

Serial Number _____

Part Number _____

MODEL RBS/RBSA
RETRIEVER AND SERVICE VALVE
USER MANUAL

ROHRBACK COSASCO SYSTEMS, INC.

11841 E. Smith Avenue

Santa Fe Springs, CA 90670

Phone: (1) 562-949-0123

Fax: (1) 562-949-3065

E-mail: rcs@rohrbackcosasco.com

Web Site: <http://www.rohrbackcosasco.com>

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SECTION 1.0
INTRODUCTION

The COSASCO 2" RBSA and RBS retrievers and service valves are designed to install and retrieve the COSASCO 2" corrosion monitoring assemblies... safely, without shutdown, and under pressure. Both RBSA and RBS retrievers have features to permit easy handling and a single retriever and service valve can service any number of COSASCO access fitting monitoring points.

The retrievers incorporate a manifold with a bleed valve and a pressure gauge to allow the operator to monitor the internal pressure during use. An optional diverter hose assembly can be attached by quick-connect to the retriever manifold or service valve for safe bleed-off. The retriever's internal wetted parts are hard-chrome plated to provide a long life and reliable sealing.

SECTION 2.0
SAFETY CHECKLIST

1. Safe operation requires a minimum of 2 trained operators.
2. Do not use this retrieval equipment unless you have been trained in its safe operation.
3. If it has been longer than 90 days since your last operation, you should review the manual and first practice on a dummy fitting prior to use.
4. Make sure you have complied with all plant safety requirements and environmental regulations.
5. Identify the type media its pressure and temperature. Review material safety data information on the media prior to operation.
6. Insure you have all the required safety equipment for the given media, "i.e. hard hat, safety glasses, protective clothing, safety gloves, respirator, spill safety equipment, etc...
7. Any actions which could vary system pressure such as surges caused by opening and closing of valves and chokes should be delayed until completion of retrieval operations.
8. Insure you have enough clearance for safe operation. Note wind direction prior to starting operations involving hazardous products.

SECTION 3.0
RETRIEVER & SERVICE VALVE CONSTRUCTION & OPERATION

RBSA retrievers feature a stainless steel outer barrel, Viton o-rings, Teflon back-up rings, and graphite-impregnated Teflon dynamic seals. They are pressure rated to 2500 psi (172 BAR) and have a maximum operating temperature of +400°F (+204°C).

RBS retrievers feature a stainless steel outer barrel, Viton o-rings, Teflon back-up rings and graphite-impregnated Teflon dynamic seals. They are pressure rated to 6000 psi (414 BAR) and have a maximum operating temperature of +400°F (+204°C).

On both models, a socket adapter assembly attached to the mandrel rod is used to install or retrieve the plug from the access fitting assembly. The thread adapter on the inner barrel of the retriever connects directly to the outlet side of the service valves.

Two valves are available. The standard valve is rated at 3600 psi (248 BAR) and the high pressure valve is rated at 6000 psi (413 BAR). Both valves have a maximum operating temperature of 250°F. Their selection depends on the maximum working pressure required. The service valves incorporate two needle valves; the first allows slow pressurizing of the retriever, which reduces the torque required to open the service valve ball. The second allows product bleed-off through a special port, either with or without the optional diverter hose assembly. The valves comply with API Fire-Safe Standard RP6F.

When the fittings are mounted at bottom-of-line they collect sand, scale or other debris. These particles can damage the threads of the access fittings, as well as the working surfaces of the retriever and service valve. Therefore, extra care and maintenance should be given to equipment used in servicing any bottom-mounted fitting. Special tools are available to aid in these situations. (See Section 7 - Retriever and Service Valve Special Tools, which describe the tools available to remove or flush sand, scale, hot tap chips or other debris from the access fitting.)

If product and operating pressure permit (lower than 2500 PSI, 172 BAR), the RBSA retriever with its thinner stainless steel outer barrel should be considered to reduce the weight.

The retriever has four main parts:

1. The outer barrel.
2. The mandrel rod.
3. The socket adapter assembly.
4. The inner barrel with thread adapter attached.

The outer barrel is rigidly connected to the mandrel rod. By turning or sliding the outer barrel, the movement is imparted to the mandrel rod.

The service valve has three main parts.

1. The service valve body.
2. The ball and seals.
3. The bypass and bleed valve.

The COSASCO access fitting body and plug assembly (hollow or solid) form a seal. However, the design allows the system pressure to bypass the seal when the plug assembly is "backed off" one or two turns. The bypass pressure enters the retriever through the service valve. The system pressure exerts a load on the mandrel rod (pushing out) which is countered by an opposing equal load on the outer barrel (pushing in). Controlled pressurization of the retriever reduces the momentum of fluid entry into the retriever to prevent "pistoning".

After pressurizing, the force to move the outer barrel is that which is enough to overcome seal friction and the weight of the outer barrel.

SECTION 4.0
RETRIEVAL OF SOLID OR HOLLOW PLUG ASSEMBLIES

The following procedure is for retrieval of solid or hollow plugs from access fitting bodies under pressure.

The operator should first determine pressure, temperature, and the type of media. Any action which could vary pressure, such as surges caused by the opening or closing of valves or chokes, should be delayed until after the retrieving operation has been completed.

1. Stroke and circumferential clearance.

Determine if the retriever has an adequate stroke clearance and that the entire operation has adequate circumferential clearance.

- a. Clearance beyond the top of the access fitting body is required for installation and extension of the retriever and service valve. The following recommendations should give adequate clearance:

| | | |
|------------|---|----------------------|
| 14" stroke | - | 5 feet (1.5 meters) |
| 18" stroke | - | 6 feet (1.8 meters) |
| 25" stroke | - | 7 feet (2.1 meters) |
| 37" stroke | - | 9 feet (2.7 meters) |
| 49" stroke | - | 11 feet (3.4 meters) |
| 61" stroke | - | 13 feet (4.0 meters) |

- b. In addition, circumferential to allow movement of the operator(s) and free movement of the equipment is required. The following recommendations should give adequate clearance:

Above ground level - From the center-line of the access fitting, a radius of at least three feet should be maintained.

