

# DESCO Corporation

## Instructions for the US Navy Mark V Exhaust Valve

Note: These instructions are an excerpt from the 1959 USN Diving Manual. The text and exhaust valve graphic are reproduced verbatim.

### AIR-REGULATING ESCAPE VALVE

(9) The air-regulating escape valve (figure 2-5) is located below the port along the right side of the helmet, together with the escape channel, so that the point of exhaust is toward the rear of the helmet. The position of the exhaust prevents air bubbles from passing in front of the faceplate and obstructing the diver's view. The purpose of the air-regulating escape valve is to maintain automatically an air pressure in the diving helmet slightly in excess of the outside water pressure and to provide a means whereby the diver can regulate the inflation of his dress and consequently his buoyancy. This valve is commonly called the "exhaust valve."

(10) As the diver enters the water, the diving dress is subjected to an external pressure which tends to force the air in the dress up into the helmet and then out of the air-regulating exhaust valve. If the escape of this air is not retarded, or if the air supply is inadequate, the dress will collapse. With a normal air supply and no means to regulate its flow from the helmet, too great an inflation of the dress will result and be followed by an excess of positive buoyancy.

(11) If a diver finds it necessary to provide increased buoyancy, it is accomplished by closing the air-regulating escape valve the necessary amount, thus allowing the dress to inflate. If the danger of overinflating becomes evident, the buoyancy is decreased by opening the valve, which causes the dress to deflate. The throw of the stem, through the medium of the chin button, is provided as a means of rapid release of all excess air.

(12) The air-regulating escape valve is one of the most important features of the diving helmet. The principles of operation are as follows: The internal pressure in the diving helmet is normally maintained at about one-half p.s.i. in excess of the external water pressure. As the pressure builds up in the suit, it is exerted against the stem valve disk (H), which is closed against the air pressure by the primary spring (K). When the internal pressure is one-half p.s.i. in excess of the external pressure, the valve stem is unseated, allowing air to escape. The valve stem continues to move forward, increasing the exhaust opening until the valve stem adjusting sleeve (J) comes in contact with the secondary spring follower (N), one end of which fits into the secondary spring, (O). This secondary spring is designed and constructed to maintain 2 p.s.i. internal pressure over the external pressure when the valve is fully closed, a condition which exists when the regulating screw (F) is screwed until the follower disk (N) bears directly against the valve stem adjusting sleeve.

(13) The exhaust opening desired is obtained by regulating the distance that the valve stem travels before coming in contact with the secondary valve spring. This distance is controlled by the valve stem adjusting sleeve (J) that screws on the valve stem (B) and its longitudinal travels in either direction to give the desired setting for length. When the proper setting is obtained, the sleeve is locked in place by the setscrew (M) which screws into a threaded hole in the end of the valve stem. The initial setting should be made so that the secondary valve spring follower disk (N) comes in contact with the sleeve when the adjusting wheel (G) is about one-eighth of a turn short of the fully closed position. The diver then is able to produce any desired airflow by manipulation of the handwheel. Regardless of the setting, it is always possible to obtain full opening immediately by manually depressing the chin button (A) because after the one-half p.s.i. spring is compressed until the setscrew (M) brings it up against the disk (N), the longitudinal motion of the valve stem may be continued to the maximum degree of travel by compressing the secondary spring (O). When the valve is fully opened, the shoulder on the underside of the chin button strikes the valve stem guide and this prevents the chin button from partly closing off the air passage, with consequent restriction of the airflow.

