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Aerospace Group
Conveyance Systems Division
Carter® Brand Ground Fueling Equipment

Maintenance Manual

Hydrant Valve

Model 61524

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MAINTENANCE, OVERHAUL & TEST INSTRUCTIONS
CARTER MODEL 61524 HYDRANT VALVE

1.0 INTRODUCTION

This manual furnishes detailed instructions covering the maintenance and overhaul of Carter Model 61524 Hydrant Valve, a family of hydrant valves as described in a later paragraph.

2.0 EQUIPMENT DESCRIPTION

The Carter 61524 family of hydrant valves is manufactured with a choice of three different pilot valve arrangements, lanyard or air pressure operation, capable of flowing in the fueling direction only, or with air pressure operation, capable of both fueling and defueling operations. All versions consist of three major sections:

- Lower Housing Assembly - functionally identical on the valves that are capable of flow in the fueling direction only. The "J" option uses a different assembly. The inlet flange, in all cases, is designed to mate a flat faced ANSI 150 lbs, 4 inch pipe flange.
- Upper Housing Assembly - functionally identical on all valves. The outlet of the unit utilizes the 2½" three lug international standard bayonet type connection. Product selection for the U.S. positions 4-6 is available as an option.
- Pilot Valve - three different pilot valves are utilized.

Various options are available to modify the basic part number to customize the end item to meet various customer's requirements. Some of these options entail utilizing various inlet flange spool pieces to allow the unit to mate with various obsolete pit configurations. These options are explained in detail in paragraph 3.0 below.

3.0 TABLE OF OPTIONS & ORDERING INFORMATION

There are three basic valves to which various modifications may be added by option letters as shown in the table below. The three basic units are as follows:

- 61524D - Lanyard Operated Pilot Valve for manual on/off control. Valve allows flow in the fueling direction only.
- 61524E - Air Operated Pilot Valve for deadman control. Valve allows flow in the fueling direction only.
- 61524J - Air Operated Pilot Valve for deadman control with defuel capability to allow flow of fuel in either fueling or defueling direction.

TABLE OF OPTIONS

The following option letters may be combined with the above basic units to customize the valve to fit specific installation requirements:

Option Letter	Description
A	Adds 10-mesh screen between upper & lower halves of unit (81557-10)
B	Adds 20-mesh screen between upper & lower halves of unit (81557-20)
C	Adds three-position product selection (43858-1) for U.S. positions 4-6 only
G*	Adds Spool Piece to convert inlet flange to mate with 6" 300-lb ASA Raised Face Flange (44364)
H*	Adds 4-mesh Stone Guard to inlet. Available only with "G" option above (43587)
M	Adds Quick Disconnect air connection to pilot port. Available only with E or J basic units only (44731)
N	Adds Inlet Adapter Kit to basic unit to fit into Avery Hardoll 12" pit with 3" ANSI mounting flange (47076). Can not be used with Options G or H
*	These options may have been originally made under license by various Carter distributors and for that reason may not be exactly the same, although physically and functionally interchangeable

Example: 61524BDGH - Unit with 6" inlet, manually operated pilot valve, stone guard & optional 20-mesh screen

4.0 SAFETY INSTRUCTIONS

The unit incorporates a servicing control valve designed to allow the Upper Housing Assembly and/or the Pilot Valve to be removed while the inlet of the unit is under pressure. See caution.

CAUTION!

It is not recommended that this procedure be utilized, except in an emergency condition. The use of this valve does pose a possible hazard if not correctly accomplished and the valve is not in good working order.

The Lower Housing Assembly consists of a pressure overbalanced piston assembly that shuts off the main flow path. The slipper type seals utilized on the piston are not absolutely zero leak seals and an increase in leakage past these seals is anticipated with age. If the leakage increases too much, the piston will no longer stay closed. It is therefore recommended that the hydrant not be maintained by use of the servicing valve on a regular basis and when it is used, the following procedure should be followed to reduce the possibility of a major spillage of fuel:

- If an inlet butterfly valve is available, close it to reduce the inlet pressure from the hydrant system.
- Close the Servicing Valve (3-3) securely, by hand. The seal on this valve could be damaged if a wrench is utilized. No threads on the Stem (3-6) should be visible when the valve is fully seated.
- Manually depress the pressure Equalization Poppet (2-13) and allow the pressure inside the Upper Housing Assembly (2-6) or (2-16) to bleed. If the flow from the Equalization Poppet (2-13) reduces to a matter of leakage as differentiated from continuous flow under pressure, it is safe to proceed.

CAUTION!

If the flow from the Equalization Poppet (2-13) is steady and under pressure, do not continue to remove the Upper Housing Assembly (2-6) or (2-16).

- Remove the Pilot Valve (1-D, 1-E or 1-J) and wait for at least one minute while checking the leakage out of the hole in which the Pilot Valve (1-D, 1-E or 1-J) was mounted. If the leakage does not appear to be under pressure proceed with the next step.
- Remove the Screws (2-3 & 2-5) attaching the Upper Half Assembly (2-6) or (2-16) and Lower Half Assembly (3-1).

CAUTION!

As long as the hydrant system pressure is on do not attempt to remove the Lower Housing Assembly (3-1) from the inlet pipe or loosen the Servicing Valve (3-3).

5.0 OPERATION

Figure A reflects a lanyard operated pilot valve shown in the open position. The operation of the Hydrant Valve, whether the pilot is lanyard or air operated, is identical. Figure B reflects the same hydrant valve with the air pilot in a closed position. The only differences between the two units are in the operating mechanism that supplies the power to open and close the pilot valve. In the air operated pilot, the closing lanyard and opening latching mechanisms are replaced with an air operated piston.

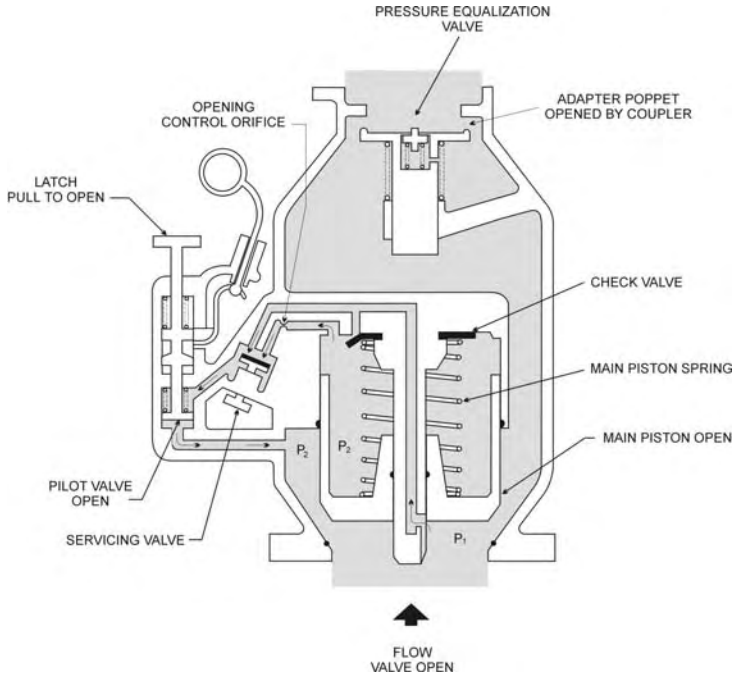


Figure A

Pilot Valve Open

Servicing Valve Open

The open pilot valve allows the continuous passageway from the main piston chamber and from the closing control orifice. The piston chamber is vented through an opening control orifice and the open Servicing valve to a point in the Lower Valve Half. The pressure (P_2) at this point is less than the inlet pressure (P_1). The piston chamber pressure is also maintained at P_2 causing an unbalance of forces on the piston. The inlet pressure force is greater than the combined piston pressure force plus the spring force hence the valve will open to allow flow. This is assuming that the outlet adapter poppet in the Upper Valve Half has been opened by a Coupler.

The pilot poppet is maintained in the open position by one of two methods:

- Lanyard operated pilot - The pilot is opened by the pull of the "T" handle located on the top of the pilot valve. When it is pulled upward, the spring loaded latch attached to the lanyard pivots to lock the pilot into the open position.
- Air operated pilot - Air pressure applied to the pilot piston will maintain the pilot in the open position until the pressure has been depleted (by release of deadman).

Pilot Valve Closed

Servicing Valve Open

Pulling the lanyard, or depleting the air supplied to their respective pilots, will allow the spring loaded pilot poppet to close. This action blocks off the venting of the piston chamber to the lower pressure area downstream. The piston chamber begins to equalize to the inlet pressure (P_1) through the check valve. The piston area is greater than the effective seal area, hence the unbalance of forces caused by the equal pressure plus the spring will cause the piston to begin to close. As the piston moves toward the closed position, the piston chamber volume increases and must be filled through the two series orifices. The primary orifice is considerably larger than the secondary (slot). During the initial and majority of the travel of the piston, the primary orifice is fully exposed to the inlet pressure, hence the rate of closure is controlled by this orifice. When the piston moves far enough closed to cover the primary orifice, the secondary (smaller) orifice begins to control the closure rate. Hence the valve begins to close relatively rapidly and then slows down as it nears its closed position. The relative size and locations of these two orifices allows the valve to close to provide a minimum of overshoot and yet limit the surge pressure shock, on closing, and still maintain a closure rate in accordance with applicable international specifications.

On "J" Defueling options the pilot valve is manually held closed by the thumb screw to allow defueling flow.

Servicing Valve Closed

Pilot Valve Open or Closed

The closing of the Servicing Valve (3-3) has the same affect as closing the Pilot Valve (1-D, 1-E or 1-J). That is, the flow passage from the piston chamber to the downstream side of the piston is blocked. The piston chamber pressure begins to equalize to the inlet pressure (P_1) through the check valve. The piston area is greater than the effective seal area, hence the unbalance of forces caused by the equal pressure, plus the spring, will cause the valve to stay closed.

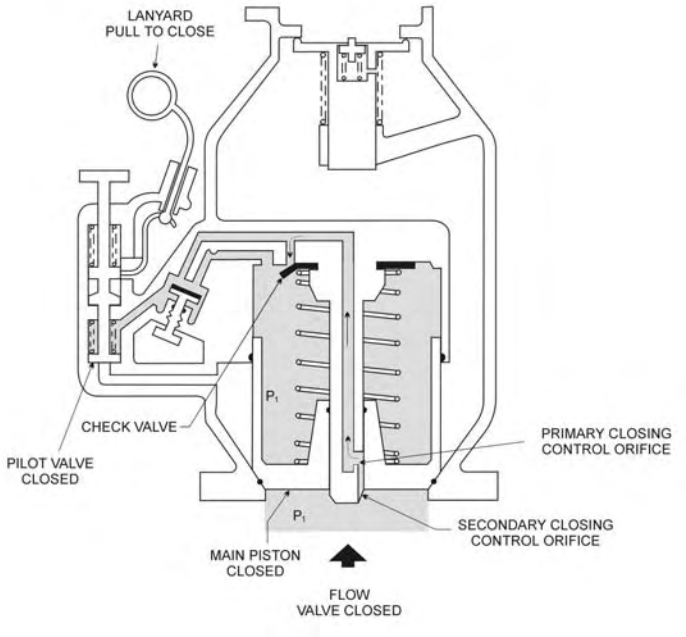


Figure B

6.0 DISASSEMBLY

This disassembly procedure assumes that the valve is located within a shop area where there is the capability of supplying the necessary tools. It is also assumed Options G or N are not removed from the pit for maintenance, although the Gasket (1-11) or O-ring (1-20) used between the two parts (Valve and Adapter) should be replaced at each removal of the unit from the pit. If the Adapter (1-17) is removed from the pit, then O-rings (1-20) & (1-22) or Gasket (1-23) should also be replaced.