Below ground level - A minimum diameter culvert of manhole of four feet should be provided; with the fitting placed off-center one foot from the culvert wall.

2. Adjust the socket adapter assembly.

For solid or hollow plug assemblies, the socket adapter should be set in the second and fourth holes from the hex end. When retrieving the hot tap plug assembly with the 14" or 18" stroke retriever, the socket adapter must be in the first and third holes from the hex end.

3. Remove the access fitting cover, if present.

After removing the cover, check the access fitting body to ensure that the o-ring contact area is clean and that the acme thread is in good condition.

If the thread has been painted or damaged, it should be repaired by brushing or filing. The use of the optional heavy protective cover manufactured of steel is recommended, since it is more durable.

4. Loosen the plug assembly.

It is recommended that, prior to removing either the plastic or steel pipe plug, the plug assembly be unfrozen from its seat.

Using either a 1-1/8" socket or a 1-1/8" box-end wrench, loosen the plug assembly by turning counterclockwise to a maximum of 1/4 turn. **DO NOT** loosen beyond the 1/4 turn maximum or leakage will result. Tighten the plug assembly.

5. Remove the pipe plug from the plug assembly.

The solid plug assembly uses a stainless steel pipe plug with a 1/2" square head which acts as a secondary seal. Hold the plug assembly hex with a box-end wrench to prevent it from backing off while using a crescent wrench to turn the pipe plug slightly counterclockwise.

If, for any reason, there is pressure behind the plug which, after one or two minutes, has not been bled-off, loosen the steel pipe plug 1/8 turn more. If pressure bleeds-off, remove the pipe plug; if it has not, re-tighten the pipe plug and refer to Section 7 -Retriever and Service Valve Special Tools, Section 7.4.

The hollow plug assembly uses a plastic pipe plug as a dust cover only; therefore, no bleed-off will be required.

6. Check the service valve.

Inspect the o-ring at the hammer nut end for nicks, cuts and abrading. It is recommended to inspect and pressure test the service valve periodically to be sure it is in good working order, as there is a possibility that, should a problem occur, it will have to be left on the line.

7. Connect the service valve to the fitting.

Lift the service valve assembly and place it on the access fitting body. Thread the hammer nut clockwise until the service valve is securely seated.

8. Tap the hammer nut tight using a brass hammer.

WEAR SAFETY GLASSES! Close and open the service valve ball to be sure there is adequate handle clearance. If there is not, loosen and reposition the handle until adequate clearance is obtained. The valve should be left in the open position.

9. Check the retriever.

Inspect the thread adapter o-ring for nicks, cuts and abrading.

a. Stroke the retriever.

Extend and collapse the retriever to ensure it is lubricated, and operating properly. If the retriever does bind or has a "scratchy" feel; it may need lubrication. See Section 8 - Retriever Maintenance.

b. Extend the retriever.

If the access fitting to be serviced is mounted on the top-of-line, install the wood clamp on the inner barrel to prevent the retriever outer barrel from collapsing of its own weight.

10. To connect retriever.

Lift the retriever and place it on the service valve. Turn the hammer nut clockwise until the retriever is seated on the service valve. Retriever stroke length weights are as follows:

| | | |
|----------|---|----------------------|
| RBSA-14" | = | 38 lbs. (17.25 kg.) |
| RBSA-18" | = | 43 lbs. (19.50 kg.) |
| RBSA-25" | = | 48 lbs. (21.75 kg.) |
| RBSA-37" | = | 59 lbs. (26.25 kg.) |
| RBSA-49" | = | 70 lbs. (31.75 kg.) |
| RBSA-61" | = | 81 lbs. (36.75 kg.) |
| | | |
| RBS-14" | = | 48 lbs. (21.75 kg.) |
| RBS-18" | = | 56 lbs. (25.50 kg.) |
| RBS-25" | = | 64 lbs. (29.00 kg.) |
| RBS-37" | = | 81 lbs. (36.75 kg.) |
| RBS-49" | = | 98 lbs. (44.50 kg.) |
| RBS-61" | = | 115 lbs. (45.25 kg.) |

11. Tap the hammer nut tight.

Using a brass hammer - WEAR SAFETY GLASSES!

12. Connect the socket adapter pilot.

Remove the wood clamp if installed. Collapse or move the outer barrel toward the access fitting body until the socket adapter pilot contacts the plug assembly ... do not allow the socket adapter hex to engage the plug assembly hex. (A turning, sliding motion - as opposed to a straight sliding motion - will prevent linear scratches on the barrels should sand or grit be present). Turn the outer barrel clockwise about four turns to engage the socket adapter pilot threads to the female threads of the plug assembly.

13. Close bleed valves.

Ensure that both the retriever and service bleed valves are closed.

14. Connect the socket adapter hex.

Collapse the retriever outer barrel toward the access fitting body while turning slightly clockwise until the socket adapter hex slides over the plug assembly hex - a movement of about 5/8" (16 mm). If a bottom-of-line location is being serviced, the retriever out barrel must be held manually in this position until plug assembly is disengaged from the access fitting body.

