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Carter® Brand Ground Fueling

**SM64800**

June 2014

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None

## **Maintenance Manual**

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### **3 X 4 Inch Hydrant Coupler with Pressure Control To Mate Hydrants in Accordance with Bulletin API 1584**

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**Model 64800**

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## Maintenance, Overhaul & Test Instructions Model 64800

### 1.0 INTRODUCTION

This manual furnishes instructions for the installation, operation, periodic inspection, trouble shooting and minor repair, as well as complete overhaul of Eaton's Carter brand Model 64800 Fuel Pressure Control Coupler designed to mate adapters and hydrant valves built in accordance with API Bulletin 1584.

Maintenance and overhaul of repairable subassemblies, including all the various options are also included.

The last section of this manual contains exploded view drawings and assembly drawings for identification of replaceable parts and other significant maintenance items referred to in the instructions. References in the text to various items refer to the appropriate figure for part identification.

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### 2.0 EQUIPMENT DESCRIPTION

Model 64800 Fuel Pressure Control Coupler is the latest design of the 3" by 4" coupler and can be used as an alternative to the older 60700-1 and 60600 type coupler made by Eaton's Carter brand for over 20 years.

It is designed for use with aviation turbine fuels in an operating temperature range of -40°F to 158°F [-40° C to 70° C].

The standard Model 64800 Fuel Pressure Control Coupler consists of three basic modules; a standard dry break coupler lower half, a fuel pressure control elbow assembly, and various female disconnects. This allows for the change out of the older Carter brand Model 60700-1 and 60600 type couplers with minimum upgrade costs. Other options are available as explained further in the table of options.

The coupler is designed to mate with standard 4-inch adapters and hydrant valves that conform to API Bulletin 1584 yet the pressure control elbow has been designed for a smaller 3" size to keep weight at a minimum. This coupler should not be used for flow rates above 800 gpm.

The standard (option 2) outlet utilizes a "no-tools needed" approach to disconnecting the unit from the hose. The other two optional outlets are designed for retrofitting older Model 60700-1 and 60600 units with minimal costs. The table in paragraph 3.0 that follows tabulates the various options available with the basic unit.

The 47245 (61525) Lower Half Coupler provides a quick means to connect to a hydrant or adapter with dry break capability. The coupler cannot be accidentally opened unless it is connected to a valve; it cannot be removed from that valve unless it is in the closed position.

The unit incorporates a pressure operated relief valve that is automatically opened by the coupler when the coupler poppet is closed, to provide a

vented to the downstream side of the main piston seat, relieving a hydraulic lock that would otherwise prevent coupler poppet closing. The spring-loaded relief valve also relieves automatically whenever the differential pressure across the closed pressure control piston seat exceeds approximately 220 psi in the inlet to outlet direction.

The pressure control elbow assembly is a direct operated normally closed fuel pressure control and shutoff valve. An air reference pressure source of approximately 28 psig (bias) greater than the maximum desired fuel pressure is required for operation. (Note that this is slightly different from Model 64900 and the earlier Model 60700-1 couplers, hence if one is changing from one of these to the Model 64800 it will be necessary to recalibrate the air reference system.) The application of the air pressure source overrides the piston spring, which is opposed by remote sensed fuel pressure. This holds the piston in the positions required maintaining the desired regulated pressure at the remote sensed point throughout the ranges of all normal inlet pressure and fuel flow rates. The actual bias will vary depending upon the flow rates of the system. The hydrant system inlet pressure will have some affect on the actual bias as well. The range of bias will be reduced with an increase in inlet pressure. Release of the air pressure, normally through a three-way deadman type valve, results in the spring force plus the fuel sense pressure causing the main piston to close. The main piston also closes whenever the downstream flow passages are blocked, causing the fuel sense pressure transmitted back from the remote sensed location to rise above the preset limits, (1.5 psi).

A spring-loaded adjustable orifice screw in the deadman air passage restricts air flow in and out of the air piston chamber which in turn primarily limits the units closing rates. This adjustment is located

outside of the air hose connection for easier adjustment.

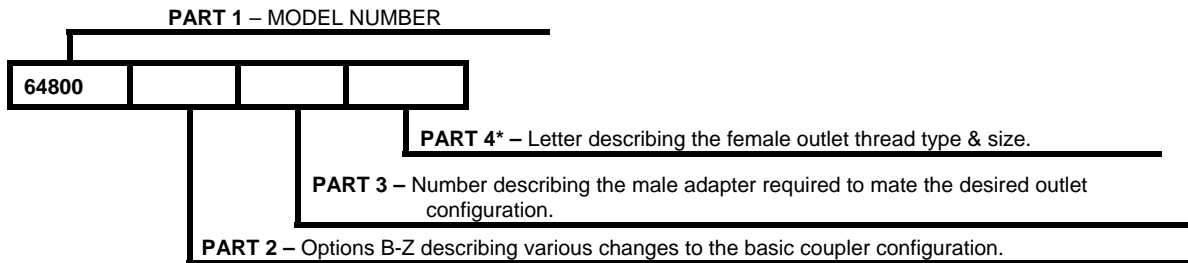
The unit's opening rate is primarily limited by a restrictor check valve, located in the fuel sense passageway, that restricts fuel flow out of the inner piston chamber but that allows full flow in the

piston closed direction. The area between the inner piston fuel and air dynamic seals is vented to exterior ambient through generous passages so that fuel cannot leak into the air system and air cannot leak into the fuel. A filter disc protects the ambient vent from aspiration of external contaminants into the unit.

**3.0 TABLE OF OPTIONS AND ORDERING INFORMATION**

The basic unit, 64800 is available with a variety of options to customize it to meet specific requirements as listed in the table below. The various options, when compatible, may be combined and listed following the part number 64800 to achieve a complete unit.

The part number of a complete coupler consists of four basic parts as illustrated below:



\* Part 4 options should only be used when a female half QD is desired. When Part 4 options are specified, the supplied female half QD will match the male half QD selected in Part 3.

		PART 2	
OPTION	DESCRIPTION	OPTION	DESCRIPTION
A	*Changes lugs to API/EI 1584, 2 <sup>nd</sup> edition	J	Replaces standard FNPT adapter fittings with 3/8" hose barb fittings to Air/fuel Sense Ports
B	Adds folding handle assembly	R	Adds 90° elbow with 1/4" FNPT port to coupler for hydrant air connection.
C	Adds product selection	W	Adds carriage assembly
D	Adds lockwire to flange joints	X	Adds safety clip to QD (with option 2 of part 3 only)
E	Adds API style air & fuel quick disconnect to mate Whittaker/Thiem F571	Y	Adds second carrying handle at outlet swivel joint (not available with option 3 of part 3)
F	Replaces standard FNPT adapter fittings with hose barb fittings to air (1/4") and fuel ports (3/8")	Z	Replaces standard transverse carrying handle at centerline of coupler with handle that is parallel to outlet
H	Replaces 1/4" standard adapter in the air port with 3/8" FNPT adapter fitting.		

\* Refer to Product News Bulletin PN6490001020 for a complete description of this change before ordering. Changes Lugs to part number 200688 (2<sup>nd</sup> edition) in lieu of part number 221860 (3<sup>rd</sup> edition)

**PART 3**

OPTION	DESCRIPTION
2	Adds 3" Adapter to mate (47152) or (47292) thumb latch swivel quick disconnect
3	Adds 4" Adapter to mate 60700-1 style female half QD (41730 or 60740)
4	Adds 4" Adapter to mate customer furnished 60600 (except 60600 option K) type QD

## PART 4

OPTION	DESCRIPTION
H	2 ½" NPT outlet (available with option 2 only)
K	2 ½" BSPP outlet (available with option 2 only)
L	3" NPT outlet
M	3" BSPP outlet
N	4" BSPP outlet
P	4" NPT outlet
Q	2" NPT option (available with option 2 only)
R	4" -8 NPSC outlet (available with option 3 only)
S	2" BSPP option (available with option 2 only)

Example: 64800BW2H – A coupler with a folding handle, collar stop assy, straight FNPT fitting ports in air/fuel sense ports, carriage assembly and an outlet swivel quick disconnect with 2 ½" NPT threads.

#### 4.0 OPERATION

Operation consists of:

- A. Connecting the coupler to the hydrant pit valve adapter;
- B. Applying air pressure to the unit by actuation of the system deadman control to open the pressure control valve;
- C. Flowing fuel through the open coupler and valve for the required period;
- D. Closing the pressure control valve by releasing the deadman control and
- E. Disconnecting the coupler from the hydrant adapter.

Operation may also include reverse flow through the unit for off-loading or defueling purposes.

##### 4.1 Coupler Connection

Connection of the coupler to the four-inch API-type adapter is simply accomplished.

Proceed as follows:

- A. Remove the dust cap assembly and place the face of the coupler assembly over the pit valve adapter. Use one hand to overcome hose weight bending forces so the coupler face is centered and square to the adapter face. Normally the weight of the coupler, when properly aligned, will cause the spring loaded detent pin to be depressed by the adapter flange, permitting the collar to drop, locking the 16 lugs to the adapter. **If the unit incorporates Option C, Product Selection, it may be necessary to rotate the collar before it can drop. This can be done easily by rotating only the collar. It is not necessary to rotate the coupler body and the service outlet hose.**

- B. With the collar dropped or extended, the two mating poppets may be opened by simply rotating the coupler poppet-operating handle in the open direction as permanently marked on the handle.

**Note:** It should be understood that the poppet operating linkage is over center with the poppet operating handle in either the full closed or full open position. This feature is required to prevent internal pressure from opening the poppet when the mechanism is in the closed position; and to prevent an external force from closing the mechanism when it is full open. Consequently, rotating the poppet operating handle to open, initially causes, the poppet to retract slightly into the coupling before moving in the poppet open direction. Further, the poppet-operating handle cannot be operated in the open direction if the collar is not extended, because of a physical interference between the handle and the collar. At the same time the collar cannot be extended unless the spring-loaded detent pin is depressed by the face of the pit valve adapter. Once extended, the collar cannot be retracted if the poppet handle is in other than the full closed position and if the Collar Stop Assy (1-31) is not depressed. Together, these features provide safety interlocks preventing a potentially hazardous or undesirable spill, by preventing the accidental opening of the unit while the coupler is disconnected, or accidental disconnection with the poppet in the open position.

- C. If the adapter is pressurized by hydrant pressure at the time of poppet opening, resistance will be felt when the coupler poppet contacts the adapter poppet. The resistance will be proportional to the hydrant pressure. The force resisting the opening of an Eaton Carter brand hydrant valve is composed of two factors, poppet spring force plus any force created by fuel pressure in the hydrant.

The normal spring force is approximately 20 pounds and the pressure force is equal to over 125 pounds for each 10-psi present. In addition to the forces attributed to the hydrant, there are forces presented by the coupler itself. The initial movement of the operating handle to get it **over center** is resisted by a stack of wave washer springs on the nose seal plus seal friction. Under even severe weather conditions, the coupler can be opened by the application of less than 30 pounds force applied to the handle. Since the adapter poppet is equipped with a pressure equalizing valve, maintain a steady, moderate force on the handle in the open direction, sufficient to hold open the adapter pressure equalizing valve until the pressure has equalized across the poppets. Then the handle can be easily moved to the full open position, permitting full communication between the hydrant adapter and the fuel pressure control valve.

It should be noted that the early release of the API Bulletin 1584 did not cover the need for a pressure-equalizing valve. This resulted in the hydrant valve manufacturers having different dimensions for the location of the operating tip of the valve. There is some incompatibility between the various older hydrants and couplers if they are intermixed. The result can be either one of considerable leakage during hookup or non-function of the equalizing valve making it very difficult to achieve connection.

Note: The time required for pressure equalizing to occur is contingent on the unfilled downstream volume, the capacity of the adapter pressure equalizing valve, and the hydrant pressure. It is also affected by the amount of leakage through the hydrant piston seals. If it is consistently difficult to open the coupler the hydrant valve maybe "hot" and it should be overhauled.

## 4.2 Fuel Pressure Control Valve Operation

### 4.2.1 Discussion

Figure A is a schematic diagram of the Fuel Pressure Control Elbow Assembly Module (unit) on which the major functional elements are illustrated and labeled. While Figure A is schematic, the general shapes of the parts have been retained as much as possible to permit a better understanding of the actual hardware.

The inner and outer piston assemblies have been split on Figure A so that the lower half illustrates the position of the pistons when the unit is closed, either because deadman air pressure is not applied or because the fuel sense pressure and the piston spring have overpowered the air pressure, and other opening forces that might be present. The upper half of the piston assembly on Figure A illustrates the position of the pistons when the unit is partly open and regulating fuel pressure.

By referring to Figure A while reading this section of the manual it should assist you in achieving a thorough understanding of the unit's operation.

With the coupler engaged and the poppets open, hydrant pressure is available at the unit's outer piston seat. The unit's piston is held normally closed by piston spring force until air pressure is applied, usually through a 3-way normally closed valve known as a deadman valve (since release of the valve's handle blocks air pressure supply to, and vents air from, the unit).

In common with pilot operated pressure control valves, this direct operated unit incorporates an air pressure over regulated fuel pressure bias. In this direct operated unit, however, the bias is provided by the main piston spring, which is not adjustable.

So, it is necessary to adjust the deadman air pressure applied to the valve to achieve the desired delivery pressure.

At any rate, if the regulated pressure at the remote sensed delivery point is considered to be too high, or too low, it is a simple matter to either increase, or decrease, the air pressure to achieve the desired delivery pressure. Of course, if the delivery pressure is low because inlet pressure is insufficient to overcome system resistance at high flow rates, then increasing the air pressure will not increase the delivery pressure (since the unit is already full open under those conditions) and will result in higher downstream pressure during normal shutoff. It should also be understood that using very high air pressure to compensate for system pressure losses will result in high shutoff and surge arrest pressures.

### 4.2.2 Refueling

Considering the previous discussion concerning bias, assuming that the unit has been filled and properly bled of air (see paragraph 7.5) and that the deadman air pressure is preset at the desired value, then the only action required to operate the automatic fuel pressure control valve (unit) is to squeeze the deadman valve to apply the air pressure to open the piston.

The main piston opening rate is limited by a restrictor check valve in the fuel sense passages that restricts displacement of fuel from the fuel control chamber as the chamber's volume decreases when the piston opens.

The piston continues to open until the pressure at the remote sensing point, transmitted back through the fuel sense line, reaches the range that is equal to the applied air pressure less the bias force of the main piston spring. At this flow rate, the main piston modulates to maintain equilibrium of forces across the inner piston and provides automatic pressure control by varying the effective flow area at the outer piston.

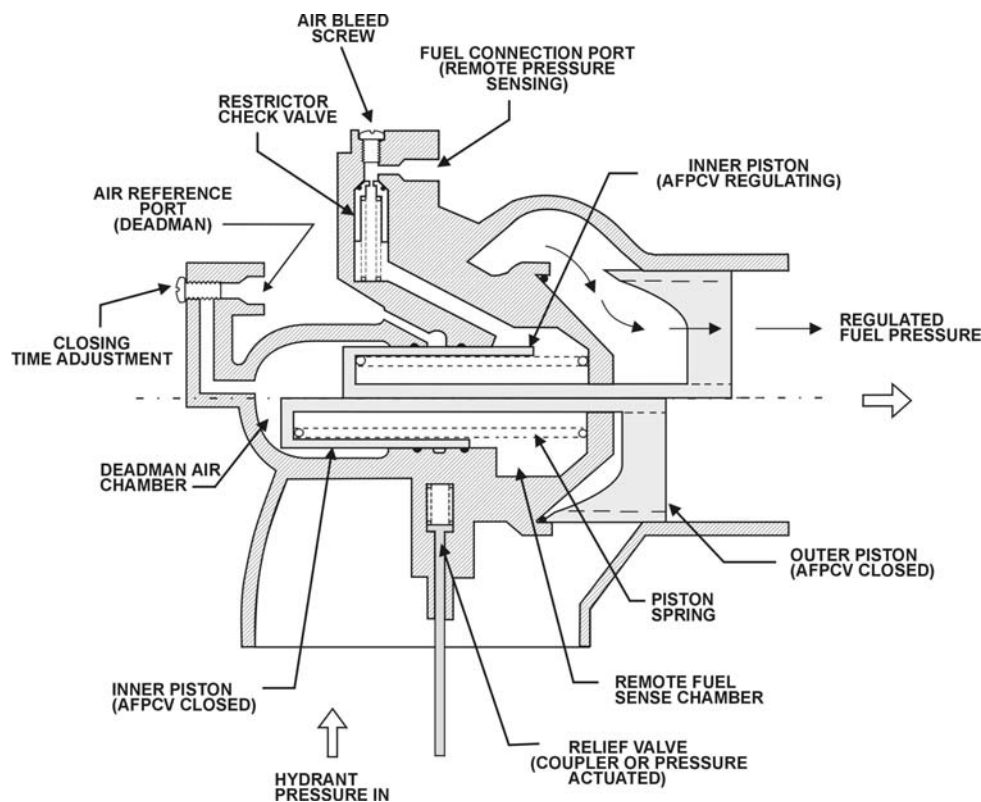
As the receiver aircraft tanks progressively fill and shut off, the flow reductions in each instance cause the pressure to increase at the remote sensing point. These pressure increases are transmitted back through the fuel sense hose. The previously mentioned restrictor check valve is lightly spring loaded. It begins to open when the fuel sense line pressure is approximately 1.5 psig greater than the inner fuel piston chamber pressure, creating a variable orifice in parallel with the very small orifice that restricts control fuel flow in the reverse direction. The increase in fuel chamber pressure causes the piston to move in the closed direction, reducing the outlet pressure, until the fuel pressure transmitted back through the fuel sense line has established a new force equilibrium condition about which the piston modulates until the next receiver aircraft tank fills and shuts off.

When the last receiver aircraft tank has shut off, the conditions described above cause the unit piston to fully close and block hydrant pressure,

preventing high pressures from reaching the aircraft manifolds as well as the servicer delivery equipment.

The rapid response inherent in a direct acting regulator combined with the essentially free flow of control fuel into the remote fuel sense chamber makes the unit an effective automatic surge control device when fueling aircraft with fast closing (1-2 second) shutoff valves.

Releasing the deadman valve at any time will cause the unit to close. The piston closing rate in this mode of operation is a function of the air passage orifice, the air hose volume, and any restrictions in the deadman valve. (The fuel restrictor check valve does not significantly affect closing rate since it easily opens to allow fuel to enter the fuel sense chamber in this closing mode.) The bias force supplied by the piston spring causes the unit piston to be fully closed by the time the air pressure on the air side of the unit inner piston has decayed to about 20 psig.



**Figure A**  
**Schematic Diagram Pressure Control Elbow Assy**

#### 4.2.3 Defueling

Should it become necessary, or desirable, to defuel through the automatic fuel pressure control coupler requires the application of an air pressure that is at least 30-35 psig higher than the defuel

pressure, or to provide a means of blocking the fuel sense pressure and venting the unit fuel sense chamber to a vented container.

Obviously, if adequate air pressure is available, the simplest method of defueling consists of

merely applying enough air pressure to overcome the closing forces created by the fuel sense (defuel) pressure and the piston spring.

Direct acting pressure regulators of this type may become unstable at some point in the piston stroke during reverse fuel flow. So it is mandatory that the unit is fully opened by enough air pressure (30-35 psig greater than the maximum defuel pressure) to overcome the defuel pressure and piston spring forces before start of reverse flow.

If it is necessary to defuel into a relatively high-pressure hydrant system, it is reasonable to assume that sufficient air pressure may not be available. The balance of this discussion is concerned with methods of venting the fuel sense chamber to permit opening of the unit with air pressure no higher than that required for normal operation.

#### 4.2.3.1 Frequent Defueling Operations

If the fuel control coupler is installed on a servicer or dispenser that is frequently used for defuel operations, then it is perhaps desirable that the dispenser design include a spring-loaded, two position, three-way selector valve in the fuel sense line between the unit and the remote sensed location. Such a valve should be installed so that, with the spring holding the valve in the "normal" position, two of the valve's ports provide thorough and unrestricted transmission of the fuel sense pressure while the third port is blocked.

Manually overriding the spring and holding the valve in the "defuel" position should, in turn, block the remote sensing point port of the valve and cause the unit fuel sense connection to communicate with the selector valves' third port. This port might best be connected through a simple check valve and suitable tubing or hose to a small, vented container. The selector valve should be the spring-loaded type so that a release of the control handle will result in spring return of the valve to the "normal" position to provide fail safe deadman-type operation.

A simple check valve should be provided between the selector valve's third port and the vented container so that flow is free out of the valve, but air return is blocked. (The check valve flow arrow should point away from the selector valve.)

The vented container can be quite small, since the fuel displaced by the unit piston when it opens is on the order of one cupful. Of course, if the servicer is already equipped with a "dump tank", then an additional container is not required.

With a servicer so equipped, defueling procedures are simplified to applying defuel pressure equal to hydrant pressure, holding the fuel sense selector in the "defuel" position, applying deadman air pressure, and increasing the defuel pressure to the valve necessary to off load the fuel at the desired rate.

At the conclusion of defueling operations, the defuel pressure should be decreased to equal hydrant pressure, then the deadman air and fuel sense selector valve may be released to close the unit.

#### 4.2.3.2 Infrequent Defueling Operations

If the unit is installed on a servicer that is used in defueling operations very infrequently, then inclusion of the design provisions discussed in 4.2.3.1 is perhaps not justifiable or warranted.

In this case, it will be necessary to disconnect the fuel sense hose at the remote sense point, and plug or cap the port at the remote sense location. The disconnected hose must be left open to atmosphere while the unit is opened and closed during the off loading operation.

It is also necessary to refill and bleed air from the fuel sense hose and inner piston fuel chamber when the fuel sense hose is reconnected following the defuel on/off loading operations.

### 4.3 Coupler Disconnection

Coupler disconnection is essentially the reverse of connection.

Proceed as follows:

A. First, the poppet must be closed by rotating the poppet handle in the direction marked closed. During the final portion of handle closing travel, a resistance will be felt as the coupler poppet enters the seal and must displace the liquid trapped within the coupler and unit.

B. Maintain a moderate steady force in the closed direction to permit the coupler poppet shaft to open the relief valve in the unit and vent some of the trapped liquid downstream of the unit outer piston seat, permitting the poppets to close.

C. With the poppet closed, the mating seal between the coupler and the adapter is broken, and a poppet leak check may be accomplished.

D. Separation is achieved by using one hand to grasp the hose and hold the coupler square to the adapter, relieving hose weight tension on the lugs locking the coupler to the adapter. Depress the collar stop assembly and lift the collar with the other hand. Then lift the coupler off the adapter. The spring-loaded detent pin will extend, locking the collar in the retracted position. With the collar lock retracted, a physical interference between the collar and the handle prevents accidental opening of the coupler poppet.

E. Following reinstallation of the dust cap, the operational cycle is complete and the unit may be returned with the hose to its normal stowage location.



## 5.0 SAFETY INFORMATION - PERIODIC INSPECTIONS

The equipment described herein is designed primarily for safe, convenient, and reliable operation under normal operating conditions. However, the more exposed parts are subject to damage, and to wear with time that can result in unreliable or unsafe operation if not detected or corrected. Consequently, it is considered mandatory that a brief safety inspection is accomplished periodically. The frequency of this inspection can vary depending upon the utilization; however, under no circumstances should the frequency be less than once a month. A more thorough periodic inspection should be accomplished at least once a year. Both inspections are discussed in the following paragraphs.

### 5.1 Interlock

The coupler incorporates an interlock feature that prevents it from being opened unless it is installed onto a hydrant or adapter. The unit may not be removed from the hydrant unless the operating handle has been moved to the closed position. An additional safety system, the collar stop assembly, has been provided to prevent the unit from being **blown off** the hydrant in the case where the hydrant valve adapter poppet fails to close. During the connection cycle, the interlock is automatically disengaged by the proper alignment of the coupler with the hydrant. During the disconnection cycle, it is necessary to manually depress the collar stop assembly to allow the collar to be moved away from the hydrant valve and complete the cycle. Should a major leakage occur after the operating handle has been closed and before unlocking the collar stop, this indicates a failure of the hydrant valve poppet. One should first re-open the coupler poppet and make sure that the hydrant valve pilot has been closed and then close the servicing valve on the hydrant valve before attempting to remove the coupler. If the leakage is still apparent, attempt to re-open the coupler to stop the leakage and then shut down the operation of the system prior to completely disconnecting the coupler to prevent a possible catastrophic spill.

### 5.2 Quick Disconnect Retention Method

The female half of the quick disconnect assembly is connected to the male half by means of 24 balls that mate with a groove in the male half and are retained there by a sleeve around the outer diameter of the female half. The sleeve maintains inward pressure on the balls to keep them in the groove of the male half. The retention of the sleeve does differ between the two styles.

A. Standard Option 2 Retention – This option is patterned after the Eaton Carter brand Quick Disconnect Dry-Break used on nozzles. Two standard and an optional third method of locking the sleeve in place are employed. First of all the

sleeve is spring loaded in the locked position requiring the operator to push the sleeve to the unlocked position before the disconnect can be achieved. In addition two spring loaded thumb latches are also employed to keep the sleeve in a locked position. Hence the operator must depress both latches and move the sleeve to the unlocked position before the disconnect can be affected.

In addition to the standard locking methods Option (X) is a safety clip that may be specified to physically prevent the sleeve from being moved to the unlocked position until it has been removed.

B. Options 3 & 4 Retention – The female half of the quick disconnect assembly is connected to the male half by means of 24 balls that mate with a groove in the male half and are retained there by a sleeve around the outer diameter of the female half. The sleeve maintains inward pressure on the balls to keep them in the groove of the male half. The sleeve itself is maintained in place by a partially circular wire-retaining ring. This ring engages coincidental grooves in the quick disconnect housing and the sleeve. The spreading of the retaining ring allows disengagement of the retaining ring from the sleeve groove and, therefore, movement of the sleeve away from the balls. A retainer plate is used to cover the retaining ring to prevent all but intentional spreading. The coupler should never be operated without the installation of this plate. A secondary locking ring is also provided to prevent the sleeve from moving away from the coupler unless it is intentional.

### 5.3 Carriage Assembly - Option W

When utilized, the Carriage Assy incorporates a torsion spring, which can produce potential injury if the unit is not handled properly. Extending and retracting the castors of the unit should be done with care to prevent possible injury.

### 5.4 Monthly Periodic Inspections

#### 5.4.1 Safety Inspections

Accomplish the following at least once each month: (An experienced operator should be able to accomplish these inspections in 30 to 45 seconds.)

A. While removing the Dust Cap (1-2) inspect the 16 Locking Lugs (2-33, 2-33A) to determine if any are missing, broken, bent, abnormally worn, etc. Verify that the Detent Pin (2-26) is extended and prevents collar extension. While holding the Collar (2-27) retracted, depress the Detent Pin (2-26) and release it to verify that it returns to the extended position. Examine the Collar (2-27) for excessive wear, cracks, or other damage. Verify that the Collar Stop Assembly (1-31) is in place and retains free movement.