Note:

The valve will be full of fuel and provisions for draining into a safe container should be made prior to beginning to work on the unit.

6.1 Place the unit in a container sufficiently large enough to contain a minimum of 5 gallons (19 l.) of fuel. Remove the Cover Assy (2-1). Push the Adapter Poppet (2-8) open and hold it open with a flexible plastic rod, or another non-marring item, to allow the unit to drain. **Hint: A scrap 23620 Rod used in Carter Model 60427 Nozzle is suitable for this job**.

6.2 Remove the Servicing Valve (3-3) and set aside.

6.3 Turn the unit over onto its outlet, being sure to place it on a surface that will not damage the outlet surfaces. Grasp the inlet flange and apply pressure to the Piston (3-18) to push it open sufficiently to insert a flexible plastic rod to keep the piston open as with the Adapter Poppet (2-8) above. Turn the valve over a few times to allow the trapped fuel to drain. The rod can then be removed to close the Piston (3-18).

6.4 Remove Screws (4-29 or 5-18) and Washers (4-29 or 5-18). Grasp the Pilot Valve (1-D, 1-E, or 1-J) and twist back and forth while applying a force away from the unit to remove the pilot. While removing the Pilot Valve (1-D, 1-E, or 1-J) be sure to maintain a straight upward pressure to prevent causing a binding of the parts contained within the Lower Housing Assy (3-10). Some of these parts could be damaged if a binding during disassembly occurs. Lay the Pilot Valve (1-D, 1-E or 1-J) aside for now.

6.5 Remove Screws (2-3 & 2-5) and Washers (2-4). Note that Screw (2-5) is shorter than Screws (2-3). It should be noted that it was installed in the hole to the left of the Pilot Valve (1-D, 1-E or 1-J) when facing the unit with the Pilot Valve (1-D, 1-E or 1-J) directly in the center. Note that on newer units this shorter Screw (2-5) is made of stainless steel, for ease of identification only, instead of the normal cadmium plated Screws (2-3).

6.6 Using a thin, wide blade screwdriver, gently pry the Upper Half Assy (2-6) or (2-16) from the Lower Half Assy (3-1). Be careful not to damage the epoxy coating. Remove and discard O-ring (2-22). Set the Lower Half Assy (3-1) aside.

6.7 Remove Strainer (2-21), if present, from unit. Set it aside.

6.8 **Upper Half Assy (2-6) or (2-16)** - Remove the plastic rod holding the Poppet (2-8) open. Set the unit onto its large flanged end.

6.8.1 Remove Screws (2-6B) or (2-6C) and then separate Flange (2-6A) from the unit. Be careful as the Poppet Assy (2-8) is spring loaded. Remove and discard O-ring (2-15).

6.8.2 Remove Poppet Assy (2-8) from Housing Assy (2-7). Remove Spring (2-14).

6.8.3 **Poppet Assy (2-8)** - Remove Nut (2-13) and then Seal (2-12) and Stem (2-11). Discard Seal (2-12).

6.9 **Lower Half Assy -** Turn Lower Half Assy (3-1) over to expose the inlet flange. Remove Screws (3-15). Early versions of the unit utilized only two Screws (3-15) to retain the Piston Retainer (3-16). The later versions utilize six. This change was made necessary on a similar valve, model 61654 with a six inch ANSI flange. On the model 61524, the Piston Retainer (3-16) is retained in place by the mating pipe flange hence the mandatory use of six screws is not necessary. However, if there are six present, all six should be replaced. Note: If Screws (3-15) are difficult to remove, an impact wrench may be necessary to prevent damage to the Phillips recesses of the Screws (3-15). Also note: Normally, the main Spring (3-26) will be strong enough to force the Piston Retainer (3-16) out of the unit. If not, use a thin blade screwdriver to carefully pry out Piston Retainer (3-16). Remove and discard O-Ring (3-17).

6.9.1 Remove Piston Assy (3-18 to 3-21), Spring (3-26), Washer (3-27) and Seal (3-28). Discard Seal (3-28). Remove Screws (3-19), Seal Retainer (3-20) and Seal (3-21). Discard Seal (3-21). Using an o-ring pick, carefully remove and discard O-Ring (3-22) and Slipper Seal (3-23) from Piston (3-18).

6.9.2 Using an o-ring pick, carefully remove Piston Seal (3-25) and O-Ring (3-24) and discard both.

6.9.3 Check to see if the Shaft (3-12) is loose in the Lower Housing (3-11) only, do not attempt to remove Screw (3-14), Washer (3-13) or Shaft (3-12) from Lower Housing (3-11). The Shaft (3-12) is press fitted into the Lower Housing (3-11) and neither part is available as a replaceable spare part. If it is necessary to replace the Shaft (3-12), it is necessary to replace the Housing Assy (3-10) as a complete unit.

6.9.4 Using an appropriately sized wide blade screwdriver, remove the Cage (4-18 or 5-2) from Lower Housing (3-11) by unscrewing counter clockwise. Remove and discard O-Ring (4-1 or 5-11) from Cage (4-18 or 5-2).

6.9.5 It is not necessary to remove the Orifice (3-29) located in one of the internal holes visible through the Servicing Valve (3-3) port. Using shop air pressure, blow air through the opening to clear the Orifice (3-29). If the air does not flow easily through the orifice out through the inner part of the Lower Housing (3-11), the Orifice (3-29) may be plugged. In that case, it will be necessary to remove the Orifice (3-29) and either clean it or replace it.

6.10 **Air Operated Pilot Valve (1-E) -** Compress Spring (5-7) with Spring Retainer (5-6) sufficiently to remove Pin (5-4). This allows the removal of Poppet (5-3). Slide Spring (5-7) off of Shaft (5-16). Unscrew Adapter (5-5) from Shaft (5-16). Slide O-Ring Retainer (5-8) off of Shaft (5-16). Carefully pick out O-Ring (5-9) from Housing (5-1) and discard. Remove and discard O-Ring (5-10). Remove Cover (5-12) and Spring (5-13). Push Piston (5-14) out of Housing (5-1). Remove Spacer (5-17). It is not necessary to unscrew Shaft (5-16) from Piston (5-14) unless either part is damaged and must be replaced. Remove and discard Bal Seal (5-15) from Piston (5-14).

6.11 **Air Operated Pilot (Defueling type) (1-J) -** The disassembly procedure is the same as in paragraph 6.10 except for the following changes and the addition of several parts as noted:

Cover Assy (5-21) instead of (5-12).

Additional parts include Defuel Control Screw (5-22), Pin (5-23), Wave Washers (5-24), Washer (5-25) between the Wave Washers (5-24) and Wear Plate (5-20) between the Piston (5-14) and the screw on the Cover (5-21). Cover (5-21) need not be disassembled unless some part is damaged and needs replacing.

6.12 **Lanyard Operated Pilot (1-D) -** Compress Spring (4-24) with Spring Retainer (4-23) sufficiently to remove Pin (4-20). This allows the removal of Poppet (4-22). Slide Spring (4-24) off of Shaft (4-16). Unscrew Adapter (4-21) from Shaft (4-16). Slide O-Ring Retainer (4-25) off of Shaft (4-16). Remove Pilot Retainer (4-27) and carefully pick out O-Ring (4-26) and discard. Remove and discard O-Ring (4-19).

Push Latch Spool (4-4) to force the Shaft (4-16) out of Housing (4-2) sufficiently to remove Pin (4-17). If the pilot latching mechanism requires servicing, cut the Cable Assy (4-10) or Clamp (4-15) after removing Hose (4-13) and Clamp (4-14). Cable Assy (4-10) can then be pulled back through Latch Bracket (4-9) to allow removal of Spring (4-12) and Latch Stop (4-11). If the Latch Bracket (4-9) is to be replaced, mount Housing (4-2) in a suitably padded vise and pull Pins (4-8) with pliers.

If necessary to replace parts, using a .187 (4.750 mm) dia. drift pin, remove Pin (4-7) from Handle (4-6) and Latch Spool (4-4). On valves where a Ball (4-6A) is installed onto Handle (4-6), do not attempt to remove it. Note on older valves the hole in the Handle (4-6) for this Pin (4-7) is on center. Newer valves have the hole to one side.

6.13 **Servicing Valve (3-3) -** Carefully, using a .156 inch (3.960 mm) drift pin, remove Pin (3-7). Remove Stem (3-6) from Poppet Retainer (3-8).

Remove and discard O-Ring (3-9) and Gasket (3-2). If Poppet (3-4) does not need replacement, do not disassemble further. If necessary, using snap ring pliers, remove Ring (3-5) to replace Poppet (3-4).

7.0 INSPECTION

7.1 PERIODIC INSPECTIONS

The inspections listed in this section should be conducted on a periodic basis, the frequency of which should be no less than that mentioned in each section. The time between testing should be tailored to fit the particular operation and age of the system.

7.1.1 **Fuel-in-the-air Check** (only applicable to Options E and J) - It is recommended that this inspection procedure be conducted initially on new units after one year of operating and then each six months thereafter.

Air operated hydrant valves are one possible source of contamination when fuel leaks into the air systems. Many of the standard air components used within a refueling system are not necessarily fuel resistant, hence the results can be costly and time consuming. In addition, fuel contamination in the air system will quickly be apparent by the expelling of a fuel mist out of the exhaust of the deadman valve. This is not a safe situation around hot jet engines. Air operated hydrant valves are not the primary source of the problem, just a possibility. Leakage of fuel into the air system can occur at any of the air-fuel interface points. These are normally found in either the line mounted pressure control valves, hydrant couplers, float operated water sump control valves or at the hydrant valve. Some of these types of components, Carter 60700-1 Hydrant Coupler and 61024 Line Mounted Pressure Control Valve, can be eliminated from consideration since they have a vent between the air to fuel interface. If the fuel seal leaks on these units, it results in an external leakage out of the vent point, not into the air system.

Both the 61524E and 61524J Hydrant Valves utilize air operated pilot valves with an air-to-fuel interface seal that is not vented, hence are candidates for fuel to the air system leakage with time.

Finding fuel in the air pilot's air chamber is not conclusive that the air pilot is the leakage source. However, every air pilot that is leaking will have the symptom of fuel in its operating air cavity and quick disconnect fitting (if so fitted).