15. Retriever "pressure balancing".

- a. Turn the retriever outer barrel slowly counterclockwise, using the handles or head bar to unseat and begin backing off the plug assembly.
- b. Retriever pressurization will begin after 1/2 to 2 turns of the outer barrel. Pressurization will be signified by one of three means; gauge, hearing the fluid enter the retriever, or feeling the increase in friction as the seals experience pressure load. When the retriever begins to pressurize, stop turning the out barrel and wait for the retriever to pressure balance. This is achieved only when the entire retriever and the operating line are at equal pressure.
- c. If the retriever fails to pressurize after 2 turns, back-off the plug assembly by an additional 2 counterclockwise turns of the outer barrel. If the retriever still has not balanced, wait for 10 to 15 minutes. **DO NOT BACK-OFF THE PLUG ASSEMBLY MORE THAN A TOTAL OF 4 TURNS!**
- d. The retriever bleed valve can be opened to test for the presence of pressure in the retriever. If after waiting the required 10 to 15 minutes, the pressure has not entered the retriever, the plug assembly or the retriever has encountered an obstruction or accumulation of dirt or debris. Back pressuring the retriever should be the next step for relieving the obstruction. See Section 6 - Retriever Back Pressuring.

16. Retrieving the plug assembly from the access fitting body.
 - a. When the retriever has "pressure-balanced" with the line, the plug assembly can be disengaged from the access fitting body.
 - b. Turn the retriever outer barrel counterclockwise approximately 15 or 16 turns to completely disengage the plug assembly from the access fitting body.
 - c. Ensure that the socket adapter hex and the plug assembly hex remain engaged during this operation. Disengagement will allow the socket adapter pilot to unscrew from the plug assembly, leaving the plug assembly in the access fitting body. (Refer to paragraphs 12 and 14).
17. After the plug assembly is removed - from the access fitting body, extend the retriever outer barrel with a twisting, turning, sliding motion. Extend the retriever outer barrel until the plug assembly and its attached corrosion monitoring or preventing device is withdrawn fully past the service valve ball.
18. Install the wood clamp - onto the inner barrel if the fitting is mounted in a position to allow the retriever outer barrel to collapse of its own weight.
19. Close the service valve equalizing valve and the service valve ball.
 - a. Close the service valve equalizing valve. The service valve extension handle features a slotted end to engage the roll pin of the equalizing valve stem for easy opening and closing.
 - b. Close the service valve ball using the service valve extension handle.
20. Bleed-off retriever pressure.

The retriever is still fully pressurized at this stage, and this pressure must be fully relieved.

An optional diverter hose assembly is recommended when bleeding off retriever pressure; fluids can be collected in a container or diverted to a safe area away from the operator. The hose is attached by quick-connect to either the retriever bleed valve or the open port in the service valve. Optional diverter hose assemblies are:

124669 diverter hose assy 10 ft (3.0 m)

124931 diverter hose assy 25 ft (7.6 m)

124685 diverter hose assy 50 ft (15.2 m)

Bleed the pressure from the retriever by opening the retriever bleed valve one or two turns for gas or liquid on bottom or side position. For top locations, remove the service valve port plug and then open the service valve bleed valve one or two turns. Watch the pressure gauge; a gradual drop to zero should be indicated, at which point the retriever should have bled-off pressure completely. This may take up to two minutes to complete.

21. Close the bleed valve.

When the retriever is completely depressurized, disconnect the diverter hose assembly and close the bleed valve.

22. WEAR SAFETY GLASSES! Tap loose the retriever hammer nut using the brass hammer.

According to weights indication in paragraph 10 for the various size stroke retrievers, it may be advisable for two men to help each other in removing the retriever from the fitting.

23. Lift the retriever to remove from the service valve.

Do this carefully. If the product media is liquid, a certain amount will ooze at the disconnect junction or from the retriever.

24. Remove the wood clamp.

If it was installed on the inner barrel as indicated in paragraph 18, and collapse the retriever.

25. Check retriever operation.

Stroke the retriever (extend and collapse); if it seems difficult to operate, feels or sounds gritty; cleaning and lubricating before further use is recommended.

SECTION 5.0
INSTALLATION OF SOLID OR HOLLOW PLUG ASSEMBLIES UNDER PRESSURE

The following procedure assumes the service valve is installed on the access fitting body and is in the closed position. The retriever must be in a cleaned and lubricated condition.

- 5.1 Prepare the plug assembly.
 - a. Visually inspect the plug assembly threads and clean or repair, if necessary. Minor repairs can be done by using thread files; or for more severe damage, the thread die assembly (part number 125112 can be used). A spare access fitting body can be used to check for fit.
 - b. Replace all o-rings and packings. If the plug assembly was previously used, it is recommended that the seals be replaced.
 - c. Connect the corrosion monitoring or preventing device to the plug assembly. After initial packing contact, compress the packing by tightening the device up to 1/4 turn more. Securely lock into place by tightening the set screw.
 - d. Index the plug assembly hex. If the corrosion monitoring or preventing device requires orienting with the product flow, "index" the plug assembly by filing a notch across the top of the hex. The notch should be filed so that the device can be aligned with the product flow.
- 5.2 Clean the fitting threads if required. Thread condition can be assessed by the ease of the removal procedure. If repair and/or cleaning appears necessary, see Section 7 - Retriever and Service Valve Special Tools.
- 5.3 Connect the plug assembly to socket adapter pilot. Engage the plug assembly female threads to the socket adapter pilot male threads. Do not bottom the plug assembly on the socket adapter pilot, but allow approximately 1/4 turn back-off from full engagement (the o-ring on the socket adapter pilot should provide the proper spacing when hand tight). Align the hex on the plug assembly with the hex on the socket adapter to ensure they will engage.
- 5.4 Extend - the retriever and, if required, install and tighten the wood clamp on the inner barrel.
- 5.5 Connect the retriever to the service valve. First, examine the o-ring at the hammer nut end of the retriever for damage and replace if nicked, cut or abraded. Lift the retriever and place it on the service valve. Turn the hammer nut clockwise until the retriever is securely seated on the service valve. Use the brass hammer to tap a secure connection. **WEAR SAFETY GLASSES!**
- 5.6 Ensure that the bleed valves are fully closed. Even though the wood clamp may have been installed, again, **ENSURE THAT THE RETRIEVER IS FULLY EXTENDED!**

