

ACTIVE OR SCUBA COMPENSATION SYSTEMS

INTRODUCTION

The J9, J11, and J13 can all be used to depths the order of 180 m if an active compensation system similar to the SCUBA equipment used by divers is attached. Figures E1, E2, and E3 are drawings of such equipment.

The compensator consists of a compressed gas cylinder, a first stage pressure regulator, a second stage pressure regulator, and a pressure relief valve. Since the SCUBA equipment feeds into the same bag as used for passive compensation, the whole equipment is actually a three-stage system. The compressed gas may be either dry nitrogen or dry air. Dry nitrogen is preferred. Figure E4 is a schematic drawing of the system. References 16 and 17 treat the subject in more detail.

INSTRUCTIONS

First check to see that the compressed gas cylinder as supplied is fully charged at 17.2 MPa (2500 psig) pressure. Before lowering the transducer into the water, open the valve at the compressed gas cylinder approximately one turn counterclockwise. Lower the transducer into the water to a depth of 5 or 6 m. Should bubbles rise for more than one minute, retrieve the transducer and examine for a malfunction. When operating properly, the transducer should not discharge air until a depth of 20 to 24 m has been reached. Failure to compensate will cause damage.

Recharge the compressed gas cylinder after each retrieval to insure that an adequate supply of gas is available for subsequent use. The cylinder can be recharged by either a compressor or a supply cylinder of dry air or dry nitrogen. The maximum pressure to be used is 17.2 MPa or 2500 psig.

OPERATION

The preparation, rigging, and acoustic operation of J-series transducers with active compensation systems is the same as those with passive systems.

The rubber bag part of the active system permits compensation of small changes in depth without calling on the SCUBA equipment. This feature extends the useful working time at depth and eliminates frequent discharges of overpressure into the water.

MULTI-TRANSDUCER SYSTEMS

When more than one transducer is used and they are at different depths, a differential relief valve must be added to the system to maintain a constant difference in the compensating pressure equal to the difference in the head of the water. Figure E5 illustrates such as case where three J11 transducers function as one sound source. Except for the relief valve, the system is otherwise the same as described above.

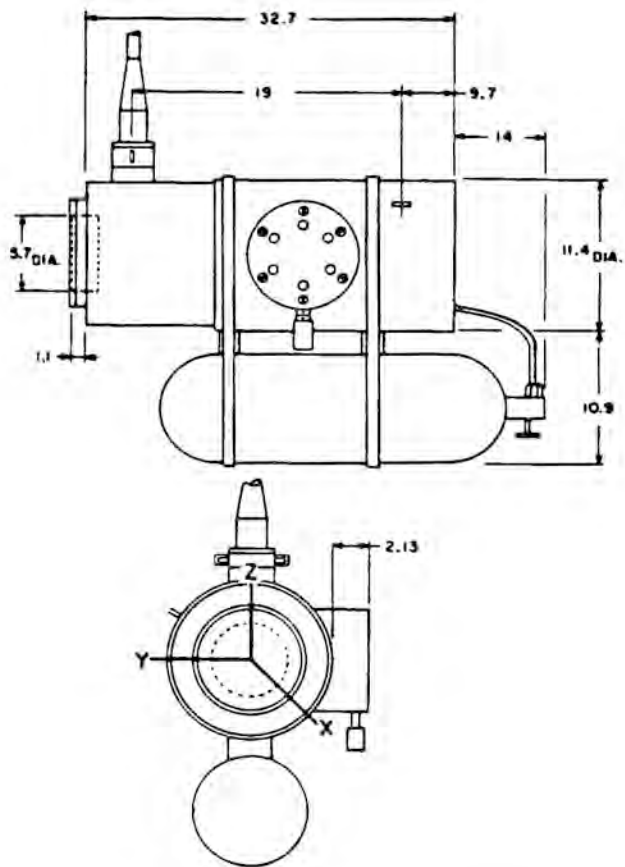


Fig. E1 - Dimensions (in cm) of a J9 with attached active or SCUBA-type compensation system.