The most obvious evidence that the air pilot is responsible for air system contamination is steady flow (or weapage) of fuel emitting from the quick disconnect fitting that is mounted to the air pilot. This confirmation will be made possible only if the fitting is specifically designed to allow air to bleed from within the air pilot's air cavity. If the quick disconnect fitting is full of fuel, but leakage flow, as described above, is not obvious, then the following procedure can be used to confirm that the air pilot is responsible for the leakage.

Remove the quick disconnect fitting and dry the interior of the air cavity and fitting with a blast of clean, dry air. Perfection in this is not required, but closely examine and mentally record the condition of the air cavity after cleaning for comparison as noted below.

Refit the quick disconnect fitting. Establish full hydrant system pressure to the hydrant's inlet. Using a clean, dry source of air, which is set to the same pressure used during normal operation of the air pilot, apply and then remove the air pressure, cyclically, thirty (30) times (one to two seconds on, then one to two seconds off). When completed, remove the air fitting and inspect the air cavity again. Any accumulation of fuel, not logically associated with residual moisture available in the air cavity, indicates that the air pilot is responsible for air system contamination. Replace this air pilot with a new or rebuilt air pilot. Overhaul of the air pilot while in the pit is not recommended.

If no significant fuel is found in the air chamber after the above investigation, it can be assumed that the residual fuel previously seen in the air chamber came from another source (coupler or in line valve).

7.1.2 **"Hot Hydrant" Check** - Applicable to all options of hydrant valves. This check should be conducted initially after one year of operation and each six months thereafter.

WHAT IS A "HOT" HYDRANT? - A Carter hydrant valve consists of four major components all contained within a single valve element:

- Outlet Adapter - A spring loaded poppet valve that is manually opened and allowed to close by the opening and closing of a mating coupler. A pressure equalization valve is contained within the poppet. This allows the trapped pressure in the upper chamber of the valve to be bled into the hydrant coupler when extending the poppet to the open position.

- Inlet Shutoff Valve (Isolation Valve in the terms of the IP) - A spring loaded piston valve

whose chamber is connected to the inlet of the hydrant valve via an orifice and to the outlet through the servicing and pilot valves. Its function is to control opening and closing times and to present a means for shutting off flow at the end of a refueling operation, either by means of a lanyard or air operated pilot valve.

- Pilot Valve - Either a lanyard or air operated valve that controls the outlet bleed path from the Inlet Shutoff Valve to the chamber between the Inlet Shutoff Valve and the Outlet Adapter.

- Servicing Valve - A mechanical valve located in series with the Pilot Valve (between the Inlet Shutoff Valve and the Pilot valve). It is designed to keep the Inlet Shutoff Valve in the closed position while allowing the changing of the upper half of the valve (Outlet Adapter) including the Pilot Valve.

Within the above sections of the hydrant valve there are various seals that prevent leakage between the elements. In a valve that is in good mechanical condition, the Inlet Shutoff Valve and Pilot Valve combine to keep the chamber between the Inlet Shutoff Valve and the Outlet Adapter at a lower than inlet pressure. This is only possible, theoretically, if there is zero leakage past the piston and Pilot Valve seals. Any leakage, with the passage of time, will allow this chamber to increase to inlet pressure. Fuel is not compressible, hence a very small amount of leakage will raise the pressure in this chamber to inlet. This does not mean that a hydrant valve is always “hot”. If the leakage rate past the appropriate seals is greater than the amount of flow possible through the pressure equalization valve (at the time the coupler is attached and begins to be opened) then the valve is “hot”. In other words, the equalization valve’s capacity is insufficient to reduce the pressure in this chamber during the coupler opening operation.

WHAT PROBLEMS ARE CAUSED BY HOT HYDRANTS? - Two major problems, not readily apparent, are caused or are potentially caused by hot hydrants.

- Hot hydrant valves make the opening of the hydrant coupler more difficult. The hydrant valve has a poppet area, against which pressure reacts, of approximately 12.6 square inches. If the pressure against which this poppet must be opened is reduced appropriately by the pressure equalization valve to about 20 psi, the opening force that must be generated by the coupler mechanism is only 252 pounds. If, on the other hand, the valve is hot and the inlet pressure is as much as 150 psi, the opening force must be 1,890 pounds. Under normal pressure conditions, it is relatively easy to open a valve against 20 psi with the application of approximately 30 pounds force applied to the coupler handle (mechanical advantage reduces the force required). If the pressure is increased, by a hot hydrant, to 150 psi, the force necessarily applied to the coupler handle is increased to 225 pounds. This is outside the realm of the average refueler so he will use his foot and force the handle to the open position. This tends to over stress the coupler mechanism resulting in a premature failure condition, hence expensive and unnecessary maintenance costs.

- A hot hydrant valve, caused by a failed Pilot or Inlet Shutoff Valve, can be a potential major spill, with the possibility of a fire. Assume that the coupler can be knocked off a functioning hydrant valve by another ramp vehicle. If the hydrant valve were hot, the deadman feature (or lanyard shutoff feature) may not cause the valve to close, resulting in a major spill and possible fire.

TESTING PROCEDURES

The test procedure is the same for a lanyard or air operated valve.

- **Equipment Required** - 61525E Coupler with pressure sense port in the elbow and the outlet plugged or a standard 61525 Coupler with a small (3/8”) port in the outlet plug. A 60 psi air or nitrogen pressure source (for air operated valves only). A short length of 3/8” plastic tubing or hose attached to the pressure sense or outlet port. A manual valve in the hose or tube. A 1,000 cc beaker. A plastic 2 gallon (liter) bucket. (Note: If a metal bucket is used, check your company’s electrical bonding procedure before proceeding).

- **Inlet Piston Valve Seals Test** - Attach the above test coupler to the test hydrant valve with the small shutoff valve in the coupler hose open to the bucket and open the hydrant valve by either pulling the “T” handle of Option D or by applying 60 psi air pressure to the pilot port of Options E or J. Allow the hydrant valve and coupler to be bled of air. Close the servicing valve of the test hydrant. Allow the leakage, if any, from the outlet to stabilize for about 30 seconds, then measure the leakage for at least 30 seconds. The amount of leakage caught in the 30 seconds should not exceed 250 cc. If it does, the hydrant valve should be tagged for removal and overhaul.

- **Pilot Valve & Servicing Valve Seals Test** - Close the pilot valve (pull the lanyard on Option D or remove the air pressure from Options E or J) and open the servicing valve. (The valve will remain in the closed position and the leakage rate under this condition should remain the same as in the test above, assuming the leakage measured was the result of faulty piston seals.) Repeat the leakage test above. If the leakage is significantly greater than that noted in the first test (assuming that the leakage was well below the 250 cc/30 seconds allowable), it is a good indication that the pilot valve seals are leaking and in need of overhaul. If the leakage rate is significantly lower, the first assumption that the majority of the

leakage originally measured was through the piston seals was faulty and it could be an indication that the seals of the servicing valve are faulty. If the leakage rate remains approximately the same as in the first test, the pilot valve and servicing valve seals would appear to be performing well and that the original assumption (leakage past the piston) is correct.

Disconnect the test coupler and close the pilot valve before completing the test.

- **Simple Test for Options E & J Only** - (This test will not test the servicing valve seals). This test is not as complete as the one specified above but can be conducted without the need for air pressure equipment. The Pilot Valve will remain closed during all phases of this test.

Close the Servicing Valve and conduct the leakage test specified above.

Open the Servicing Valve and recheck the leakage. If the leakage increases significantly, the pilot valve seals will be the contributor to the increased leakage. If the total leakage is less than 250 cc/30 seconds, the valve can continue to be used. If greater, replace it immediately.

7.1.3 **Worn Adapter Check** - The following inspections of the adapter are recommended to be carried out at each refueling operation to assure that one is connecting to a safe adapter:

- Visually check for bent, broken, missing or excessively worn lugs or slots. Worn slots are easily detected. A normal slot will have a slight machine broken edge [chamfer of .030 inch (0.762 mm)]. If the edge is worn such that the corner is badly distorted and enlarged it should be inspected more closely and accurately. Carter Adapter Wear Gauge, 61657-2, should be utilized to check the width and thickness of the lugs if they appear to be worn. Wear of the thickness dimension of the lug will promote premature nose seal leakage. Wear of the width of the lug combines with slot wear in defeating the coupler interlock. This could result in the removal of a coupler from the unit in a condition such that the coupler poppet could be opened causing a spill.

7.2 DETAIL PARTS INSPECTION

It is recommended that the parts in the following table be replaced at each overhaul. Detail inspection of parts shall be conducted in accordance with the information in the following paragraphs.

SAFETY NOTE:

Any and all quick disconnect fittings used to connect the air system to the hydrant valve must be configured or altered to not tightly shut off the air pilot's air cavity. Without this feature, full hydrant system pressure could build in the air pilot's air cavity as a result of the leaking air pilot. The hydrant would then be in an open condition or would be a "hot" unit causing problems in connecting the coupler. This would defeat the safe use of the hydrant as it was designed and would increase maintenance costs for the coupler.

Parts to be Replaced at Each Overhaul

Item Number	Description	Item Number	Description
2-12	Seal	3-25	Seal
2-15	O-Ring	3-28	Seal
2-22	O-ring	4-1	O-Ring
3-2	Gasket	4-19	O-Ring
3-9	O-Ring	4-26	O-Ring
3-17	O-Ring	5-9	O-Ring
3-21	Seal	5-10	O-Ring
3-22	O-Ring	5-11	O-Ring
3-23	Seal	5-15	Bal Seal
3-24	O-Ring	4-10	Cable Assy (if cut during disassembly or worn only)

7.2.1 Inspect all metal parts for dings, gouges, abrasions, etc. Use 320 grit paper to smooth and remove sharp edges. Replace any part with damage exceeding 15% of local wall thickness. Use alodine 1200 to touch up bared aluminum.

7.2.2 If present, inspect Strainer (2-21) for damage and presence of dirt. Clean thoroughly to remove any potential blockage.

7.2.3 Check the epoxy coating on the interior of the lower housing for chips and missing portions. If the chips are apparent in the sealing area, it is necessary to strip and recoat the part. The product used on the unit an epoxy coating. It is applied .001 to .005 thick. Any fuel resistant epoxy coating is suitable provided the thickness is controlled to the above limits. Limited repairs to the surfaces that are not utilized for sealing

purposes can be accomplished by using the process outlined in the following paragraphs.

- Degrease the entire area to be repaired, plus approximately one (1) inch (25 mm) beyond, with a good commercial degreasing solvent.

- With an abrasive media, emery paper or steel wool, abrade the previously cleaned area, to the bare metal if practical.

- With a paint brush, apply one coat of Henco-Phos 1326 Base (E/M Corporation) in accordance with the manufacturer's instructions, and allow to air cure, approximately one hour.