- 5.7 Slowly open the service valve equalizing valve to pressurize the retriever. Before proceeding further, wait until the retriever is fully pressurized.
- 5.8 Open the service valve ball and close the equalizing valve.
- 5.9 Remove the wood clamp from the inner barrel, and begin collapsing the retriever. Use a twisting, turning, sliding motion. Do this slowly until the plug assembly just barely contacts the access fitting body.
- 5.10 Engage the plug assembly to the access fitting body.
- a. When the plug assembly and the access fitting body are in contact, slowly thread the plug assembly into the access fitting body by turning the retriever outer barrel clockwise and inward toward the access fitting body. If the plug assembly does not start threading properly, turn the retriever outer barrel counter-clockwise one full turn, then clockwise again to engage the threads. Do not use excessive force and be sure that the threads engage properly to prevent cross threading.
 - b. If cross threading does occur, the plug assembly will have to be removed observing all of the procedures as outlined in Section 4 - Retrieval of Solid or Hollow Plug Assemblies under Pressure. Also, see Section 7 - Retriever and Service Valve Special Tools Tap Assembly #125116.
- 5.11 To complete the engagement - of the plug assembly to the access fitting body, turn the retriever outer barrel 14 or 15 turns. The plug assembly should be barely or lightly seated. Tighten only 1/4 turn after the primary packing contacts its seat within the access fitting body. This will leave sufficient room for travel for orientation using the index mark mentioned previously.
- 5.12 If the plug assembly does not seat properly, it may be caused by one of the following:
- a. Damaged plug assembly thread. Remove and repair with thread die assembly #125112 or replace the plug assembly.
 - b. Damaged access fitting body thread. The use of thread tap assembly (part number 125111) is recommended.
 - c. Sand or chips in the threads. Use the thread brush assembly #125116, surge tube assembly #123672 or the magnetic swab assembly #121870.
 - d. Monitoring or preventing device hitting the bottom of the pipe. This will require replacement with a shorter device.
 - e. Monitoring or preventing device hitting an obstruction at the access fitting body base. This may be due to improper weld procedures or noncentricity of access fitting body with the cut or hot tapped hole into the pipe. This condition will require the reaming of the hole into the pipe with a hot tap square end mill (part number 612016-7.12).

- f. Incorrect access fitting body weld procedures. This can cause body distortion or warpage due to excessive heat or improper after-weld stress relieving. If distortion or warpage appears minor, the use of access fitting body seat reamer #125125 is recommended. If distortion or warpage is major, a new access fitting body should be welded to the line using the proper welding procedures. See Manual M-1.300 - Trepanning, Positioning and Welding Procedures.

Indications of any of the above causes will be noted after retriever bleed-off is accomplished as described in paragraph 13. The indications may be an unstable pressure gauge reading, the hearing of pressure still entering the retriever, or feeling the lack of pressure load on the seals as evidenced by a lack of friction.

If the plug assembly cannot be seated and sealed, it may be necessary to leave the service valve on the line until a later shut-down when repairs can be made. If this becomes necessary, a service valve blanking plug #127391 should be placed on the service valve after the retriever has been removed to prevent possible leaks or inadvertent opening of the service valve.

- 5.13 Retriever bleed-off. Open the bleed valve and drain the retriever product pressure and media residue into a container or safe area until all pressure has been relieved.
- 5.14 Disengage the socket adapter from the plug assembly. Disconnect the diverter hose assembly, if it was used. Pull back the outer barrel slightly to disengage the socket adapter hex. While maintaining this disengagement, unscrew the socket adapter pilot from the plug assembly by turning counterclockwise five or six turns.
- 5.15 Loosen the retriever hammer nut and remove the retriever. Using the brass hammer, tap loose the hammer nut and unscrew fully. **WEAR SAFETY GLASSES!** Lift the retriever from the service valve ... do this carefully if the product media is a liquid because a small amount of product will be lost at the disconnect junction.
- 5.16 Install the stainless steel pipe plug. Liberally grease 1/2" stainless steel pipe plug and install securely into the solid plug assembly.

NOTE: Hollow plug assemblies use a red plastic pipe plug; therefore, greasing is unnecessary.

- 5.17 Orient the plug assembly. The index mark filed as mentioned in paragraph 1.d must now be aligned to the product flow direction. Turn the plug assembly hex clockwise until the mark aligns with the flow direction. If the plug assembly was installed as described, sufficient room for travel to allow orienting will be available.

CAUTION: DO NOT TURN THE PLUG ASSEMBLY HEX COUNTERCLOCKWISE TO ACHIEVE ORIENTATION!

5.18 Prior to installing the protective cover - thoroughly grease the acme threads on the access fitting body. This measure will save many hours of cleaning when the access fitting is next serviced.

SECTION 6.0
RETRIEVER BACK PRESSURING

Back pressuring is the pressurizing of the retriever from an external source through the retriever bleed valve. This procedure may be necessary when the plug assembly will not allow line pressure to bleed past it within the access fitting body or removing fittings at high pressures with the RBS retriever. Several means of back pressuring may be used:

- a. Nitrogen bottle.
- b. Hydraulic (Part No. 203855) or pneumatic pump.
- c. An adjacent tee access fitting (utilizing its line pressure).

The nitrogen bottle method is the procedure described. The procedure assumes that the retriever and service valve are connected to the access fitting body.

6.1 Connect a high pressure hose to the retriever bleed valve.

6.2 Nitrogen bottle connection. Connect the other end of the high pressure hose to the nitrogen bottle outlet. It is recommended that:

- a. The nitrogen bottle pressure be at least 200 psi (13 BAR) higher than the line pressure.
- b. The nitrogen bottle be equipped with a regulator.
- c. The nitrogen bottle be fitted with a bleed valve. (This is desirable to allow bleeding down the hose after back pressuring is completed).