Reason: Missing, damaged, cracked, and abnormally worn or broken lugs can result in fuel pressure ejecting the coupler off the adapter with the poppet open. A stuck or malfunctioning detent pin can permit collar extension and accidental opening of the coupler poppet with the coupler disengaged from the adapter. The collar stop prevents gross adapter poppet leakage from raising the collar and blowing the coupler off the adapter.

B. Visually inspect the closed Poppet (2-15) for signs of abnormal positioning. Visually inspect the molded rubber seal for cracks and tears.

Reason: Abnormal poppet retraction or extension indicates a compression or tension failure of portions of the internal linkage that could either result in a mid-position jam or complete separation of the linkage and accidental poppet opening. Damage to the molded seal can result in coupler connected external leakage or coupler disconnected poppet leakage.

C. If the unit incorporates Product Selection (Option C), verify that it is properly installed and that the bolt heads do not extend above the adjacent collar surface.

Reason: Improper product selection installation will, at the very least, result in an unnecessary connection delay, and at the worst, permit connection to the wrong product.

D. Inspect the poppet operating handle for bent, worn, broken, or missing pieces on the round cam-like surface. Inspect the adjacent surface of the collar.

Reason: The round portion of the handle locks the collar in the engaged, extended position. Broken, bent, or missing portions of this handle, or of the collar may permit accidental collar retraction with the poppets open that could result in the coupler being ejected from the adapter.

E. Visually inspect the Nuts (3-3) securing the coupler housing to the elbow for security of installation and damage.

Reason: If the nuts are found to be loose or not properly tightened leakage of the joint may occur. If necessary, check torque of these Nuts (3-3) to assure that they are tightened to  $90 \pm 10$  in.-lb. ( $104 \pm 12$  kg-cm)

F. Visually inspect the female half quick disconnect to verify that the ball retaining sleeve is fully engaged. On Options 3 & 4 verify that the ring retainer is secured by two lockwired screws so that the two ends of the retainer ring extend through the remaining two holes in the ring retainer. Verify that the lock ring is engaged in the safety groove immediately adjacent to the ball-retaining sleeve. On Option 2 verify that the thumb latches are fully in the locked position. If Option X, Safety Clip is used verify that it is installed in the groove at the

end of the sleeve to prevent the sleeve from moving to the unlocked position.

Reason: See WARNING in paragraph 7.1.

G. Visually inspect the air pressure and fuel sense line connections to the unit's connectors for security of installation and damage. If the side port on the coupler is used to connect the air source to the hydrant valve then verify that the fitting and hose are securely installed. Inspect the unit's body for impact damage or depressions that might cause the main piston to hang open.

Reason: Pressure tight air and fuel connections are required for proper function. Unit body depressions or dents may cause the main piston to hang open and prevent a deadman release shutdown.

#### 5.5 Extended Periodic Inspections - (Annual Inspection)

In addition to the safety inspection advocated above, a more extended inspection should be accomplished. It will be necessary to provide a container to capture entrapped fuel during the following inspection. The parenthetical numbers are the item numbers in the list of materials in the referenced tables.

A. Refer to paragraph 7.1 for method of separating female half quick disconnect from the automatic fuel pressure control valve. Capture spilled fuel in a suitable container.

B. Inspect female half quick disconnect. Inspect Balls (5A-8) or (6A-8) for chips, flat spots, or excessive wear. Inspect ball retaining Sleeve (5A-6) or (6A-6) for cracks and wear from the Balls. Inspect Housing (5A-5) or (6A-5) on the female half for cracks or thread damage.

C. Replace male adapter O-Ring (4-22), (5-5) and (6-5). Inspect ball race Rings (4-19), (5-2) or (6-2) for brinelling (indenting of the material by the Balls (4-5), (5A-8) or (6A-8) and other indications of damage. Replace brinelled or damaged ball race Rings (4-19), (5-2) or (6-2). Remove outer ball race Ring (4-19), (5-2) or (6-2) and measure the smallest wire diameter. Replace the ball race ring if the smallest wire diameter is 0.123 inch (3.12 mm) or less. Reinstall an acceptable ball race Ring (4-19), (5-2) or (6-2).

D. Conduct the Coupler Lower Half inspection detailed in paragraph 9.5. If the specified Wear Gauge, 61362, is not available then continue with the inspections detailed in paragraphs E and F below as an alternative. The use of the Wear Gauge is preferred and will give more positive results.

E. Grasp opposite sides of the Collar (2-27) with the fingers while depressing the spring loaded Detent Pin (2-26) with one thumb. The Collar (2-27) will move to the engaged position, away from

the Poppet Operating Handle (2-1 or 1-B). Verify that the 16 Lugs (2-33, 2-33A) cannot be depressed back into the collar with the Collar (2-27) extended.

F. Inspect 16 coupling Lugs (2-33, 2-33A) very closely for wear, cracks or damage. If any Lugs (2-33, 2-33A) are cracked, damaged, missing, or worn locally beyond 0.030 inch (0.76 mm), the unit is unsafe and should be withdrawn from service and completely overhauled. This inspection may be made by comparison with a new Lug (2-33, 2-33A).

Press the tip of one Lug (2-33, 2-33A) inward until stopped by the Collar (2-27). While holding the Lug (2-33, 2-33A) inward, rotate the Collar (2-27) through 360° to determine whether any grooves have been pressed into the Collar (2-27) by the Lugs (2-33, 2-33A) during previous misuse. If such grooves are evident, they will alternately cause the Lug (2-33, 2-33A) to move out and in when it is pressed against the Collar (2-27). If grooves are felt, the coupling is unsafe and should be removed from service and completely overhauled.

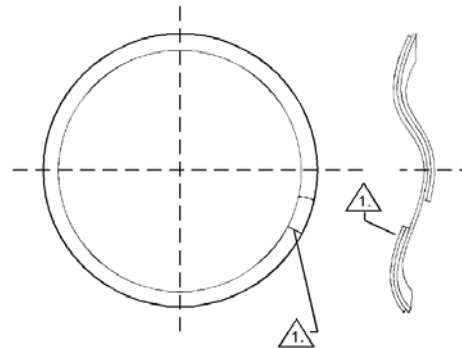
Alternately press each Lug (2-33, 2-33A) against the Collar (2-27) to determine which Lug protrudes the least distance through the body slot. Then, while holding the Lug (2-33, 2-33A) against the Collar (2-27), use a scale to measure the inward distance the lug tip protrudes from the adjacent body inside diameter. If the measured distance is less than 0.15 inch (3.8 mm) then the coupling is unsafe and should be removed from service and completely overhauled.

G. Carefully operate the Poppet Operating Handle (2-1 or 1-B) to the open position while capturing trapped fuel in a suitable container. Operation should be smooth and even.

**Note:** The molded rubber Nose Seal (2-17) which is normally contained either by the Poppet (2-15) or the pit adapter face, may extend with the Poppet (2-15) contingent on the relative friction between the Poppet and the Nose Seal; and that between the same Nose Seal (2-17) and the Quad Ring (2-18) and Housing (2-5). Do not be alarmed if the nose seal does come out of the unit. Use the opportunity to inspect the Wave Washer (2-19) for damage. The Wave Washer (2-19), is designed such that the ends of layers will be forced against the adjoining layers. If installed incorrectly the ends move away from the adjoining layers and into the Nose Seal (2-17) or Body (2-5) causing it to move inward until it tends to jam the mechanism. The Wave Washer (2-19) should be inspected to assure that it is correctly arranged. Refer to Figure B for a graphic representation of the correct arrangement. If it is incorrect it can easily be changed by turning it within itself. The Quad Ring (2-18) may also be replaced if it appears scrubbed. Reposition the Wave Washer and install the Quad Ring onto the Nose Seal (2-17) prior to closing the Poppet (2-15).

## NOTE:

1. THIS EDGE MUST BE ON TOP OF THE SPRING COIL.



**Figure B - Wave Washer**

H. Inspect the molded rubber Nose Seal (2-17) for damage, tears, etc. on both the adapter and poppet sealing surfaces.

I. Depress the Collar Stop Assy (1-31) and verify that the Collar (2-27) cannot be retracted with the Poppet Operating Handle (2-1 or 1-B) in any position but the full closed position.

J. With the Poppet (2-15) closed and the Collar Stop Assy (1-31) depressed, push the Collar (2-27) to the retracted position while observing that the spring loaded Detent Pin (2-26) extends and locks Collar.

K. With the Poppet (2-15) closed, precisely measure the distance between outer surface of the molded seal and the adjacent surface of the coupler body at two places 180° apart. If the average of these two measurements exceeds 0.100 inch (2.54 mm), the internal linkages are excessively worn and the coupler should be withdrawn from service and completely overhauled.

L. Apply 60 psig minimum air pressure to unit connector. The Piston Assy should open. Maintain air pressure, and using a flashlight, carefully inspect O-Ring (3-18). With the air pressure maintained, place a bubble of liquid soap solution over vent port in Housing (3-32) at Filter (3-34) and observe for excessive leakage. A bubble may form with the soap solution. However, if the bubble quickly forms and breaks, the unit should be overhauled and Seal (3-30) and O-Ring (3-29) need replacing. **Note: The seal cartridge has been made more robust and resistant to leakage by the modification of the Seal (3-30) to include an energizing internal spring. The new Retainer (3-31) and the new Seal Housing (3-28) are not interchangeable with either the superseded Seal (3-30A) or the superseded Seal Housing (3-28A), refer to Figure 3. Upgrade kit KD64800-13 is available**

**and contains the needed Seal Housing (3-28) and Retainer (3-31) for overhaul of the seal cartridge.** Relieve air pressure. Unit piston should close. Using the flashlight, inspect relief valve passage in unit Seal Retainer (3-14) and verify it is clean and not clogged.

M. If the unit contains Option C, Product Selection, inspect for security, effectiveness and damage. Verify that product selector bolt heads are flush to 0.03 inch (0.76 mm) below the adjacent Collar (2-27) surface.

N. Lubricate unit outlet O-Ring (4-22), (4-12), (5-7) or Teflon Seal (6A-9) on Option 4 Female Adapter, as appropriate, with petroleum jelly. Reassemble and safety lock the female half quick disconnect (options 3 & 4 only) the female half quick disconnect per paragraph 7.1.2.I.

O. Check the mating flange on the Elbow (1-1) with the Body (2-5) for damage to the studs in the

Elbow (1-1) or the wall of the Elbow (1-1). Check the wall between the inner diameter of the coupler upper half Elbow (1-1) and the studs. The diameter should be smooth and continuous with no evidence of bulging or hairline cracks. If the wall is bulged or cracked, the studs retaining holes are already over stressed and the part is no longer safe for use. The coupler Elbow (1-1) will have to be replaced.

- 5.6 Prior to each overhaul or on at least an annual basis – The latest edition of API 1584 requires each coupler and hydrant valve manufacturer to have inspection gauges available to help inspect for excessive mating wear that may be a potential source of inadvertent disconnect between the coupler and the hydrant valve. Refer to paragraph 9.5 for coupler wear inspection. Note: Refer to either SM60554 or SM61654 for the appropriate gauge and instructions on how to use it for Eaton's Carter brand hydrant valves.

## 6.0 TROUBLE SHOOTING AND MINOR REPAIR

General trouble shooting analysis and minor repair actions are as follows:

- 6.1 Trouble: Collar (2-27) will not drop or extend during engagement.

Probable Cause:

- A. Coupler improperly positioned.
- B. Product Selection not mated or incorrectly set.
- C. Detent Pin (2-26) is not depressed into hole in Body (2-5) properly.
- D. Collar (2-27) may be out of round.

Remedy:

- A. Use one hand to relieve hose weight while using the other hand to center and square coupler to adapter.
- B. Rotate Collar (2-27) until Product Selection mates. If adapter flange incorporates a tab, align strip or arrow on Collar (2-27) with tab. Verify that adapter and coupler Product Selection is intended to mate.
- C. Square coupling face to adapter to assure that the Detent Pin (2-26) is depressed. If hole in Body (2-5) in which Detent Pin (2-26) is housed is egg shaped it may be difficult to depress.
- D. If Collar (2-27) is out of round then replace Collar.

- 6.2 Trouble: Poppet Operating Handle (2-1 or 1-B) cannot be moved in open direction.

Probable Cause: Collar (2-27) is not engaged, removing physical safety interlock between Poppet Operating Handle (2-1 or 1-B) and Collar (2-27) preventing movement of Handle (2-1 or 1-B).

Remedy: Fully engage Collar (2-27). See 6.1 above.

- 6.3 Trouble: Poppet Operating Handle (2-1 or 1-B) rotates easily for approximately 45° in the open direction and then a high resistance is felt.

Probable Cause: This is normal if the adapter is pressurized.

Remedy: Continue to apply moderate pressure to the Poppet Operating Handle (2-1 or 1-B) in the poppet open direction until the pressure equalizes and the poppet opens easily.

- 6.4 Trouble: External Leak Between Coupler Lower Half (1-5) Flange And Pressure Control Elbow Assy (1-1).

Probable Cause:

- A. Nuts (3-3) loose.
- B. O-Ring (2-10) damaged.
- C. Studs in Elbow (1-1) loose.

Remedy: Refer to Figures 1, 2 & 3:

- A. Tighten Nuts (3-3) to 90 ±10 in.-lb. (104 ± 12 kg-cm) and recheck for leakage. **Note: Special torque wrench kit, WL4680 is available to make it easier to reach less accessible screws and nuts.**

- B. Replace O-Ring (2-10) as follows:

1. Use suitable container to capture entrapped fuel. Verify coupler is depressurized. Remove six Nuts (3-3), six Washers (3-2), and Dust Cap (1-2).

2. Carefully separate Pressure Control Elbow Assy (1-1) from coupling Body (2-5). Remove and discard O-Ring (2-10).

3. Lubricate new O-Ring (2-10) and carefully place over pilot on Body (2-5).

4. Carefully assemble Elbow Assy (1-1) to Coupler Lower Half (1-5), reinstalling six Washers (3-2), Dust Cap (1-2) and six Nuts (3-3). Torque nuts to  $90 \pm 10$  in.-lb. ( $104 \pm 12$  kg-cm).

5. Pressure check new O-Ring installation at 5 and 150-psig fuel pressure, if possible. If not possible, carefully observe for leakage during next use.

C. Studs (3-1) should be retightened using two nuts on each as jam nuts. If threads retaining studs are damaged then the Elbow (1-1) will have to be replaced.

6.5 **Trouble:** External leak between disconnect halves.

**Probable Cause:** Damaged O-Ring (4-22), (5-7) or the Teflon Seal in the female half as appropriate.

**Remedy:** Remove and replace O-Ring (4-12), (5-7) or the Teflon Seal (6A-9) in the female half as appropriate as follows:

A. Use suitable container to capture entrapped fuel. Refer to paragraph 7.1 for correct method of separating disconnect.

B. With the disconnect separated, remove and discard O-Ring (4-12), (5-7) or (6A-9). Lubricate with petroleum jelly and carefully install new O-Ring (4-12), (5-7) or (6A-9).

C. On options 3 & 4, reconnect, safety check and lockwire disconnect assembly per paragraph 7.1. On Option X be sure that clip is in the proper locking position.

D. Leak check at 5 and 150 psig fuel pressure if possible. If not, carefully observe joint during next operation.

**Note:** Excessive wear of the Wire Race (5-2 or 6-2) or Sleeve (5A-6 or 6A-6) can allow the connection to become loose causing leaks and or premature failure of the O-Ring (4-12) or Teflon Seal (5A-9). Refer to section 10.4 or 10.5.

6.6 **Trouble:** Leak at Poppet Operating Handle (2-1 or 1-B).

**Probable Cause:** O-Ring (2-25) damaged, worn or scrubbed.

**Remedy:**

A. O-Ring (2-25) can be replaced without removing the coupling from the hose.

**CAUTION:**

**Assure that the hose is not pressurized.**

B. With the coupler held over an adequately sized container, depress the Detent Pin (2-26) and extend the Collar (2-27), operate the Poppet Operating Handle (2-1 or 1-B) in the open direction, opening the Poppet (2-15) to drain the coupler. The coupler will hold approximately 2.5 quarts of fuel between the inlet Poppet (2-15) and the Outer Piston (3-11) when closed. If fuel continues to come out beyond that amount discontinue operation until the coupler can be removed from the hose and inspect Outer Piston (3-11) and Outer Piston Seal (3-7) for damage or excessive wear. Leave the Poppet (2-15) open to prevent repressurization of the coupler.

C. Remove Bolt (2-6), lock Washer (2-7), and Washer (2-8). Remove poppet operating Handle (2-1 or 1-B), Key (2-9), and outer shaft seal Bearing (2-24). Use a sharp pointed instrument or pin to remove old O-Ring (2-25). Lubricate new O-Ring (2-25) with petroleum jelly or equivalent. Use clean, lint-free cloth dipped in clean fuel or solvent to clean the sealing surfaces of the Crank Shaft (2-20) and Body (2-5). Carefully install new, lubricated O-Ring (2-25) using clean, smooth blunt instrument to seat it properly. Inspect O-Ring (2-25) to verify that it is not twisted.

D. Reinstall outer shaft seal Bearing (2-24), Key (2-9), poppet operating Handle (2-1 or 1-B), Washer (2-8), lock Washer (2-7), and Bolt (2-6). Torque Bolt (2-6) to  $90 \pm 10$  in.-lb. ( $104 \pm 12$  kg-cm).

E. If possible, connect this coupler to a pressurized adapter and open Poppet (2-15). Observe the Crank Shaft (2-20) for leakage through several poppet opening and closing cycles.

6.7 **Trouble:** External leakage between unit and adapter or hydrant with unit engaged and Poppet (2-15) open.

**Probable Cause:**

A. Damaged adapter sealing surface.

B. Damaged Nose Seal (2-17), or Damaged/ worn Quad Ring (2-18), or Missing, damaged, broken, or ineffectual Wave Washer (2-19).

**Remedy:**

A. Replace or repair hydrant adapter.

B. Disassemble as follows and inspect Nose Seal (2-17) for tears, abrasions, blisters, bond failure, etc. Inspect Quad Ring (2-18) for damage or wear. And inspect the integrity of the Wave Washer (2-19). If any inspected parts are damaged or otherwise defective, remove and replace with new ones.

**CAUTION:**

**Assure that the hose is not pressurized.**

1. Open Poppet (2-15) by depressing Detent Pin (2-26) and sliding Collar (2-27) forward, then rotate Handle (2-1 or 1-B) to the open position. Drain the unit in an appropriate basin or tank. See paragraph 6.6.B for additional information.

2. Remove Screws (2-15B) from Poppet Assembly (2-15) using a torque wrench. The running torque to remove the Screws (2-15B) shall not be less than 6 in.-lb (6.9 kg.-cm.). Remove Poppet (2-15C) and O-Ring (2-15D). Discard O-Ring (2-15D).

3. Grasp Nose Seal (2-17) with fingers and pull it out of the Body (2-5) bore, inspect and discard if necessary. Remove and inspect Quad Ring (2-18), discard if necessary. Use opportunity to inspect Wave Washer (2-19) for damage. Inspect the Wave Washer (2-19) in accordance with Figure B, paragraph 5.5G.

4. Use clean, lint-free cloth soaked in clean solvent or fuel to clean out Body (2-5) bore, and Poppet (2-15). Dry the O-Ring groove in poppet shaft (2-15E).

5. Lubricate new Quad Ring (2-18) with petroleum jelly and assemble it over new Nose Seal (2-17). Ensure that Quad Ring is not twisted.

6. Position Wave Washer (2-19) in Body (2-5) bore. Carefully insert new Nose Seal (2-17) in Body (2-5) bore, ensuring that new Quad Ring (2-18) is not pinched.

7. Assemble new O-Ring (2-15D) to the Shaft (2-15E) after lightly lubricating it. Install Poppet (2-15C) to the Shaft (2-15E) with Screws (2-15B). Torque the Screws (2-15B) to  $10 \pm 1$  in.-lb. (11.5  $\pm$  1 kg-cm). If running torque of Screws (2-15B) is less than 6 in.-lb. (6.9 kg-cm) replace the Screws (2-15B) with new ones.

8. Close and open Poppet (2-15) several times. Then close Poppet (2-15), depress Collar Stop Assy (1-31) and retract Collar (2-27) to retracted position.

9. If removed, reassemble Coupler Lower Half (1-5) to Pressure Control Elbow Assy (1-1) and conduct coupler functional, proof pressure and leakage tests per paragraphs 12.4 and 12.5.

6.8 **Trouble:** Leakage past Poppet (2-15) seal with coupler disengaged.

**Probable Cause:**

A. Damaged Poppet (2-15) sealing surface.

B. Damaged molded rubber on Nose Seal (2-17).

C. Damaged quad ring (2-18).

**Remedy:**

Isolate problem by reducing pressure in the unit by draining unit, and opening poppet as described in paragraph 6.7.B.1. Inspect Poppet (2-15C) sealing surface and Nose Seal (2-17). Replace damaged component or components per paragraph 6.7 remedy B. Disassemble only to the extent necessary to replace either the Poppet (2-15C), Nose Seal (2-17), or Quad Ring (2-18). Replace Quad Ring (2-18) if Nose Seal (2-17) is replaced.

6.9 **Trouble:** Excess force required during last portion of poppet closing travel.

**Probable Cause:**

A. Steady force had not been applied to poppet operating Handle (2-1 or 1-B) long enough to permit relief valve to vent trapped fluid downstream, relieving the hydraulic lock.

B. Pressure trapped downstream of unit.

C. Relief Valve (3-57 through 65) improperly adjusted.

**Note: The Relief Valve Assembly has been redesigned as one assembled unit (3-48), and it requires no adjustment. This Relief Valve (3-48) supersedes items 3-57 thru 3-65 found in older units, refer to Figure 3. It is recommended that the upgrade of the relief valve be accomplished at next overhaul of the unit's elbow. KD64800-14 contains the Relief Valve assembly (3-48).**

D. Relief valve passages clogged with foreign matter or unit piston Seal Retainer (3-14) is mis-installed so that relief valve passage is blocked.

**Remedy:**

A. Apply steady moderate force until poppet closes.

B. Vent trapped pressure.

C. Maintain steady force on poppet Handle (2-1 or 1-B) and momentarily actuate deadman valve to relieve hydraulic lock and close poppet to permit coupling disengagement. Then, remove the unit from service for bench correction. Disassemble only to the extent necessary to readjust relief valve or clean clogged passages. (see note paragraph 6.9.C). Perform a bench static pressure test all seals that are broken during disassembly.

6.10 Trouble:

Unit does not open or opens very slowly (several minutes), when deadman air valve is actuated.

Probable Cause:

- A. Coupler poppet has not been opened.
- B. Deadman air pressure too low to overcome piston spring.
- C. Air pressure hose or passages clogged.
- D. Air orifice clogged.
- E. Clogged orifice in restrictor Check Valve (3-39 through 46).
- F. Locked-in downstream pressure has unit shut off.

Remedy:

- A. Open coupler poppet.
- B. Increase deadman air pressure to 60-psi minimum.
- C. Loosen air hose connection at unit connector and verify that air pressure is reaching unit. If it is not, repair the hydrant dispenser air control system as required.
- D. Refer to Figure 3. Remove Plug (3-35). The orifice is a Screw (3-37) which has an Allen key type head under which is a Spring (3-38). Use an Allen key to remove the Screw (3-37). Carefully clean out the slot in the thread of the Screw (3-37). Adjust the position of the Screw (3-37) in accordance with the instructions in paragraph 11.5.1.K. If the system uses fuel reference pressure instead of air reference, Screw (3-37) and Spring (3-38) should not be present (refer to SM64803 for information).

Then re-install the Plug (3-35) ensuring the O-Ring (3-36) remained in place around plug during removal. Replace O-Ring (3-36) if necessary prior to reinstalling Plug (3-35).

**CAUTION:**

Never operate the unit without orifice Screw (3-37) and Spring (3-38) installed on systems using air reference pressure. Operation without the air orifice Screw (3-37) can result in propagation of destructive pressure surges into the hydrant system when the deadman air valve is released. The unit is direct operated and, without the air orifice Screw (3-37) and Spring (3-38), the closing rate is very fast.

On fuel reference pressure systems the Screw (3-37) and Spring (3-38) should be removed for proper operation.

E. Remove and clean restrictor Check Valve (3-39 through 46) as follows: Refer to Figure 3.

(1) Remove Check Valve Housing (3-41). The Check Valve (3-44) is located under the housing just removed.

(2) Place Check Valve (3-44) in container of clean fuel and agitate to wash out material clogging orifice hole. Examine O-Ring (3-43) and replace if damaged.

(3) Reinstall Spring (3-46) and Check Valve (3-44). Examine O-Rings (3-42 and 3-45) and replaced if damaged. Lubricate O-Rings (3-42 and 3-45) and install Check Valve Housing (3-41). Reactivate fuel sense line. If necessary, fill fuel sense line and passages with fuel and bleed air prior to use.

F. Unit will open when downstream pressure is relieved by initiating flow.

6.11 Trouble:

Closing time is slow.

Probable Cause:

Deadman air valve is restricting release of air, hose diameters are small and/or hose is exceptionally long or kinked. Unit orifice is clogged or out of adjustment.

Remedy:

Open up deadman air valve vent passages, increase hose inside diameter and/or shorten hose, remove kinks. Refer to paragraph 6.10.D for orifice cleaning instructions and paragraph 11.5.1.K for adjustment instructions.

6.12 Trouble:

A. Unit does not close when deadman valve is released following defuel operation.

B. Unit does not regulate during normal refuel operations following a defuel operation, but acts as simple deadman fuel shutoff valve.

Probable Cause:

A. Servicer incorporates defuel selector valve similar to that discussed in paragraph 4.2.3.1 which is stuck in "defuel" position.

B. Fuel sense line not reconnected after defueling per paragraph 4.2.3.2

Remedy:

Reselect "normal" position of selector valve or reconnect and bleed fuel sense hose per paragraph 7.5.

6.13 Trouble:

Unit opens and then abruptly shuts off when deadman air valve is actuated.

Probable Cause:

Downstream system is blocked.

Remedy:

Open nozzle(s) or other valve blocking flow.

6.14 Trouble:

Unit either does not open, or shuts off early during defuel operations.

Probable Cause:

Defuel pressure, transmitted back through the fuel sense line, has caused unit to shut off.

Remedy:

- A. Increase air pressure to a value that is at least 30 psi above the maximum defuel pressure.
- B. If A is not practical, proceed per 4.2.3 and subparagraphs.

6.15 Trouble:

Regulated pressure is lower at high flow rates. Increasing the air pressure does not increase regulated fuel pressure.

Probable Cause:

Hydrant pressure is insufficient to overcome system resistance at high flow rates and regulator is full open.

Remedy:

None unless hydrant pressure can be increased or system resistance reduced.

6.16 Trouble:

Desired regulated pressure is achieved, but flow rate is considered low.