- Utilizing a mixing dish and utensil, mix the two part epoxy kit, Everlube 13-509 (E/M Corporation, 6940 Farmdale Ave., North Hollywood, CA 91605, phone (818) 875-0101), in accordance with instructions provided with the kit.

- Within a four hour period, liberally apply the mixed Everlube 13-509 coating to the prepared surface, with a paint brush in accordance with instructions provided with the kit. Make certain the entire prepared surface is coated. Allow to air cure until completely dry. Keep away from fuel or other solvents for at least 8 hours.

7.2.4 Inspect the Lower Housing (3-11) for damage to the red coating as was done with the Upper Housing (2-7). epair such damage in accordance with the instructions in paragraph 7.2.6 above.

Check all sealing surfaces for nicks, gouges or other damage that might cause leakage.

Verify that the Orifice (3-29), located in one of the holes visible through the Servicing Valve (3-3) port in the Lower Housing (3-11) is in place. This orifice controls the opening time of the unit.

7.2.5 Inspect Poppet (3-4) for damage or to assure that the rubber portion is still bonded in place. If there is a permanent indentation in the sealing surface of the rubber, discard and replace.

7.2.7 Inspect Poppet (4-22 or 5-3) as in paragraph 7.2.3 above.

7.2.8 Inspect the sealing surface of the Housing (5-1), especially the inside diameter in which the Piston (5-14) slides. Polish out any irregularities that may have been caused by incursion of dirt or corrosion using a very fine emery cloth. Replace if the irregularities can not be polished out completely.

7.2.9 Inspect the Latch Bracket (4-9) for wear or rounded edge where it contacts the Latch Spool (4-4). Replace if this corner is rounded more than .04 (1 mm).

7.2.10 Check the Latch Spool (4-4) corner that comes in contact with the Latch Bracket (4-9). If this corner is worn to more than .04 (1 mm) replace the Latch Spool (4-4).

7.2.11 Inspect the lanyard Cable Assy (4-10) for wear or fraying. Replace as necessary. Note that a replacement Clamp (15A) is available for this purpose.

7.2.12 Inspect the rubber sealing portion of Poppet (2-9) for nicks, cuts or missing portions. Replace if needed.

8.0 REASSEMBLY

Reassemble in reverse order of disassembly, noting the following:

8.1 **Upper Housing Assy (2-6) or (2-16)**

8.1.1 Apply two drops of Locktite Compound 242, one each on opposite sides of the threaded portion of the Nut (2-13). Insert Spring (2-10) into Poppet (2-9). Install Stem (2-11) into Poppet (2-9) with small end facing outward. Place Seal (2-12) onto Stem (2-11) and secure with Nut (2-13). Torque Nut (2-13) to 10 ± 5 in.-lb. (.12 ± .06 kg-m) to retain and align one slot with the slot in the Poppet (2-9).

8.1.2 Install Spring (2-14) into Upper Housing Assy (2-7); place Poppet Assembly (2-8) into Spring (2-14) and into the hole in Upper Housing Assy (2-7); place O-ring (2-22) onto the Housing Assy (2-7); and assemble Flange (2-6A) using Screws (2-6B) or (2-6C). The latter Screws (2-6C) are used when installing product Selector Ring (2-6D). Torque Screws (2-6B) or (2-6C) to 20 ± 2 in.-lb. (.23 ± .023 kg-m).

8.1.3 Push the Poppet Assy (2-8) open and closed several times to assure that there is no binding and that all parts are properly retained.

8.2 **Lower Housing Assy (3-1)**

8.2.1 With the Lower Housing Assy (3-10) placed such that the inlet flange is up (be careful that the unit is placed on a smooth clean surface to prevent damage), insert O-Ring (3-24) into the groove in the Lower Housing (3-10). Hint: Grasp the O-Ring (3-24) in both hands and stretch it approximately 0.5 to 1.0 inch (12 - 25 mm)

before inserting into groove. Place Slipper Seal (3-25) such that the flanged portion of the seal is facing upward (leg of seal into valve), carefully install it into the groove over the O-Ring (3-24). It will be necessary to deform the Slipper Seal (3-25) into a slight "heart" shape to insert it into the bore, however, do not exaggerate the deformation and do not crease the part. Smooth the installed Slipper Seal (3-25) on its inside diameter with a thumb to assure there are no wrinkles. Place a light coat of seal lubricant onto the Slipper Seal (3-25).

8.2.2 Place O-Ring (3-22) into groove in Piston (3-18). Carefully insert Slipper Seal (3-23) into the groove over the O-Ring (3-22). Smooth Slipper Seal (3-23) with finger to remove all possible wrinkles. Place a light coat of seal lubricant onto the Slipper Seal (3-23).

8.2.3 Place Seal (3-21) onto the face of the Piston (3-18) and smooth into place. Place the Seal Retainer (3-20) onto the Seal (3-21) and Piston (3-18) and hold in place while installing Screws (3-19). Tighten Screws (3-19) evenly until the heads contact the Seal Retainer (3-20). The Seal Retainer (3-20) is held in place by the heads of the Screws (3-19). Torque the Screws (3-19) to 14 inch-lbs (16 cm-kg).

8.2.4 Place the flat Seal (3-28) in the piston cavity of the Lower Housing Assy (3-10). Insert the Washer (3-27) onto the Seal (3-28). Spring (3-26) is next placed to rest on Washer (3-27). Carefully guide the Piston Assy (3-18 to 3-23) into the Lower Housing Assy (3-10) and push it with even force until contact is made with resistance of the seals. Continue even pressure until the Piston Assy (3-18 to 3-23) is fully installed such that the Piston Retainer (3-16) can be installed and held in place with the Screws (3-15). Evenly tighten the Screws (3-15), then torque to 23 inch-lbs (26 cm-kg).

8.2.5 Push Piston Assy (3-18 to 3-23) open and allow it to be closed by the Spring (3-26) several times to check for binding that could be caused by pinched seals.

8.2.6 If the Cage (shown as a part of the Pilot Valve (1-D, 1-E or 1-J)) (4-18 or 5-2) was removed from the Lower Half Assy (3-1), replace the O-Ring (4-1 or 5-11) and lightly lubricate it. Install it into the Lower Housing (3-10) and tighten by hand with a wide blade screwdriver.

8.3 **Servicing Valve (3-3) -** Using snap ring pliers, reassemble the Poppet (3-4) onto the Stem (3-6). Install O-Ring (3-9) onto Stem (3-6). Lightly lubricate O-Ring (3-9). Thread this assembly into Poppet Retainer (3-8) until the hole in the Stem (3-6) is well in the clear. Insert Pin (3-7) into the hole and with the Stem (3-6) fully supported on a soft surface (block of wood or plastic), drive it into place until its ends are approximately equally spaced on each side of the Stem (3-6). Install Gasket (3-2) onto the Poppet Retainer (3-8) and lightly lubricate it. Set this assembly aside for later reassembly into unit.

8.4 **Air Operated Pilot Valve (1-E)**

8.4.1 Carefully install the Bal Seal (5-15) onto the Piston (5-14) being certain that the open portion of the "U" is facing away from the major portion of the piston (faces in the same direction as the Shaft (5-16)). Lightly lubricate it. If Shaft (5-16) was removed it should be reinstalled.

8.4.2 Drop Spacer (5-17) into its groove in the Housing (5-1). (Note: if there is no groove to receive the Spacer (5-17), the unit is not a current production unit. Refer to paragraph 6.10 for information about the identification of air operated pilot valves.) Place the assembled Piston (5-14) - Shaft (5-16) assembly into the Housing (5-1) and slowly push it into place until resistance from the Bal Seal (5-15) is encountered. Continue a downward even pressure on the parts until the Piston (5-14) - Shaft (5-16) assembly is fully into the Housing (5-1). It may be wise to use an "orange stick" (small round stick of hardwood with a flattened end) to assist in getting the Bal Seal (5-15) to evenly enter the Housing (5-1).

8.4.3 Lightly lubricate O-Ring (5-9) and insert into counter bore in Housing (5-1) and over Shaft (5-16). Push into place using O-Ring Retainer (5-8). (Note: O-Ring Retainer (5-8) is symmetrical and can be inserted either end first).

8.4.4 Screw Adapter (5-5) onto Shaft (5-16) until it bottoms. Place Spring (5-7) over Shaft (5-16) and onto O-Ring Retainer (5-8). Place Spring Retainer (5-6) into Spring (5-7) and compress sufficiently to uncover the cross hole in the Adapter (5-5). Place the Poppet (5-3) into the Adapter (5-5) and align the holes in both the Adapter (5-5) and Poppet (5-3). Push Pin (5-4) into the hole and release Spring Retainer (5-6) to retain the Pin (5-4) and Poppet (5-3).

8.4.5 Note that the Cage (4-18 or 5-2), although shown pictorially and furnished as part of the pilot valves, is assembled into the Lower Half Assy (3-1).

8.4.6 When ready to install the Pilot Valve (1-E) into the Lower Housing Assy (3-1), install O-ring (5-10) onto Housing (5-1) and carefully insert the previously assembled parts into the Cage (5-2), installed within the Lower Housing Assy (3-1). Note: When the Pilot Valve (1-E) is procured as a spare part, the Cage (5-2) is furnished as an integral part thereof. Insert Spring (5-13) into Piston (5-14) and place Cover (5-12) onto Spring (5-13) compressing into place while inserting Screws (5-18) and Washers (5-19). Torque to 120 inch-lbs (138 cm-kg).

8.5 **Air Operated Pilot Valve - Defueling (1-J)**

8.5.1 Carefully install the Bal Seal (5-15) onto the Piston (5-14) being certain that the open portion

of the "U" is facing away from the major portion of the piston (faces in the same direction as the Shaft (5-16)). Lightly lubricate it. If Shaft (5-16) was removed it should be reinstalled

8.5.2 Place one Wave Washer (5-24) into the piston bore of the Housing (5-1), then Washer (5-25) followed by the other Wave Washer (5-24).

8.5.3 Place the assembled Piston (5-14) - Shaft (5-16) assembly into the Housing (5-1) and slowly push it into place until resistance from the Bal Seal (5-15) is encountered. Continue a downward, even pressure on the parts until the Piston (5-14) - Shaft (5-16) assembly is fully into the Housing (5-1). It may be wise to use an "orange stick" (small round stick of hardwood with a flattened end) to assist in getting the Bal Seal (5-15) to evenly enter the Housing (5-1).

8.5.4 Lightly lubricate O-Ring (5-9) and insert into counter bore in Housing (5-1) and over Shaft (5-16). Push into place using O-Ring Retainer (5-8). (Note: O-Ring Retainer (5-8) is symmetrical and can be inserted either end first).

8.5.5 Screw Adapter (5-5) onto Shaft (5-16) until it bottoms. Place Spring (5-7) over Shaft (5-16) and onto O-Ring Retainer (5-8). Place Spring Retainer (5-6) into Spring (5-7) and compress sufficiently to uncover the cross hole in the Adapter (5-5). Place the Poppet (5-3) into the Adapter (5-5) and align the holes in both the Adapter (5-5) and Poppet (5-3). Push Pin (5-4) into the hole and release Spring Retainer (5-6) to retain the Pin (5-4) and Poppet (5-3)

8.5.6 Note that the Cage (4-18 or 5-2), although shown pictorially and furnished as part of the pilot valves, is assembled into the Lower Half Assy (3-1).