6.3 Nitrogen bottle control valve. Open the control valve and allow pressure build-up within the hose to 100 psi (6 BAR) above the line pressure.

6.4 Open the retriever bleed valve - and allow the nitrogen pressure to enter the retriever. Normally, the pressure will come to a balance and the excess pressure will enter the operating line. A back pressure or pressure flow reverse will have been accomplished. In doing so, debris, contaminants or other obstructions within the retriever, service valve, plug assembly or access fitting body will be dislodged to enter the product stream flow.

6.5 Close the retriever bleed valve.

6.6 Close the nitrogen bottle control valve. Bleed off the pressure within the hose and disconnect it from the retriever bleed valve.

6.7 Remove the plug assembly - in the normal manner and as previously described in Section III.

SECTION 7.0
RETRIEVER & SERVICE VALVE SPECIAL TOOLS

When using the service tools described within this section, it is advisable to use the shortest stroke, and consequently the lightest, retriever available. Besides easier handling, it will provide the best "feel" when using the special tools.

The following procedures assume that the service valve is installed on the access fitting body and that it is in the closed position. The plug assembly is also assumed to be absent from the access fitting body.

7.1 Thread Tap Assembly #125111.

The thread tap assembly is used to clean debris from threads or to repair thread damage.

1. Attach and grease the tap. Attach the tool to the socket adapter pilot male thread. Apply grease liberally to the cutting edges.
2. Connect the retriever. Extend the retriever fully. If the access fitting to be serviced is mounted on the top-of-line, install the wood clamp on the inner barrel to prevent the retriever out barrel from collapsing of its own weight.

Lift the retriever and place it on the service valve. Turn the hammer nut clockwise until the retriever is securely seated and tightened in place on the service valve. Use the brass hammer to make up a secure connection. **WEAR SAFETY GLASSES!**

3. Open the service valve equalizing screw and then open the service valve ball.
4. Collapse the retriever with a twisting, turning, sliding motion on the retriever outer barrel until the tool just barely contacts the access fitting body.
5. Turn the retriever outer barrel two full turns counterclockwise. This will help to allow the tap threads to align with the access fitting body threads.
6. For thread tap cutting, slowly turn the retriever outer barrel clockwise allowing the tool threads to engage the access fitting body threads. Continue turning the retriever outer barrel 14 to 17 turns; occasionally, turn the retriever outer barrel counterclockwise to help the tap threads to clear. Do not allow the tap to bottom.
7. When the tap operation is completed, connect the diverter hose assembly to the retriever bleed valve. Open the retriever bleed valve and allow bleed-off for approximately twenty seconds. Normally this is sufficient time for debris to be flushed from the access fitting body threads.

8. Close the retriever bleed valve. Remove the diverter hose assembly.
9. Retriever the tap. Turn the retriever outer barrel counterclockwise for about 14 to 17 turns until the tap threads are fully disengaged from the access fitting body threads.
10. Extend the retriever.
11. Close the service valve ball and the service valve bleed screw.
12. Bleed and remove the retriever. Open the retriever bleed valve and allow pressure to bleed off completely. Using the brass hammer, tap loose and fully unscrew the retriever hammer nut. **WEAR SAFETY GLASSES!** Lift the retriever from the service valve.
13. Remove the tap. Unscrew the tap from the socket adapter pilot. (**NOTE:** If the tool flutes have a large amount of debris, it is recommended that the surge tube assembly or thread brush assembly be used to clean the access fitting body and threads prior to reinstalling the plug assembly. See part 7.3 and/or 7.2 following.)

7.2 Thread Brush Assembly #125116.

The thread brush assembly is used to clean small amounts of debris from the access fitting body threads.

1. Attach the thread brush assembly to the socket adapter pilot threads.
2. Connect the retriever. Extend the retriever fully. Lift the retriever and place it onto the service valve. If the access fitting to be serviced is mounted on the top-of-line, install the wood clamp on the inner barrel to prevent the retriever outer barrel from collapsing of its own weight. Turn the hammer nut clockwise until the retriever is securely seated on the service valve. Use the brass hammer to tap a secure connection. **WEAR SAFETY GLASSES!**
3. Open the service valve equalizing valve and then open the service valve ball.
4. Collapse the retriever, remove the clamp and with a twisting, turning, sliding motion on the retriever outer barrel until the thread brush just barely contacts the access fitting body.
5. Brush the threads. Continue the twisting, turning, sliding motion of the brush, in a clockwise direction, until it bottoms.
6. Retrieve the thread brush assembly. Beginning with a very slight clockwise rotation, pull the brush straight up and out of the access fitting body.

7. Extend the retriever.
8. Close the service valve and the service valve equalizing valve.
9. Bleed and remove the retriever. Open the retriever bleed valve and allow pressure to bleed off completely. Using the brass hammer, tap loose and fully unscrew the retriever hammer nut. **WEAR SAFETY GLASSES!** Lift the retriever from the service valve.
10. Remove the thread brush assembly. Unscrew the thread brush assembly from the socket adapter pilot.

7.3 Surge Tube Assembly #123672.

The surge tube assembly is used to flush debris from the access fitting body by using line pressure.

1. Connect the surge tube assembly. Lift the surge tube assembly and place the hammer nut end on the service valve. Turn the hammer nut clockwise until the surge tube assembly is securely seated. Use the brass hammer to tap a secure connection. **WEAR SAFETY GLASSES!**
2. Close the surge tube bleed valve. The same optional diverter hose assemblies used on the retriever and service valve are available for connection to the surge tube assembly.
3. For **LOW PRESSURE** lines: (pressures lower than 250 psi -17 BAR), see **(L)** steps below.

