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Aerospace Group  
Conveyance Systems Division  
Carter® Brand Ground Fueling Equipment

## **SM64015**

December 2007

Applicable additional manuals:

SM60427 Nozzle

SM64348 Nozzle

SM64349 Nozzle

SM64200 Nozzle

SM64201 Nozzle

## **Maintenance & Repair Manual**

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### **Nozzle Ball Valve**

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#### **Model 64015**

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## Maintenance, Overhaul & Test Instructions Model 64015, Nozzle Ball Valve

### 1.0 INTRODUCTION

This manual furnishes detailed instructions covering the maintenance and overhaul of Eaton's Carter brand Model 64015 Nozzle Ball Valve.

For the maintenance of options to the basic Model 64015, refer to Options Table, Section 3.0.

### 2.0 EQUIPMENT DESCRIPTION

Eaton's Carter brand Model 64015 nozzle ball valve is a 2-1/2 inch manually operated ball valve designed to allow the inspection of the strainer with little or no spillage of fuel. Model 64015 is an improved version of the older unit made by Warner Lewis (Germany) and utilizes many interchangeable parts.

The basic unit would be procured under model number 64015 with the appropriate option letter(s) to specific specifications as listed in the table shown in Section 3.0. The exploded views in the figures at the end of the manual include the various options available.

### 3.0 TABLE OF OPTIONS AND ORDERING INFORMATION

There are four basic ball valves provided to mate with various nozzles as indicated below. Each of these units can be modified to tailor the unit to custom needs by adding one or more option letters from the table below.

- 64015 - Ball Valve to mate with Carter brand Model 60427, Avery Hardoll HU3000 and with Carter Model 64200/64348 when the 47013 regulator is used.
- 64015F - Ball Valve to mate with Carter brand Model 61428, 64200 and 64348 Nozzles (use Model 64015 if flanged Model 47013 Regulator is used).

- 64015T - Ball Valve to mate with Whittaker F116/F117 Nozzles
- 64015U - Ball Valve to mate with any D-1/D-2 Nozzle (regardless of the make or model - as long as the nozzle has the standard 6-bolt military flange).

The following options may be added to any of the above basic ball valves as indicated in the following table:

#### TABLE OF OPTIONS FOR THE 64015 BALL VALVE

| Option Letter | Description  | Option Letter | Description  |
|---------------|--|---------------|--|
| A             | Adds 40-mesh strainer (44373-40)   | *K            | Specifies 2-1/2" BSPP inlet  |
| B             | Adds 60-mesh strainer (44373-60)   | *L            | Specifies 3" NPT inlet   |
| C             | Adds 100-mesh strainer (44373-100)   | *N            | Specifies 2" BSPP inlet  |
| D             | Replaces inspection port cap with glass inspection cap (47020-2)                         | *P            | Specifies 2" NPT inlet   |
| E             | Adds drag ring (220062)  | R             | Provides separate Allen key for use in operating defueling capability (220075)     |
| *H            | Specifies 2 1/2" NPT inlet   | S             | Provides separate short wrench for operating unit (no spanner capability) (220061) |
| J             | Provides separate spanner wrench for operating unit and removing inspection cap (220060) |               |  |

\* Option H, K, N or P must be specified to get a completed unit.

### 4.0 OPERATION INFORMATION

The Ball Valve is designed to allow for the inspection of the nozzle strainer with little or no loss of product. It also provides a convenient method to allow for defueling through the strainer in the correct flow direction. The strainer is contained within the inside of a ball that is rotated into one of three positions, "refueling", "defueling" and "strainer". These

positions are indicated by the raised letters "R", "D" and "S" respectively. A position indicator is included within the operation mechanism to point at the appropriate position letter.

The following describes the operation of the unit for the three functions of the unit:

#### 4.1 FUELING (REFUELING) DIRECTION

The position indicator should be pointing toward the "R" (refueling position). This is accomplished by using either the option J, Spanner Wrench, or S, Short Wrench, to move the ball into the correct position. Either wrench is removed from the unit once the correct position is obtained. This position assures that the strainer is located such that the flow is from the inside to the outside of the strainer.

drained into a container. The strainer retainer is easily removed through the lid opening and then the strainer. Once inspected or cleaned the strainer can be reinstalled and the retained by the clip. The lid would then be reinstalled and the ball moved, by the wrench, to the "R" position for normal operation.