8.5.7 When ready to install the Pilot Valve (1-J) into the Lower Housing Assy (3-1), install O-ring (5-10) onto Housing (5-1) and carefully insert the previously assembled parts into the Cage (5-2), installed within the Lower Housing Assy (3-1). Note: When the Pilot Valve (1-J) is procured as a spare part, the Cage (5-2) will be furnished as an integral part thereof. Insert Wear Plate (5-20) and Spring (5-13) into Piston (5-14) and place Cover (5-12) with Screw (5-22) and Pin (5-23) installed onto Spring (5-13) compressing into place while inserting Screws (5-18) and Washers (5-19). Torque to 120 inch-lbs (138 cm-kg). If Screw (5-22) and Pin (5-23) were removed for replacement, reinstall prior to placing Cover (5-21) into place.

8.6 **Lanyard Operated Pilot Valve (1-D)**

8.6.1 With Housing (4-2) in a suitable vise, being careful not to damage part, place Latch Bracket (4-9) over corresponding holes in Housing (4-2) being certain that the tang of the Latch Bracket (4-9) is correctly positioned to enter the Housing (4-2) slot. Tap Pins (4-8) into the Housing (4-2), through the Latch Bracket, (4-9) until Pins (4-8) are bottomed. Slide Cable Assy (4-10) through hole in Latch Bracket (4-9), Latch Stop (4-11) and Spring (4-12), then through the appropriate hole in the Housing (4-2). Check, by pulling and releasing Cable Assy (4-10), to confirm that there is free movement of the Latch Bracket against the Spring (4-12). Place Hose (4-13) into position and retain with Clamp (4-14). If a suitable tool is available, the production Clamp (4-15) can be used. A suggested tool is made by National Telephone Supply Co., stock number 51-X-850 or equivalent. Thread the free end of the Cable Assembly (4-10) through the Clamp (4-15). Bend Cable Assy (4-10) to form a suitable loop in the free end. Thread the free end of the Cable Assy (4-10) back into the Clamp (4-15) and crimp in place. If a suitable tool is not available, use alternative Clamp (4-15A) which utilizes two screws to retain the loop.

8.6.2 Place Spring (4-3) over Latch Spool (4-4) and insert Latch Spool (4-4) into Housing (4-2). Note that the Latch Bracket (4-9) will have to be pulled out of the way by pulling upon the Cable Assy (4-10) while attempting to do this operation. Place Latch Cover (4-5) over Latch Spool (4-4) such that the large open end protrudes over the Housing (4-2). If the Ball (4-6A) is to be replaced, simply tap it onto the Handle (4-6) being sure that the provided ring is first installed within the hole in the Ball (4-6A). Place Handle (4-6) over Latch Spool (4-4) and align holes. With adequate support for the parts, tap Pin (4-7) to retain assembly.

8.6.3 Pull Handle (4-6) and observe that the Latch Bracket (4-9) latches onto the Latch Spool (4-4). Pull the Cable Assy (4-10) to release the Latch Spool (4-4).

8.6.4 While applying pressure to the Cable Assy (4-10) to keep the Latch Bracket (4-9) clear of the Latch Spool (4-4) and Spring (4-3), Push Handle (4-6) inward to force the Latch Spool (4-4) out of Housing (4-2) sufficiently to align Shaft (4-16) with Latch Spool (4-4) and install Pin (4-17).

8.6.6 Place Pilot Retainer (4-27) over Shaft (4-16) and move into groove in Housing (4-2). Lightly lubricate O-Ring (4-26) and insert into counter bore in Pilot Retainer (4-27) and over Shaft (4-16). Push into place using O-Ring Retainer (4-25). (Note: O-Ring Retainer (4-25) is symmetrical and can be inserted either end first).

8.6.7 Screw Adapter (4-21) onto Shaft (4-16) until it bottoms. Place Spring (4-24) over Shaft (4-16) and onto O-Ring Retainer (4-25). Place Spring Retainer (4-23) into Spring (4-24) and compress sufficiently to uncover the cross hole in the Adapter (4-21). Place the Poppet (4-22) into the Adapter (4-21) and align the holes in both the Adapter (4-21) and Poppet (4-22). Push Pin (4-20) into the hole and release Spring Retainer (4-23) to retain the Pin (4-20) and Poppet (4-22).

8.6.8 Note that the Cage (4-18 or 5-2), although shown pictorially and furnished as part of the pilot valves, is assembled into the Lower Half Assy (3-1).

Install O-ring (4-19) onto Pilot Retainer (4-27) and carefully insert the above assembled parts into the Cage (4-18) and align the mounting holes with the appropriate holes in the Lower Housing Assy (3-1). Fasten in place with Screws (4-29) and Washers (4-28). Tighten evenly and then torque to 120 inch-lbs (138 cm-kg).

8.7 **Final Assembly**

8.7.1 With Lower Half Assy (3-1) set up such that the piston (inlet) is against the work bench, insert the Strainer (2-21) as applicable.

8.7.2 Lightly lubricate and place O-Ring (2-22) into the groove in the Lower Half Assy (3-1).

8.7.3 Be sure that the Stem (3-6) of the Servicing Valve (3-3) is fully screwed out, install the Servicing Valve (3-3) into the Lower Half Assy (3-1). Torque to 100-110 ft lbs (13.83 to 15.21 m-kg). Do not over tighten. (Some valves were wire locked at the factory, but later versions substituted this torque requirement for the wire locking.)

8.7.4 Place the Upper Half Assy (2-6) or (2-16) onto the Lower Half Assy (3-1) such that the notch in the mating flange is located opposite to the pilot valve boss. The one shorter Screw (2-5) is to be installed in the hole just to the left of the pilot valve boss. Install Screws (2-3 & 2-5) and Washers (2-4) making sure that the Cover (2-1) is attached to one of the Screws (2-3) using Retaining Washer (2-2).

8.7.5 Installation of the 61524 onto the mating flange should be done by loosely tightening the mounting bolts evenly. The bolts should then be torqued in a normal cross pattern in three successive steps. If the bolt pattern is numbered 1 through 8 in a clockwise fashion, tighten in sequence 1,5,3,7,2,6,4 and 8. The torque for the three steps should be 40 ft-lbs (5.5 m-kg), 70 ft-lbs (9.7m-kg) and 93 ft-lbs (12.9 m-kg).

9.0 TEST

9.1 Test conditions

Test media shall be Stoddard Solvent (Federal Specification P-D-680), JP-4 per MIL-J-5624D at 75° ± 15° F, Jet A or equivalent.

9.2 Functional Test

The valve must be connected to a fluid pressure source with capability of static pressure of 200 psig, flow pressure (deadhead) of 120 psig and a flow rate of up to 600 USGPM. For the air operated units, a minimum of 120 psig air pressure must be available.

9.2.1 Leakage & Proof Pressure - Attach valve to a static fuel pressure source of 300 psig minimum. Open Pilot Valve (1-D , 1-E or 1-J), open Servicing Valve (3-3) and fill valve manually opening the Pressure Equalization Stem (2-11) in the outlet Poppet Assembly (2-8) to allow trapped air to escape. Blow the external wetness off of the valve and pressurize the unit to 25 psig and 200 psig for a minimum of one minute at each pressure and observe for external leakage. There should be no leakage.

9.2.2 Seal Leakage - With the unit in the same test setup, close pilot valve and block the outlet Poppet open with a soft plastic rod (see paragraph 6.1 for hint). Apply 25 and 200 psig for one minute at each pressure and observe for leakage as evidenced by fuel flow out of Poppet Assembly (2-8). There shall be no leakage from unit.

9.2.3 Servicing Valve Leakage - With the same test setup, close Servicing Valve (3-3) and open Pilot Valve (1-D, 1-E or 1-J). Apply 200 psig for one minute and observe for leakage. The Servicing Valve (3-3) shall not open and there shall be no evidence of leakage as evidenced by leakage through the Poppet Assembly (2-8).

9.2.4 Flow Tests - Install the valve in high flow test stand. Connect the outlet of the unit to a Carter 61445 Coupler. Open Pilot Valve (1-D, 1-E or 1-J). With 120 psig deadhead pressure establish a flow rate of 600 USGPM.

9.2.4.1 Close the Pilot Valve (1-D, 1-E or 1-J) and observe closing time and overshoot. Overshoot is defined as the volume of fluid that passes through the valve after the pilot valve has been closed. Closing time shall be 2 to 5 seconds and overshoot shall be less than 30 gallons at 600 USGPM.

9.2.4.2 Opening Time - Using the same test setup, start with a closed valve and 120 psig deadhead pressure, open Pilot Valve (1-D, 1-E or 1-J) and observe opening time. Opening time is defined as the time required for the valve to achieve at least 90% of rated flow, 540 USGPM in this case. The opening time shall be 5 to 10 seconds.

10.0 TROUBLE SHOOTING

10.1 External Leakage - Between Upper and Lower Housing Assy (2-6 or 2-16 & 3-1). - Flange Screws (2-3 & 2-5) not tightened properly or O-Ring (2-22) pinched or cut.

10.2 Leakage past Servicing Valve (3-3). - Damaged Poppet (3-4).

10.3 Leakage past Equalization Valve Stem (2-11). - Damaged seal in Poppet (2-9).

10.4 Valve does not close when Pilot Valve (1-D, 1-E or 1-J) is closed. - If unit closes when Servicing Valve is shut, problem could be a damaged or leaking Pilot Valve Poppet (4-22 or 5-3) or O-Ring (4-1 or 5-11). If Pilot Valve 1-E or 1-J is used, check to see if Piston (5-14) is free to travel open and closed. If Lanyard Pilot 1-D is used, check to see if Cable Assy (4-10) has been pulled to allow the pilot to close.

10.5 Valve does not close when Pilot Valve (1-D, 1-E or 1-J) is closed and when Servicing Valve (3-3) is shut. - If flow rate, when attempting to close the valve, changes very little, the problem could be damaged Piston Slipper Seal (3-25) and/or O-Ring (3-24) or jammed main Piston (3-18). Check for movement (manually) of Piston (3-18). If the flow rate changes to leakage when the valve is signaled to close, the problem could be the Piston Seal (3-21).

10.6 On units with an Air Operated Pilot Valve (1-E or 1-J). - Valve will not open when air pressure is applied - Damaged Bal Seal (5-15), Piston (5-14) is binding or damaged bore of Housing (5-1). Actuate with up to 80 psig air pressure several times before checking for leaking Bal Seal (5-15). Leaking Bal Seal (5-15) should be evidenced by air flowing out of the gap between the Cover (5-12 or 5-21) and the Housing (5-1).