Probable Cause:

Aircraft resistance equals regulated pressure at maximum flow rate.

Remedy:

None unless aircraft operator will agree to increase in regulated pressure.

6.17 Trouble:

Unit will not maintain steady pressure while in operation. This phenomenon is sometimes called surging or hunting. This problem may manifest itself as small pressure variations such as a 10 psig variation that continuously repeats to the most extreme example with the valve opening and closing very rapidly. Unit may also appear to jump open with no other symptoms.

Probable Cause:

- A. Fuel sense line and/or fuel control passages contain air.
- B. Check Valve (3-44) plugged, blocked in the open position or installed incorrectly.

Remedy:

A. Removal of air from the fuel sense lines and fuel control passages of the coupler is very important for the smooth operation of this valve. Fill fuel sense system and bleed air per 7.5.

B. Remove check valve (3-44) per instructions in section 6.10, Remedy E. The check valve (3-45) should be installed according to the image in Figure 3, with the closed end including the small orifice up.

6.18 Trouble:

Excessive internal fuel leakage.

Probable Cause:

- A. Inlet pressure is above 200 psi and relief valve is relieving.
- B. Deadman air pressure is not completely relieved.
- C. Foreign object is holding unit outer piston off seat.
- D. Unit seal leakage.

Remedy:

- A. Decrease inlet pressure to less than 175 psi.
- B. Completely vent deadman air pressure.
- C. Remove unit from hose by disconnecting female half quick disconnect per paragraph 7.1, exercising all specified safety provisions. Apply deadman air pressure to fully open Outer Piston (3-11); use pliers or other gripping tool to remove foreign object; and then release deadman air pressure to close unit. Reinstall on hose by connecting female half quick disconnect per paragraph 7.1.

**WARNING:**

**Do not** insert fingers into valve while deadman air is holding piston open. Accidental release of deadman air could result in finger amputation or other personal injury. **Always** use needle nose pliers or other grasping tool if practicing this remedy.

D. Disassemble the unit per the instructions in section 9 sufficiently to examine Outer Piston (3-11), Seal (3-7) and O-Ring (3-18). If the cause of the leak is not found then further disassembly to access relief valve (3-48) may be required.

6.19 Trouble:

Unit closing rates are too fast.

Probable Cause:

Air orifice screw was not installed during overhaul.

Remedy:



Install air Orifice Screw (3-37) and Spring (3-38) using procedure of paragraph 6.10, remedy D. Observe **CAUTION** in paragraph 6.10, remedy D.

#### 6.20 Trouble:

Coupler poppet linkage does not cause relief valve to relieve hydraulic lock and vent trapped fluid downstream of closed unit piston seat.

#### Probable Cause:

Relief Valve (3-57 through 65) is not correctly adjusted.

**Note: The Relief Valve Assembly has been redesigned as one assembled unit (3-48), and it requires no adjustment. This Relief Valve (3-48) supersedes items 3-57 thru 3-65 found in older units, refer to Figure 3. It is recommended that the upgrade of the relief valve be accomplished**

**at next overhaul of the unit's elbow. KD64800-14 contains the Relief Valve assembly (3-48).**

#### Remedy:

Readjust relief valve per paragraph 11.5.1.N

#### 6.21 Trouble:

Collar (2-27) will not move to the stowed position or is difficult to move.

#### Probably Cause:

The Detent Pin (2-26) is worn on the outer diameter on the spring end of the pin.

#### Remedy:

A short-term remedy is to rotate the Pin (2-26). A more positive remedy is to replace it.

## 7.0 INSTALLATION

Installation of the Coupler consists of connecting the outlet to the hose and connecting the deadman air and fuel sense hoses to the unit connector hose fittings. Proceed as follows:

### 7.1 Outlet Hose Connection

The installation of the coupler to the hose is contingent of the optional outlet arrangement incorporated in the specific unit. The Pressure Control Elbow Assy (1-1) with the appropriate Option 2, 3 or 4 male half quick disconnect will connect to any of its compatible various sized outlet threaded female half quick disconnects with carrying handle. A proper pipe thread lubricant should be used when tightening the female half quick disconnect to the hose thread.

#### 7.1.1 On option 2, thumb latches and a spring-loaded sleeve are provided to assure that the locking device is secure. Option X provides extra safety.

A. If Option X Safety Ring is present, gently spread it to move it off the disconnect and leave it on the hose.

B. Depress both Latches (4-8) simultaneously and push the sleeve toward the hose. Pull the female (hose half) away from the coupler to separate.

#### 7.1.2 On options 3 & 4, holes have been provided in the screws used to lock the Retainer on the female half in place. It is recommended that these screws be lockwired to further prevent loosening during service.

A. Observe the method of lockwire securing the two screws to assure correct reassembly. Break lockwire if present and remove the two screws. Remove retainer on the female half. Note that housing on the female half incorporates two

lock ring grooves. If the lock ring on the female half is installed in the outer groove, away from the ball-retaining sleeve, proceed to step B. If the lock ring on the female half is installed in safety inner groove on the housing, adjacent to the ball-retaining sleeve, spread the lock ring until it may be moved into full engagement in the second (outer) groove.

B. Grasp outside diameter of the ball retaining sleeve with the fingers while using the thumbs to spread the ends of the retainer ring. Slide ball-retaining sleeve back until stopped by the lock ring on the female half in the housing on the female halfgroove. This action allows the 24 balls to disengage from the mating groove in the appropriate Pressure Control Elbow Assy (1-1). The two parts may now be separated. **Note:** The O-Ring utilized, on Elbow Assy (1-1), to seal the joint between the two halves will provide considerable resistance to separation. The Teflon seal used on option 4 will separate easier. Axial force and twisting of the two halves in opposite directions will aid in this operation.

C. Inspect the hose fitting male threads for damage and clean to remove all contamination including old thread tape and or sealants. Clean and repair threads as necessary. Apply anti seize compound. For Options K, M, N or S (BSPP threads) install a proper sized gasket (not furnished by Eaton) in the proper position. Use the wrench flats on the female housing (4-1, 4-14, 5A-5 or 6A-5) on the female half to tighten the female half to the hose fitting.

D. Reconnect, safety lock and lockwire the female half quick disconnect to the Pressure Control Elbow Assy (1-1) as appropriate using the following steps:

**WARNING:**

On options 3 & 4 improper (or omission of) safety locking and lockwiring of the female half quick disconnect can result in accidental separation of the disconnect at high pressures and/or flow rates resulting in a potentially unsafe and undesirable product spill that could result in personal injury.

1. Assure that O-Ring (5-7) or Teflon Seal (6A-9) in the female half as appropriate is lubricated with petroleum jelly. Install female half quick disconnect/hose assembly on to the coupler male adapter. Some twisting may be required to fully seat the two halves.

2. **On Options 3 & 4-** Press forward (away from hose) on ball retainer sleeve while spreading retainer ring with thumbs until sleeve fully captures the balls. Release the ends of retainer ring to allow it to snap into the housing groove.

3. **On option 2-** Depress the two thumb latches and press forward (away from the hose) on the Sleeve Assy (4-6) until the Balls (4-5) are engaged into the groove. Release the Sleeve Assy (4-6) and the Latches (4-8) to lock in place. If option X is utilized, place it in the groove behind the Sleeve Assy (4-6) to keep it from moving forward.

4. **On options 3 & 4-** Install ring retainer on the female half so that two of its holes capture the ends of the retainer ring while the other two holes line up with the threaded holes in sleeve. Fasten ring retainer on the female half with two screws. Before lockwiring the two screws together, grasp sleeve at two places, without touching retainer ring, and attempt to move sleeve to the disengaged position.

**CAUTION:**

If the sleeve on any of the options can be moved toward the disengaged position, or can be partially cocked, the female half quick disconnect is unsafe for use and should be withdrawn from service until the cause is found and corrected.

**Probable Cause:** On options 3 or 4, one probable cause is mishandling that has resulted in permanent deformation of the tips of retainer ring which has bent them toward each other. If bent sufficiently, then the installation of the ring retainer on the female half will hold retainer ring in the spread position so it is not fully engaged in the housing groove.

5. Lockwire two screws on either options 3 or 4, to each other with 0.020-inch stainless steel lockwire in a manner that backing out of the screws results in the lockwire being tightened.

6. On options 3 & 4, **be sure and move the lock ring on the female half to safety groove nearest**

**sleeve.** Verify that the lock ring on the female half is fully engaged in safety groove.

**WARNING:**

On options 3 & 4, omission, or loss, of ring retainer on the female half can result in accidental separation of the quick disconnect under high flow conditions. Under no condition should the disconnect be used without the ring retainer on the female half locking the end of the retainer ring and the screws, secured.

7.2 Deadman Air And Fuel Sense Connections

**Note:** To prevent damage to the housing (3-32) all ports on the 64800 hydrant coupler include straight threads that require adapters with O-Rings to seal. NPT connections should be made to those adapters.

Connect the deadman air hose to the ¼" straight thread air reference port with the standard female NPT port adapters, option H port adapters or to the option F or J hose barbs. Connect the fuel sense hose to the port marked Fuel in a like manner. If desired, where air operated hydrant valves are utilized, connect a hose to the side port on the coupler or to option R the 90° elbow to connect to the air pilot on the hydrant.

7.3 Product Selector Set

If unit contains Option C, Product Selection, verify that set is correctly positioned for desired product. If it is not, reposition the required Bolt (1-C) and verify that bolt head is flush to 0.03-inch (0.76-mm) below the adjacent Collar (2-27) surface.

7.4 Installation Inspection

**Option 2** – Verify that the thumb latches are in the locked position. Grasp the Sleeve Assy (4-6) and attempt to move it toward the unlocked position. If it will not move the latches are properly seated. If Option X is utilized be sure it is properly installed to prevent the Sleeve Assy (4-6) from moving to the unlocked position.

**Options 3 & 4** - Verify security of installation, reinstallation and lockwiring of female half quick disconnect retainer screws, and correct positioning of disconnect lock ring on the female half. See WARNING in paragraph 7.1.D.

7.5 Initial Installation Preparation

Following the initial installation of the fuel pressure control coupler, it is necessary to fill the fuel pressure control passages with fuel, and to bleed air from these passages and from the fuel sense hose to prevent erratic operation of the fuel pressure control valve (Pressure Control Elbow Assy (1-1)). A Bleed Screw (3-39) has been provided in the center of the Check Valve Housing (3-41) to simplify and shorten the time required for

this process. Additionally, the coupler will be installed at the end of the fuel sense lines. Proper flushing of these lines will prevent any contamination that may be present from entering the control section of the coupler.

While the detailed fill and bleed methods may understandably vary according to the detail design of the servicer or dispenser on which the unit is installed, the following general procedure is one practical method of filling and bleeding the Pressure Control Elbow Assy (1-1) and fuel sense lines following field replacement of the unit.

- A. Move the hydrant dispenser to a suitable test facility.
- B. Make all necessary connections to safely recirculate or flow fuel through the test facility including connecting the nozzles and hydrant coupler to appropriate adapters.
- C. To ensure that all air and any contamination is completely removed from the fuel sense lines it will be necessary to flow fuel through those lines at high velocity. Remove the fuel sense hose from the coupler and place it in a bucket or other appropriate container that will prevent excessive splashing of the fuel expected to be released.
- D. If the hydrant dispenser has been drained or is new and has no fuel in the filter vessel it will be necessary to restrict the flow of fuel upon entry to prevent damage to the filter elements or the filter housing. Before activating the deadman, partially close the valves on the test rig, upstream of the hydrant coupler and hydrant valve to reduce the fuel flow. The flow should be restricted to a rate no greater than the capacity of the air eliminator device to eliminate air in the filter vessel. The purpose is to prevent excess pressure build up in the filter housing that could cause a filter fire or burst a filter element due to the sudden inrush of fuel. If there are no valves on the test rig suitable for this purpose you may use the hydrant dispenser's inlet hose isolation valve. It is best practice to restrict the flow upstream of the filter vessel.
- E. Assure that there is a minimum of 60 psig deadman air or air reference pressure available

and activate the deadman. You can expect the coupler outlet hose to jump. The coupler will open very quickly the first time as there is no fuel in the fuel chamber to slow the opening rate. As the flow through the hydrant dispenser is restricted you should also expect fuel to flow out of the fuel sense hose at a slow rate.

- F. Continue to flow the unit at a reduced rate until it is established that the filter vessel has been purged of all air. Then slowly open the restricted valve to establish full flow. The flow rate of fuel coming out of the fuel sense line will also increase. Prevent spills or excessive splashing by securing the fuel sense hose during the flush of debris and air from the line.
- G. Restrict the flow at the outlet of the hydrant dispenser by partially closing the valves on the test rig downstream of the nozzles. Continue to restrict this flow until you have achieved approximately 15 psig fuel sense pressure. At this point the fuel from the fuel sense line will be at sufficient velocity to remove all air and dislodge any contaminants from the fuel sense line.
- H. When you have removed approximately 2 gallons of high velocity fuel via the fuel sense line release the deadman to stop flow. Reconnect the fuel sense line to the appropriate port on the hydrant coupler. Activate the deadman while retaining the 15 psig of fuel sense pressure. Loosen air bleed screw (3-39) to remove remaining air from coupler.
- I. After all air has been removed from the coupler and fuel sense line proceed to remaining checks and adjustments as described in section 12.

**WARNING:**

To prevent possible damage to an aircraft DO NOT place a hydrant coupler into active service until all functions of the valve have been checked and or adjusted including pressure control settings, closing time adjustments and proper verification of appropriate opening time.

## 8.0 **SPECIAL TOOLS**

The following special Eaton Carter brand tools are recommended for use during the maintenance of the coupler:

- 61362 Wear Gauge - Inspects completely assembled couplers to indicate wear.
- 60505D or 61526D - 4" API Adapter for use in testing the unit.

- WL4680 – Screw/bolt torque wrench kit. Includes a torque wrench with 50 – 250 in.-lb. capabilities. Contains all special sized sockets to fit into the tight places on the coupler. Can be used on all Eaton Carter brand nozzles and hydrants as well.

## 9.0 **DISASSEMBLY**

Refer to Figures 1-14 for exploded views of the unit and its options to assist in disassembly. The numbers mentioned herein are those shown in the figures.

### 9.1 Outlet Connection To Hose

Refer to Figures 4 thru 6A. Unless there is a need to replace or repair any parts of the female half of the quick disconnect, it may be left on the hose.

Excessive wear of the inside diameter of the sleeve can be a cause of external leakage from the O-Ring or seal between the two halves. Removal of the coupler from the female half quick disconnect may be accomplished in the following manner:

#### **Option 2:**

A. If Option X is present remove it by spreading the ends of the clip sufficiently to move it to a location on the hose fitting away from the disconnect. If not, proceed with B below.

B. Depress the two thumb Latches (4-8) and simultaneously move the Sleeve Assy (4-6) toward the hose. This action will unlock the joint and the coupler can be separated from the female disconnect.

#### **Option 3 & 4:**

A. Break the lockwire if present and remove the Screws (5A-2) or (6A-2). Remove the Retainer Plate (5A-4) or (6A-4). Note that the Housing (5A-5) or (6A-5) incorporates two lock ring grooves. The Lock Ring (5A-1) or (6A-1) should be installed in the groove closest to the Sleeve (5A-6) or (6A-6) during operation. Move it to the groove farthest from the Sleeve (5A-6) or (6A-6).

B. Grasp the outside diameter of the Sleeve (5A-6) or (6A-6) with the fingers while using the thumbs to spread the ends of the Retaining Ring (4-6). The Sleeve (5A-6) or (6A-6) may then be moved toward the outlet (hose) end of the unit until stopped by the Lock Ring (5A-1) or (6A-1), unloading the Balls (5A-8) or (6A-8) that lock the coupler to the quick disconnect. The Female Half Quick Disconnect (1-L-N, P or R) may be removed from the coupler. Considerable force may be required (Option 3) due to the presence of an O-Ring seal used between the two halves.

C. Remove the Lock Ring (5A-1) or (6A-1) from the Housing (5A-5) or (6A-5). Spread the Retaining Ring (5A-7) or (6A-7) to keep it from catching in either of the other two grooves in the Housing (5A-5) or (6A-5) as you slide the Sleeve (5A-6) or (6A-6) off of the Housing (5A-5) or (6A-5). Take care to catch the Balls (5A-8) or (6A-8) in a container to prevent losing them as the Sleeve (5A-6) or (6A-6) releases them.

D. If Option 4 is being disassembled, the Teflon Seal (6A-9), contained within the Housing (4A-5) or (5A-5) need not be removed unless it is to be replaced due to observed leakage.

### 9.2 Product Selection Set

If the unit incorporated Option C, Product Selection, it is not necessary to remove the Bolts (1-C) from the Collar (2-27) unless there is apparent damage to one of the Bolts (1-C) or the position desired is to be changed. Note that there are six potential positions, numbered 1 through 6. There are two other unmarked slots. The mating unit should have three studs or bolts protruding from it that match the three slots in which there are no bolts. The numbered position that has no bolt is the **set** position.

### 9.3 Pressure Control Elbow Assembly

Refer to Figures 1 & 3 to identify the part numbers. Lockwire is used on the Nuts (3-3) only on Option D. Nuts (3-3) have holes for lockwire purposes at the option of the customer or furnished when Option D is ordered. Remove the Lockwire if present, Nuts (3-3) and Washers (3-2). The Dust Cap (1-2) will be removed with these items also. Removal of the Collar Stop Assembly (1-31) will also be achieved. Set the Collar Stop Assembly (1-31) aside for now. Separate Coupler (1-5) from the Pressure Control Elbow Assy (1-1).

The separation of the male half Adapter (4-17), (5-1 thru 5 or 6-1 thru 6-6) need not be accomplished unless there is evidence of leakage or a major replacement of all seals is desired.

Proceed with the disassembly as follows:

A. If disassembly of male half adapter is desired, then remove the 8-screws (on option 2) or 8-nuts and washers (on options 3 or 4) retaining the male half for the quick disconnect. Discard O-Ring (4-22), (5-5) or (6-5) as appropriate.

#### Old-Style Relief Valve:

B. Loosen Lock Nut (3-59) and remove Pressure Relief Adjusting Screw (3-58) and assembled parts, while containing and removing Pressure Relief Valve Spring (3-57).

C. Remove Lock Nut (3-49), Washer (3-50), Seal Retainer (3-51), O-Rings (3-52 & 53), Pressure Relief Adjusting Screw (3-58) and Lock Nut (3-59) from Pressure Relief Shaft Assembly (3-60). There is no need to further disassemble Shaft Assembly (3-60) unless replacement of any parts is needed. If needed, remove Pin (3-65) to gain access to Washer (3-62), Spring (3-63), Shaft (3-61) and Slide (3-64).

**Note: The Relief Valve Assembly has been redesigned as one assembled unit (3-48), and it requires no adjustment. This Relief Valve (3-48) supersedes items 3-57 thru 3-65 found in older units. It is recommended that the upgrade of the relief valve be accomplished at first overhaul. KD64800-14 contains the Relief Valve assembly (3-48).**

To Disassemble New Relief Valve:

D. Loosen and remove Relief Valve (3-48) from the Housing (3-32).

E. Remove Lock Nut (3-49), Washer (3-50), and Seal Retainer (3-51). Remove and discard O-Ring (3-52) from beneath Seal Retainer (3-51). Remove and discard O-Ring (3-53) from the groove in Body (3-54). There is no need to further disassemble Shaft Assembly (3-48) unless replacement of any parts is needed (see note paragraph C above).

**WARNING:**

Relief Valve Spring is under tension & could cause personal injury. If completing disassembly, it is advisable to place the Relief Valve in a clamp and gradually relieve tension on the Spring.

F. Remove the fittings installed in the three ports that connect to the air reference pressure (possibly two ports) and the fuel sense lines. Discard the O-Rings (1-19 & 1-20). Remove Plug (3-35), Orifice Screw (3-37) and Spring (3-38). Clean the slot in Screw (3-37) of any debris. Remove and discard O-Ring (3-36).

G. Remove Screw (3-39), Check Valve Housing (3-41), Check Valve (3-44), O-Rings (3-40, 42 & 43), Gasket (3-45) and Spring (3-46). Discard O-Rings and Gasket.

H. It is not necessary to remove Option Z Handle (1-Z) unless damaged and it needs replacing. In that case remove the attaching Screws (1-28) and Washers (1-29).

I. It is not necessary to remove the standard transverse Handle (1-30) unless damaged and it needs replacing. In that case remove the attaching Screws (13-3) and Washers (13-2). To replace Grips (13-6), remove Screws (13-4) and Washers (13-2).

J. Rotate Outer Piston (3-11), if necessary, to gain access to the four Screws (3-12). Screw (3-12) is a self locking type screw. They are designed to be reused several times before losing their locking effectivity. Using a torque wrench, remove Screws (3-12) from the Housing (3-32), measuring the torque during removal. If the torque of any screw is less than 2 in.-lb. (0.023 kg-m) discard and replace it with a new one during reassembly. Remove O-Rings (3-13). Grasp Piston Assembly and pull it from the outlet of the Unit.

K. Pull out Connector Tube (3-47) with O-Rings (3-47A). Discard the O-Rings (3-47A).

**WARNING:**

Before proceeding further, beware that the Piston Assembly (3-11) and the attaching parts are heavily spring loaded and that a clamp or an arbor press will be required to safely disassemble this part of the unit.

**NOTE:**

Shaft (3-22) and nut (3-9) are both stainless steel. Nut (3-9) also includes a locking element. Due to this combination there is the possibility when these items are disassembled that the threads may gall or become damaged beyond repair. If it is necessary to disassemble these items you should replace both nuts (3-9) and consider replacing the shaft (3-22).

**WARNING:**

Be sure that the assembly is securely held in place and can not slip, allowing the unit to forcibly separate when the first Nut (3-9) is removed. Forcible separation may cause personal injury and will damage some parts beyond repair.

L. If an arbor press is used to disassemble the piston assembly it will be necessary to create some type of jig to allow access to the nut on each end of the shaft and to maintain alignment of the inner and outer piston to prevent the lateral escape of the spring. These jigs should be fashioned from some material that will not scratch the sealing surface of either piston. A simple clamp can be created using two threaded rods and two wooden blocks. These wooden blocks should be shaped to allow access to the nut on either end of the shaft and to maintain the alignment of the inner and outer piston. When releasing the tension of the spring, care should be taken to prevent lateral escape of the spring.

**NOTE:**

Be careful not to damage the sealing surfaces of the Outer Piston (3-11), Piston Shaft (3-22) or Inner Piston (3-26). Protect these sealing surfaces during and after disassembly. Damage to these surfaces will cause leakage and may cause regulator malfunction.

M. With the assembly securely clamped in place, carefully remove Nut (3-9) from the opposite end of the Outer Piston (3-11). Remove Washer (3-10).

Slowly open the clamping device, allowing internal spring force to cause the Inner Piston (3-26) to follow the clamp until all spring force is relieved. Then, carefully remove the clamp. Lift Inner Piston (3-26) from the piston Spring (3-21) and remove the Spring. Remove O-Ring (3-25) and Washers (3-24) and (3-23). Remove Shaft (3-22) and the Outer Piston (3-11). Remove Washer (3-20). Remove Screw (3-19A). Spring Guide (3-19) from Retainer (3-14). Remove Shaft Seal (3-16) and O-Ring (3-15) from Retainer (3-14). Discard seal and O-Ring after removal.

N. It is not necessary to remove the nut (3-9) that secures the Outer Piston (3-11) to the Shaft (3-22) unless the Shaft (3-22) or the Outer Piston (3-11) need to be replaced. If it becomes necessary to remove this nut (3-9) use two thin 3/8-24 UNF-2B nuts as jam nuts on the Shaft (3-22) at the opposite end to the Outer Piston (3-11), remove and discard Nut (3-9) and remove Washer (3-10), retaining the Outer Piston (3-11). Remove Outer Piston (3-11) from Shaft (3-22).

O. If present, remove the six Screws (3-6), Seal Housing (3-4) and O-Ring (3-5). It is now possible to access the Outer Piston Seal (3-7) and O-Ring (3-8) from inside the groove in the Housing (3-32). Remove and discard the O-Rings and Seal. (Refer to Note 7 in the Notes section.)

P. Remove Screws (3-27) and pull Retainer (3-28) and Seal Housing (3-31) from main Housing (elbow) (3-32). Remove and discard Inner Piston Seals (3-30) and O-Rings (3-29) from the grooves in Seal Housing (3-31) being careful not to damage the surrounding surfaces of Housing & Retainer.

**Note: It is recommended the user upgrade to the new seal cartridge. The new design with the energized Seal (3-30) and O-Ring (3-29) are included in all of the overhaul kits KD64800 -1 thru -6. Request a -13 kit for hardware items (3-28 & 3-31) to complete the upgrade. This configuration provides a more robust seal, reducing leakage and frequency for overhaul of the seal cartridge.**

Q. If necessary to replace, complete the disassembly of the unit by removing Retaining Ring (3-33) and Filter Disc (3-34).

#### 9.4 Quick Disconnects

##### 9.4.1 Option "2 H, K-N & P, Q & S" Standard QD

The Quick Disconnect is made up of two halves, the Male Adapter bolted to the Pressure Control Elbow Assembly and the Female Half attached to the hose. Refer to Figure 4.

The Thumb Latches identify this option. Option "2" is the male half bolted onto the pressure control elbow. Options "H, K-N, P & S" pertain to the female half of the QD and must be combined with Option 2 to form a completed assembly. Option "X", Safety Lock Ring may or may not be present.

A. Female Half - As mentioned earlier, unless repair or overhaul is necessary the Female Half need not be removed from the hose. There are two different female half QD's used with option "2", one for the 2"-3" units and another for the 4" units.

2, 2½ and 3" Option "2" Units – Push and hold the Spring Retainer (4-3) toward the end opposite to the threaded end to expose Retaining Ring (4-2). Using a small blade screwdriver, carefully pry up one end of the ring and remove it. Release the

spring load on the Spring Retainer (4-3) and remove it from the Body (4-1). Spring (4-4) can then be removed, followed by the Sleeve Assembly (4-6). The Balls (4-5) will fall out of the unit so it is suggested that this operation be conducted over a pan to catch the balls.

Check the Latches (4-8) to see that they function properly by depressing and releasing them several times. The latches shall return to the outward position easily without binding. Check the latches for missing parts. If needed, using a properly sized drift pin with proper bench support for the Sleeve Assembly (4-6), drive the Pin (4-7) out of the sleeve. Remove Spring (4-9) as well. Discard the Spring (4-9).

Remove and discard the O-Ring (4-12) and the two internal Wear Rings (4-11) from Body (4-1).

4" Units – These units differ from the 2, 2 ½ and 3" ones in the method of spring retention. In place of the simple captured Retainer Ring (4-2) and spring Retainer (4-3) a two piece body is employed. Hence first remove 12 Screws (4-13) located inside the threaded end. Remove and discard O-Ring (4-15) from groove in Body (4-1). The remainder of the disassembly is the same as for the 2 ½" units above.