For **HIGH PRESSURE** lines: (pressures higher than 250 psi -17 BAR), see **(H)** steps below.
- 4L. Open the service valve quickly.
- 5L. Open the surge tube bleed valve and allow flow for approximately twenty seconds.
- 6L. Close the surge tube bleed valve.
- 7L. Close the service valve.
- 8L. Open the surge tube bleed valve and allow the surge tube pressure to bleed off.
- 9L. Close the surge tube valve.
- 10L. Repeat steps 4L through 9L at least two more times.

- 4H. Open the service valve equalizing valve. This will reduce the torque required to open the service valve.
- 5H. Open the service valve quickly and then close the service valve equalizing valve.
- 6H. Open the surge tube bleed valve and allow flow for approximately twenty seconds.
- 7H. Close and open the surge tube bleed valve - at least two more times and each time allow flow for approximately twenty seconds. Each time the surge tube valve is in the open position, partially close and then fully open the service valve. This will help to remove solids or particles from the seat area or carrier.
- 8H. Close all valves. Close the surge tube bleed valve, the service valve and the service valve equalizing valve.
- 9H. Open the surge tube bleed valve and allow the surge tube pressure to bleed-off.
- 10H. Close the surge tube bleed valve. If the optional diverter hose assembly is being used during the operation, it should be removed at this time.
11. Remove the surge tube assembly. Using the brass hammer, tap loose and fully unscrew the surge tube hammer nut. **WEAR SAFETY GLASSES!** Lift the surge tube assembly from the service valve.

7.4 Steel Pipe Plug Adapter #125115.

The steel pipe plug adapter is used to install or allow retrieval of the 1/2" steel pipe plug, while plug assemblies are under pressure. This tool is used in cases where bleed-off cannot be accomplished.

The procedure described for the steel pipe plug adapter differs from the other tools described in this section in that the service valve is assumed not to be installed and that the plug assembly is assumed to be present within the access fitting body.

1. Attach the pipe plug adapter to the square head of the pipe plug and tighten the Allen head set screws.
2. Install the service valve onto the access fitting body in the same manner as described previously in Section 4, paragraphs 6, 7, and 8. Open the service valve ball.
3. Install the retriever and engage the socket adapter in the same manner as described previously in Section 4, paragraphs 8 through 14.

4. Pressure-balance the retriever in the same manner as described previously in Section 4, paragraph 15. After pressure-balance is achieved, slowly turn the retriever outer barrel in a counterclockwise direction, thus loosening the pipe plug.
5. Retrieval of the pipe plug. Continue to turn the retriever outer barrel in a counterclockwise direction until the pipe plug is disengaged from the pipe plug assembly; then extend the retriever fully. If the access fitting to be serviced is mounted on the top-of-line, install the wood clamp on the inner barrel to prevent the retriever outer barrel from collapsing of its own weight.
6. Close the service valve.
7. Open the bleed valve and bleed off pressure.
8. Using the brass hammer tap loose the retriever hammer nut and unscrew fully. **WEAR SAFETY GLASSES!** Lift the retriever from the service valve. Remove the wood clamp if it was installed.
9. Collapse the retriever to expose the socket adapter, the attached pipe plug adapter and the pipe plug. Remove the adapter and the pipe plug from the socket adapter pilot.
10. Reinstall the retriever on the service valve and remove the solid plug assembly in the same manner as described previously in Section 4, paragraph 9 and on the conclusion of the Section.

SECTION 8.0

RETRIEVER MAINTENANCE

The maintenance interval required by either the RBSA or RBS retriever will vary depending upon the service to which it is subjected. Certain fluids will wash out all lubricant from the retriever after one retrieval; others will deposit debris in the retriever making operation difficult.

If the retriever has been in use and it is anticipated not being used again for a period longer than one day, it should be completely disassembled, cleaned and lubricated. Also, if in a days operation (because of adverse retrieval environment conditions) the retriever becomes difficult to operate, feels gritty and does not stroke or turn easily, it should first be cleaned and lubricated without disassembly as indicated in Part 8.2 below. If cleaning and lubricating without disassembly does not relieve the difficulties in the retriever operation, it should be completely disassembled, cleaned and lubricated as indicated in either Part 8.3 or 8.4 of this Section.

Lubricant choices are many. For a particular service, some experimentation may be necessary. Recommended lubricants are:

1. Motor Oil - (SAE 30 weight or equivalent).
2. Lubriplate (multi-purpose) - A lithium base grease; usually the best choice for most service since it is thin and applies easily. Use for service temperatures of 0° to +350°F (-18° to +177°C). Available as COSASCO 129372.
3. Synthetic lubricant - A molybdenum disulfide grease containing rust and oxidation inhibitors. It is recommended for use in extreme pressures and temperatures (-40° to +600°F, -40° to +316°C). Available as COSASCO 201688.

8.1 Sour Gas Service.

On both the RBS and RBSA retrievers, applicable materials comply with the requirements of NACE standard MR0175, "Sulfide Stress Cracking Resistant Metallic Materials for Oil Field Equipment." As stated in this standard. "Materials ... are resistant to, but not necessarily immune to (sulfide stress cracking) under all service conditions." Thus, when the retriever is used in sour environments, it must be thoroughly cleaned after use to help prevent corrosion and/or damage to internal materials.

8.2 Cleaning and lubricating without disassembly.

1. Extend the retriever until the socket adapter is withdrawn into the inner barrel by approximately 1/2 inch. Place the retriever head end down on a clean surface.