10.7 On units with an Air Operated Defuel Pilot Valve (1-J). - Valve will not open when air pressure is applied - Defuel Screw (5-22) is screwed in too far. Back out the Screw (5-22) until it is stopped by Pin (5-23).

10.8 On units with an Air Operated Defuel Pilot Valve (1-J). - Valve will not open to allow defueling operation - Defuel Screw (5-22) is not screwed in far enough. Be sure the Screw (5-22) is bottomed out on the Piston (5-14).

10.9 On units with an Air Operated Defuel Pilot Valve (1-J). - Valve will not open to allow defueling operation - Incorrect Piston Seal Retainer (3-20) is installed. The correct Seal Retainer (3-20) to have defueling capability is part number 207727. The height of the Seal Retainer (3-20) should be approximately 0.540 (13.72 mm) to be correct. Replace Seal Retainer (3-20) with correct part.

10.10 On units with a Lanyard Operated Pilot Valve (1-D). - If the valve won't open, check to see that the Latch Spool (4-4) remains in the locked up position. Pull and hold up the Handle (4-6) for 30 seconds. If flow is established, the Latch Spool (4-4) is not locking in the open position. Problem could be wear either on the Latch Bracket (4-9) or Latch Spool (4-4).

10.11 Fuel leakage into the air reference system (on air operated pilot valve units only, option E or J). - O-ring (5-9) needs replacing.

11.0 ILLUSTRATED PARTS CATALOG

Tables 1.0 through 5.0 tabulate the parts comprising the various configurations and options of the 61524 Series of Hydrant Valves. The item numbers are keyed to the appropriate exploded view for the option or sub-assembly as diagrammed.

TABLE 1.0
61524 Series Hydrant Valve and Options
Figure 1

Fig.	Item	Part Number	Description	Units/ Assy	Hydrant Option	Spare/10 Units / yr
1	C	No part number	Product Selection Ring Assy	1	C	-
	1	81068	Ring	1	C	-
	2	GF51957-66	Screw	9	C	-
	3-7	Left intentionally blank.				
	D	44248	Lanyard Pilot Valve	1	D	-
	E	44721	Pilot Valve, Air Operated	1	E	-
	G	44364	6 x 4" IP Spool Assy	1	G	-
	10	207742	Adapter	1	G	-
	11	82154	Gasket	1	G	-
	12	82155	Bolt	8	G	-
	13	82156	Nut	8	G	-
	14	GF960-1016	Washer	16	G	-
	H	43587	Stone Guard Assy	1	H	-
	8	203331	Stone Guard	1	H	-
	9	RR-637-S	Retaining Ring	1	H	-
	J	44570	Pilot Valve, Defueling	1	J	-
	M	44731	Quick Disconnect Assy	1	M	-

Fig.	Item	Part Number	Description	Units/ Assy	Hydrant Option	Spare/10 Units / yr
	18	B2K16-VB(S)DWC	Male QD Fitting	1	M	-
	19	220013-01	Close Nipple	1	M	-
	N	47076	12” Pit Adapter Kit	1	N	-
	13	82156	Nut	8	N	-
	14	GF960-1016	Washer	8	N	-
	15	MS29513-246	O-ring	1	N	10
	16	220345	Set Screw	8	N	-
	17	47045	Adapter	1	N	-
	18	GF16997-168	Screw	4	N	-
	19	5712-403-63	Washer	4	N	-
	20	MS29513-232	O-ring	2	N	4
	21	220342	Spacer	2	N	-
	22	MS29513-237	O-ring	1	N	2
	23	220344	Gasket	1	N	2

TABLE 2.0
Upper Housing Assy, Options A And B
Figure 2

Fig.	Item	Part Number	Description	Units/ Assy	Hydrant Option	Spare/10 Units / yr
2	1	41607	Dust Cap Assembly	1	All	5
	2	5758-20C2	Washer, Retaining	1	All	-
	3	GF16998-60	Screw	7	All	-
	4	GF960-516	Washer	8	All	-
	5	GF16996-32	Screw	1	All	-
	6	44758-1	Upper Housing Assy (No Prod. Sel.)	1	All but C	-
	6A	25668	Flange	1	All	4
	6B	GF51957-64	Screw	9	All but C	-
	7	210188	Upper Housing	1	All	-
	8	47011	Poppet Assembly	1	All	-
	9	220052	Poppet	1	All	-
	10	LC022D-5	Spring	1	All	-
	11	220043	Stem	1	All	-
	12	220044	Seal	1	All	10
	13	220045	Nut	1	All	-
	14	2753	Spring	1	All	-
	15	MS29513-042	O-ring	1	All	10
	16	44758-2	Upper Housing Assy (Prod. Sel.)	1	C	-
	6A	25668	Flange	1	All	4
	6C	GF51957-66	Screw	9	C	-
	6D	81068	Selector Ring	1	C	-
	7	210188	Upper Housing	1	All	-
	8	47011	Poppet Assembly	1	All	-
	9	220052	Poppet	1	All	-
	10	LC022D-5	Spring	1	All	-
	11	220043	Stem	1	All	-
	12	220044	Seal	1	All	10
	13	220045	Nut	1	All	-
	14	2753	Spring	1	All	-

Fig.	Item	Part Number	Description	Units/ Assy	Hydrant Option	Spare/10 Units / yr
	15	MS29513-042	O-ring	1	All	10
	17-20	Left intentionally blank				
	21	81557-10	Strainer, 10-mesh	1	A	-
		81557-20	Strainer, 20-mesh	1	B	-
	22	MS29513-165	O-Ring	1	All	10

TABLE 3.0
Lower Half Assy
Figure 3

Fig.	Item	Part Number	Description	Units/ Assy	Hydrant Option	Spare/10 Units/ yr
3	1	43219	Lower Half Assy	1	All but J	-
		44292	Lower Half Assy	1	J	-
	2	MS29512-12	Gasket	1	All	10
	3	43272	Servicing Valve	1	All	-
	4	202597	Poppet	1	All	2
	5	5008-62-H	Retainer	1	All	-
	6	202631	Stem	1	All	-
	7	.156-1.000MDP	Pin	1	All	-
	8	202630	Retainer, Poppet	1	All	-
	9	MS29513-010	O-Ring	1	All	10
	10	42927	Lower Housing Assy	1	All	-
	11	202556	Lower Housing (Note 3)	1	All	-
	12	202593	Shaft (Note 3)	1	All	-
	13	5710-66-060	Washer	1	All	-
	14	GF51957-79	Screw	1	All	-
	15	NAS517-3-3	Screw	6	All	-
	16	202596	Retainer, Piston	1	All	-
	17	MS29513-249	O-Ring	1	All	10
	18	202592	Piston	1	All	Note 4
	19	GF51958-62	Screw	6	All	-
	20	203032	Retainer, Piston Seal	1	All but J	-
		207727	Retainer, Piston Seal	1	J	-
	21	210127	Seal, Piston	1	All	10
	22	MS29513-118	O-Ring	1	All	10
	23	203030	Seal, Slipper	1	All	10
	24	MS29513-245	O-Ring	1	All	10
	25	202594	Seal, Slipper	1	All	10
	26	202595	Spring	1	All	-
	27	203029	Washer	1	All	-
	28	203028	Seal	1	All	10
	29	29224-7	Orifice	1	All	-

TABLE 4.0
Lanyard Operated Pilot Valve
Figure 4

Fig.	Item	Part Number	Description	Units/ Assy	Hydrant Option	Spare/10 Units/ yr
4	D	44248	Lanyard Pilot Valve	1	D	Note 4
	1	201201-014	O-Ring	1	All	10
	2	202704	Housing	1	D	-
	3	202714	Spring	1	D	-
	4	202706	Spool, Latch	1	D	-
	5	202705	Cover, Latch	1	D	5
	6	203533	Handle	1	D	-
	6A	47084	Ball	1	D	-
	7	GF16562-234	Pin	1	D	-
	8	GF51923-297	Pin	2	D	-
	9	202716	Bracket, Latch	1	D	-
	10	42954	Cable Assy	1	D	-
	11	202717	Stop, Release	1	D	-
	12	202715	Spring, Release	1	D	-
	13	81052	Hose	1	D	1
	14	81094	Clamp, Hose	1	D	-
	15	82114	Sleeve	1	D	-
	15A	81095	Clamp, Cable	1	D	-
	16	207589	Shaft	1	D	-
	17	202743	Pin	1	D	-
	18	207718	Cage	1	All	-
	19	MS29513-114	O-Ring	1	All	10
	20	GF9105-04	Pin	1	All	2
	21	44252	Adapter	1	All	-
	22	207585	Poppet	1	All	5
	23	207586	Retainer	1	All	-
	24	202712	Spring	1	All	-
	25	202742	Retainer, O-ring	1	All	2
	26	201201-008	O-Ring	1	All	10
	27	202708	Retainer, Pilot Valve	1	D	-
	28	GF960-516	Washer	2	D	-
	29	GF35308-333	Bolt	2	D	-

TABLE 5.0
Air Operated Pilot Valve
Figure 5

Fig.	Item	Part Number	Description	Units/ Assy	Hydrant Option	Spare/10 Units/ yr
5	E	44721	Pilot Valve, Air Operated	1	E	Note 4
	1	208967	Housing	1	E, J	-
		207600	Housing (Obsolete)	1	E	-
	2	207718	Cage	1	All	-
	3	207585	Poppet	1	All	5
	4	GF9105-04	Pin	1	All	2
	5	44252	Adapter	1	All	-
	6	207586	Retainer	1	All	-
	7	202712	Spring	1	All	-
	8	202742	Retainer, O-ring	1	All	-
	9	201201-008	O-Ring	1	All	10
	10	MS29513-114	O-Ring	1	All	10
	11	201201-014	O-Ring	1	All	10
	12	207598	Cover	1	E	-
	13	207706	Spring	1	E, J	-
	14	44571	Piston	1	E, J	-
	15	82107-218	Bal Seal	1	E, J	10
	16	207588	Shaft	1	E, J	-
	17	210176	Spacer	1	E	-
	18	GF16998-63	Screw	2	E, J	-
	19	GF960PD516	Washer	2	E, J	-
	J	44570	Pilot Valve, Defueling	1	J	Note 4
	1	208967	Housing	1	E, J	-
	2	207718	Cage	1	All	-
	3	207585	Poppet	1	All	5
	4	GF9105-04	Pin	1	All	2
	5	44252	Adapter	1	All	-
	6	207586	Retainer	1	All	-
	7	202712	Spring	1	All	-
	8	202742	Retainer, O-ring	1	All	-
	9	201201-008	O-Ring	1	All	10
	10	MS29513-114	O-Ring	1	All	10
	11	201201-014	O-Ring	1	All	10
	13	207706	Spring	1	E, J	-
	14	44571	Piston	1	E, J	-
	15	82107-218	Bal Seal	1	E, J	10
	16	207588	Shaft	1	E, J	-
	18	GF16998-63	Screw	2	E, J	-
	19	GF960PD516	Washer	2	E, J	-
	20	208958	Wear Plate	1	J	-
	21	208968	Cover	1	J	-
	22	208959	Screw, Defuel Control	1	J	-
	23	GF16562-213	Pin	1	J	-
	24	SSR0150-S17	Wave Washer	2	J	-
	25	5710-355-30	Washer	1	J	-

KD61524-1 Kit of soft goods to overhaul the Upper and Lower Half Assemblies only less pilot valves - items 2-12, 2-15, 2-22, 3-2, 3-4, 3-9, 3-17, 3-21, 3-22, 3-23, 3-24 3-25 & 3-28.