B. Male Half – Remove the eight Screws (4-20) and Washers (4-21) to remove the Male Half from the Elbow Assembly. Remove and discard O-Ring (4-22) from Adapter (4-18). Remove the Wire Race (4-19) to inspect for excessive wear in accordance with paragraph 5.5.C. Replace if necessary.

##### 9.4.2 Option "3" Male Adapter QD

This option is designed to mate with a 60700-1 style Female QD. Refer to Figure 5.

A. Female Half – Refer to SM60700-1 for disassembly or repair information.

B. Male Half – Loosen and remove Screw (5-3) and Washers (5-4). Discard O-Ring (5-5). Remove and discard O-Ring (5-7). Remove the Wear Rings (5-2) to inspect for excessive wear in accordance with paragraph 5.5.C.

##### 9.4.3 Option "4" Male Half Adapter QD

This option is designed to mate with a 60600 or 60600-1 style Female QD. Refer to Figure 6.

A. Female Half – Refer to SM60600 for disassembly or repair information.

B. Male Half – Use same procedure as defined in 9.4.2.B above except there is no O-Ring on the main diameter to discard.

##### 9.5 Pre-Disassembly Inspection Of Coupler Lower Half Subassembly

It is recommended that a "lift test" be performed to determine the extent of wear to the collar and coupler

body, as well as an inspection for excessive wear to lugs and mating surfaces be performed prior to disassembly of the coupler. Coupler Wear Gauge, part number 61362, should be utilized for determining wear to the coupler. The wear gauge is designed to give a quick, convenient and accurate method of checking aggregate wear of all related parts in the lower half coupler. The following instructions are provided to assist in performing a "lift test" and utilizing the wear gauge:

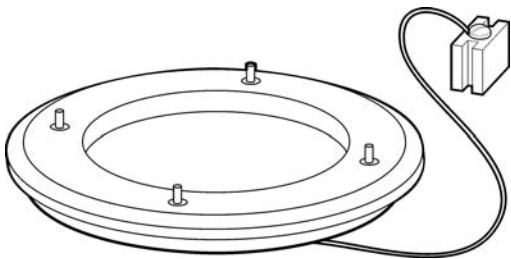
A. Install coupler on a non-pressurized API/IP 1584 adapter known to be within allowable wear limits. Ensure collar has dropped into the engaged position. It is not recommended to open the poppet since that removes the capability to rotate the parts relative to one another. Coupler should not be pressurized and full of fuel.

B. Using only hands, push down on one side of the collar to keep it stationary relative to the coupler body, while simultaneously lifting firmly upward from beneath the collar on opposing side. This action will take up the clearance between the housing and collar. If worn, this will result in the top of the collar lifting away from the coupler housing, which is normally flush. Take note of the collar offset relative to the housing from opposite of the operating handle. If the offset exceeds .063 inch (1.6 mm) then the coupler has too much wear for continued use.

Note: If the lower coupler fails the "lift test" it may be disassembled and inspected and maybe one of the two components might be reused with a new mating part provided the "lift test" is repeated after assembly and it passes the collar offset limits above.

#### MODEL 61362 COUPLER WEAR GAUGE

Eaton has offered this wear gauge for years. When used as instructed, it indicates whether there is excessive wear in the coupler system that requires additional inspection of detail parts.



**61362 Coupler Wear Gauge**

C. Continue with wear inspection: Remove lower half assembly from the API/IP adapter. Place the Wear Gauge into the inlet of the coupler with

the pins of the gauge pointing toward the coupler inlet.

#### **NOTE:**

Be sure that the pins do not rest on the coupler Detent Pin (2-26).

Extend the Collar (2-27) to the locked-on position and open the Poppet (2-15). This must be done to simulate a coupler locked onto a hydrant valve.

#### **NOTE:**

This operation should be done with a catch basin under the coupler so as to catch any fuel trapped inside the coupler.

D. **Operation** - Once the Wear Gauge is in place, all four (4) gauge pins of the wear gauge should be above the exposed gauge surface. Slowly rotate the Collar (2-27). Note the position of the gauge pins as the rotation is accomplished. Should any one of the four pins become flush or recede below the gauge surface, the coupler exhibits excessive wear and should not be used again until overhauled. See note below. Pay particular attention to the detailed inspection of the Collar (2-27), Body (2-5), Lugs (2-33, 2-33A) and Lug Rings (2-32) during the inspections detailed in Section 10.0.

#### **NOTE:**

Should only one pin (of the gauge) indicate wear, it is suggested that the gauge be removed and turned approximately one-fourth turn and the inspection be repeated. There may be a local indentation in the surface of the Body (2-5) on which the pin rests causing a false reading.

#### 9.6 Coupler

Refer to Figures 1 and 2 to identify the part numbers. Remove O-Ring (2-10) and discard. Remove Bolt (2-6) and Washers (2-7 & 8) from Handle (2-1 or 1-B). Poppet (2-15) should be open for the following actions. Remove Handle (2-1 or 1-B) and Woodruff Key (2-9).

9.6.1 Collar Stop Assembly (1-31) - Note how Torsion Spring (7-3) is installed to facilitate reassembly. Remove Cotter Pin (7-5). Push out Hinge Pin (7-4), separating Collar Stop (7-1), Torsion Spring (7-3) and Bracket (7-2). Spring should be replaced if it is distorted or weak.

9.6.2 Folding Handle Assembly (1-B) - **Do not disassemble the Folding Handle Assembly (1-B) unless one or more parts are damaged and require replacement. It is necessary that**

**Spring (1-8) be replaced whenever the Folding Handle (1-B) is disassembled.**

Place the assembly in a small, soft-jawed vice so that the jaws grip the boss of the Handle Cam.

**CAUTION:**

Do not over tighten vise as this may collapse or damage handle cam.

Insert large blade screwdriver in clevis end of Pin (1-6). Rotate Pin (1-6) slightly in a counter-clockwise direction to release torsion on Cotter Pin (1-7). Remove Cotter Pin (1-7).

**CAUTION:**

Maintain a restraining torque on Pin (1-6) with screwdriver to prevent spring's tendency to unwind following Cotter Pin (1-7) removal. Gradually release Spring (1-8) torsion by slowly allowing Pin (1-6) to rotate the inserted screwdriver until the Spring (1-8) torque has been relieved.

Remove Pin (1-6) by pressing on either end. With Pin (1-6) removed, Handle (1-11) and Spring (1-8) may be separated from Handle Cam (1-10).

9.6.3 **Coupler Subassembly (1-5) - Disassemble Coupler Subassembly (1-5) as follows:**

Remove Cotter Pin (2-11) and Washer (2-12) from Crank Shaft (2-20). Rotate Link (2-16) slightly and disengage Link from Crank (2-20). Remove Bearing (2-13). Press Poppet (2-15) and Link (2-16) far enough out of the coupler outlet end to remove Pin (2-14). Then withdraw Poppet (2-15) and Link (2-16) from opposite ends of the coupler.

It is not necessary to disassemble Poppet Assembly (2-15) unless a part of the unit is to be replaced or the unit is undergoing a major overhaul.

If disassembly of the Poppet Assembly (2-15) is required do so by removing the four Screws (2-15B). Remove these Screws (2-15B) using a torque wrench noting the running torque as they are removed. If the running torque is less than 6 in.-lb. (6.9 kg-cm), then discard the Screws (2-15B) and replace. Remove and discard O-Ring (15D).

Remove Seal (2-17), Quad Ring (2-18) and Wave Washer (2-19).

Discard the Quad Ring (2-18).

Rotate the Crank Shaft (2-20) and press down so it enters cavity cast into Body (2-5), then tilt Crank Shaft (2-20) and remove it along with Bearing Washer (2-21). Remove Bearing Washer (2-21).

Remove Bearing (2-22). Remove one Shaft Seal Bearing (2-24), O-Ring (2-25), second Shaft Seal Bearing (2-24) and Shaft Bearing (2-23). Discard O-Ring (2-25) and Shaft Seal Bearing (2-24).

Depress Detent Pin (2-26) and pull Collar (2-27) with Bumper (2-28) to extended position. Remove Retainer Ring (2-29). Withdraw Collar (2-27) over opposite end of Body (2-5). Ball Bearing (2-30) will fall out. Locate and secure Ball Bearing (2-30). Do not remove Bumper (2-28) from Collar (2-27) unless it is to be replaced. If Bumper (2-28) requires replacement, use a sharp cutting tool to cut it away from Collar (2-27).

**WARNING:**

Use extreme care to prevent personal injury while cutting Bumper (2-28) from Collar (2-27).

Remove four Lug Rings (2-32) each with four Lugs (2-33, 2-33A) attached from Body (2-5). Remove Lugs (2-33, 2-33A) from Lug Ring (2-32).

Insert a metal rod of 5/32 inch (3.9 mm) or smaller diameter in hole in Detent Pin (2-26) to prevent Detent Pin (2-26) from turning while unscrewing Bolt (2-34).

**CAUTION:**

Do not use pliers or other gripping tools to hold Detent Pin (2-26). Raised burrs on Detent Pin (2-26) may cause pin to jamb depressed, resulting in an unsafe condition that could result in a fuel spill.

Remove Bolt (2-34) and Washers (3-35 & 36). From opposite end, remove Detent Pin (2-26) and Detent Spring (2-31) from Body (2-5). Disassembly of the Coupler Subassembly (1-5) is completed.

9.7 **60532 Carriage Assy**

Refer to Figure 8.

The Carriage Assy (1-W) should be removed from the unit before any work is performed on it.

**WARNING:**

When operating the Carriage Assembly do not place hands onto any part of the unit except the Lever (8-10). Improper operation can result in injury to the hands.

The 64800 utilizes the existing hardware to install the Carriage Assembly, no different bolts or nuts are required.



**NOTE:**

Couplers using either options 3 or 4 disconnects must use 60532C Carriage. This unit has integral spacers on the flange to remove interference with the female half of the disconnect. If an existing Carriage Assembly from either a 60700-1 or a 60600 Type Coupler is to be used on a 64800, contact Eaton for instructions prior to trying to assemble.

To remove Carriage Assembly (1-W) from the unit remove only Nuts (3-3) and Washers (3-2) that retain it to the unit. To disassemble the carriage,

remove Nuts (8-1), Washers (8-2) and Casters (8-3). Remove one Screw (8-4), Washer (8-5) and Washer (8-6). Set feet of Strut (8-16) into a soft jawed vise and hold securely. Grasp Spring (8-8) with a pair of vise grips or other suitable tool to hold it in place then pull the Shaft (8-7) from the Strut (8-16). Items (8-9) through (8-13) will then be loose. The other Washers (8-6) will also be loose. There is no need to remove the other Screw (8-4) and Washer (8-5) from the Shaft (8-7) unless one of the parts is to be replaced. Remove Cotter (8-14) and Clevis (8-15) to disassemble Latch (8-13).

**10.0 INSPECTION AND REPAIR****10.1 General**

Inspect all metal parts for cracks, nicks, gouges, scratches, corrosion, etc. Special attention should be given to the Body (2-5) in the window areas that contain the Lugs (2-33, 2-33A). Weld repair in the area is not recommended due to potential distortion of the Body (2-5) which could cause the Collar (2-27) not to slide freely on the Body (2-5). Inspect all parts for stripped or crossed threads and loose inserts.

**10.2 Collar Stop Assembly (1-31)**

Torsion Spring (7-3) - Inspect for distortion. Free ends of Spring (7-3) shall be in proper position and actuate Collar Stop (7-1) without evidence of sticking or binding. Inspect Collar Stop Assembly (1-31) for damage sufficient to prevent proper operation paying particular attention to Bracket (7-2).

**10.3 Coupler Subassembly (1-5)**

Precisely measure the following wear surfaces. Discard and replace those parts that fail this inspection:

- A. Pin (2-14) - Inspect bearing diameter for indications of galling, raised metal, etc. Replace pin if local wear results in low spots exceeding 0.005 inches (0.12 mm) below adjacent surfaces.
- B. Link (2-16) - Place Link (2-16) on straight edge or surface plate and inspect for flatness. Replace Link if bent. The holes in this link are round but may become elongated with wear. Measure longest dimensions of both holes in Link (2-16). Replace if longest dimension of the smaller hole exceeds 0.382 inch (9.70 mm) and larger hole exceeds 0.505 inch (12.83 mm).
- C. Dust Cap (1-2) - Inspect for continued serviceability. Replace if required.
- D. Bearing (2-13) - Measure outside diameter and inside diameter of Bearing (2-13). The outside

diameter should not be less than 0.494 inch (12.55 mm) in the smallest dimension. The inside diameter should not be greater than 0.390 inch (9.91 mm) in the largest dimension. Replace Bearing (2-13) if either of these dimensions is exceeded.

**NOTE:**

This bearing was originally (for over 25 years) made of stainless steel. After evaluating complaints about its short life, the material was changed to a better bearing material, cast iron which has been dry-film lubricated. It is dark gray in color compared to a shiny stainless steel. This bearing will not perform its intended function if the Crank (2-20) is worn beyond the limits noted in the following paragraph. On a worn out crank, the bearing will become unsupported and crack quickly.

E. Crank (2-20) - Measure the diameter of the protrusion on the Crank (2-20) that mates with the Bearing (2-13). The diameter of the protrusion shall not be less than 0.365 inch (9.271 mm). Excessive wear of the protrusion will cause failure of the Bearing (2-13) as noted above. In addition, wear of the crank will increase the side load on the Poppet Shaft (2-15E) which results in catastrophic galling of the shaft and the shaft support in Body (2-5).

F. Poppet (2-15C) and Shaft (2-15 E) - Inspect sealing surface for nicks, scratches, or gouges that will cause leakage. Minor scratches may be repaired by polishing with abrasive cloth, 300 grid or finer. Measure Shaft (2-15E) through-hole largest diameter. Replace Poppet (2-15) or Shaft (2-15E) if through-hole largest diameter exceeds 0.382 inch (9.70 mm).

G. Lugs (2-33, 2-33A) - Measure diameter of hole through all 16 lugs. Reject all lugs with hole dimension greater than 0.163 inch (5.15 mm) in any direction. Use a new Lug (2-33, 2-33A) as a

template. Compare each Lug (2-33, 2-33A) to the new Lug (2-33, 2-33A). Reject all lugs with local wear exceeding 0.030 inch (0.76 mm) by comparison to the new Lug (2-33, 2-33A). Carefully inspect all remaining Lugs (2-33, 2-33A) for cracks or other damage. If any one lug should need replacing, best practice would be to replace all lugs to assure even loading across all 16 lugs when attached to a hydrant valve.

**Note:** Due to the breakaway force requirements of API/IP Specification 1584, the lugs have been re-designed & the actuating collar made stronger. KD64800-15 has the parts necessary to upgrade the Lugs (2-33 replaces 2-33A) & KD64800-16 upgrades the Lugs (2-33 replaces 2-33A) and contains the strengthened Collar Assy. with Bumper (items 2-27 & 2-28).

**CAUTION:**

Lug (2-33, 2-33A) failure can result in the coupler being ejected from the mating adapter. Replace any Lug (2-33, 2-33A) that is questionable.

H. Detent Pin (2-26) - Inspect diameter of end closest to Spring (2-31), annulus and 25° angle cam surface of pin for excess wear. Replace Detent Pin (2-26) with local wear in excess of 0.005 inch (0.125 mm) deep. It may be possible to prolong the life of the pin by rotating the pin such that any visible wear is not presented toward the Ball (2-30).

I. Lug Rings (2-32) - Inspect the four Lug Rings (2-32) for local wear. Replace rings where local wear has reduced local wire diameter below 0.149 inch (3.78 mm).

J. Ball Bearing (2-30) - Inspect Ball Bearing (2-30) for local wear or flat spots. Replace if any flat spots are observed.

K. Wave Washer (2-19) - Carefully inspect the Wave Washer (2-19) for cracks. Replace cracked Wave Washer (2-19). Check part to paragraph 5.5.G, Figure B.

L. Collar (2-27) - Inspect the 0.335 inch (9.5 mm) wide shoulder, located on the collar's inside diameter 1.36 inches (35.5 mm) from the collar's connection end, for local depressions in excess of 0.08 inch (2.0 mm) wide and 0.010 inch (0.25 mm) deep. Replace Collar (2-27) if any are found. The inside diameter of the Collar (2-27) that rubs against the outer diameter of the Body (2-5) will also wear. The amount of allowable wear of both parts together is checked by performing the "lift test" found in 9.5 and measuring the offset of the collar to the body housing. The "lift test" test should have been performed before disassembly of lower section,

but may be performed during the post assembly testing phase.

M. Body (2-5) - Inspect Body (2-5) for excessive wear, abrasions, gouges, cracks, etc. Pay particular attention to the area around the windows in which the Lugs (2-33, 2-33A) fit. If this area is cracked, replace the Body (2-5). Determine that the two pins shown in Figure 2 are in place. These pins are used to prevent rotation of the Lug Rings (2-32).

**CAUTION:**

If the pins are missing, rotation of the Lug Rings (2-32) will cause Lugs (2-33, 2-33A) to drop out and can cause a coupler disconnect.

N. Rigid Operating Handle (2-1) - Inspect the round surface of the Handle (2-1) and the adjacent surface of the Collar (2-27) that acts as the interlock for cracks, being bent, worn, etc. Replace damaged handle or Collar (2-27).

O. Folding Handle Assembly (1-B) - Inspect the round surface of the Handle Cam (1-10) and the adjacent surface of the Collar (2-27) that acts as the interlock for cracks, being bent, worn, etc. Replace damaged handle or Collar (2-27).

10.4 Female Half Quick Disconnect Assembly used with Option 2.

A. Balls (4-5) - Inspect the 24 Balls (4-5) for chips, flat spots, excess wear, etc. Replace as required.

B. Sleeve Assy (4-6) - Inspect inside of Sleeve Assy (4-10) for indication of brinelling or ball indentations at intersection of tapered surface with the constant inside diameter at ball lock area as well as for cracks, excessive abrasions or other damage. Replace if damaged or worn as described. Accurately measure the minor diameter of the Sleeve Assy (4-6). If the diameter measures greater than 4.293" (109.04 mm) replace it.

C. On the Male Half – check entrance diameter that mates the Female Half for damage or scratches, especially if leakage at the joint has been noted. If damaged, replace the part.

10.5 Disconnect Assembly used with Options 3 & 4.

A. Refer to SM60700-1 or SM60600 for instructions on inspection of the female halves of these disconnects.

B. On the Male Half for Option 4 (mates 60600 type coupler), check outer diameter that mates Teflon seal for damage of any kind that will cause the seal to leak. Replace part if scratches are present that may have caused the joint to leak. Replace Teflon Seal (6A-9) if needed.

10.6 Product Selection (Option C) (1-C) If Included

Inspect the Coupler Subassembly (1-5) to assure the correct number of Product Selection Bolts (1-C) are utilized (five) and that they are placed in the correct positions. The outer head of the bolts should be flush to 0.03 inch (0.76 mm) below the adjacent Collar (2-27) surface.

10.7 Carriage Assy (1-W)

Inspect all parts, for cracks, especially in the Strut (8-16), Casters (8-3) for excessive wear that will make rolling difficult, and the contact surfaces of the Latch (8-13) and Lever (8-10).

**WARNING:**

When operating the Carriage Assembly do not place hands onto any part of the unit except the Lever (8-10). Improper operation can result in injury to the hands.

Using a new Latch (8-13) as a guide, compare the contour of the new one to the one disassembled from the unit. If there is wear in excess of .030 inch (0.76 mm) it should be replaced.

Measure the distance on the Flange (8-9) between the centerline of the hole for the Shaft (8-7) to the surface that makes contact with the Latch (8-13). The dimension shall not exceed 1.04 inch (26.42 mm). The hole in the Flange (8-9) shall not be larger than 0.544 (13.818 mm).

Measure the Clevis Pin (8-15) diameter. It shall not be less than 0.370 inch (9.398 mm) in the area where the Latch (8-13) makes contact.

Measure the hole in the Latch (8-13). It shall not exceed 0.386 inch (9.804 mm).

Measure the diameter of the Shaft (8-7). It shall not be less than 0.485 inch (12.319 mm).

10.8 Pressure Control Elbow Assembly

Inspect all parts, especially sealing and seat surfaces, for scratches, nicks or gouges that can be causes for leakage or for operation problems.

Clean all parts prior to reassembly. Check the Housing (3-32) for excessive external wear that could lead to structural failure of the unit. On all parts except Inner Piston (3-26) and Outer Piston (3-11), use 320 grit paper to smooth and remove sharp edges. The outer diameters of both the Inner Piston (3-26) and the Outer Piston (3-11) can be polished to remove minor scratches by using a very fine emery cloth (600 grit) while the parts are rotated. **Do not** polish local areas of these diameters. By using the Shaft (3-22) as a fixture, both pistons can be installed in a portable drill held in a vise to achieve rotation. **Do not** break through the hard anodize surface of the part. If scratches are too pronounced, the parts should be replaced. Replace any part with damage exceeding 15% of local wall thickness.

Nuts (3-9) are self-locking types and once removed, they should be replaced with new nuts.

10.9 General Repair

A. Remove corrosion and minor damage from metal parts by polishing with abrasive cloth, 300 grid or finer. Apply chemical film (alodine 1200 or equivalent) to bared aluminum surfaces.

B. Cleaning - Clean all parts with clean solvent or fuel, using soft bristle brush and lint-free cloth. Air dry.

**WARNING:**

Use solvent or fuel in safe, well ventilated area only.

10.10 Replacement

A. General - Replace all parts found damaged beyond repair or found excessively worn during inspections above.

B. Recommended Replacements - Eaton recommends that the following parts, if present, be replaced at each overhaul regardless of condition:

Item No.	Part No.	Description	Used On
1-8*	29179	Spring	Option B - Folding Handle Assy (1-B) (Only if the item is disassembled).
1-19	MS29512-04	O-Ring	Options E, F, H, J, & R
1-20	MS29512-06	O-Ring	Options E, F, Std, H & J
2-10	MS29513-249	O-Ring	Coupler Assy (1-5)
2-11	202010	Cotter Pin	Coupler Assy (1-5)
2-15D	MS29513-037	O-Ring	Coupler Assy (1-5)
2-17	28755	Nose Seal	Coupler Assy (1-5)
2-18	209837-347	Quad Ring	Coupler Assy (1-5)
2-21	200103	Bearing Washer	Coupler Assy (1-5)

Item No.	Part No.	Description	Used On
2-22	203563	Bearing	Coupler Assy (1-5)
2-23	29221	Bearing	Coupler Assy (1-5)
2-25	MS29513-212	O-Ring	Coupler Assy (1-5)
3-5	MS29513-042	O-Ring	Pressure Control Assy (1-1)
3-7	220665	Seal	Pressure Control Assy (1-1)
3-8	MS29513-151	O-Ring	Pressure Control Assy (1-1)
3-13	MS29513-008	O-Ring	Pressure Control Assy (1-1)
3-15	203565	O-Ring	Pressure Control Assy (1-1)
3-16	221595**	Seal	Pressure Control Assy (1-1)
3-17	MS29513-038	O-Ring	Pressure Control Assy (1-1)
3-18	201201-231	O-Ring	Pressure Control Assy (1-1)
3-25	MS29513-012	O-Ring	Pressure Control Assy (1-1)
3-29	MS29513-134	O-Ring	Pressure Control Assy (1-1)
3-30A	200758	Seal	Pressure Control Assy (1-1)
3-31A	MS29513-129	O-Ring	Pressure Control Assy (1-1)
3-36	MS29512-04	O-Ring	Pressure Control Assy (1-1)
3-40	MS29513-010	O-Ring	Pressure Control Assy (1-1)
3-42	MS29513-115	O-Ring	Pressure Control Assy (1-1)
3-43	MS29513-009	O-Ring	Pressure Control Assy (1-1)
3-45	MS29512-08	Gasket	Pressure Control Assy (1-1)
3-47A	MS29513-006	O-Ring	Pressure Control Assy (1-1)
3-52	M83248/2-008	O-Ring	Pressure Control Assy (1-1)
3-53	MS29513-011	O-Ring	Pressure Control Assy (1-1)
4-11	220872	Wear Ring	All Option "2" QD (Figure 4)
4-12	MS29513-341	O-Ring	All Option "2" QD (Figure 4)
4-15	MS29513-045	O-Ring	Options 2N & P only. (Figure 4)
4-22	MS29513-041	O-Ring	All Option "2" QD (Figure 4)
5-5	MS29513-041	O-Ring	Option "3" QD (Figure 5)
5-7	201201-348	O-Ring	Option "3" only. (Figure 5)
6-5	MS29513-041	O-Ring	Option "4" QD (Figure 6)

\* Replace only if the Folding Handle Assy (1-B) has been disassembled.

\*\* See Note 6 in Section 14.0 if this seal is to be replaced to assure the correct one is used.

## 11.0 REASSEMBLY 11.1 General

Assembly is accomplished in essentially the reverse order of disassembly. The following paragraphs cover assembly of the major components, followed by final assembly of the complete Unit. **The use of power tools for reassembly is not recommended.**

Replace Spring (1-8) each time the handle is disassembled. Assemble the Handle (1-B) as follows:

A. Place the Cam (1-10) in small, soft-jawed vise.

### 11.2 Collar Stop Assembly (1-31)

A. Insert Pin (7-4) through Bracket (7-2), Collar Stop (7-1) and Torsion Spring (7-3). Position free ends of the Torsion Spring (7-3) as shown in Figure 7.

B. Install Cotter Pin (7-5).

C. Check that the Collar Stop (7-1) moves under pressure of the Torsion Spring (7-3) without sticking or binding.

#### **CAUTION:**

Do not over tighten vise and collapse or damage handle Cam (1-10).

B. Position new Spring (1-8) in clevis of Handle (1-11) and place both between clevis of Handle Cam (1-10). Note the orientation of the flat and slotted end on the Pin (1-6) in Figure 1 to assure correct reassembly. Insert Pin (1-6) through holes in Handle Cam (1-10) and Handle (1-11) and with end of Spring (1-8) hole over Pin (1-6) and

### 11.3 Folding Handle Assembly (Option B) (1-B)

balance of Spring (1-8) passing under Pin (1-6) and over Handle (1-11).

C. Fasten end of Spring (1-8) to Pin with pan head Screw (1-9).

D. Insert large blade screwdriver in clevis end of Pin (1-6) and wind Spring (1-8) in a counterclockwise direction.

E. When Spring (1-8) is wound, insert Cotter Pin (1-7) to lock Pin (1-6). Operate Handle Assembly (1-B) to fully unfolded position while inspecting the following:

1. Clearance between Spring (1-8) and adjacent face of Handle Cam (1-10) should occur throughout travel.
2. Clevis ends of Handle (1-11) should bottom on face of Handle Cam (1-10) with Handle Assembly (1-B) in extreme extended condition.