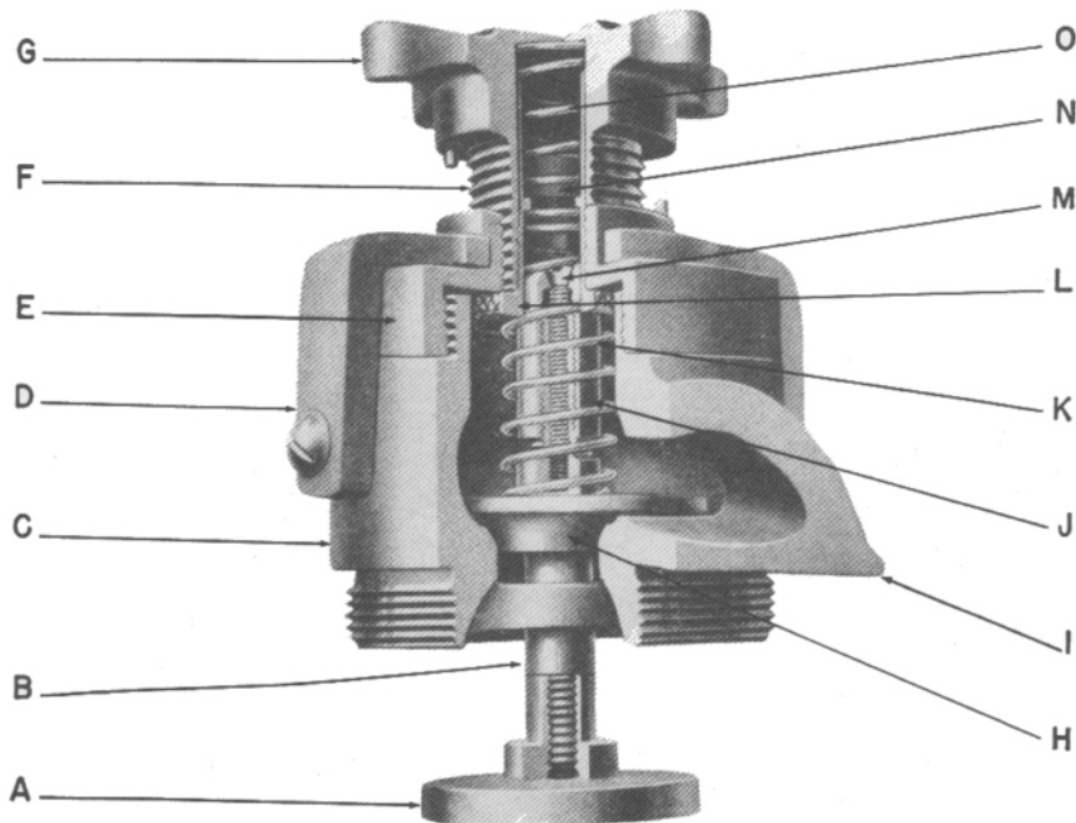
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(14) The regulating screw (F) is provided with a handwheel (G) of improved design which permits a diver who is wearing gloves to grasp it more easily, and to estimate the degree of turn more readily than with wheels of conventional type. A dowel pin on the underside of the handwheel strikes against another dowel pin on the bonnet (E) when the valve is in the fully closed position and thus prevents the wheel from continuing its travel until it becomes jammed against the bonnet. The bonnet guard (D) prevents the bonnet from backing off the exhaust valve body (C).

(15) The air-regulating escape valve should be inspected prior to each period of diving after prolonged inactivity and weekly while diving to insure that it is clean and lightly oiled, that the exhaust tube is clean, and that the valve seat is tight. The primary spring should be activated when the pressure on the seat exceeds the outside pressure by one-half p.s.i. and the secondary spring should be activated when the internal pressure exceeds external pressure by 2 p.s.i. A failure of the air-regulating escape valve might result in "blowing up" of the diver.



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|--------------------------|-------------------------------------|
| A - CHIN BUTTON          | I - AIR ESCAPE CHANNEL              |
| B - VALVE STEM           | J - ADJUSTING SLEEVE                |
| C - VALVE BODY           | K - PRIMARY VALVE SPRING            |
| D - BONNET GUARD         | L - RETAINER RING                   |
| E - BONNET               | M - ADJUSTING SLEEVE SET SCREW      |
| F - ADJUSTING SCREW      | N - SECONDARY SPRING FOLLOWER DISC. |
| G - ADJUSTING HAND WHEEL | O - SECONDARY SPRING                |
| H - STEM VALVE DISC      |                                     |

Figure 2-5. Air-regulating exhaust valve.