4.2 STRAINER

Either wrench is inserted into the unit and the ball is rotated until the position indicator points toward the "S" on the valve body. In this position, the nozzle and inlet is sealed by the ball seals and the inspection lid can be removed to allow for the removal of the strainer for checking. If the glass inspection lid (option D) is used, the strainer can be checked through the glass and the lid need not be removed. If the lid is removed a small amount of fuel will be trapped in the ball and the surrounding cavity and it should be

4.3 DEFUELING

If defueling is desired, the ball should be moved to the "D" position. To do so, first one must use an Allen key to move the stop pin out of the path of the indicator to allow the position to be moved to "D". Moving the ball to this position, aligns the strainer to allow flow to be from the inside to the outside of the strainer. During defueling, it is not possible to remove the wrench from the unit. This provides an indication that the unit is in the defuel position and the wrench must be moved back to either the "S" or "R" position to remove the wrench.

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5.0 SPECIAL TOOLS

The following special tools are recommended for proper repair and or overhaul of the nozzle:

- Spanner Wrench 220060.
- 61607 Ball Assembly Tool

- WL4680 Torque Wrench Kit

The above items are available from your Carter distributor.

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6.0 DISASSEMBLY

6.1 Refer to Figure 1 for detail numbers. Removal of the Ball Valve from nozzle inlet depends upon the type of unit as follows:

- 6.1.3 64015U used on military D-1/D-2 Nozzles - remove the six Bolts (6), Nuts (7) and Washers (8) and separate the ball valve from the nozzle. Remove and discard O-ring (3). (Skip to paragraph 6.2).
- 6.1.4 64015T used on Whittaker F116/F117 nozzles - Remove unit from nozzle and discard O-ring (43).
- 6.2 Screw (10) is a self-locking type screw that utilizes a nylon insert in the threads to affect the resistance required to provide the locking. Self-locking screws are designed to be reused a number of times before losing their locking effectivity. Using a torque wrench, remove Screw (10) and O-ring (11) from lower half of Body (15), measuring the torque during removal. If the torque is less than 9.5 in lbs (10.9 cm kg) discard the screw and replace it with a new one during reassembly. Screw Ball Assy Tool 61607 into the boss from which Screw (10) was removed. Hold the ball valve such that the Tool is below the ball valve and rotate the Inlet Adapter (12) until all Balls (13) have been captured in the Tool. The correct amount of Balls (13) will be captured when the level of Balls (13) reaches the line scribed on the tube of the Tool. If the Tool is not utilized, remove Balls (13), 39 each, from unit by hand. Hold bolt hole vertical (pointed down) and allow all ball bearings to fall through the bolt hole. Catch all balls in a container. Some rotation between the Body (15) and the attached Adapter (12) may be required to allow 39 Balls (13) to fall out of hole. Remove the Adapter (12). If Clip (14) is

6.1.1 64015 Basic unit used with either a Carter brand nozzle Model 60427, 64348 or 64200 (with a 47013 hose end regulator) or an Avery Hardoll HU3000 nozzle - Remove six Screws (1) and Washers (2) from outlet flange mating the Ball Valve to the nozzle. Separate the unit from the nozzle. Remove and discard O-ring (3). (Skip to paragraph 6.2).

6.1.2 64015F used with a Carter brand 61428, 64348 or 64200 Nozzle (with a ball swivel inlet fitting) - Remove the screw that secures the ball race of the nozzle and insert 61607 Ball Removal Tool into the nozzle body. Hold the nozzle/ball valve such that the tool is pointing downward. Rotate the nozzle body to allow the balls to fall into the tool. When the balls in the tool reach the scribed line on the tool, the ball valve can be removed from the nozzle. Refer to the appropriate service manual for the nozzle type for overhaul instructions for same.

The Seal (4) and O-ring (5) located in the groove in the outlet of the Ball Valve need not be removed unless there is evidence of damage to the Seal (4) or there was evidence of leakage from the joint prior to disassembly. The Wear Ring (15A) present on newer units need only be removed and replaced if there is significant wear. (Skip to paragraph 6.2).

to be replaced, use a pair of needle nose pliers to grasp the existing part and pull it from the hole in the Body (15). See Figure 2. Clear the hole of any debris.

Remove option E, Drag Ring (16), if present.

Remove and discard O-ring (17) from internal groove in the inlet of the Body (15).

