard cubic foot size), the necessary piping and manifolds, a pressure-reduction regulator, and a volume tank (at least one cubic foot volume) (see Figures 5.28, 5.29). A high-pressure filter should always be incorporated into or be located just upstream of each pressure regulator. Filter elements should be of the woven-metal cloth [illegible] should have a collapse pressure rating [illegible] imum possible pressure differenti[illegible] ust be located ahead of th[illegible] low-pressure ga[illegible] der. The volume[illegible] essure relief valve. A ma[illegible] by-pass valve or a redundant regu[illegible] filter also should be included in the system.

Should Read as Follows:

3,000 psi

NOTE

If cylinder banks are used as a back-up to a compressor supply, the bank must be manifolded with the primary source so that an immediate switch from primary to secondary air is possible.

FIGURE 5.29
Fill Station

TABLE 5.4
Typical Fill Times

FROM PRESSURE IN STORAGE (AFTER EQUALIZING IN DIVE TANK)	TO NOMINAL TANK SIZE AND PRESSURE			
	83 cu. ft. to 3,000 psi	71.2 cu. ft. to 2,475 psi	71.2 cu. ft. to 2,250 psi	80 cu. ft. to 4,400 psi
2,500 psi	12 sec.			60 sec.
2,250 psi	28 sec.	14 sec.		90 sec.
2,000 psi	39 sec.	22 sec.	12 sec.	
1,500 psi	75 sec.	50 sec.	35 sec.	

5.9 BREATHING GAS BOOSTER PUMPS

Booster pumps "boost" medium pressure storage gas (air, nitrox, oxygen) directly into dive cylinders to higher pressures rapidly. An example would be taking a pressure of 2,250 psi to 4,400 psi in a 80 cu. ft. cylinder in 60 seconds (see Table 5.4 and Figures 5.30, 5.31). This system of increasing pressure to a higher range provides cooler operation on medium pressure compressors which will extend time between overhauls of compressors. Gas booster pump benefits:

- Cooler operation to extend time between overhauls by thousands of hours regardless of compressor nameplate rating
- Lower cost storage cylinders, purifier units, compressors, motors and piping
- Provides 2,500 psi up to 5,000 psi scuba cylinder fills

WARNING

HIGH-PRESSURE GAS CAN BE DANGEROUS IF IMPROPERLY HANDLED.

NOTE

Maximum "net" boost is 2,250 psig. In practice (for reasonable fill speed), consider 2,000 psi as maximum "net." For example, storage pressure should be no less than 1,000 psi to top off 3,000 scuba cylinders or 2,400 psi to top off 4,400 psi scuba cylinders.