#### 11.4 Coupler Subassembly (1-5)

Replace all parts found defective in the inspections noted above with new or serviceable parts. Replace all parts specified in paragraph 10.10 with new parts. Lightly lubricate all O-Rings and threaded parts with petroleum jelly (Vaseline or equivalent).

A. If a new Bumper (2-28) is being utilized it is suggested that the Bumper (2-28) be heated to 150° - 160° (32° - 71° C) to soften it to make assembly to the Collar (2-27) easier. This can be accomplished in either an oven or in hot water, however, use caution.

#### **CAUTION:**

Do not overheat Bumper (2-28) or it will melt!

B. Assemble four (4) Lugs (2-33, 2-33A) to each of four (4) Lug Rings (2-32). Assemble the four Lug Rings (2-32) with Lugs (2-33, 2-33A) installed in groove in Body (2-5) so Lugs (2-33, 2-33A) mate with slots in Body (2-5). The end of one Lug Ring (2-32) should be positioned against the spiral pin pressed into Body (2-5) (See Detail on Figure 2). This pin is there to prevent the Lug Rings (2-32) from gradually rotating around during use and allowing the Lugs (2-33, 2-33A) to become dislodged.

C. Slide Collar (2-27) (with Bumper (2-28) attached) over Body (2-5) from the outlet end, capturing Lug Rings (2-32) and Lugs (2-33, 2-33A). Install large Retaining Ring (2-29) into groove in Body (2-5).

D. Lay unit thus far assembled on its side with Detent Pin (2-26) hole in bottom location. Slide Collar (2-27) all the way forward against the Retaining Ring (2-29). Insert Ball Bearing (2-30) into Detent Pin (2-26) hole, making certain that it

drops into the hole in the Body (2-5). Assemble Detent Spring (2-31) to Detent Pin (2-26). Place hardened rod of 5/32 inch (3.9 mm) or smaller diameter through hole at forward end of Detent Pin (2-26) and insert Detent Pin (2-26) and Spring (2-31) in hole in Body (2-5). Depress Detent Pin (2-26) as far as possible and while holding Detent Pin (2-26) depressed. Holding the hardened rod through the Detent Pin (2-26) to prevent turning, assemble the Detent Pin (2-26) to the Body (2-5) by installing Washers (2-35 & 36) and Bolt (2-34). Washer (2-35), the one with the smallest outside diameter, should be adjacent to the head of the Bolt. Remove hardened rod after Bolt (2-34) is tightened.

E. Install Bearing (2-22) into crank shaft bore from inside of Body (2-5). Install Shaft Bearing (2-23) into crank shaft bore from outside of Body (2-5). Place Bearing Washer (2-21) over Crank Shaft (2-20) and insert Crank Shaft (2-20) through bearings

F. Assemble one shaft seal Bearing (2-24), O-Ring (2-25) and second shaft seal Bearing (2-24) over Crank Shaft (2-20) from the outside and press these parts into the Body (2-5), exerting care that the O-Ring (2-25) is not pinched.

G. Position Wave Washer (2-19) into Body (2-5) bore. Assemble Quad Ring (2-18) over Seal (2-17) and press into Body (2-5) bore, capturing Wave Washer (2-19) and being careful that O-Ring (2-18) is not pinched.

H. If Poppet (2-15) was disassembled, reassemble at this time. Install O-Ring (2-15D) into the groove in Shaft (2-15E). Assemble Poppet (2-15C) onto part and retain with the four Screws (2-15B). Torque Screws to 10 ± 1 in.-lb. (128 kg-cm).

I. Insert Link (2-16) into Body (2-5) bore so Link (2-16) bump is in the bore's longest slot. Secure Poppet (2-15) to Link (2-16) with Pin (2-14) and press back into bore so Pin (2-14) is captured.

J. Slightly turn and work the largest hole in the Link (2-16) over lug of Crank Shaft (2-20). Place Bearing (2-13) through Link (2-16) and onto lug of Crank Shaft (2-20). Position Washer (2-12) over Bearing (2-13). Fasten Link (2-16) to Crank Shaft (2-20) with Cotter Pin (2-11).

#### **NOTE:**

The use of a standard headed cotter pin in lieu of the correct part number specified will present a problem when the Coupler Subassembly (1-5) is utilized as a part of Pressure Control Coupler 64800.

K. If a pre-disassembly check of wear to the Collar (2-27) and the Body (2-5) was not performed, then a post-assembly check using the

Wear Gauge, 61362, and a "lift test" will be required to determine if the collective wear between the Collar (2-27) and Body (2-5) is less than allowable. Perform the check described in paragraph 9.5.

If the unit fails the gauge check, it will be necessary to disassemble the unit sufficiently to replace the Collar (2-27). If after the Collar (2-27) has been replaced and the unit still fails the gauge check, it will be necessary to replace the Body (2-5).

L. Install Woodruff Key (2-9) and Handle (2-1 or 1-B) onto Crank Shaft (2-20). Fasten Handle (2-1 or 1-B) with Washer (2-8), Lock Washer (2-7) and Bolt (2-6). Torque Bolt (2-6) to  $90 \pm 10$  in.-lb. ( $104 \pm 12$  kg-cm).

## 11.5 Pressure Control Elbow Assembly (1-1)

### 11.5.1 Assembly

Replace all parts found defective in the inspection of paragraph 10.7. Replace all parts specified in paragraph 10.10 with new parts. Lightly lubricate all O-Rings (exception: O-Ring (3-8) and O-Ring (3-31A) [old seal cartridge design] to be installed dry) and threaded parts with petroleum jelly (Vaseline or equivalent). Refer to Figure 3 and proceed as follows:

A. Install Screen (3-34) and secure with Retaining Ring (3-33) in Housing (3-32).

B. One O-Ring (3-29) should be placed into the seal cavity in the Housing (3-32). Install the Inner Piston Seals (3-30) into Seal Housing Retainer (3-31) so that the "spring" is visible from both sides of the Retainer (3-31). Place the assembled seals and retainer into the Housing (3-32), on O-Ring (3-29) previously inserted in seal cavity. The O-Ring should seat in the outer groove of Retainer (3-31). Take second O-Ring (3-29) and place it in the visible outer groove of Retainer (3-31). Using the Seal Housing (3-28) to apply pressure needed to seat O-Rings (3-29) in the grooves of Retainer (3-31), position Seal Housing (3-28) so the "notched" area aligns with the flow path orifice in the Housing (3-32). This alignment minimizes the obstruction to the flow path. When properly positioned, secure Seal Housing (3-28) in place with the Screws (3-27). Reference Figure 11.0.

Note: It is not necessary to condition the newly designed seals by polishing them with the run-in tool as with the previous seal cartridges.

C. Place O-Rings (3-47A) onto Tube (3-47) and lubricate thoroughly. Insert one end of this assembly into Housing (3-28) until seated. It is very important that the connector tube be properly positioned and seated, refer to Figure 3.0.

D. Place Outer Piston (3-11) onto the appropriate end of Shaft (3-22). Hold loosely in place with Washer (3-10) and Nut (3-9). Use two thin 3/8-24-UNF-2B nuts as jam nuts at opposite end of Shaft (3-22) while torquing Nut (3-9) to 195 - 205 in.-lb. (225 - 236 kg-cm). Remove the jam nuts.

Note: Anytime Nuts (3-9) are removed after initial installation, they should be replaced with new Nuts.

E. Install O-Ring (3-15) and piston shaft Seal (3-16) into the bore in the Retainer (3-14) with the Seal (3-16) shoulder facing toward the open end of the Retainer (3-14). (On older units, the end opposite the flanged end will have a tapered end that is split. It is designed to be snapped into place for retention.) Attach Spring Guide (3-19) with the Screws (3-19A). Slide seal Retainer (3-14) and attaching parts onto the long end of Shaft (3-22). Install Washer (3-20) over Spring Guide (3-19). Insert Washers (3-23) into Inner Piston (3-26), a small amount of petroleum jelly will hold these in place. Place Washer (3-24) and O-Ring (3-25) on free end of Shaft (3-22). Install Spring (3-21) over shaft (3-22). Place Inner Piston (3-26) over free end of Spring (3-21). Use clamp or arbor press as described in section 9.3 to compress Spring (3-21). Use care not to damage threads on shaft (3-22).

#### **CAUTION:**

Be very careful to properly center the slots in the clamp tips and to adjust the two clamp screws evenly so the bars remain essentially parallel while compressing the spring. The piston Spring (3-21) force is between 50 and 55 lbs. when the Shaft (3-22) has entered Inner Piston (3-26) and the Inner Piston (3-26) is bottomed on Washer (3-16).

Install second Washer (3-10). Install second self locking Nut (3-9) and torque to 195 - 205 in.-lb. (225 - 236 kg-cm) while holding the other self locking Nut (3-9) with an open end wrench to react the torque.

F. Install O-Ring (3-8) (DO NOT LUBRICATE WITH PETROLATUM) into the seal groove near outlet of Housing (3-32). O-Ring should be positioned in the groove on the edge nearest the outlet flange. Carefully install Outer Piston Seal (3-7) over O-Ring (3-8). The seal has an L-shaped lip and O-Ring (3-8) should be positioned to rest against the lip of the Outer Piston Seal. Apply a very thin film of petroleum jelly over the visible surface of the Seal (3-7).

G. If present, install O-Ring (3-5) into groove on Seal Housing (3-4). Secure Seal Housing (3-4) into

main Housing (3-32) with Screws (3-6). See Note number 7 Section 14.0.

H. Remove the piston assembly assembly from the clamp. Place four O-Rings (3-13) and Screws (3-12) in the piston seal Retainer (3-14).

I. Grasp this assembly by Outer Piston (3-11) struts and carefully insert into Housing (3-32) through the outlet until Outer Piston (3-11) has entered outer piston Seal (3-7) and the piston seat Retainer (3-14) has begun to enter the Housing (3-32) pilot diameter.

**NOTE:**

Inspect Retainer (3-14) to determine the location of the Connector Tube (3-47) which is the relief valve hole. Rotate the Retainer (3-14) if necessary so that the Tube (3-47) lines up with the recess in Housing (3-32) which is in the quadrant toward the Housing (3-32) inlet. Once aligned properly continue to press entry of the Retainer (3-14) to seat the O-Ring (3-25) on the tube.

J. Tighten four Screws (3-12) with the four O-Rings (3-13) securing Retainer (3-14) to Housing (3-32). Torque to  $19 \pm 2$  in.-lb. ( $21.9 + 2$  kg-cm).

K. Verify that air orifice Screw (3-37) has been cleaned. Install Spring (3-38) into slanted hole in the top of Housing (3-32) then insert Screw (3-37). Use an Allen key to tighten Screw (3-37) to bottom out. Then back out Screw 3-4 complete turns. This should adjust closing time to approximately 2.5 to 3 seconds. Finer adjustment may be necessary during test.

Place O-Ring (3-36) onto Plug (3-35) and install Plug (3-35) finger tight into the appropriate port on top of the Coupler. Plug (3-35) will need to be removed during test to adjust for closing time after which it should be tightened.

L. Place Spring (3-46) into opening at the top of the Coupler. Install O-Ring (3-43) into the groove in Check Valve (3-44) and install on top of Spring (3-46). Put Gasket (3-45) and O-Ring (3-42) into their respective grooves in Check Valve Housing (3-41) and install it into the Housing (3-32). Place O-Ring (3-40) onto Screw (3-39) and install it into the Check Valve Housing (3-41).

M. Reinstall appropriate fittings and O-Rings as required into the air and fuel ports.

N. Reassembly of Old-Style Relief Valve (3-60): Place Spring (3-63) over Spring Slide (3-64). Compress Spring (3-63) with Washer (3-62) until slot in Slide (3-64) is visible above the Washer (3-62). Insert Shaft (3-61) into center hole of assembled parts until the hole in the Shaft (3-61) can be aligned with the slot in Slide (3-64). Insert Pin (3-65) through Slide (3-64) and Shaft (3-61)

and release the Spring (3-63) to arrive at Shaft Assy (3-60). Assemble locking Nut (3-59) and O-Ring (3-53) to pressure relief adjusting Screw (3-58). Slide Screw (3-58) over pressure relief Shaft Assembly (3-60). Assemble O-Ring (3-52) to seal Retainer (3-51) and slide seal Retainer over Shaft Assembly (3-60) until it bottoms on the shaft shoulder. Hold the pressure relief Shaft Assembly (3-60) in one hand and install Washer (3-50) and self-locking Nut (3-49). Do not tighten Nut (3-49) at this time.

O. Place Spring (3-57) over pilot of seal Retainer (3-51) and insert in the hole in the Housing (3-32) inlet. With the locking Nut (3-59) loose, tighten pressure relief adjusting Screw (3-58). Adjust the screw until the sum of a depth micrometer measurement from the head of the Shaft Assembly (3-60) to a parallel bar placed across the Housing (3-32) inlet plus the parallel bar thickness is 1.725 - 1.755 inches (43.8 - 44.6 mm). Then torque locking Nut (3-49) to 230 - 250 in.-lb. (265 - 288 kg-cm).

Example: If parallel bar is measured and found to be exactly 0.500 inch (12.7 mm), then depth micrometer reading should be 1.225 - 1.255 inch (31.1 - 31.9 mm) when relief valve adjustment is within the required limits.

P. Reassembly of New-Style Relief Valve (3-48): Place Spring (3-55) over Shaft (3-56). Slip new O-Ring (3-53) over the top of the Body (3-54) and into the groove. Install new O-Ring (3-52) into the bottom of the Seal Retainer (3-51) and install on Body (3-54). Place the Body assy (3-54) on the Shaft (3-56) compressing the Spring (3-55). Washer (3-50) slips over threaded top of Shaft (3-56), install Nut (3-49) on to the assembled unit and tighten.

Q. Install the assembled Relief Valve (3-48) in the hole in the Housing (3-32) inlet. Then torque the Relief Valve to 230 - 250 in.-lb. (265 - 288 kg-cm). With the 47698 Relief Valve Assy. (3-48) there is no need to measure and adjust the relief valve in the control elbow the way the old-style relief valve assembly requires.

Note: KD64800-14 contains the item (3-48) to complete this upgrade. The new assembly supersedes items (3-57) thru (3-65) found in figure 3.

#### 11.5.2 Preliminary Functional Test

True proof pressure, functional and leakage tests are conducted in conjunction with test of the complete coupler, paragraph 12.0. It is well to conduct several tests at this stage of assembly however, before additional assembly labor is expended.

A. Hold the assembly in the hands and place the end of the pressure Relief Shaft Assembly (3-48) or (3-60) against a flat, sturdy surface. Press with enough force to compress the relief valve spring (opening the relief valve) and release

(allowing the relief valve to close) several times. If adjustable, then recheck the relief valve adjustment measurement as described in step O of paragraph 11.5.1. The relief valve adjustment should not change and the relief valve should not stick open.

B. Apply and relieve 60 psig air pressure to the air port several times. The Outer Piston (3-11) should open fully with each pressure application and fully close as pressure is relieved. There should be no indication of stickiness or hang-up in either direction.

#### 11.6 Female Half Quick Disconnect (1-H, K-N, P, Q & S)

##### **For use with Option "2" – (See Figure 4)**

A. Male Half – Replace O-Ring (4-22) onto Adapter (4-18). If removed, replace Wire Race (4-19) in the grooves on Adapter (4-18). Install Male Half onto Housing (3-32) using the eight Screws (4-20) and Washers (4-21). Torque to  $90 \pm 10$  in.-lb. ( $104 \pm 12$  kg-cm.).

B. Female Half – If removed replace the Stop Pin (4-7) and Latches (4-8) and Springs (4-9). One of the holes, for the Pin (4-7), is larger than the other to allow easier installation. Push the Pin (4-7) into the larger hole and into one leg of the Latch (4-8). Push the Spring (4-9) under the Latch (4-8), with the open ends of the Spring (4-9) against the Sleeve (4-10), until the Pin (4-7) can be inserted into the coil diameter and on into the other hole of the Latch (4-8). Locate the other hole in the Sleeve Assy (4-6) and drive the Pin into it for approximately 0.25 (6.35 mm). After replacement actuate them to check for binding.

On some early Option 2Q, the 2" NPT inlet was achieved by inserting a bushing into the standard 2 1/2" thread. If necessary on these units replace the Bushing (4-23) (not available through Eaton. Refer to Figure 4 and Section 14.0, Note 5).

**On 2, 2 1/2 and 3" units** – When installing the Sleeve Assy (4-6), Spring (4-4) and Balls (4-5) it is recommended that the balls be coated with petroleum jelly to retain them in the holes in the Body (4-1). Place Balls into Body (4-1) and slide Sleeve Assembly (4-6) onto Body (4-1) to retain Balls (4-5). Place Spring (4-4) into Sleeve Assembly (4-6) and over Body (4-1). Depress Spring (4-4) with Spring Retainer (4-3) to expose the groove in Body (4-1). Insert Retainer Ring (4-2) into groove and release Spring Retainer (4-3) to capture Ring (4-2). Check locking action of Latches (4-8) by depressing both together and sliding Sleeve Assembly (4-6) toward the threaded end of the Body (4-1). If the latches are not depressed the sleeve assembly should not be capable of being moved to the open position.

Carefully overlap the ends of the Wear Rings (4-11) and replace both in the groove in the Body (4-1) with O-Ring (4-12) assembled between the rings.

**On the 4" units** – Follow the same procedure as above except after placing the Spring (4-4) over the Body (4-16) retain the entire assembly using the Fitting (4-14). First place O-Ring (4-15) in the groove in the Body (4-16). Secure the fitting with the 12 Screws (4-13).

#### 11.6.1 Female Half Quick Disconnects Options L-N P, Q & R

Information on the female portion of the quick disconnects used on options "3" & "4" is available in either SM60700-1 or SM60600. Replace all parts found defective in the inspection procedures above.

#### 11.7 Male Half Quick Disconnects Options 2-4

Replace all parts found defective in the inspection procedures above.

##### 11.7.1 Option "2" – See Figure 4

Refer to paragraph A of 11.6

##### 11.7.2 Option "3" – See Figure 5

Replace, if removed, Wire Race (5-2) in the grooves in the Adapter (5-1). It is recommended that the split in the rings not line up when final assembly is completed. Replace O-Ring (5-5) onto the shoulder end of the part and O-Ring (5-7) onto Adapter (5-1). It is now ready for final assembly.

##### 11.7.3 Option "4" – See Figure 6

Replace, if removed, Wire Race (6-2) in the grooves in the Adapter (6-1). It is recommended that the split in the rings not line up when final assembly is completed. Place O-Ring (6-5) onto shoulder of Adapter (6-1). It is now ready for final assembly.

#### 11.8 Carriage Assy (1-W)

Place the feet of the Strut (8-16) in a soft jawed vise to hold it firmly with the feet flat on the work bench. Install Latch (8-13), Clevis Pin (8-15), Washers (8-12) and Cotter Pin (8-14) into Strut (8-16). Install one Screw (8-4) and Washer (8-5) onto Shaft (8-7). Place two Washers (8-6) onto Shaft (8-7) and then place Shaft (8-7) through one hole of the Flange (8-9) and Lever (8-10). Place another Washer (8-6) between the Lever (8-10) and Strut (8-16). Place this sub-assembly into position with the Strut (8-16) and the Spring (8-8). The straight tang of the Spring (8-8) is to be placed in the hole in the Strut (8-16).

#### **WARNING:**

Be very careful during the next phase of the assembly. The Spring (8-8) is very strongly loaded and could cause injury if not controlled properly.



Grasp the Spring (8-8) with a pair of battery pliers (channel locks) with the straight tang toward the left. Using a pair of vise grips in the right hand grasp the spring and rotate the spring until the bent tang is approximately into position under the Flange (8-9). Holding the Spring (8-8) with the vise grips, push the Shaft (8-7) through the Spring (8-8) to engage the other hole of the Strut (8-16) and on through the other parts. Note that one Washer (8-6) should be placed between the Strut (8-16) and Lever (8-10) and between the Lever (8-10). Install two Washers (8-6) onto Shaft (8-7). Fasten in place with the other Screw (8-4) and Washer (8-5).

Install Spring (8-11) and Washer (8-12) into recess in Strut (8-16).

**WARNING:**

If Carriage Assy (1-W) is latched when it is not attached to the unit, unlatching may cause serious injury. Be very careful in unlatching the Carriage Assy (1-W) in this position.

11.9 Final Assembly

Verify that the Coupler Subassembly (1-5), the Female Half Quick Disconnect (1-H, K-N, P, Q or S), Elbow Assembly (1-1) and the Collar Stop

Assembly (1-31) have been overhauled and reassembled.

A. Assemble O-Ring (2-10) onto the outlet of the Coupler (1-5).

B. Assemble Pressure Control Elbow Assembly (1-1) to Coupler Assembly (1-5) while being careful that the O-Ring (2-10) is not pinched. Fasten, along with Collar Stop Assembly (1-31), using six Nuts (3-3), Washers (3-2) and tab of Dust Cap (1-2) beneath one Nut (3-3). Place Collar Stop Assembly (1-31) under two Nuts (3-3) as shown in Figure 9. Lockwire Nuts (3-3) if desired using Lockwire (1-D). Nuts (3-3) should be torqued to  $90 \pm 10$  in.-lb. ( $104 \pm 12$  kg-cm).

C. Options 3 or 4 - Install the Female Half Quick Disconnect (hose half) to the Male Half (part of the Elbow Assembly (1-1). Refer to SM60700-1 or 60600 as appropriate for instructions. For Options M or N (BSPP threads) install a proper sized gasket (not furnished by Eaton) in the proper position. Use the wrench flats on the Female Half housing on the female half to tighten the unit to the hose.

D. If the Carriage Assy (1-W) is utilized it is reinstalled in accordance with Figure 10 using the existing hardware Nuts (3-2) and Washers (3-3). No installation kits are required.

**12.0 TESTING**

12.1 Test Equipment

The following test equipment is required:

- Inlet test adapter conforming to API Bulletin 1584 with pressure equalization valve such as Eaton's Carter brand Model 60505D or 61526D.
- Outlet test adapter to mate pipe threads in outlet.
- 0-300 psig fuel or test solvent pressure source.
- 0-125 psig air pressure source.
- Shutoff valves, regulators, pressure gauges, and other miscellaneous test equipment.

12.2 Test Conditions

Test media shall be JP-4, Jet A or odorless kerosene, commercial solvent 140.

12.3 Functional Test

A. With the Collar (2-27) retracted (Unit not attached to an adapter and closed), verify that the opening Handle (1-B or 2-1) cannot be rotated to the open position.

B. Depress and release the Detent Pin (2-26) several times to verify that the pin promptly

extends and locks the Collar (2-27) each time it is released. Rotate the Detent Pin (2-26) in  $90^\circ$  increments and repeat this operation at each position to verify that there is no position at which the Detent Pin (2-26) hangs retracted.

C. With the Collar (2-27) retracted, place the Coupler squarely over an unpressurized, vented Model 60505D or 61526D Adapter so the face of the adapter depresses the Detent Pin (2-26). The Collar (2-27) should drop freely in a positive manner into the engaged position with no hesitation, sticking or binding. With the Collar (2-27) extended, it should be impossible to separate the Unit from the test adapter. Retract the Collar (2-27), depressing the Collar Lock Assembly (1-31), if present, at the same time, and lift the Unit off of the adapter. The Detent Pin (2-26) should extend and prevent extension of the Collar (2-27).

D. Repeat C several times. Then, engage the Unit to the adapter and open and close the Poppet (2-15) by rotating the operating Handle (2-1 or 1-B), while verifying that it is not possible to retract the Collar (2-27) with the Handle (2-1 or 1-B) in any position but the fully closed position. The Collar Stop Assembly (1-31) should automatically engage the Collar (2-27) each time the Collar (2-27) becomes extended preventing the retraction of the Collar (2-27) until it is manually depressed.

E. Repeat D several times. Then, retract the Collar (2-27) and separate the Unit from the adapter. Verify that the Detent Pin (2-26) has extended and locked the Collar (2-27) in the retracted position, Verify that the Poppet (2-15) can not be opened with the Collar (2-27) retracted.

#### 12.4 Proof And Leakage Test - Detached

A. With the Unit not attached to an adapter, apply 5 psig fluid pressure to the outlet of the Unit and 60 psig air pressure to the deadman air connection and maintain for one minute. Observe the Unit for external and or seal leakage. Then relieve the applied pressures.

B. There shall be no indication of external leakage through any joints or through the nose seal during the test.

#### 12.5 Proof And Leakage Test - Engaged

A. Connect the **outlet, inlet and fuel sense port** to an available fluid pressure source of 0-300 psig. Means to allow bleeding of the outlet should be provided (include a tee in the outlet with a bleed valve or similar means). The test adapter shall have a manually controlled shutoff valve attached to its inlet. Connect a 0-125 psig air pressure source to the Unit's deadman connection.

B. Open the Unit's Poppet (2-15) using Handle (2-1 or 1-B).

C. Apply 60 psig air pressure to the deadman connection.

D. Fill the test Unit and adapter with liquid while bleeding all air through the valve at the adapter inlet. (Rotate the test setup so the adapter and its valve are at the high point while bleeding air.) The pressure sense port must also be filled with test fluid and bled of all trapped air by opening the bleed screw on the top of the elbow. Once bleeding has been completed retighten the screw.

E. Simultaneously increase the test fluid pressure to 300-psig to the sense port, inlet and outlet and maintain for one minute while inspecting the Unit for indications of external leakage.

F. Reduce the test pressure to 5 psig and repeat step E.

G. There shall be no indication of external leakage, permanent deformation or set during or after the above test.

H. Reduce the test pressures to 0 psi. Close the Poppet (2-15) and disengage the Unit from the test adapter.

#### 12.6 Internal Leakage And Functional Test

A. Connect the test fluid pressure source to the test adapter inlet. Connect the test Unit to the adapter and open the Poppet (2-15). Remove the Unit's outlet test adapter and place the Unit such

that its outlet is in an upward position. Connect the 0-125 psig air source to the Unit's deadman connection through a three-way valve.

B. Squeeze and release the deadman air valve several times, applying and venting 60 psig air pressure, while observing the movement of the Outer Piston (3-11). The Outer Piston (3-11) shall fully open with each application of air and fully close each time the air is vented.

C. With the air pressure applied, fill the test Unit with test fluid to a level above the Outer Piston Seal (3-7) and release the air pressure to close the Outer Piston (3-11). Drain the liquid from the Unit's outlet and increase the internal liquid pressure to 5 psig. Rotate the Unit such that any leakage from the unit can be collected in a beaker or other suitable measuring device and measure liquid leakage at the outlet for one minute. On a factory new Unit the leakage allowable from the Unit is 10 cc/min. An overhauled unit may have a leakage rate of up to 30 cc/min.

#### 12.7 Relief Valve Function

A. Using the same setup as above, deadman air relieved, test Unit filled and bled, place a shop rag or equivalent over the outlet to restrain relief valve flow.

#### **WARNING:**

Wear safety glasses or other eye protection during this test to prevent possible eye injury from test liquid exposure.