- 6.3 Remove Lock Screw (18), Lockwasher (18A) and discard. Unscrew Cap (19) and remove. Note: Item (18A) may not be present in older units. It is recommended that both Lock Screw (18) and Lockwasher (18A) be replaced. Using an O-ring pick carefully remove O-ring (9) and Ball Seal (20) and discard same.

**NOTE:**

Lock Screw (18) may come from the factory with a compound blocking the screw driver slot. This is to indicate that the screw is not to be tightened further. The head of the screw is not flush with the Body (15) and it is meant to be that way.

Cap (19) on newer units will include a split Wear Ring (19A). It is not necessary to remove this ring unless obvious wear is apparent.

- 6.4 Rotate Ball (21) to the "S" position (strainer inspection). This should align the tongue on the Ball Stem (22) to allow for removal of the Ball (21) out through the inlet of the Body (15). Remove the Ball (21). If the Strainer (24A, 24B

or 24C) and Ring (25) are present, remove them also.

- 6.5 Remove and discard Thrust Bearing (26). Using spanner wrench, remove Inspection Lid (27) or (29). Remove and discard O-ring (28). If option D, Glass Inspection Lid (29) is used, carefully remove Retaining Ring (31) and Glass (32). Remove and discard O-ring (33) and Spacer (34).
- 6.6 Remove the three ball stem Screws (35) and Cover Plate Assembly (36). Remove Collar Pin (37) and Collar (38). Push Ball Stem (22) inward into the Body (15) to remove. Remove and discard O-ring (40) and Thrust Bearing (41).
- 6.7 It is not necessary to remove Stop Pin (42) unless it is damaged and needs replacing.
- 6.8 The Cover Plate Assembly (36) is used on newer models. It is designed to lock the ball from inadvertently moving closed while refueling. The older Cover Plate (36A) is no longer available and the newer assembly should be used to replace it on overhaul. It is not necessary to disassemble Cover Plate Assembly (36) unless it is damaged or needs repair. Move on to 6.8.1 if it is necessary to disassemble the assembly.
- 6.8.1 Using a small blade screwdriver insert it into the small hole next to the Locking Roll (36B) and push the Pin (36C) outward until it can be grasped by a pair of pliers. Pull it pin out.
- 6.8.2 The Roll (36B) and the Wave Washers (36D) can then be removed.

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7.0 INSPECTION

The parts listed in the table below should be replaced at each overhaul.

| Item | Part Number  | Description    | Used on       |
|------|--------------|----------------|---------------|
| 3    | 201201-151   | O-ring         | Basic Unit, U |
| 9    | MS29513-155  | O-ring         | All           |
| 11   | MS29513-013  | O-ring         | All           |
| 17   | M29588/1-235 | O-ring         | All           |
| 18   | 2915868      | Screw          | All           |
| 18A  | GF16213-60   | Washer, Lock   | All           |
| 20   | 220068       | Seal           | All           |
| 26   | 220069       | Thrust Bearing | All           |
| 28   | MS29513-149  | O-ring         | All           |
| 33   | MS29513-038  | O-ring         | D             |
| 34   | 220125       | Spacer         | D             |
| 40   | MS29513-111  | O-ring         | All           |
| 41   | 220065       | Thrust Bearing | All           |
| 43   | 201201-042   | O-ring         | T             |

Inspect all metal parts, except for the Ball (21), 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.

Carefully check the Ball (21) on the spherical surfaces for any scratches or worn areas. If present, replace the Ball (21). (Since the Ball (21) is an expensive replacement part, it may be wise to first try the Ball (21) in a unit with new seals. If the unit does not leak when tested, then

the Ball (21) is in good enough condition to continue use.)

Check the ball race groove in both the Adapter (12) and Cap (19) for raised burrs or buildup of material that may prevent the disassembly of the mating Adapter (12). The corner of the ball race should be a smooth radius no greater than .03 inches (.76 mm). The raised burr may be removed with appropriate abrasive. If the burr is too large to remove in this manner, replace the appropriate parts.

On the Body (15) of Option F the outlet fitting includes a replaceable wear ring in the ball race

groove. Older units do not have this ring. Check the external ball race on the outlet of the Body (15) of the older units in the same manner as above. On the newer units check for wear on the Wear Ring (15A) and replace if wear is present.

Check Glass (32) to assure that it is clear from scratches that would prevent visual checking of the strainer. Clean the glass thoroughly.

Inspect Wear Ring (19A) in newer units for wear and replace if worn.