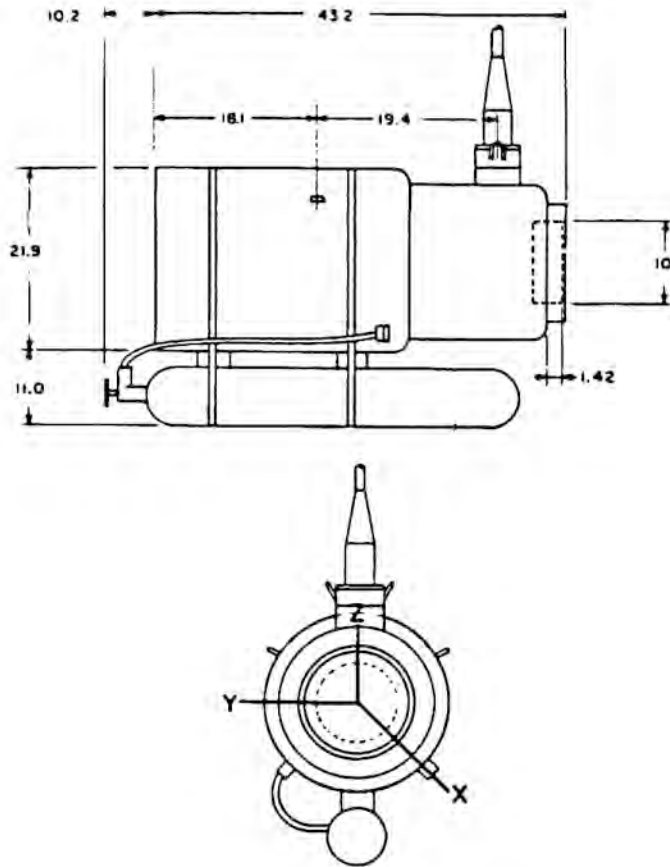


Fig. E2 - Dimensions (in cm) of a J11 with an attached active or SCUBA-type compensation system.

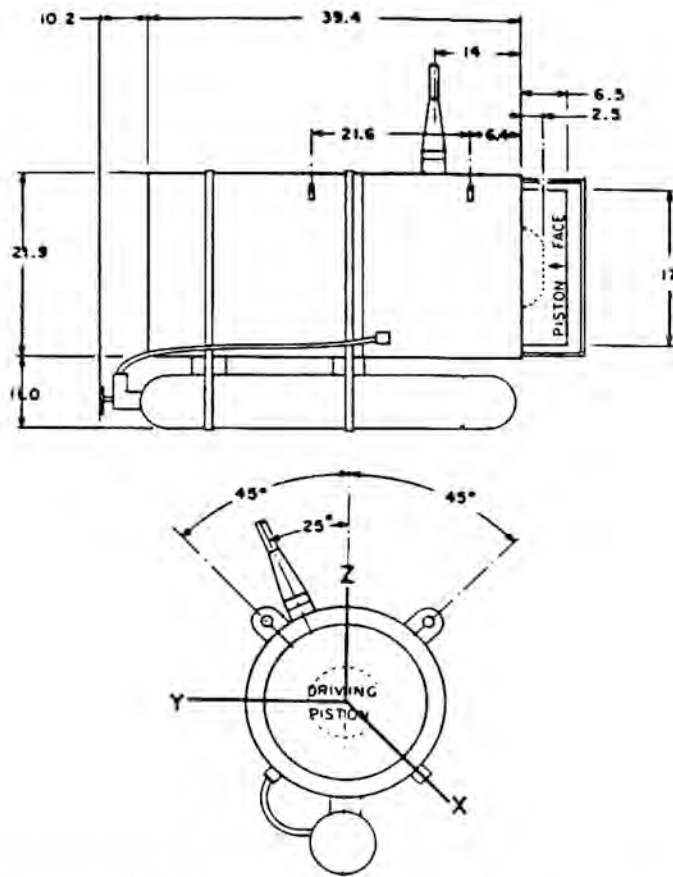


Fig. E3 - Dimensions (in cm) of a J13 with an attached active or SCUBA-type compensation system.

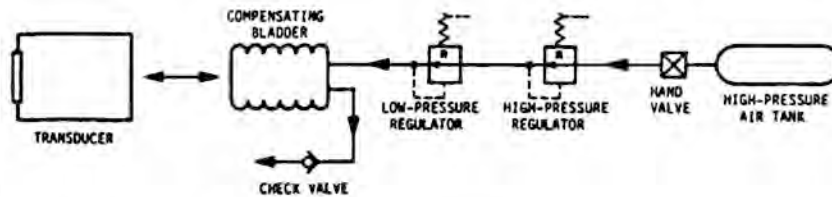


Fig. E4 - Flow of gas in the active pressure compensation of a single J-series transducer.

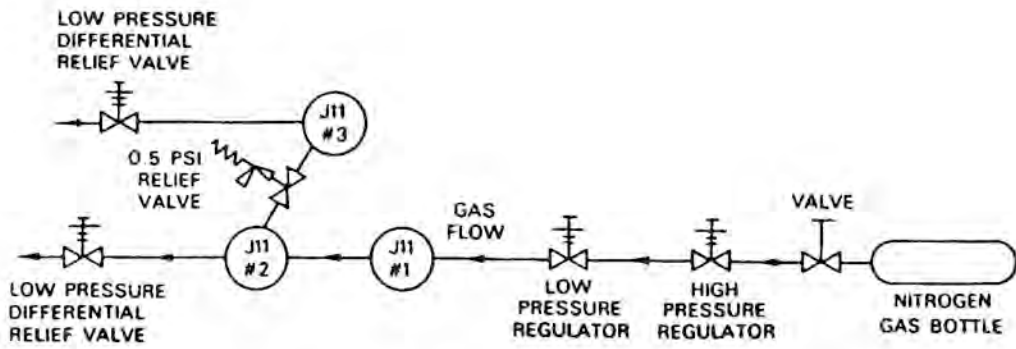


Fig. E5 - Flow of gas in an active pressure compensation system for an array of J-series transducers at two depth levels.