B. Apply 150 psig liquid pressure through the inlet test adapter. Then close the coupler poppet and apply a steady force in the closed direction while verifying that the coupler poppet shaft has opened the relief valve venting trapped liquid downstream of the Unit's piston seat (through the hole in the seal retainer) to allow coupler poppet closure.

C. Then disengage from the test adapter, open the Unit with deadman air pressure and drain all test liquid through the outlet.

#### 12.8 Flow Testing

##### 12.8.1 Installation

The unit should be installed in a test system equivalent to that shown in Figure C. Be sure the female half quick disconnect is connected. The air line may be connected, but prior to connecting fuel sense line to the coupler, contaminants and air should be flushed per 7.5.F thru I. The hydrant deadhead pressure shall be initially set at 120 psig.

##### 12.8.2 Coupler

Start the pump with the coupler poppet in the full closed position. Slowly open the poppet by rotating the poppet-operating handle counter-

clockwise. Some resistance will normally be felt when the handle has been rotated about 45 degrees. At this point, maintain some pressure against the poppet to allow the pressure equalizer valve (in the inlet test adapter) to fill and pressurize the unit. When the pressure has equalized, open the poppet fully. Check that the poppet opens fully without the handle striking the coupler collar which might prevent full over-center operation. Next, close the poppet to check for proper relief valve operation within the automatic fuel pressure control valve. Resistance to closing at about the 45 degree position (from full closed) is normal. However, when constant pressure is held against the handle, the relief valve should bleed fluid (internally) from the Unit, which will allow the handle to slowly close fully. Lift the collar and disconnect the coupler.

### 12.8.3 Pressure Control Testing

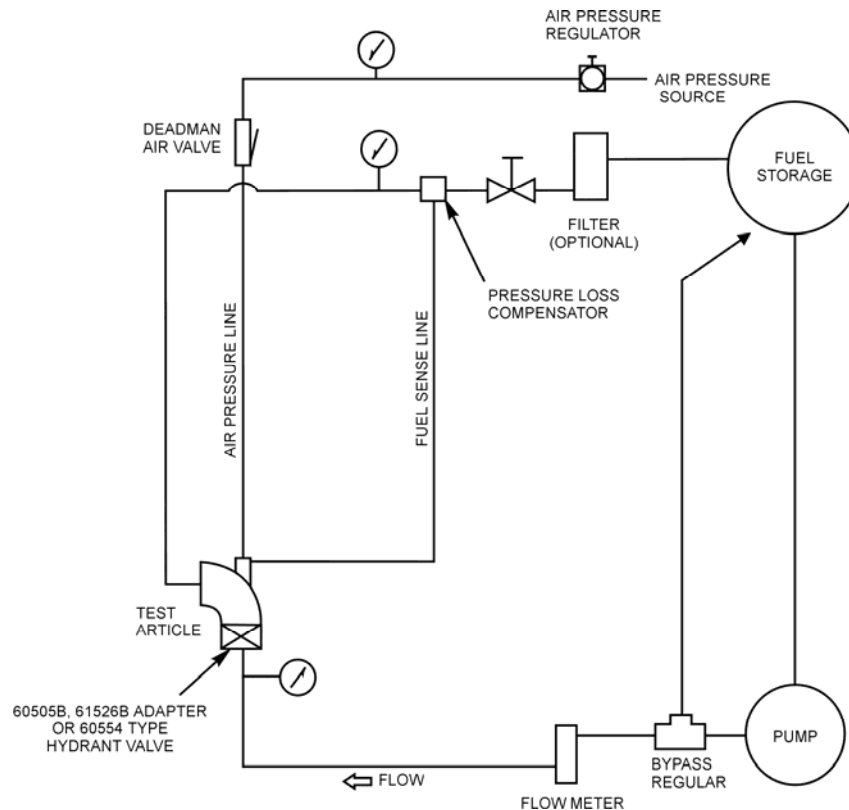
A. Open poppets on nozzles and the coupler poppet.

B. With the system valves open sufficiently to obtain approximately 800 gpm or maximum system flow rate, apply 75 psig deadman air pressure. The regulator should open and assume a pressure regulation. The fuel pressure regulation should be roughly 30psig less than the deadman air pressure. This is commonly referred to as bias pressure.

C. While flowing at approximately 600 gpm or maximum system flow rate, whichever is the lower, release the deadman air valve and measure the time required to reach zero flow. The time required should be between 2-5 seconds. Factory setting of a new coupler for closing time is  $3 \pm .5$ . Overshoot, the volume of fuel passing through the unit during closure shall not exceed 30 gallons at the 600 gpm flow rate. If the overshoot exceeds the allowable amount, the closing time can be readjusted by turning Screw (3-37) counter-clockwise to increase the orifice size.

Also measure the time required to open from zero flow to 540 gpm or maximum system flow rate, whichever is the lower. The units are set to open at approximate seven seconds; however, the specification allows opening times of from 5-10 seconds. This is not adjustable, but is slightly affected by the closing time adjustment on the newer units. The operating time will vary with system setup and adjustments but should be within the same range of times from unit to unit.

C. Throttle the system flow from 600 gpm flow to 0 flow in about 5 increments to stabilize at each flow rate. The stabilized pressure at the venturi should be 50 psig or less except it may be higher at shutoff if the flow is shutoff very rapidly. The regulated fuel pressure should be stable at all flow rates.



**FIGURE C**  
**SIMPLIFIED TEST SYSTEM SCHEMATIC DIAGRAM**

E. Close the nozzle poppets and apply deadman air to open the regulator against a locked out system. The locked in pressure should not exceed 75 psig and most units will lock in about 60-70 psig.

Squeeze the deadman and open flow to 600 US gpm or more. Release the deadman. The pressure control valve shall close and prevent leakage greater than 30 cc/min. Within 30 seconds of closing there shall be no audible squeal or buzz from the unit.

12.8.4 Dynamic Closing Leakage

With the deadman valve released and the nozzle poppets open, set the hydrant pressure to 150 psig.

12.9 Post Test Procedure

After removing unit from test system place on an adapter housing and open poppet to drain fuel.

**13.0 STORAGE**

If it is necessary to store the unit for any length of time, install the dust cap, if present, otherwise cover the inlet and outlet with a moisture barrier

paper or film to protect it from the effects of dust and high humidity.

**14.0 ILLUSTRATED PARTS CATALOG**

Tables 1.0 through 10.0 tabulate the parts and sub-assemblies comprising the 64800 Model Hydrant Pressure Control Coupler including all available options. The item numbers of the table are keyed to the exploded views or drawings shown in Figures 1 through 8.

**TABLE 1.0**  
64800 Coupler and Options

Fig.	Item	Part Number	Description	Units/ Assy	Coupler Option	Spares/10 Units/Yr
1	1	47173	Pressure Control Elbow Assy .....	1	All	-
	2	44660	Dust Cap.....	1	All	-
	3-4	Left blank intentionally				
	5	47245	Lower Half Coupler Assy .....	1	All	-
	Option B	41731	Folding Handle Assy.....	1	B	-
	6	29178	Pin.....	1	B	-
	7	MS9245-68	Cotter Pin.....	1	B	4
	8	29179	Spring.....	1	B	10
	9	MS51957-42	Screw .....	1	B	2
	10	29177	Handle Cam .....	1	B	1
	11	207355	Handle.....	1	B	-
	19	MS29512-04	O-Ring .....	1	All	10
	20	MS29512-06	O-Ring .....	1	All	10
	33	2405-4-4	Adapter – ¼" NPT to ¼" Female Straight Thd	1	Std & J only	-
	34	2405-6-6	Adapter – 3/8" NPT to 3/8" Female Straight Thd	1	Std & H only	-
	C	GF4-7A	Product Selection Set (41802).....	5	C	-
	Option D	GF20995C32	Lockwire – Fasteners .....	AR	D	Roll
	Option E	None	Adds QD (API 1584) for Air/Fuel Connections	-	E	-
	12	61498	Air/Fuel QD .....	1	E	-
	13	29736	Connector .....	1	E	-
	14	30182-4-6B	¼ NPT x 3/8" Hose Barb.....	1	E	-
	15	220906	¼" Hose .....	1	E	2
	16	220907	3/8" Hose .....	1	E	2
	17	30682-4-4B	¼" Hose Barb.....	1	E	-
	18	30682-6-6B	3/8" Hose Barb.....	1	E	-
	19	MS29512-04	O-Ring (Note 3).....	1	E	20
	20	MS29512-06	O-Ring.....	1	E	10

Fig.	Item	Part Number	Description	Units/ Assy	Coupler Option	Spares/10 Units/Yr
1	21	2403-4-4	¼" Union .....	1	E	-
	22	2403-6-6	3/8" Union .....	1	E	-
	Option R	None	Adds 90 degree elbow connection to side of coupler for air hose connection for use with hydrants.....			
	23	5504-4-4	Elbow .....	1	R	-
	32	2404-4-4	Adapter, ¼" Tube to NPT.....	1	R	-
	19	MS29512-04	Gasket.....	1	R	10
	26	GF51840-23	Plug .....	1	All but R	-
	19	MS29512-04	O-Ring .....	1	All but R	10
	Option F	None	Adds Hose Barb Fittings to Air/Fuel Ports .....			
	19	MS29512-04	O-Ring.....	1	F	10
	20	MS29512-06	O-Ring.....	1	F	10
	24	30382-4-4	¼" Hose Barb.....	1	F	-
	25	30382-6-6B	3/8" Hose Barb.....	1	F	-
	Option H	None	Adds 3/8" Female NPT Adapters to Air/Fuel Ports			
	34A	2405-4-6	Air Port Adapter – ¼" x 3/8" FNPT.....	1	H	-
	19	MS29512-04	O-Ring.....	1	H	20
	Option J	None	Adds 3/8" FNPT Adapter Fittings to Air/Fuel Sense Ports			
	33	2405-4-4	Adapter, ¼" NPT .....	1	J	-
	14	30182-4-6B	¼ NPT x 3/8" Hose Barb.....	1	J	-
	19	MS29512-04	O-Ring.....	1	J	20
8	Option W w/Option 2	60532	Carriage Assy. (Table 8).....	1	W	-
8	Option W w/Options 3 & 4	60532C	Carriage Assy. (Table 8).....	1	W	-
	Option X	220822	Clip, Safety .....	1	X	-
14	Option Y	47182	Adds Handle to outlet flange of control unit (Table 9	1	Y	-
1	Option Z	47214	Handle, Optional Coaxial Carrying .....	1	Z	-
	27	220993	Handle.....	1	Z	1
	28	GF16998-43	Screw .....	2	Z	-
	29	5702-517-30	Washer.....	2	Z	-
1, 13	30	47186	Handle, Standard Transverse Carrying.....	1	All	-
	1	220969	Plate.....	2	All	-
	2	GF960C516L	Washer.....	6	All	-
	3	GF18153-31	Screw .....	4	All	-
	4	GF35207-296	Screw .....	2	All	-
	5	220970	Bar .....	1	All	-
	6	220971	Grip .....	2	All	4
1	31	44140	Collar Stop Assy (Table 7).....	1	All	-
1, 4	Option 2	47198	3" Male Adapter Assembly – mates standard swivel disconnect (Table 4) .....	1	2	-
		47152-4	Female QD Assembly, 2 ½" NPT (Table 4).....	1	2H	-
		47152-3	Female QD Assembly, 2 ½" BSPP (Table 4) .....	1	2K	-
		47152-2	Female QD Assembly, 3" NPT (Table 4).....	1	2L	-
1		47152-1	Female QD Assembly, 3" BSPP (Table 4) .....	1	2M	-
		47292-1	Female QD Assembly, 4" BSPP (Table 4) .....	1	2N	-
		47292-2	Female QD Assembly, 4" NPT (Table 4).....	1	2P	-
		47152-5	Female QD Assembly, 2" NPT (Table 4).....	1	2Q	-
		47152-6	Female QD Assembly, 2" BSPP (Table 4) .....	1	2S	-
1, 5	Option 3	47274	4" Male Adapter Assembly to mate 60700-1 type QD (Table 5).....	1	3	-

Fig.	Item	Part Number	Description	Units/ Assy	Coupler Option	Spares/10 Units/Yr
		41730-3	Female QD Assembly, 3" NPT (Table 5).....	1	3L	-
		41730-4	Female QD Assembly, 3" BSPP (Table 5) .....	1	3M	-
		41730-2	Female QD Assembly, 4" BSPP (Table 5) .....	1	3N	-
		41730-1	Female QD Assembly, 4" NPT (Table 5).....	1	3P	-
		60740	Female QD Assembly, 4"-8 NPSC (Table 5).....	1	3R	-
1, 6	Option 4	47275	Male Adapter Assembly to mate 60600/ 60600-1 (except option K) type QD (Table 6)	1	4	-
		44220-1	Female QD Assembly, 3" NPT (Table 6).....	1	4L	-
		44220-2	Female QD Assembly, 3" BSPP (Table 6) .....	1	4M	-
		44220-4	Female QD Assembly, 4" BSPP (Table 6) .....	1	4N	-
		44220-3	Female QD Assembly, 4" NPT (Table 6).....	1	4P	-

Kit Part Number	Description
KD64800-1	Kit - Contains all soft goods (seals) and other necessary parts to overhaul a complete 64800 Coupler with option "2" QD. Contains items – 1-19, 1-20, 2-10, 2-11, 2-13, 2-15D, 2-17, 2-18, 2-22, 2-23, 2-24, 2-25, 2-28, 2-33, 3-5, 3-7, 3-8, 3-13, 3-15, 3-16, 3-17, 3-18, 3-25, 3-29, 3-32, 3-36,3-42, 3-40, 3-43, 3-47A, 3-52, 3-53, 4-11, 4-12, 4-15 & 4-22.
KD64800-2	Kit – Contains all soft goods (seals) and other necessary parts to overhaul a 64800 Coupler with option "3" QD. Contains items - 1-19, 1-20, 2-10, 2-11, 2-13, 2-15D, 2-17, 2-18, 2-22, 2-23, 2-24, 2-25, 2-28, 2-33, 3-5, 3-7, 3-8, 3-13, 3-15, 3-16, 3-17, 3-18, 3-25, 3-29, 3-32, 3-36, 3-40, 3-42, 3-43, 3-47A, 3-52, 3-53, 5-5, & 5-7.
KD64800-3	Kit – Contains all soft goods (seals) and other necessary parts to overhaul a 64800 Coupler with option "4" QD. Contains items -1-19, 1-20, 2-10, 2-11, 2-13, 2-15D, 2-17, 2-18, 2-22, 2-23, 2-24, 2-25, 2-28, 2-33, 3-5, 3-7, 3-8, 3-13, 3-15, 3-16, 3-17, 3-18, 3-25, 3-29, 3-32, 3-36, 3-40, 3-42, 3-43, 3-47A, 3-52, 3-53, 6-5 & 220552.
KD64800-4	Kit – Contains all soft goods (seals) and other necessary parts to overhaul the 47173 Pressure Control Elbow for the 64800 Coupler that includes option "2". Contains items - 1-19, 1-20, 3-5, 3-7, 3-8, 3-13, 3-15, 3-16, 3-17, 3-18, 3-25, 3-29, 3-32, 3-36, 3-42, 3-40, 3-47A, 3-52, 3-53, 4-11, 4-12, 4-15 & 4-22.
KD64800-5	Kit – Contains all soft goods (seals) and other necessary parts to overhaul the 47173 Pressure Control Elbow for the 64800 Coupler that includes option "3". Contains items - 1-19, 1-20, 3-5, 3-7, 3-8, 3-13, 3-15, 3-16, 3-17, 3-18, 3-25, 3-29, 3-32, 3-36, 3-40, 3-42, 3-47A, 3-52, 3-53, 5-5, & 5-7.
KD64800-6	Kit – Contains all soft goods (seals) and other necessary parts to overhaul the 47173 Pressure Control Elbow for the 64800 Coupler that includes option "4". Contains items - 1-19, 1-20, 3-5, 3-7, 3-8, 3-13, 3-15, 3-16, 3-17, 3-18, 3-25, 3-29, 3-32, 3-36, 3-40, 3-42, 3-47A, 3-52, 3-53, 6-5 & 220552.
KD64800-7	Kit – Contains all soft goods (seals) and other necessary parts to overhaul the 61525 Lower Half Coupler Assembly for the 64800 Coupler. Contains items – 1-19, 1-20, 2-10, 2-13, 2-17, 2-18, 2-22, 2-23 2-24, 2-25, 2-28, 2-33.
KD64800-8	Kit – Contains all parts necessary to convert 60700-1 or 60600 Couplers to 64800 with NPT Fittings for Air and Fuel Sense connections.
KD64800-9	Kit – Contains all parts necessary to convert 60700-1 or 60600 Couplers to 64800 with hose barb fittings for Air and Fuel Sense connections.
KD64800-10	Kit – Contains all parts necessary to convert 60700-1 or 60600 Couplers to 64800 with 61498 Male Single Point Air & Fuel Sense Connection to mate Whittaker F571.
KD64800-11	Kit- Contains the assembly part necessary to upgrade old style Inner Piston Seal to assembly part number 47348. It comes as one assembled unit containing these items – 3-9, 3-10, 3-11, 3-14, 3-15, 3-16, 3-19, 3-19A, 3-20, 3-21, 3-22, 3-23, 3-24, 3-25, & 3-26.
KD64800-13	Kit – Contains the parts necessary to upgrade the coupler seal cartridge assembly (recommended). Does not contain the inner piston seal(s) 3-30. Contains items- 3-28 & 3-31.
KD64800-14	Kit – Contains the part necessary to upgrade the coupler relief valve assembly (recommended). Contains item(s) – 3-48 assembly part number 47698.

- KD64800-15 Kit – Contains parts necessary to upgrade the Latching Lugs of the Lower Half of the 64800 Coupler to be compliant with the breakaway force requirements of API/IP Specification 1584, 3<sup>rd</sup> Edition. Contains item (2-33).
- KD64800-16 Kit – Contains parts necessary to upgrade the Latching Lugs of the 61525 Lower Half of the 64800 Coupler to be compliant with the breakaway force requirements of API/IP Specification 1584, 3<sup>rd</sup> Edition and strengthened Actuating Collar. (Note: Bumper will be assembled to the Collar prior to shipment.) Contains items – 47695 (2-27replacement), 2-28 & 2-33.

TABLE 2.0  
Lower Coupler Half

Fig.	Item	Part Number	Description	Units/ Assy	Coupler Option	Spares/10 Units/Yr
2	1	207494	Handle.....	1	All but B	2
	5-36	47245	Coupler, Lwr Half w/o handle.....	1	All	-
	2-4	Left intentionally blank				
	5	43945	Body.....	1	All	-
	6	GF4-4A	Bolt.....	1	All	-
	7	GF35338-44	Lockwasher.....	1	All	-
	8	28781	Washer.....	1	All	-
	9	201286	Key.....	1	All	-
	10	MS29513-249	O-Ring.....	1	All	10
	11	202010	Cotter Pin.....	1	All	10
	12	NAS1169C10	Washer.....	1	All	-
	13	28765	Bearing.....	1	All	5
	14	210004	Pin.....	1	All	1
	15	47064-1	Poppet Assembly.....	1	All	1
	15B	LP57G82P8	Screw.....	4	All	1
	15C	220276	Poppet.....	1	All	1
	15D	MS29513-037	O-Ring.....	1	All	10
	15E	220275	Shaft.....	1	All	1
	16	209601	Link.....	1	All	1
	17	28755	Seal, Nose.....	1	All	10
	18	209837-347	Quad Ring.....	1	All	10
	19	210587	Wave Washer.....	1	All	-
	20	209996	Crank Shaft.....	1	All	-
	21	200103	Washer.....	1	All	2
	22	203563	Bearing.....	1	All	10
	23	29221	Bearing.....	1	All	10
	24	29216	Bearing.....	2	All	20
	25	MS29513-212	O-Ring.....	1	All	10
	26	200689	Detent Pin.....	1	All	-
	27	47695	Collar Assy.....	1	All	1
	28	28928	Bumper.....	1	All	5
	29	RR-800-S	Retaining Ring.....	1	All	-
	30	GF19060-4815	Ball.....	1	All	-
	31	28763	Spring.....	1	All	-
	32	28760	Lug Ring.....	4	All	4
	33	221860	Lug (3 <sup>rd</sup> edition).....	16	All but A	16
	33A	200688	Lug (2 <sup>nd</sup> edition)	16	A	16
	34	GF3-3A	Bolt.....	1	All	-
	35	GF960C10L	Washer.....	1	All	-
	36	GF35333-39	Lockwasher.....	1	All	-

TABLE 3.0  
Pressure Control Elbow Assy

Fig.	Item	Part Number	Description	Units/ Assy	Coupler Option	Spares/10 Units/Yr
1	1	47173	Pressure Control Elbow Assy.....	1	All	1
3	1	221321	Stud.....	6	All	-
		GF35338-45	Washer.....	6	All	-
	3	GF9882-11	Nut	6	All	-
	4	220961	Housing, Seal (older units*).....	1	Note 7	-
	5	MS29513-042	O-Ring (older units*).....	1	Note 7	10
	6	GF16997-18	Screws (older units*)	6	Note 7	-
	7	220665	Seal, Outer Piston.....	1	All	10
	8	MS29513-151	O-Ring.....	1	All	10
	-	47348	Piston Assembly.....	1	Note 6	-
	9	50FK-624	Nut.....	2	Note 6	-
	10	GF960C616L	Washer.....	2	Note 6	-
	11	220666	Piston, Outer.....	1	Note 6	3
	12	220685-1250	Screw.....	4	Note 6	-
	13	MS29513-008	O-Ring.....	4	Note 6	40
	14	221641	Retainer, Piston Seal.....	1	Note 6	-
	14*	220963	Retainer, Piston Seal (older units*).....	1	Note 6	-
	15	203565	O-Ring.....	1	Note 6	10
	16	221595	Seal.....	1	Note 6	10
	16*	200770	Seal (older units*).....	1	Note 6	10
	17	MS29513-038	O-Ring.....	1	All	10
	18	201201-231	O-Ring.....	1	All	10
	19	221594	Guide, Spring.....	1	Note 6	-
	19*	200879	Guide, Spring (older units*).....	1	Note 6	-
	19A	NAS1351C04-4	Screw.....	6	Note 6	-
	20	5610-381-50	Washer, Teflon.....	1	All	-
	21	200757	Spring.....	1	Note 6	-
	22	202290	Shaft.....	1	Note 6	-
	23	5720-158-25	Washer, Bronze.....	2	All	-
	24	202291	Washer.....	1	Note 6	-
	25	MS29513-012	O-Ring.....	1	Note 6	10
	26	200759	Piston, Inner.....	1	Note 6	3
	27	GF16997-32L	Screw.....	4	All	-
	Items 28A, 30A & 31A have been superseded by items 28, 30 & 31					
	28	222161	Retainer, Seal.....	1	All	-
	29	MS29513-134	O-Ring.....	2	All	20
	30	222165	Seal, Inner Piston.....	2	All	20
	31	222160	Seal Housing.....	1	All	-
	28A	221307	Seal, Housing.....	1	All	-
	29	MS29513-134	O-Ring.....	2	All	20
	30A	200758	Seal, Inner Piston.....	2	All	20
	31A	MS29513-129	O-Ring.....	2	All	20
	32	47196	Housing Assembly.....	1	All	-
	33	N5000-43-H	Ring.....	1	All	-
	34	7-1F60	Filter.....	1	All	-
	35	GF51840-23	Plug.....	1	All	-
	36	MS29512-04	O-Ring.....	1	All	10
	37	220413	Screw, Closing Time Adjustment (Note 6)	1	All	-
	38	C0300-030-0500S	Spring (Note 6).....	1	All	-
	39	GF35206-276	Screw.....	1	All	-
	40	MS29513-010	O-Ring.....	1	All	10
	41	220848	Housing, Check Valve.....	1	All	-
	42	MS29513-115	O-Ring.....	1	All	10



Fig.	Item	Part Number	Description	Units/ Assy	Coupler Option	Spares/10 Units/Yr
3	43	MS29513-009	O-Ring .....	1	All	10
	44	200788	Check Valve .....	1	All	-
	45	MS29512-08	Gasket .....	1	All	10
	46	200791	Spring .....	1	All	-
	47	220962	Tube, Connector.....	1	All	-
	47A	MS29513-006	O-Ring .....	2	All	20
	48	47698	Pressure Relief Valve Assy.....	1	All	1
	49	GF21083C04	Nut .....	1	All	-
	50	NAS620C4	Washer .....	1	All	-
	51	29555	Retainer, Seal.....	1	All	-
	52	M83248/2-008	O-Ring .....	1	All	10
	53	MS29513-011	O-Ring .....	1	All	10
	54	222130	Body .....	1	All	-
	55	71429S	Spring .....	1	All	-
	56	222131	Shaft.....	1	All	-
	Items 57-65 have been superseded by item 48 p/n 47698 above					
	57	29436	Spring .....	1	All	-
	58	200752	Screw, Pressure Relief Adj.....	1	All	-
	59	200761	Nut.....	1	All	-
	60	44229	Shaft Assy, Pressure Relief.....	1	All	-
	61	221605	Shaft.....	1	All	-
	62	221934	Retainer.....	1	All	-
	63	207519	Spring .....	1	All	-
	64	221606	Slide .....	1	All	-
	65	MS16562-194	Pin .....	1	All	-

TABLE 4.0  
Option "2" Quick Disconnect Assy.