**8.0 REASSEMBLY**

8.1 Reassemble in reverse order of disassembly (Refer to Figure 1), observing the following:

8.1.1 Make certain all components are clean and free from oil, grease, or any other corrosion resistant compound on all interior or exterior surfaces. Wash all parts, except the Glass (32), with cleaning solvent, Federal Specification P-D-680 or equivalent, and dry thoroughly with a clean, lint-free cloth or compressed air. Clean the Glass (32) with a commercial glass cleaner.

**WARNING:**  
Use cleaning solvent in a well-ventilated area. Avoid breathing of fumes and excessive solvent contact with skin. Keep away from open flame.

8.1.2 **DO NOT** use any form of grease on Balls (13) and be certain to install proper number of balls in the hole of Body (15). The use of Tool 61607 will facilitate the counting and assembly of the Balls (13) back into the unit. Also make sure that Clip (14) is installed properly to maintain continuity through the unit. Refer to Figure 2 for installation information.

**NOTE:** A light coat of petroleum jelly can be applied to all O-rings, springs, and screws for ease of installation.

8.2 When installing Ball Seal (20) into Cap (19) be sure that the seal is completely into its groove and that the surface of the seal is smooth and that there are no bumps or wrinkles. Make certain that Wear Ring (19A) is installed within the ball groove in Cap (19) (on newer units only).

8.3 The Thrust Bearing (26) must be installed with the flat surface seated against the Body (15) and the chamfered surface (inside diameter) facing into the Ball (21) cavity.

8.4 When installing the Ball (21) the Collar Pin (37) must be in a position such that it points toward the "S" position. In other words the Ball (21) is installed with the grooved inside diameter closest to the Inspection Lid ((27) or (29). Note that if the Ball (21) is installed in any other

manner the Strainer (24A), (24B) or (24C) can not be viewed through the inspection port.

8.5 The Strainer (24A), (24B) or (24C) and its retaining Ring (25) may be installed prior to installing the Ball (21) or just prior to installing the Inspection Lid (27) or (29).

8.6 Install Stop Pin (42), if it was removed, prior to installing Cover Plate Assembly (36). Once Cover Plate Assembly (36) has been installed the Stop Pin (42) should be backed out to its stop position within the recess in the Cover Plate Assembly (36).

8.7 Apply Loctite (47) locking fluid to the first two threads of Collar Pin (37) and then it shall be installed in Collar (38) and the assembly lined up with the indentation in the Ball Stem (22) to assure that the Collar Pin (37) is locked into its correct orientation.

8.8 Apply Loctite (47) locking fluid to the first two threads of Screws (35) and install in place. Torque the Screws (35) that affix the Cover Plate (36) to 83 ± 4 inch-lb. (95 cm-kg).

8.9 Install Cap (19) into Body (15) and torque to 85-100 in.-lbs. (106 cm-kg). Install Washer (18A) and Screw (18) and torque the Screw (18) to 9-10 inch-lb. (11 cm-kg) to assure that it locks the Cap (19) in place.

**NOTE!**  
Head of Screw (18) will not necessarily be seated against Body (15) when properly installed. It is intended for the Washer (18A) to "bite" into the outer diameter of the Cap (19) thereby locking it in place.

8.10 Use Ball Tool 61607 to install correct number of Balls (13). If the tool is not used count the Balls (13) to make sure that a total of 39 are installed.

8.11 If Drag Ring (16) is used, it is installed prior to installing the Adapter (12).

8.12 **CRITICAL ASSEMBLY NOTE:** Where applicable on assembly of this unit to a nozzle the following torquing sequence and values for the mating to the nozzle should be used:

- 8.12.1 The Screws (1) should be torqued to 75-79 in-lbs. (8.5-9 N-m). Tighten all screws to bottom the heads against the flange without over tightening. approximately to half of the end torque values above. Skip across to screw "4" followed by "6", "2", "5" and finally "3".
- 8.12.2 Then start with one screw, mentally numbered "1" working in a clock-wise pattern, tightening
- 8.12.3 Repeat the tightening at the final torque value above in the same pattern.