2. Add solvent. Pour approximately one pint (1/2 liter) of solvent into the retriever inner barrel.
3. Collapse the retriever slowly.
4. Extend the retriever slowly. The solvent, while in the process of cleaning and flushing will remove all lubricant or at least emulsify sufficiently to make extension of the retriever difficult.
5. Turn the retriever end-for-end. With the retriever head end up, let the solvent drain out.
6. Repeat steps 1 through 5.
7. Extend the retriever again as indicated in paragraph 1. The retriever head end should again be placed down on a clean surface.
8. Pour SAE 30 weight motor oil into the retriever inner barrel (about four ounces - 100 grams).
9. Apply grease to the external surface of the retriever inner barrel.
10. Stroke the retriever. Extend and collapse the retriever until the oil and grease have been adequately filmed on all working surfaces.
11. Test the retriever operation. If the retriever still has a gritty feel and sound after the stroking procedure indicated above, it must be disassembled for thorough cleaning and lubricating.

8.3 Retriever Disassembly.

1. Collapse the retriever.
2. Loosen and remove the mandrel rod stop nut (15). Remove the flat washer (14).
3. Loosen and remove the four 3/8" Allen head cap screws (1) retaining the retriever head, using a 5/16" Allen wrench.
4. Remove the retriever head (10) and the mandrel rod stop washer (11).
5. Withdraw the mandrel rod (12) from the inner barrel end (22).
6. Loosen or remove the socket adapter assembly if required. The socket adapter assembly may be left attached or removed from the mandrel rod. To remove, unscrew the two 5/16" Allen head cap screws with a 1/4" Allen wrench. Slide the socket adapter off the mandrel rod and revolve its retaining key. Remove the socket adapter pilot, spring and flat washer by driving out the spring pin with a 1/4" punch.

7. Remove the hammer nut retaining lock ring (13). Lift the last turn of the hammer nut retaining lock ring up and out of the groove; work around the ring until the entire ring comes out of its groove in the thread adapter (8).
8. Loosen and remove the two 1/4" Allen head screws (26) which retain the thread adapter (8) by using a 1/8" Allen wrench.
9. Remove the thread adapter (8) from the inner barrel (22) by unscrewing one from the other. Spanner holes are provided in the head end of the inner barrel (22) and in the sides of the thread adapter (8) to accommodate the spanner wrench. Remove the hammer nut (7) and retaining lock ring (13).
10. Slide seal installation tool (P/N 210473) over threads of inner barrel (22). If tool is not available, wrap threads with teflon tape to protect the outer seal (P/N 201928) from damage.
11. Loosen and remove the four 3/8" Allen head cap screws (1) to remove the seal stop collar (9).
12. Carefully remove the seal assembly by sliding them over the protected threads of the inner barrel.
13. Stand the retriever in a vertical position with the inner barrel (22) thread end downward. Push down on the outer barrel (20) until the inner barrel head end is exposed.
14. Pull the inner barrel (22) out of the outer barrel (20).
15. Remove the seals from the inner barrel (22). It will be necessary to first remove the four 1/4" socket head cap screws (15) in the head of the inner barrel (22). Remove the cap (24) and seal retainer assembly by carefully prying on side, then the other with a small slotted screwdriver.
16. Remove the retriever bleed valve assembly (4) or (33) from the outer barrel (20). The bleed assembly (4) or (33) can be removed by unscrewing it from the valve body. The seals on the bleed valve can also be removed for servicing.

8.4 Retriever Assembly.

During assembly the working surfaces of the retriever should be inspected for damage. Should the chrome surfaces become damaged to the point that it no longer seals, the parts will require replacement.

1. Clean the outer barrel (20) inside surface using a cleaning solvent. Wipe the bore thoroughly clean and inspect it for damage.

2. Replace the o-rings, back-up rings and seals each time the retriever is reassembled.
3. Apply grease to about four inches of the bore of the outer barrel (20). The grease will be filmed throughout the inside of the retriever when it is fully assembled and later stroked.
4. Clean the inner barrel (22) using solvent. If the unplated areas of the inner barrel have been scratched or scored, polish the area with fine emery cloth. Minor scratches in the chrome can be dressed with fine crocus cloth. Examine the inner barrel (22) threads and repair as necessary.
5. Lubricate mandrel seal (16) (P/N 201927). Press mandrel seal (16) (cup facing outward) into seal mandrel retainer (27) (P/N 208463) using care not to kink, crimp or roll the seal.

Lubricate and install the o-ring (30) (P/N 129398) into the o-ring groove of the mandrel seal retainer (27).

Install the mandrel seal retainer assembly into the inner barrel (22) (cup facing inward). Lubricate inner seal (17) (P/N 201929). Press inner seal (17) (cup facing outward) into inner seal retainer (29) (P/N 208465) using care not to damage the seal. Lubricate and install the o-ring (32) (P/N 201926) into the o-ring groove of the inner seal retainer. Install the inner seal retainer assembly onto the inner barrel (cup facing inward). Insert the four 1/4" socket head cap screws (19) through the end cap screw holes and torque to 80 in. lbs.

6. Apply grease to the inside and outside surfaces of the inner barrel (22).
7. Stand the outer barrel (20) vertically with the bleed valve assembly, end down. Place the inner barrel (22) thread end first, into the outer barrel (20). Hold the inner barrel (22) within the outer barrel and turn the barrels end-for-end. Place a rag under the inner barrel (22) head end, and push down on the outer barrel (20) until the barrels are in place.
8. Slide the seal installation tool (P/N 210473) over threads of inner barrel (22), and remove the seal push ring from the seal installation tool. If tool is not available, wrap threads with Teflon tape to protect the outer seal (18) from damage. Lubricate outer seal (18) (P/N 201928) and slide the seal onto the inner barrel (22), with the cup facing the threads. Work the seal carefully over the threads until it is resting in the thread relief groove of the inner barrel (22), between the threads and the chrome surface. Lubricate and install the o-ring (31) (P/N 201925) onto the outer seal retainer (28) (P/N 208464). With the inner diameter groove facing the previously installed outer seal, slide the partially assembled outer seal retainer (28) over the threads and into the thread relief of the inner barrel (22). Gently press the outer seal (18) into the groove in the seal retainer (28). Slide the assembled seal retainer onto the chrome surface on the inner barrel (22). Care must be used when moving the assembled seal retainer out of the thread relief groove to avoid twisting or kinking the outer seal (18). A good technique is to slide one side of the assembled retainer assembly from the thread relief groove onto the chrome surface, and then press inward on the assembly to allow the opposite side to be slid onto the chrome surface. Once the retainer assembly is on the chrome surface, then slide the

assembled seal retainer into the outer barrel (20). Install the seal back-up ring (21) (P/N 127541) behind the seal retainer assembly, then install the seal stop collar (9) (P/N 127524), using four 3/8" Allen head cap screw (1) (P/N 116209). **DO NOT** tighten the screws fully at this time; allow the seal stop collar to have slight play.