KD61524-2 Kit of soft goods to overhaul the entire Hydrant Valve with Option D Lanyard Operated Pilot Valve, 44248, only - items 2-12, 2-15, 2-22, 3-2, 3-4, 3-9, 3-17, 3-21, 3-22, 3-23, 3-24 3-25, 3-28, 4-1, 4-5, 4-19, 4-22 & 4-26.

KD61524-3 Kit of soft goods to overhaul Option E & J Air Operated Pilot Valves, 44721 & 44570, only - items 2-12, 2-15, 2-22, 3-2, 3-4, 3-9, 3-17, 3-21, 3-22, 3-23, 3-24 3-25, 3-28, 5-3, 5-9, 5-10, 5-11 & 5-15.

Notes:
1. All part numbers beginning with "GF" are interchangeable with those beginning with either "AN" or "MS". If the "GF" is followed by three numbers it is interchangeable with and "AN" part, otherwise it is interchangeable with an "MS" part of the same number.
2. The recommended spare parts shown above are the number required to support 10 Units for one year or each overhaul whichever is sooner. These quantities do not include replacement spares for intermediate replacement of parts required by abuse or misuse of the equipment. The recommended quantities are based on the ratio of spare parts sold for each unit during a one year period of time. The actual quantity required will vary from location to location.
3. These items are not sold as separate parts, only the next assembly is available.
4. It is recommended that at least one each be on hand for each 50 or less hydrant valves in the system.
5. Kits of spare parts are available for normal overhaul or repair of this item. The following kits are available and contain the items indicated:

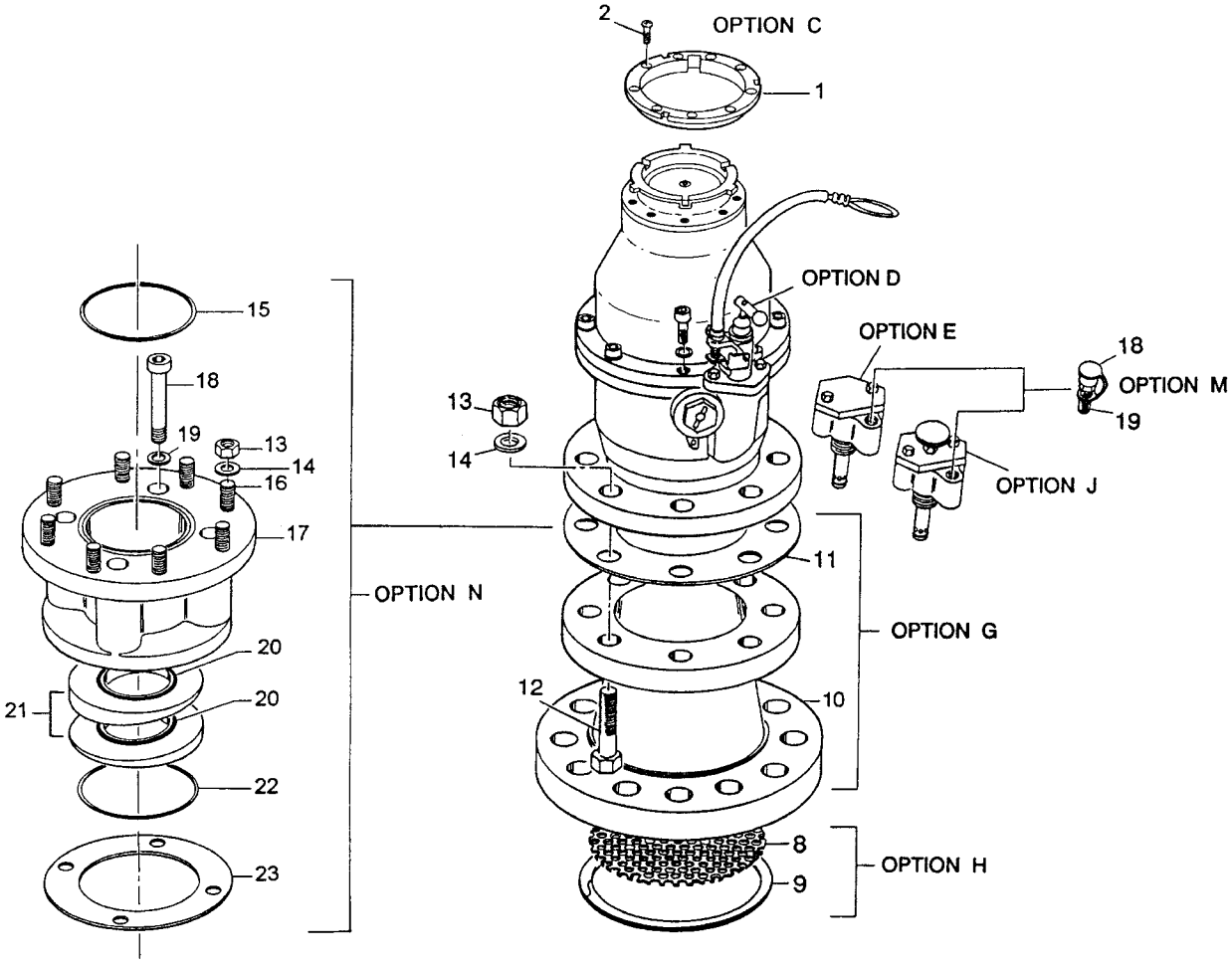


FIGURE 1

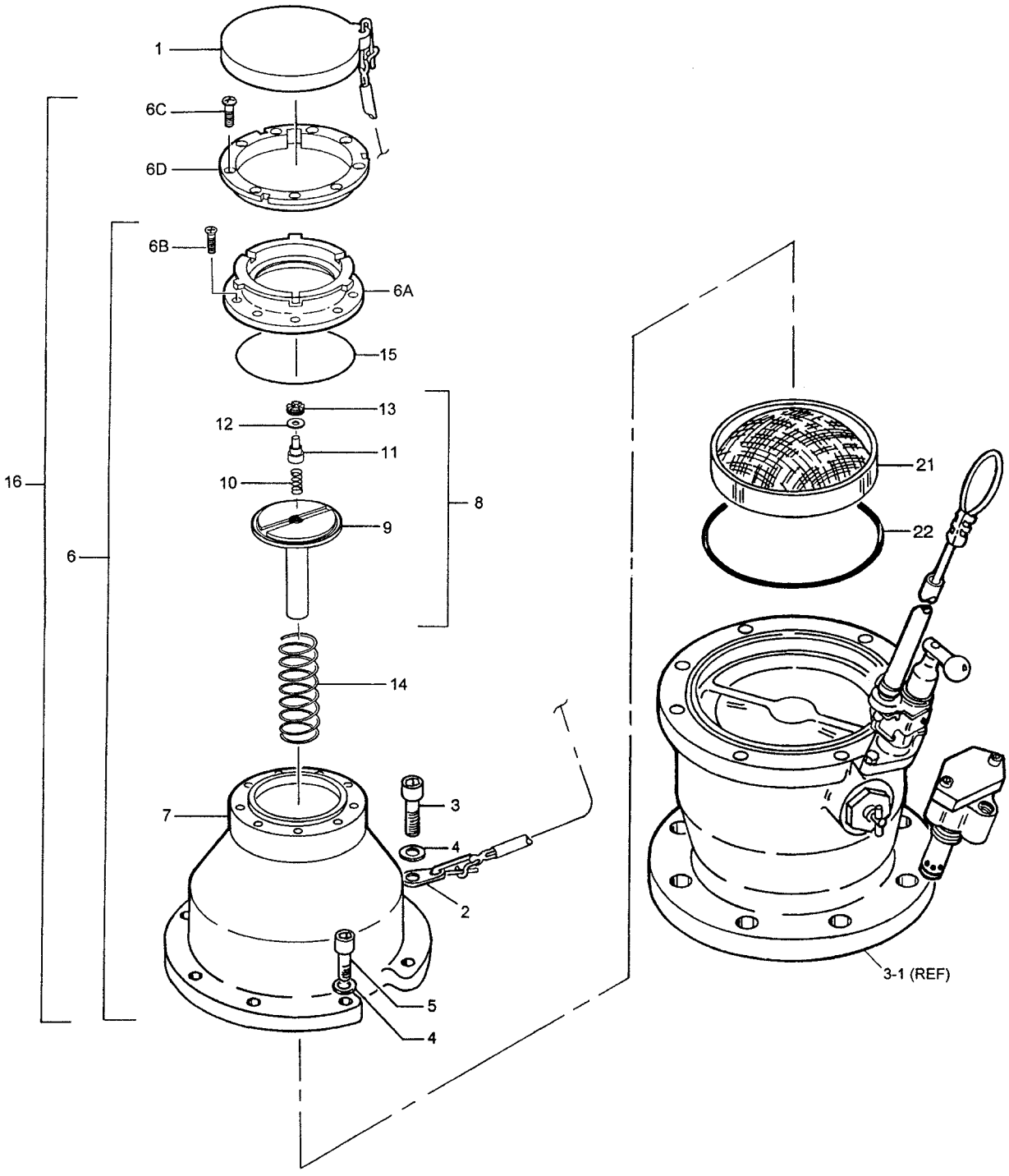


FIGURE 2

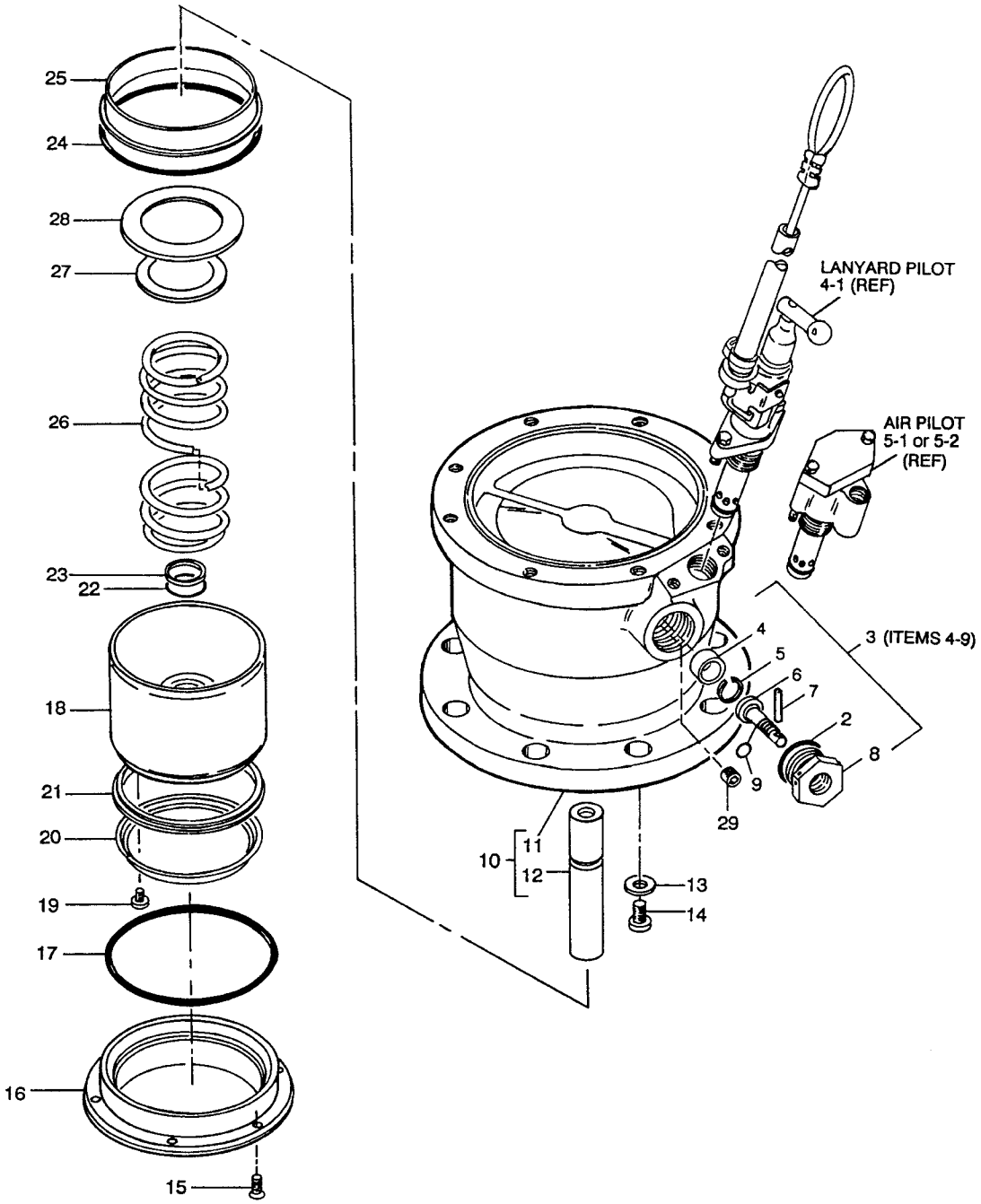
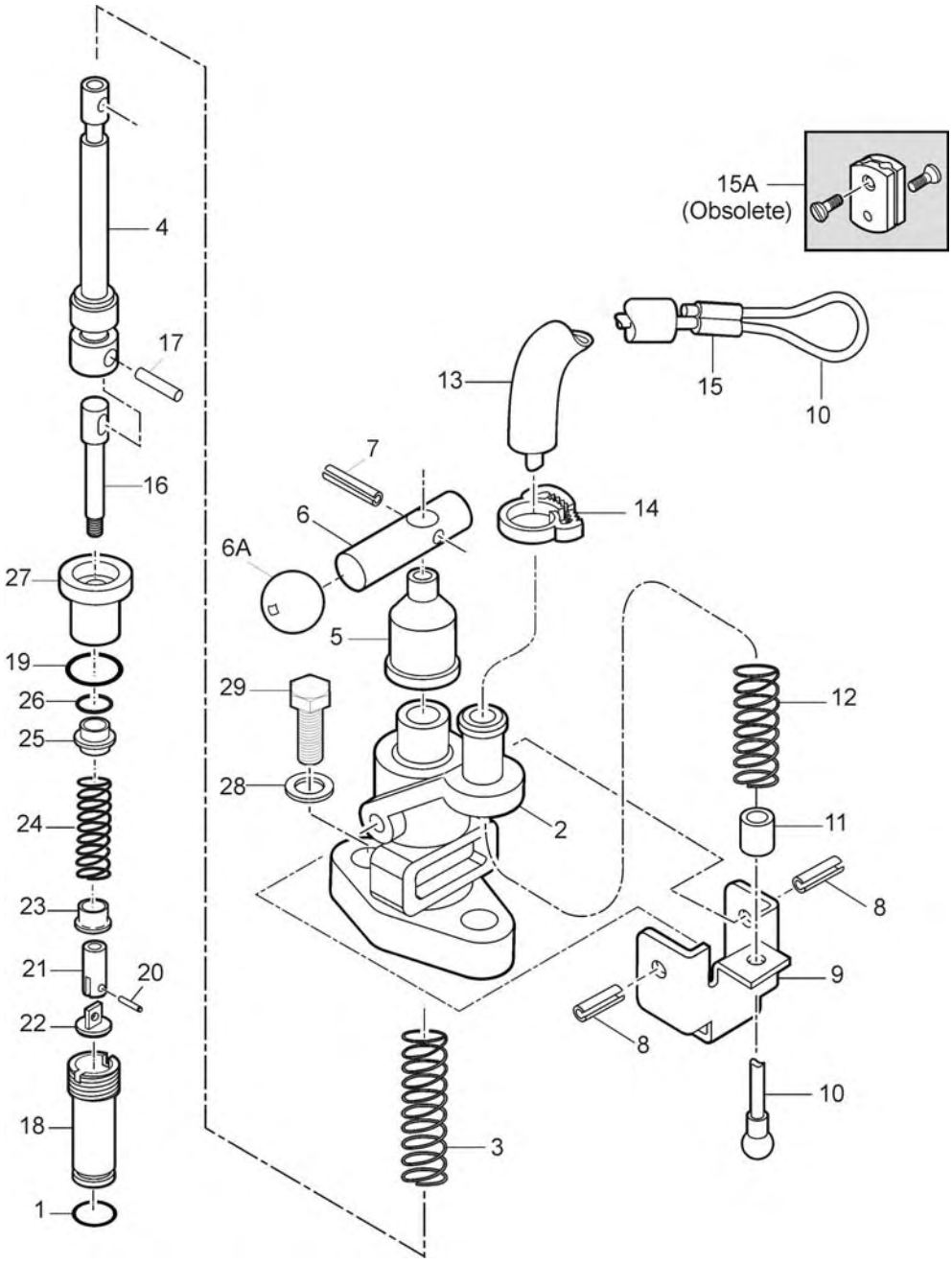

25
24
28
27
26
23
22
18
21
20
19
17
16
15
LANYARD PILOT
4-1 (REF)
AIR PILOT
5-1 or 5-2
(REF)
3 (ITEMS 4-9)
4
5
6
7
2
8
9
29
10
11
12
13
14

FIGURE 3


15A
(Obsolete)
4
17
16
27
19
26
25
24
23
21
20
22
18
1
13
15
10
7
6
6A
14
5
29
28
2
12
11
8
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8
10
3

FIGURE 4

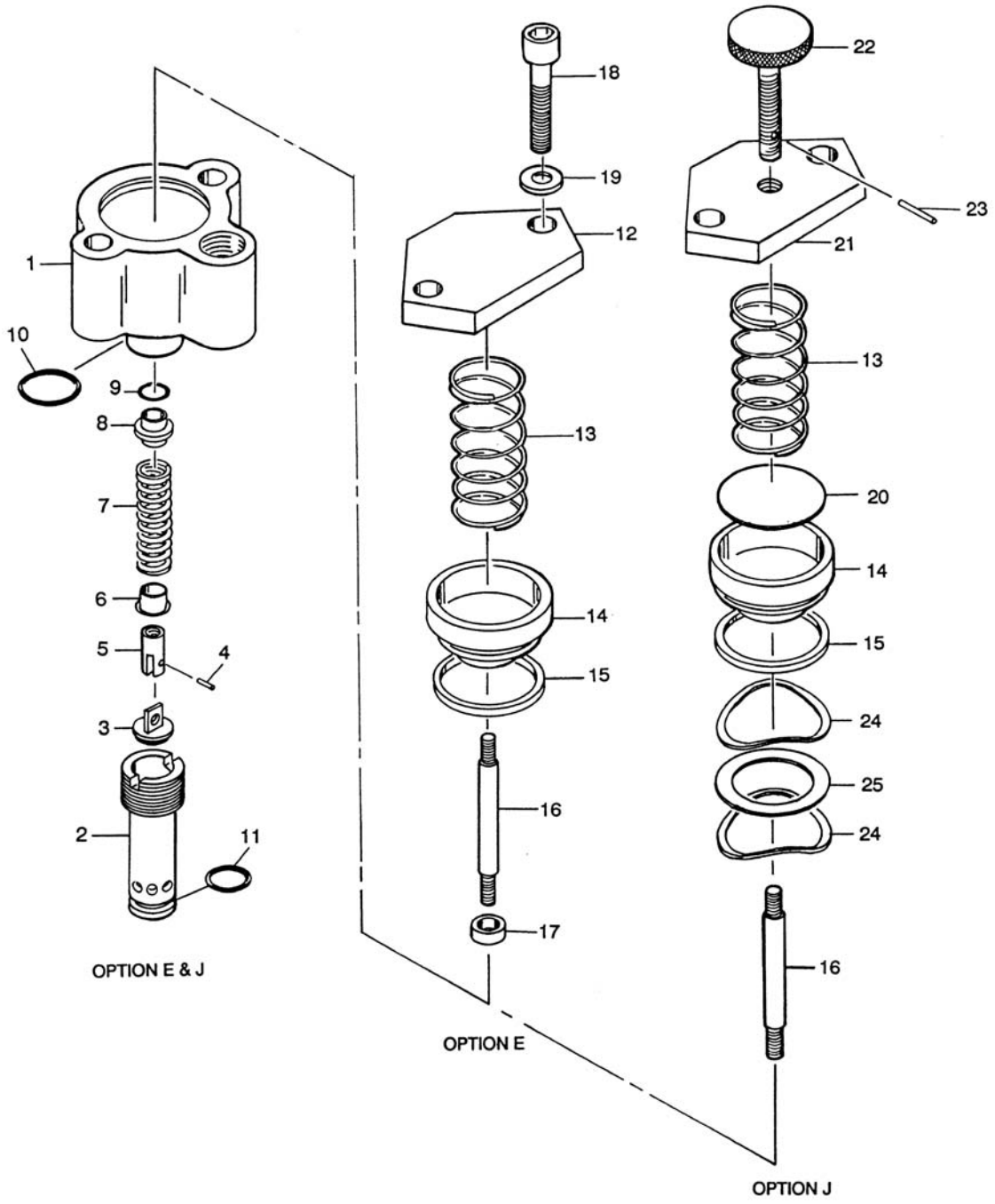
1
10
9
8
7
6
5
4
3
2
11
OPTION E & J
18
19
12
13
14
15
16
17
OPTION E
22
23
21
13
20
14
15
24
25
24
16
OPTION J

FIGURE 5

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