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## 9.0 TEST

- 9.1 The following test procedures will be accomplished after overhaul: Close the ball valve and apply 120 psig pressure to the inlet for one minute. Check for leakage from the open inspection port. Leakage shall not exceed 1 drop/min.
- 9.2 Test conditions  
Test media shall JP-4, Jet A or odorless kerosene, commercial solvent 140. Reduce the pressure to 5 psig and repeat the above test.
- 9.3 Leakage Test  
The unit may be tested as a part of a nozzle or independently.  
Fill the open ball valve with test fluid and bleed all trapped air from the unit. With the ball valve mounted with its major axis in a horizontal position and the open inspection port pointing downward, pressurize the inlet and outlet simultaneously to 300 ± 20 psig for one minute and observe for leakage from the inspection port. There shall be no evidence of leakage from the unit.  
Reduce the pressure to zero and remove the Inspection Lid (27) or (29).
- 9.4 Continuity Test  
Measure the electrical resistance, in ohms, between the inlet to the outlet. There are un-anodized patches provided under the heads of the mounting bolts for the standard unit, option T and U and face of the outlet of option F plus patches provided in the inlet pipe threads. Be sure to measure the resistance at these patches. If the nozzle is installed onto a nozzle, then the measurement can be made from an aircraft adapter flange to the inlet hose fitting. The resistance across the ball valve shall not exceed 10 ohms when not installed on a nozzle. If on a nozzle the resistance can be 20 ohms.

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## 10.0 ILLUSTRATED PARTS CATALOG

Table 1.0 tabulates the parts and sub-assemblies comprising the Model 64015 Ball Valve. The item numbers of the table are keyed to the exploded views of the unit diagrammed in Figure 1.

**TABLE 1.0**

| Item | Part Number  | Description  | Units/<br>Assy | Nozzle<br>Option          | Spares/10<br>Units/Yr |
|------|--------------|--|----------------|---------------------------|-----------------------|
| 1    | GF16995-49   | Screw  | 6              | Basic                     | -                     |
| 2    | 5710-63-030  | Washer   | 6              | Basic                     | -                     |
| 3    | 201201-151   | O-ring   | 1              | Basic                     | 10                    |
| 4    | 207807       | Seal   | 1              | F                         | 4                     |
| 5    | M25988/1-040 | O-ring   | 1              | F                         | 4                     |
| 6    | GF35308-334  | Screw  | 6              | U                         | -                     |
| 7    | GF21083C5    | Nut  | 6              | U                         | -                     |
| 8    | GF960C516    | Washer   | 12             | U                         | -                     |
| 9    | MS29513-155  | O-ring   | 1              | All                       | 10                    |
| 10   | 220484       | Screw  | 1              | All newer units           | -                     |
|      | 209827       | Screw (No longer available – replaced with KDT-1191) | 1              | All older units           | -                     |
| 11   | MS29512-03   | O-ring (Use with 220484)                             | 1              | All newer units           | 10                    |
|      | MS29513-013  | O-ring (Use with 209827)                             | 1              | All older units           | 10                    |
| 12   | 220055-1     | Adapter, 2½" NPT                                     | 1              | H                         | -                     |
|      | 220055-2     | Adapter, 2½" BSPP                                    | 1              | K                         | -                     |
|      | 220055-3     | Adapter, 2" BSPP                                     | 1              | N                         | -                     |
|      | 220055-4     | Adapter, 2" NPT                                      | 1              | P                         | -                     |
|      | 220355       | Adapter, 3" NPT                                      | 1              | L                         | -                     |
| 13   | 21075        | Ball   | 39             | All                       | -                     |
| 14   | 209853       | Clip   | 1              | All                       | -                     |
| -    | 47255        | Body Assy, swivel outlet                             | 1              | F (newer units with (15A) | -                     |