Fig	Item	Part Number	Description	Units/ Assy	Coupler Option	Spares/10 Units/Yr
4	1	47152-4	Female Half, QD, 2 ½" NPT .....	1	2H	-
		220876-4	Body, Coupling, 2 ½" NPT .....	1	2H	-
	1	47152-3	Female Half, QD, 2 ½" BSPP .....	1	2K	-
		220876-3	Body, Coupling, 2 ½" BSPP.....	1	2K	-
	1	47152-2	Female Half, QD, 3" NPT .....	1	2L	-
		220876-2	Body, Coupling, 3" NPT .....	1	2L	-
	1	47152-1	Female Half, QD, 3" BSPP .....	1	2M	-
		220876-1	Body, Coupling, 3" BSPP.....	1	2M	-
	16	47291	Body, Coupling .....	1	2N, 2P	-
	1	47292-1	Female Half, QD 4" BSPP .....	1	2N	-
	14	221163-1	Female Half, Fitting 4" BSPP .....	1	2N	-
	1	47292-2	Female Half, QD 4" NPT.....	1	2P	-
	14	221163-2	Female Half, Fitting 4" NPT .....	1	2P	-
	1	47152-5	Female Half, QD, 2" NPT (Note 5) .....	1	2Q	-
		220876-5	Body, Coupling, 2" NPT .....	1	2Q	-
	1	47152-6	Female Half, QD, 2" BSPP .....	1	2S	-
		220876-6	Body, Coupling, 2" BSPP.....	1	2S	-
	2	200924	Ring, Retaining .....	1	All "2" but 2N,P	-
	3	220874	Retainer, Spring.....	1	All "2" but 2N,P	-
	4	220873	Spring.....	1	All "2"	-
	5	GF19060-4818	Ball .....	16	All "2"	-
	6	No Part Number	Sleeve Assy .....	1	All "2"	-
	7	210151-3	Pin.....	2	All "2"	-
	8	209885	Lever .....	2	All "2"	-
	9	209946	Spring .....	2	All "2"	-
	10	220871	Sleeve.....	1	All "2"	-
	11	220872	Wear Ring.....	2	All "2"	20
	12	MS29513-341	O-Ring.....	1	All "2"	10
	1	47292-1	Female Half, QD, 4" BSPP .....	1	2N	-
	13	NAS1352N3-8	Screw .....	12	2N, P	-
	15	MS29513-045	O-Ring.....	1	2N,P	10
	6	No Part Number	Sleeve Assy .....	1	All "2"	-
	7	210151-3	Pin.....	2	All "2"	-
8	209885	Lever .....	2	All "2"	-	
9	209946	Spring .....	2	All "2"	-	
10	220871	Sleeve.....	1	All "2"	-	
11	220872	Wear Ring .....	2	All "2"	20	
12	MS29513-341	O-Ring.....	1	All "2"	10	
1	47292-2	Female Half, QD, 4" NPT .....	1	2P	-	
13	NAS1351N3-8	Screw .....	12	2N, P	-	
14	221163-1	Fitting .....	1	2P	-	
15	MS29513-045	O-Ring.....	1	2N,P	10	
16	47291	Body, Coupling.....	1	2N, P	-	
4	220873	Spring.....	1	All "2"	-	
5	GF19060-4818	Ball .....	16	All "2"	-	

Fig	Item	Part Number	Description	Units/ Assy	Coupler Option	Spares/10 Units/Yr
4	6	No Part Number	Sleeve Assy .....	1	All "2"	-
	7	210151-3	Pin.....	2	All "2"	-
	8	209885	Lever.....	2	All "2"	-
	9	209946	Spring .....	2	All "2"	-
	10	220871	Sleeve.....	1	All "2"	-
	11	220872	Wear Ring.....	2	All "2"	20
	12	MS29513-341	O-Ring.....	1	All "2"	10
	17	47198	Adapter Assembly, Male Half .....	1	All "2"	-
	18	220890	Adapter, Male Half .....	1	All "2"	-
	19	200923	Wire Race .....	2	All "2"	-
	20	GF24673-12	Screw .....	8	All "2"	-
	21	5710-63-30	Washer.....	8	All "2"	-
	22	MS29513-041	O-Ring.....	1	All "2"	10
	23	No Part Number	Bushing.....	-	(Note 5)	-

TABLE 5.0  
Option "3" Quick Disconnect Assy

Fig.	Item	Part Number	Description	Units/ Assy	Coupler Option	Spares/10 Units/Yr
1	NA	41730-1 to -4	Female Half (Note 4).....	1	(Note 4)	-
	Option 3	47274	Adapter Assembly, Male QD .....	1	3	-
5	1	221141	Adapter.....	1	3	-
	2	28382	Wire Race .....	2	3	-
	3	GF9882-10	Nut.....	8	3	-
	4	GF35338-44	Washer.....	8	3	-
	5	MS29513-041	O-Ring.....	1	3	10
	6	GF565AC428H20	Set Screw.....	8	3	-
	7	201201-348	O-Ring.....	1	3	10

TABLE 5A  
Female Half QD to mate Option "3" Quick Disconnect Assy

Fig.	Item	Part Number	Description	Units/ Assy	Coupler Option	Spares/10 Units/Yr	
1	Option L	41730-3	Female Half – 3" NPT .....	1	L	-	
	Option M	41730-4	Female Half – 3" BSPP .....	1	M	-	
	Option N	41730-2	Female Half – 4" BSPP .....	1	N	-	
	Option P	41730-1	Female Half – 4" NPT .....	1	P	-	
	Option R	60740	Female Half – 4" NPSC	1	R	-	
5A	1	26961	Ring, Lock .....	1	3	-	
	2	GF35276-261	Screw .....	2	3	-	
	3	Left intentionally blank					
	4	28383	Retainer.....	1	3	-	
	5	27374	Housing - 3" NPT.....	1	3L	-	
		27377	Housing - 3" BSPP .....	1	3M	-	
		29174	Housing - 4" BSPP .....	1	3N	-	
29173		Housing - 4" NPT.....	1	3P	-		
60740		Housing - 4" NPSC.....	1	3R	-		
6	28779	Sleeve .....	1	3	-		
7	26962	Ring, Retainer .....	1	3	10		

TABLE 6.0  
Option "4" Quick Disconnect Assy

Fig.	Item	Part Number	Description	Units/ Assy	Coupler Option	Spares/10 Units/Yr
1	NA	44220-1 to -4	Female Half	1	(Note 4)	-
	Option 4	47275	Adapter Assembly, Male QD.....	1	4	-
6	1	221143	Adapter.....	1	4	-
	2	207483	Wire Race.....	2	4	-
	3	GF9882-10	Nut.....	8	4	-
	4	5710-63-30	Washer.....	8	4	-
	5	MS29513-041	O-Ring.....	1	4	10
	6	GF565AC428H20	Set Screw.....	8	4	-

TABLE 6A  
Female Half QD to mate Option "4" Quick Disconnect Assy

Fig.	Item	Part Number	Description	Units / Assy	Coupler Option	Spares/10 Units/Yr
1	Option L	44220-1	Female Half – 3" NPT .....	1	L	-
	Option M	44220-2	Female Half – 3" BSPP .....	1	M	-
	Option N	44220-4	Female Half – 4" BSPP .....	1	N	-
	Option P	44220-3	Female Half – 4" NPT .....	1	P	-
6A	1	26961	Ring, Lock .....	1	4	-
	2	GF35276-261	Screw .....	2	4	-
	3	Left intentionally blank				
	4	28383	Retainer.....	1	4	-
	5	207253-1	Housing – 3" NPT.....	1	4L	-
		207253-2	Housing – 3" BSPP .....	1	4M	-
		207253-4	Housing – 4" BSPP .....	1	4N	-
		207253-3	Housing – 4" NPT.....	1	4P	-
	6	26960	Sleeve .....	1	4	-
7	26962	Ring, Retainer .....	1	4	-	
8	GF19060-4818	Ball .....	24	4	-	
9	220552	Seal .....	1	4	10	

TABLE 7.0  
Collar Stop Assy

Fig.	Item	Part Number	Description	Units/ Assy	Coupler Option	Spares/10 Units/Yr
1	31	44140	Collar Stop Assy	1	All	-
7	1	207165	Stop .....	1	All	-
	2	207166	Bracket .....	1	All	-
	3	207167	Spring.....	1	All	1
	4	MS20392-2C63	Pin .....	1	All	-
	5	MS24665-151	Cotter Pin .....	1	All	2

TABLE 8.0  
60532 Carriage Assy, Option W

Fig.	Item	Part Number	Description	Units/ Assy	Coupler Option	Spares/10 Units/Yr
1	W	60532	Carriage Assy.....	1	W w/option 2	-
		60532C	Carriage Assy.....	1	W w/options 3 & 4	-
8	1	GF51971-4	Nut.....	2	W	-
	2	GF35338-47	Washer.....	2	W	-
	3	203577	Caster.....	2	W	-
	4	GF35206-296	Screw.....	2	W	-
	5	GF35333-41	Washer.....	2	W	-
	6	GF960-816L	Washer.....	6	W	-
	7	29745	Shaft.....	1	W	-
8	8	29663	Spring, Torsion.....	1	W	-
	9	29664	Flange.....	1	W/option 2	-
		47078	Flange Assy with Spacers.....	1	W/options 3 & 4	-
	10	201041	Lever.....	1	W	-
	11	29665	Spring.....	1	W	-
	12	GF960-616L	Washer.....	3	W	-
	13	29662	Latch.....	1	W	2
	14	GF9245-44	Cotter.....	1	W	-
	15	GF20392-5C73	Pin, Clevis.....	1	W	-
	16	29667	Strut.....	1	W	-

TABLE 9.0  
47182 Carrying Handle, Option "Y"

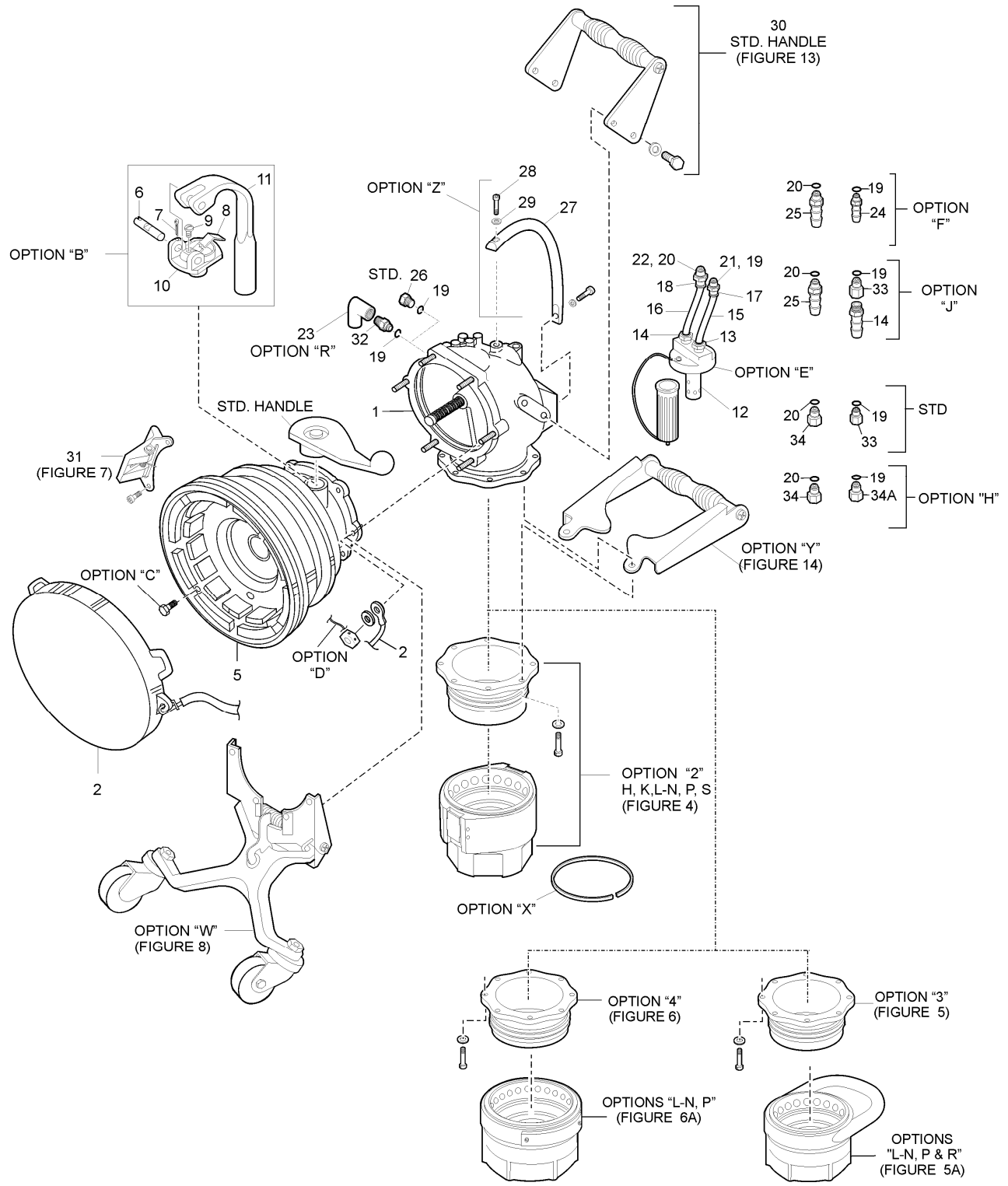
Fig.	Item	Part Number	Description	Units/ Assy	Coupler Option	Spares/10 Units/Yr
1	Y	47182	Carrying Handle Assy.....	1	Y	-
14	1	220972-2	Side Plate - 2.....	1	Y	-
	2	220972-1	Side Plate -1.....	1	Y	-
	3	220970	Bar, Handle.....	1	Y	-
	4	220971	Grip.....	2	Y	2
	5	GF960C516L	Washer.....	2	Y	-
	6	GF35207-296	Screw.....	2	Y	-

Table 10.0  
Torque Specifications 64800

Fig.	Item	Part Number	Description	Torque in.-lb.
2	6	GF4-4A	Bolt .....	90 ± 10 in.-lb. (104 ± 12 kg-cm)
2	15B	LP57G82P8	Screw(s) .....	10 ± 1 in.-lb. (11.5 ± 1 kg-cm)
3	1	221321	Stud(s) .....	90 ± 10 in.- lbs. (104 ± 12 kg-cm)
3	3	GF9882-11	Nut(s) .....	90 ± 10 in.-lb. (104 ± 12 kg-cm)
3	9	50FK-624	Nut(s) .....	195 ± 10 in.-lb. (225 ± 12 kg-cm)
3	12	220685-1250	Screw(s) .....	19 ± 2 in.- lb. (21.9 ± 2 kg-cm)

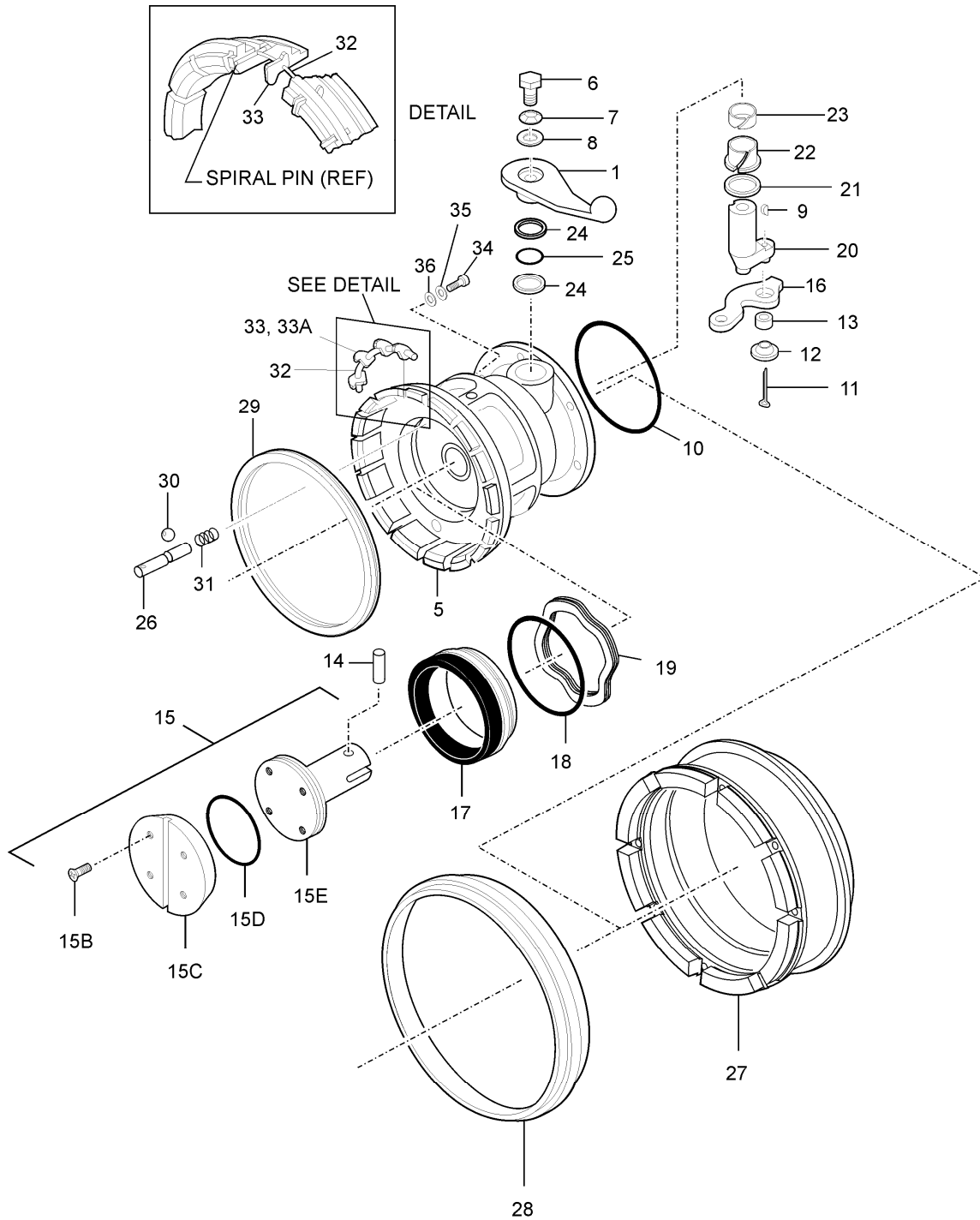
## Notes:

- 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 an "AN" part, otherwise it is interchangeable with an "MS" part of the same number.
- The recommended spare parts shown above are the number required to support 10 Units for one year. In addition it is advisable to keep a spare Coupler Subassembly (1-5) complete with the Elbow Assy (1-E or F) to interchange with any unit in the field that may exhibit a problem. 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.
- Plug, item 1-26 and Gasket item 1-19 are normally installed in all couplers. Item 1-23, elbow is provided for those users with air operated hydrants for ease of connection of the air system to the quick disconnect on the hydrant valve. Discard the parts not needed for your system.
- The Female Quick Disconnect Half is furnished as a part of a new coupler only when specified. When retrofitting an existing 60700-1, 60600 or 60600-1 Coupler to the 64800 Coupler, it is assumed the existing Female Half QD will be used. The information furnished here is for convenience keeping all information required for overhauling the coupler in one manual. The option letters furnished for the Female QD are referenced back to the basic coupler on which it was first sold. Note: Presently there is no male option on the 64800 to mate the "K" option of the 60600 or 60600-1 Couplers.
- Early Option 2Q units used a bushing in a standard 2H QD to reduce outlet to 2" NPT. This part is not available through Eaton.
- Early units (serial numbers prior to 483) had a Seal ( see 3-16) retained by a detent designed into the seal. An improved design was introduced in 2003 to make this seal retention more positive (especially where a defueling operation is used). On serial numbers 483 and subsequent, the Seal (3-16) was changed to be retained by the Spring Guide (3-19) itself held in place by 6 Screws (3-19A). The previous Seal (similar to 3-16) may or may not be available as a spare part. Kit KD64800-11 contains the Piston Assembly (47348) to upgrade the older units (recommended). Spring Guide (3-19) and Retainer (3-14) can be used interchangeably with the older (3-19\*) and (3-14\*) respectively. It is not recommended to use the new style Seal (3-16) with the old-style Spring Guide (3-19\*) or the old-style Retainer (3-14\*). The old-style Seal (3-16\*) may be used with either style of Spring Guide or Retainer. Once the coupler has been updated with the new style seal then subsequent replacements of the Seal (3-16) can be made with not further replacement of other parts.
- Early units utilized the Seal Housing (3-4), O-Ring (3-5) & Screws (3-6) (refer to shaded area of Figure 3). These items are no longer present on new units and are considered unnecessary to the overall performance of the unit.
- For information on obsolete parts for the older lower half coupler that has not been retrofitted see the manuals for the 60700-1, 60600, or 60600-1.

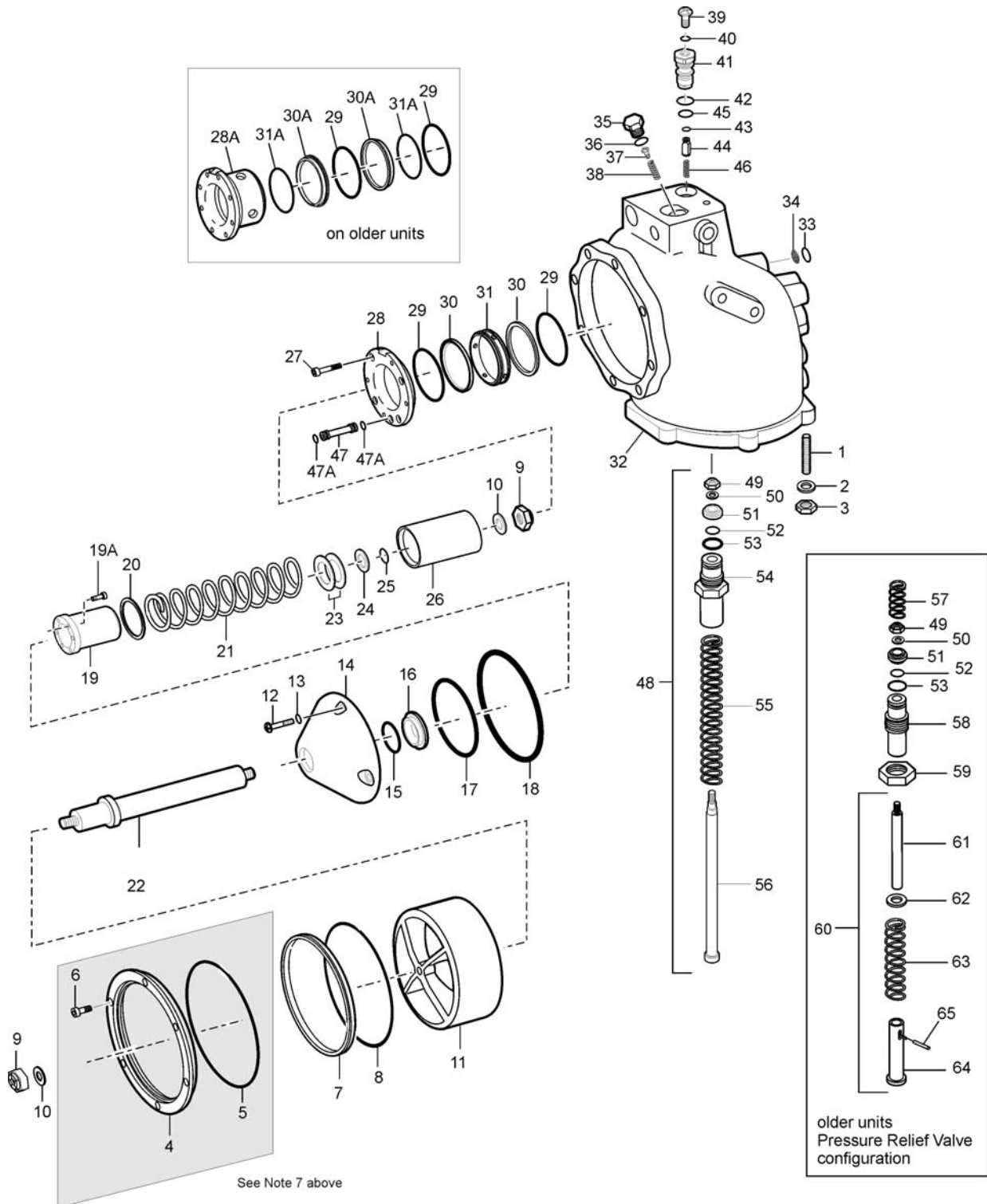


**FIGURE 1**  
**64800 HYDRANT COUPLER & OPTIONS**

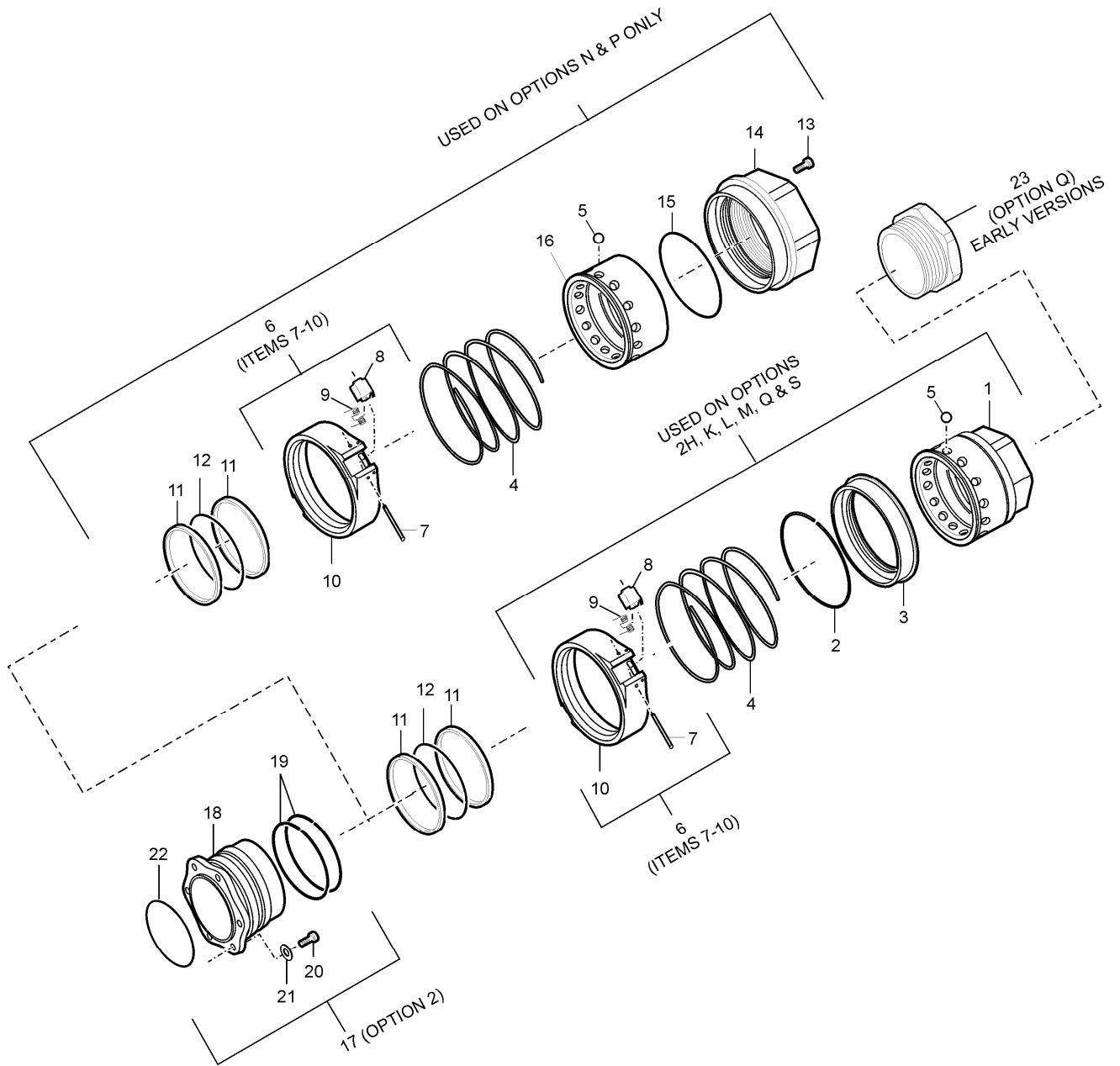




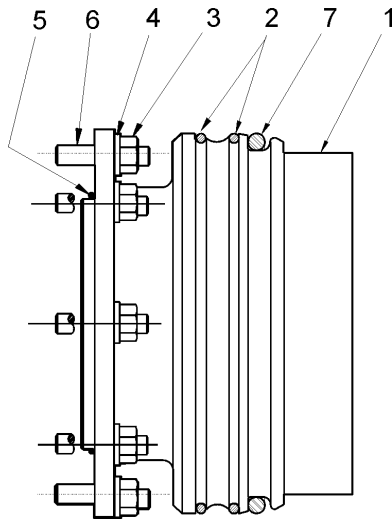
**FIGURE 2**  
**64800 LOWER COUPLER HALF ASSEMBLY**  
Note: Item 1 is not furnished as a part of spare Lower Half Coupler Assembly, 47245.