| Item | Part Number              | Description                          | Units/<br>Assy | Nozzle<br>Option        | Spares/10<br>Units/Yr |
|------|--------------------------|--------------------------------------|----------------|-------------------------|-----------------------|
| 15   | 220053-2                 | Body, swivel outlet                  | 1              | F (older units w/o 15A) | -                     |
| 15A  | 220894                   | Wear Ring                            | 1              | F                       | -                     |
| 15B  | 221069                   | Body, swivel outlet                  | 1              | F                       | -                     |
| 15   | 220053-1                 | Body, 6-bolt Carter outlet flange    | 1              | Basic                   | -                     |
|      | 220053-3                 | Body, 6-bolt military outlet flange  | 1              | U                       | -                     |
|      | 220053-4                 | Body, 6-bolt Whittaker outlet flange | 1              | T                       | -                     |
| 16   | 220062                   | Drag Ring                            | 1              | E                       | 2                     |
| 17   | M25988/1-235             | O-ring                               | 1              | All                     | 10                    |
| 18   | 2915868                  | Screw                                | 1              | All                     | 10                    |
| 18A  | GF16213                  | Washer                               | 1              | All                     | 10                    |
| 19   | 221067                   | Cap                                  | 1              | All newer units         | -                     |
|      | 220054                   | Cap                                  | 1              | On older units          | -                     |
| 19A  | 220893                   | Wear Ring                            | 1              | All newer units         | -                     |
| 20   | 220068                   | Ball Seal                            | 1              | All                     | 10                    |
| 21   | 220057                   | Ball                                 | 1              | All                     | -                     |
| 22   | 220058                   | Ball Stem                            | 1              | All                     | -                     |
| 23   | 44373-40                 | Screen Assy, 40-mesh                 | 1              | A                       | -                     |
|      | 44373-60                 | Screen Assy, 60-mesh                 | 1              | B                       | -                     |
|      | 44373-100                | Screen Assy, 100-mesh                | 1              | C                       | -                     |
| 24A  | 208092-40                | Screen, 40-mesh                      | 1              | A                       | -                     |
| 24B  | 208092-60                | Screen, 60-mesh                      | 1              | B                       | -                     |
| 24C  | 208092-100               | Screen, 100-mesh                     | 1              | C                       | -                     |
| 25   | 208091                   | Ring, Retainer                       | 1              | A,B,C                   | -                     |
| 26   | 220069                   | Thrust Bearing                       | 1              | All                     | 10                    |
| 27   | 220056-1                 | Inspection Lid                       | 1              | Basic                   | -                     |
| 28   | MS29513-149              | O-ring                               | 1              | All                     | 10                    |
| 29   | 47020-2                  | Glass Inspection Lid Assy            | 1              | D                       | -                     |
| 30   | 220056-2                 | Lid                                  | 1              | D                       | -                     |
| 31   | WH-262-S02               | Retaining Ring                       | 1              | D                       | -                     |
| 32   | 220072                   | Glass                                | 1              | D                       | -                     |
| 33   | MS29513-038              | O-ring                               | 1              | D                       | 10                    |
| 34   | 220125                   | Spacer                               | 1              | D                       | 10                    |
| 35   | GF24693C96               | Screw                                | 3              | All                     | -                     |
| 36   | 47170                    | Cover Plate Assembly                 | 1              | All (Note 7)            | -                     |
| 36A  | 220059                   | Cover Plate (Note 7)                 | 1              | All                     | -                     |
| 36B  | 220891                   | Roll, Locking                        | 1              | All (Note 7)            | -                     |
| 36C  | GF16562-192              | Pin                                  | 1              | All (Note 7)            | -                     |
| 36D  | B0187-007-S              | Spring Washer                        | 1              | All (Note 7)            | -                     |
| 37   | 220066                   | Collar Pin                           | 1              | All                     | -                     |
| 38   | 220067                   | Collar                               | 1              | All                     | -                     |
| 39   | Left intentionally blank |                                      |                |                         |                       |
| 40   | MS29513-111              | O-ring                               | 1              | All                     | 10                    |
| 41   | 220065                   | Thrust Bearing                       | 1              | All                     | 10                    |
| 42   | SHSS250C00BY21           | Stop Pin                             | 1              | All                     | -                     |
| 43   | 201201-042               | O-ring                               | 1              | T                       | 10                    |
| 44   | 220060                   | Spanner Wrench                       | 1              | J                       | -                     |
| 45   | 220061                   | Short Wrench                         | 1              | S                       | -                     |
| 46   | 220075                   | Allen Key                            | 1              | R                       | -                     |
| 47   | 24205                    | Loctite                              | 1              | All                     | 10                    |

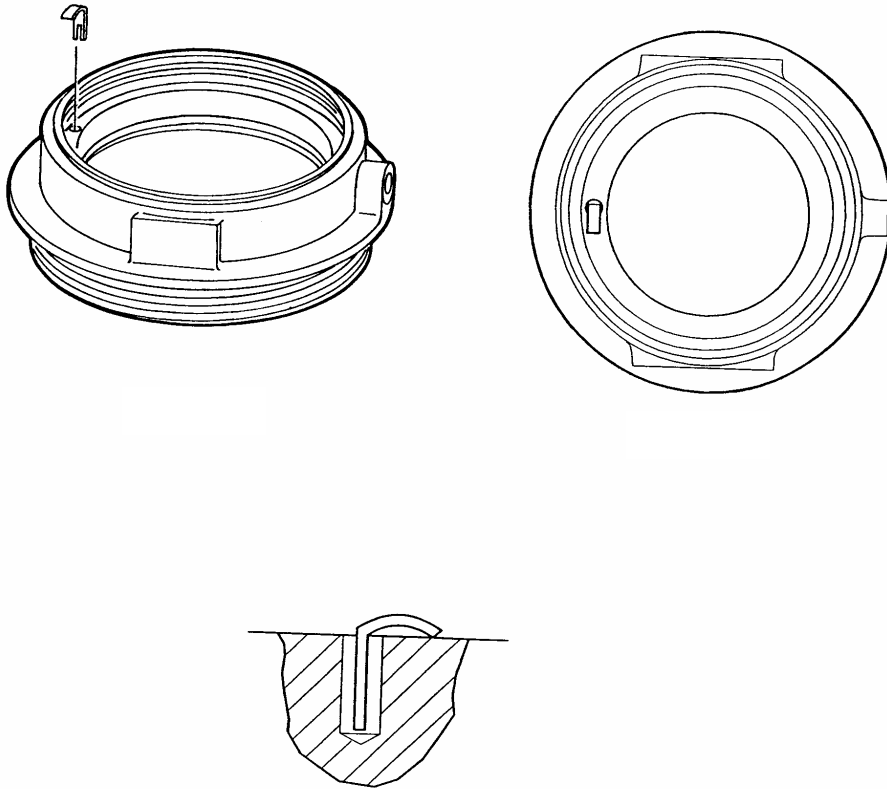
| <b>Kit Part No.</b> | <b>Description</b>   | <b>Kit consists of items</b>                  |
|---------------------|--|---|
| KD64015-1           | Part to used for a normal overhaul of a basic 64015 or U option Ball Valve.                  | 3, 9, 11, 17, 18, 18A, 20, 26,28, 40, 41 & 47 |
| KD64015-2           | Provides a kit of parts that replace similar parts in the Warner Lewis 3710 Ball Valve.      | 37 & 38                                       |
| KD64015-3           | When used with a -1 kit (as KD64015-1-3) provides parts for overhauling Option F Ball Valve. | 4 & 5   |
| KD64015-4           | When used with a -1 kit (KD64015-1-4) provides parts for overhauling Option T Ball Valve.    | 43  |
| KD64015-5           | When used with a -1 kit (KD64015-1-5) provides parts for overhauling Option D Ball Valve.    | 33 & 34                                       |

The -1 Kit can be combined with either the -3, -4 or -5 to arrive at a complet kit for the desired option. The -2 is a stand alone kit and can not be combined with anyother kit.

The contents of the kits listed above are correct at the time of publication, however changes do occur from time to time and the kit contents provided may differ from that above. The kit furnished is the correct one.

- Notes:
1. Spanner Wrench (44) is needed to remove the Inspection Lid (27) or (29) or to operate the ball valve to the strainer checking, defuel or refuel positions. The short spanner (option S) can be used for the ball operating condition but does not have the spanner capability. A standard spanner wrench can be used for the inspection lid removal in lieu of the Carter 220060. The number of Spanner Wrenches (44) required at each base depends upon the frequency of use and can not be determined by Carter.
  2. Wrench (45) is needed to operate the ball valve to its various positions. It does not have spanner capability to remove the Inspection Lid (27) or (29). The number of Wrenches (45) needed at any one base depends upon the frequency of use and can not be determined by Carter
  3. The Allen Key (46) is required only to allow for the ball valve to be moved into the defuel position and then to return the valve to the normal refuel stop position. The number of Allen Keys (46) required at any one base depends upon the frequency of the defuel operation and can not be determined by Carter.
  4. 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.
  5. 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.
  6. KD64015-1 can be combined with either KD64015-3, -4 or -5 to obtain a complete kit to maintain Option "F", "T" or "D" respectively. Example: KD64015-1-5 is a kit to maintain any Option "D" unit.
  7. Item 36, Cover Plate Assembly is used on newer units and Cover (36A) is note furnished as a separate part. When ordered Cover (36A) will automatically be replaced with Cover Assembly (36).





**FIGURE 2 – CONTINUITY CLIP (14) INSTALLATION**

Aerospace Group  
Conveyance Systems Division  
9650 Jeronimo Rd  
Irvine, CA 92618  
Ph (949) 452-9500  
Fax (949) 452-9992