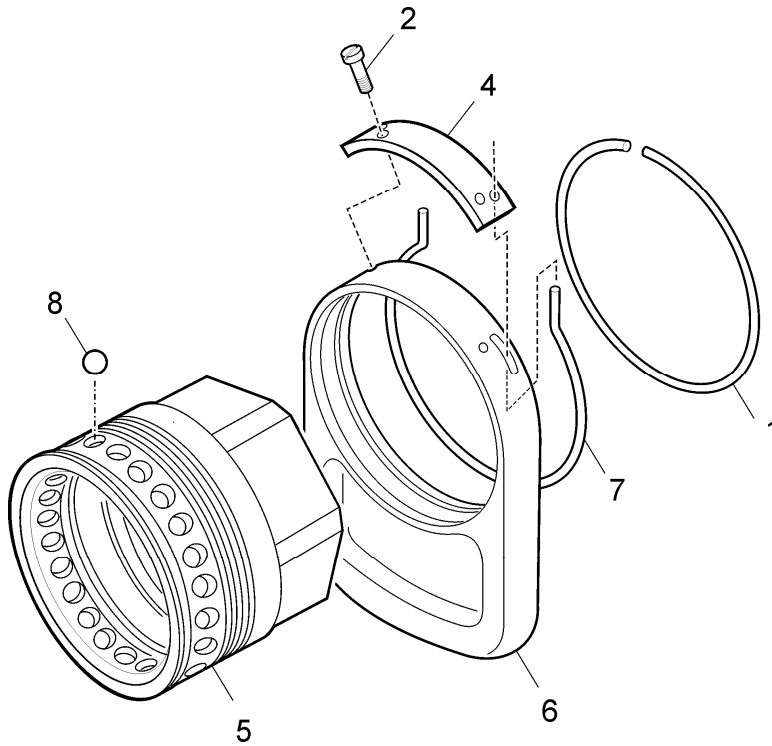
**FIGURE 3**  
**PRESSURE CONTROL ELBOW ASSY FOR 64800**



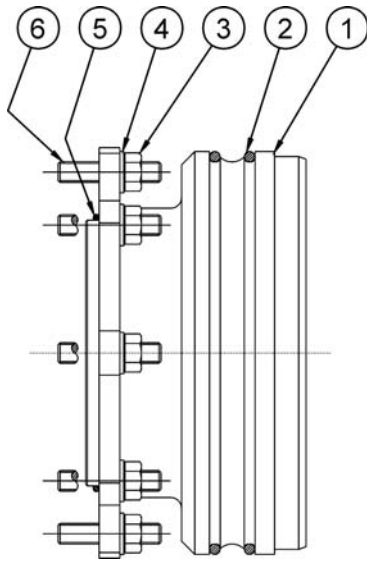
**FIGURE 4**  
**OPTION 2H, K-M, Q & S QUICK DISCONNECT ASSEMBLIES**



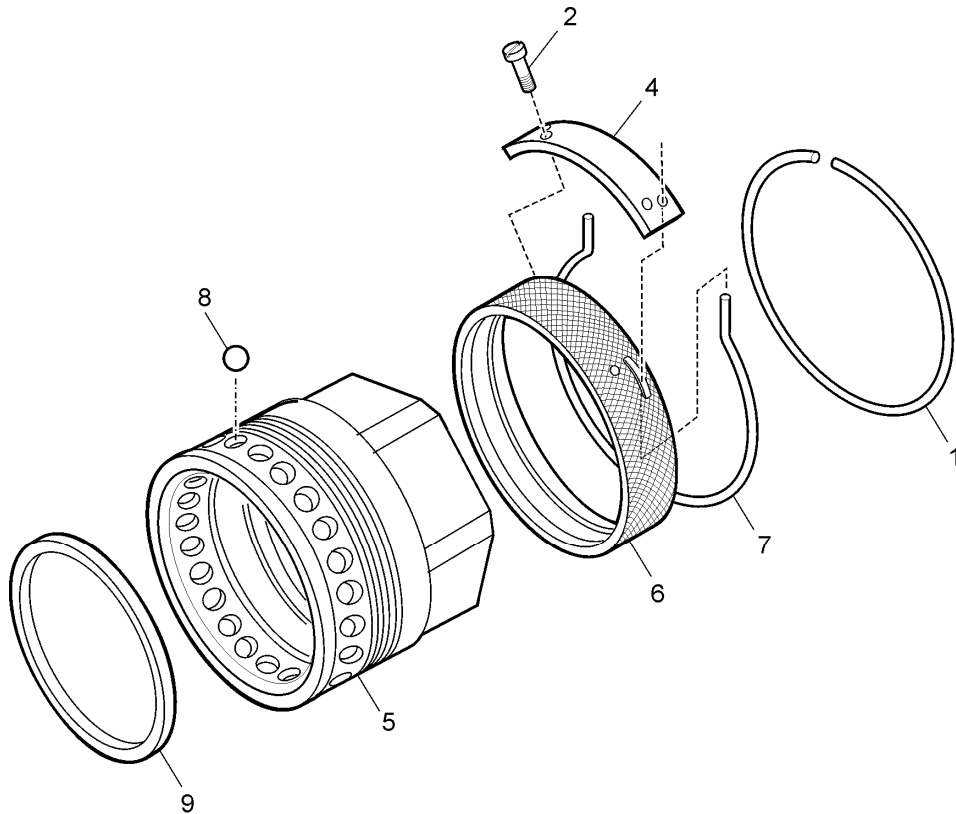
**FIGURE 5**  
**OPTION 3 QUICK DISCONNECT ASSEMBLIES**



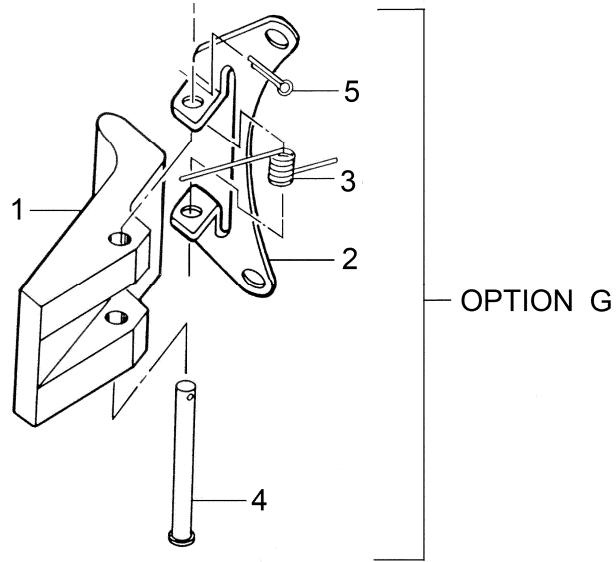
**FIGURE 5A**  
**OPTION 3 QUICK DISCONNECT ASSEMBLIES**



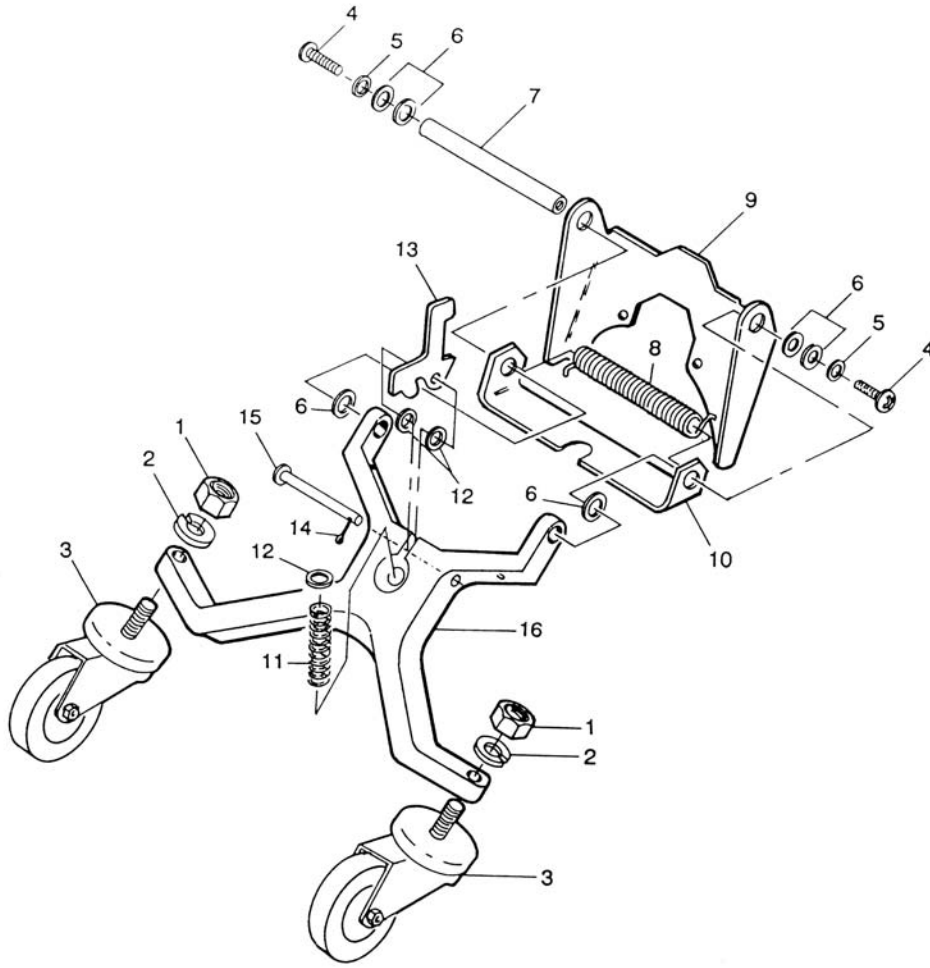
**FIGURE 6**  
**OPTION 4 QUICK DISCONNECT ASSEMBLIES**



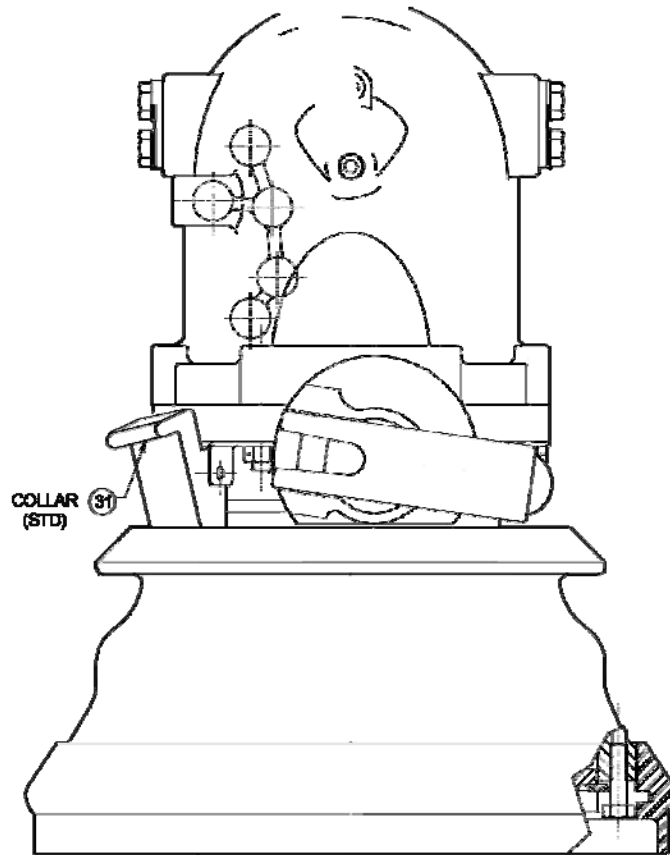
**FIGURE 6A**  
**OPTION 4 QUICK DISCONNECT ASSEMBLIES**



**FIGURE 7**  
**COLLAR STOP LOCK ASSEMBLY**



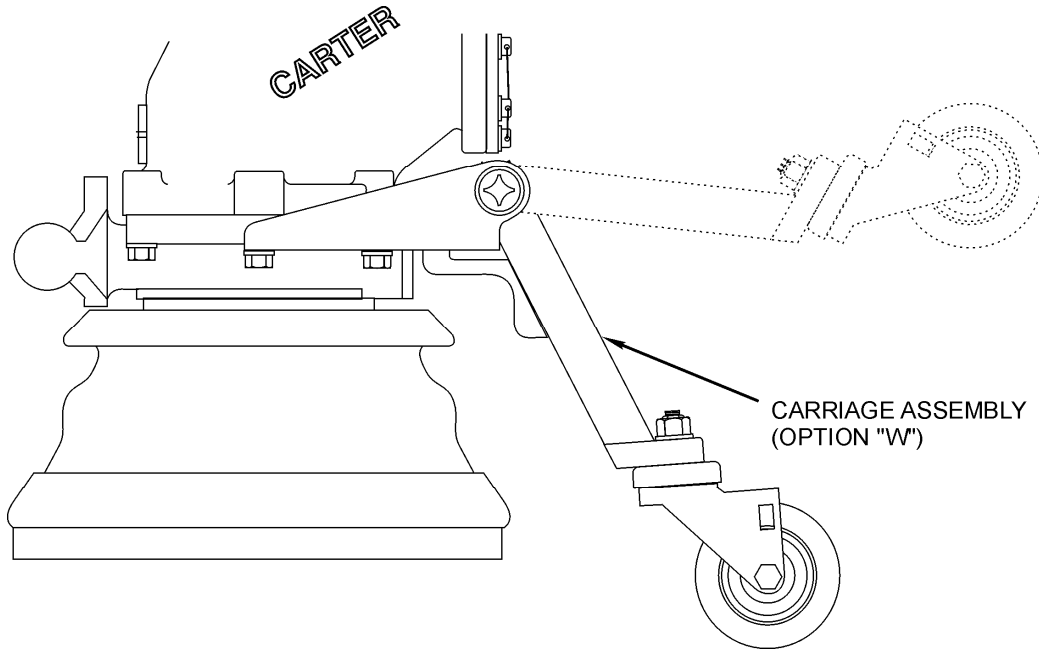
**FIGURE 8**  
**60532 CARRIAGE ASSEMBLY**  
**OPTION W TO 64800**



The Collar Lock Assembly is assembled to the coupler in location shown using two of the studs from the elbow assembly and the existing Nuts (3-3) and Washers (3-2).

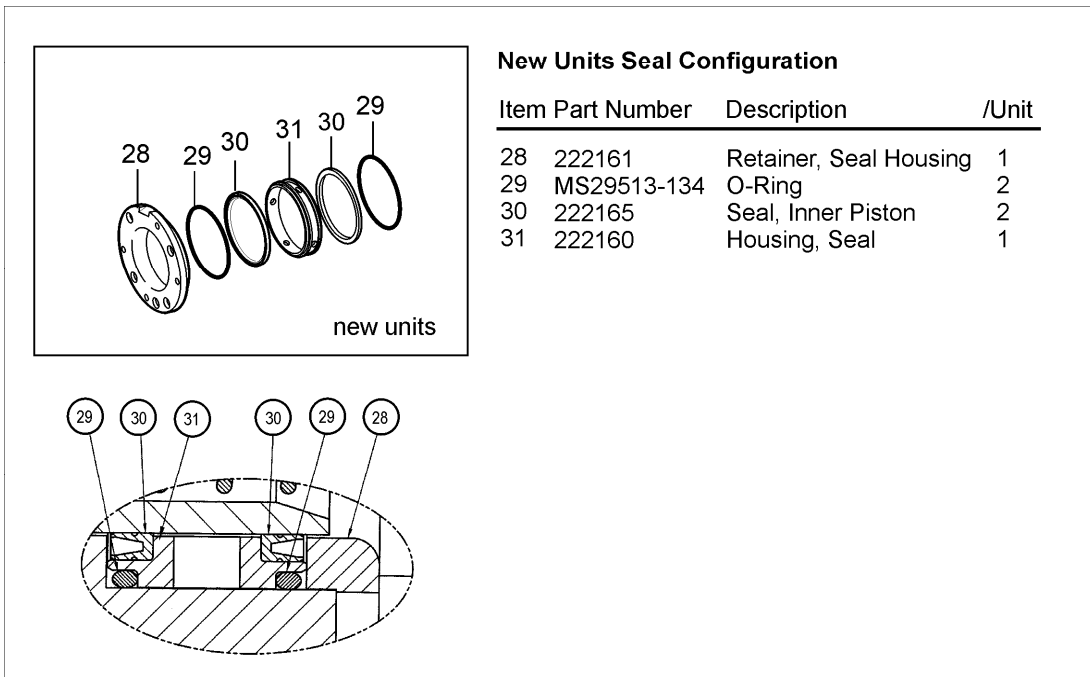
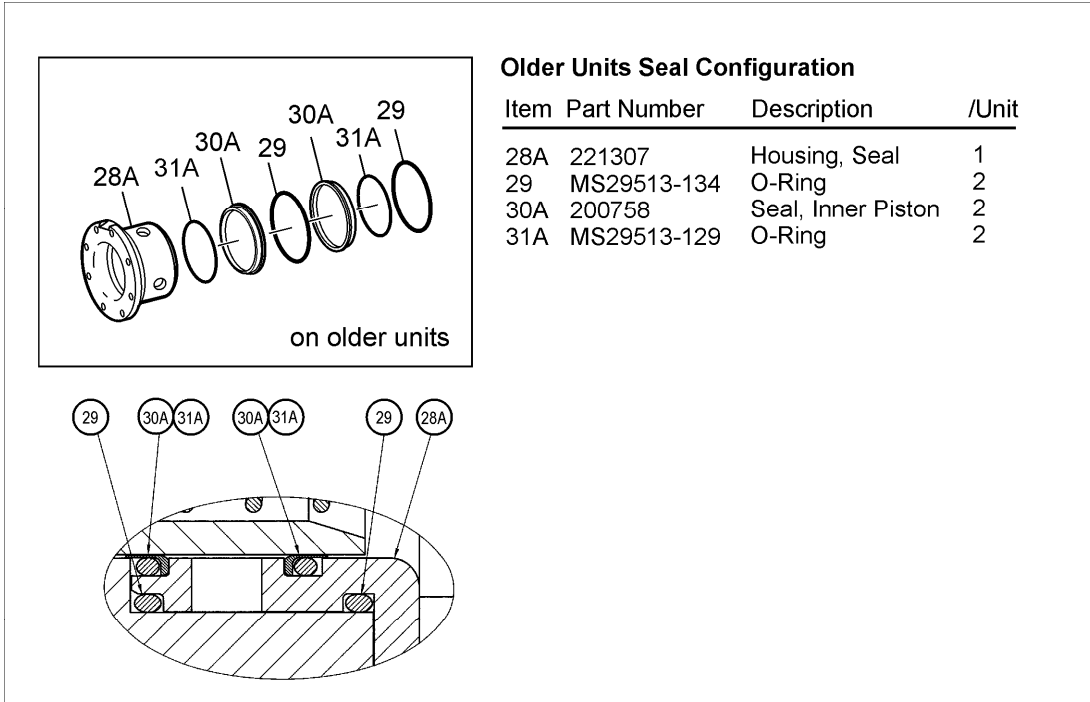
**FIGURE 9**  
**COLLAR LOCK ASSEMBLY**  
**MOUNTING INSTRUCTIONS**



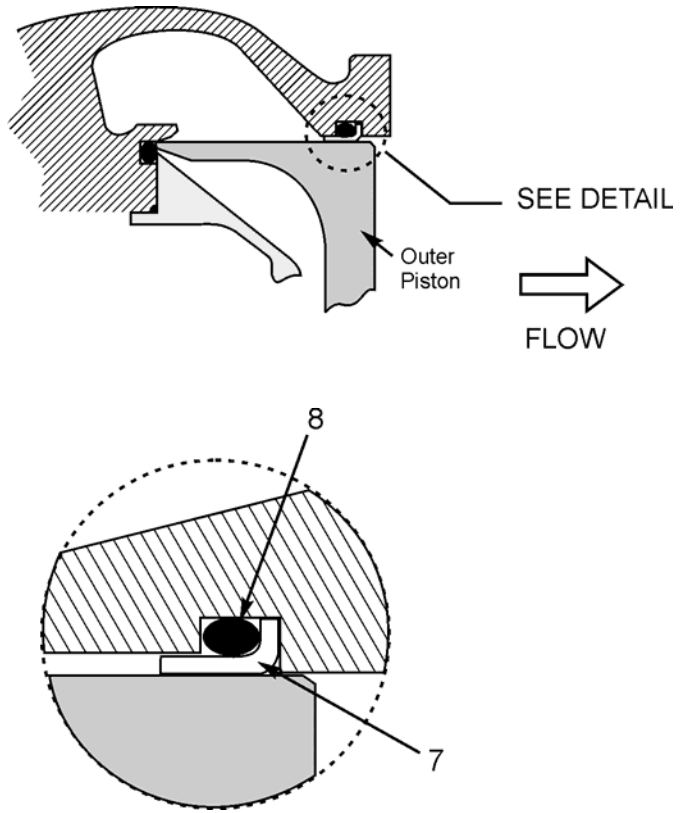


The carriage is assembled by removing four (4) of the Nuts (3-3) and Washers (3-2), placing the carriage in place and reinstalling the nuts and washers as noted in paragraph 11.9.D.

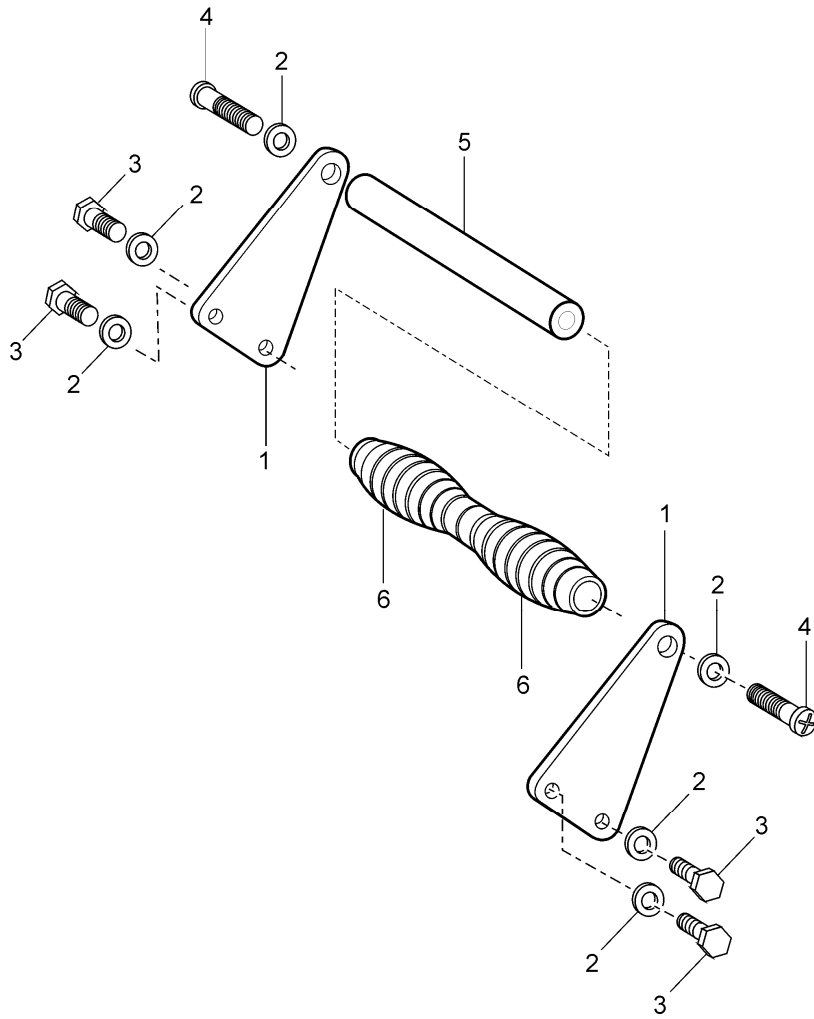
**FIGURE 10**  
**CARRIAGE INSTALLATION INSTRUCTIONS**



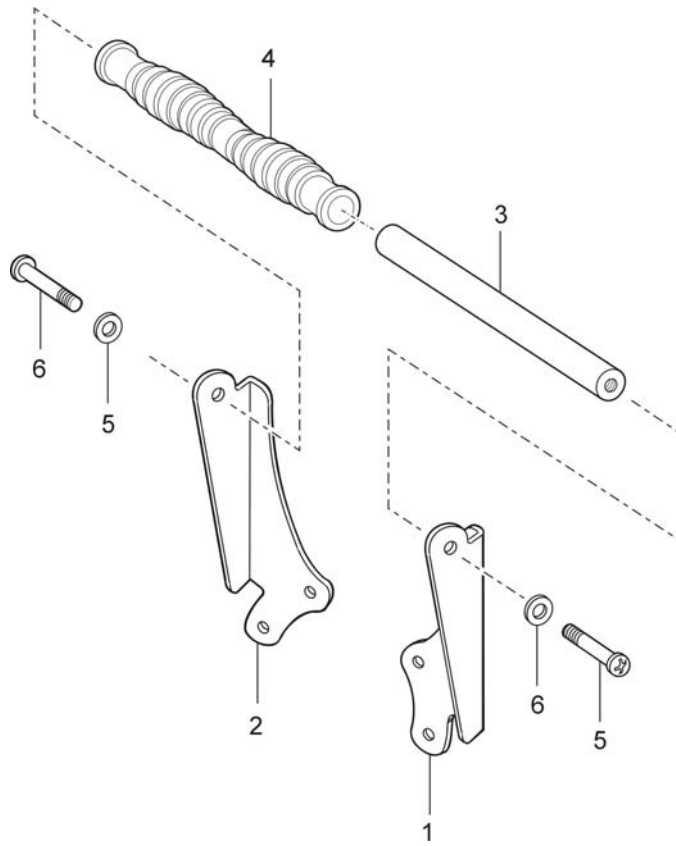
**FIGURE 11  
INNER PISTON SEAL INSTALLATION**



**FIGURE 12  
OUTER PISTON SEAL INSTALLATION**



**FIGURE 13**  
**STANDARD TRANSVERSE CARRYING HANDLE**



**FIGURE 14**  
**OPTION Y CARRYING HANDLE**

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