9. Grease and install the o-ring (2) on the thread adapter (8). Install the back-up ring (3) behind the o-ring (2) and on the same side as the threads.
10. Slide the retaining hammer nut (7) and the retaining lock ring (13) onto the inner barrel (22). Remove the Teflon tape that was applied. Grease the thread end of the inner barrel (22).
11. Tighten the thread adapter (8) onto the inner barrel (22) using the spanner wrench. Install and tighten the two 1/4" Allen head set screws (26) with a 1/8" Allen wrench and torque to 70 in. lbs.
12. Install the retaining lock ring (13) onto the thread adapter (8) by feeding the leading edge into the groove and then working around the ring.
13. Clean the mandrel rod (12) with solvent. Examine the mandrel rod (12) for damage. Apply grease liberally to the entire length of the mandrel rod (12), including the chamfer at the threaded end.
14. Pull the thread adapter (8) until the inner barrel (22) is withdrawn from the outer barrel (20) and has approximately two inches exposed. Insert the mandrel rod (12) threaded end first into the inner barrel (22). Gently push the mandrel rod (12) through the seal.
15. Lay the retriever on its side. Continue pushing the mandrel rod (12) until the threaded end is exposed from the outer barrel (20) end approximately one inch. Place the mandrel stop washer (11) onto the exposed threaded end of the mandrel rod (12).
16. Place the retriever head (10) onto the mandrel rod (12), install the washer (4) and start the stop nut (15).
17. Install the four 3/8" Allen head cap screws (1) through the retriever head screw (10) holes and into the outer barrel (20) screw holes. Torque the cap screws (1) with a 5/16" Allen wrench to 45 ft. lb.
18. Tighten the mandrel rod stop nut (15) with a socket.
19. Torque the four 3/8" Allen head cap screws (1) that were initially installed as indicated in paragraph 8 to retain the retriever seal stop collar (9) to 45 ft. lbs.
20. Install the retriever bleed valve assembly (4) or (33).
21. Position the key in the mandrel rod (12) and reassemble and install the socket adapter assembly if it was removed. Position the two 5/16" cap screws in the third and fifth holes from the socket adapter pilot end for normal service.

22. Stroke the retriever to ensure it slides easily and does not bind. If the retriever does bind, loosen the eight 3/8" cap screws (1), four at the head (10) end and four at the seal stop collar (9) end. Stroke the retriever. Re-tighten all eight cap screws (1) to 45 ft. lb.; the retriever should now stroke freely.

23. Pressure test the retriever. Rated working pressure is 2500 psi (17.2 MPa) for the model **RBSA**, or 6000 psi (41.3 MPa) for the model **RBS** retriever. Note that the pressure rating for the retriever is engraved on the outer barrel of the tool.

SECTION 9.0
3600 PSI SERVICE VALVE MAINTENANCE

The maintenance interval required for the service valve will be determined by the media acting upon the valve. Sand, grit, or metal chips may damage seats causing leaks which will require seat replacement. Occasional lubrication will be necessary to reduce opening torque. The use of a synthetic lubricant, such as Cosasco 201688 is recommended.

9.1 Sour Gas Service.

On both the 3600 PSI and 6000 PSI service valves, applicable materials comply with the requirements of NACE standard MR0175, "Sulfide Stress Cracking Resistant Metallic Materials for Oil Field Equipment." As stated in this standard. "Materials ... are resistant to, but not necessarily immune to (sulfide stress cracking) under all service conditions." Thus, when the valve is used in sour environments, it must be thoroughly cleaned after use to help prevent corrosion and/or damage to internal materials.

9.2 Service Valve Disassembly.

Applicable to 3600 pound service valve kit P/N 061001, valve P/N 601000.

The RBSA/RBS service valve has a valve ball that is removable only from the service valve hammer nut end (access fitting body connection).

1. Remove the four 3/4" Allen head cap screws (19) at the hammer nut end (20), using a 5/8" Allen wrench. The cap screws (19) secure the hammer nut assembly (20) to the valve body (1).
2. Remove the hammer nut assembly (20) and retainer (16) from the valve body (1) exposing the first of two seat seal rings (15) and their carriers (13). Remove both the seat seal ring (15) and its carrier (13) from the valve body (1). Remove the retainer-to-access fitting body, o-ring (18) and retainer-to-valve body o-ring (17) which are now accessible.
3. Remove the 5/16" Allen head cap screw (4) securing the valve handle (5) to the square head of the stem by using a 1/4" Allen wrench. Remove the position stop plate (25) which is now exposed.
4. Remove the four 7/16" Allen head cap screws (23) and the two 1/2" Allen head cap screws (24) retaining the bonnet (2) to the valve body (1) by using a 5/16" and 3/8" Allen wrench respectively.
5. Remove the bonnet (2) and stem intact from the valve body (1). Remove the bonnet-to-valve body o-ring seal (11) which is now exposed.
6. Remove the valve ball (12) from the valve body (1).
7. Remove the second seat seal ring (15) and its carrier (13) from the valve body. Remove the carrier seal (14) which is now accessible.

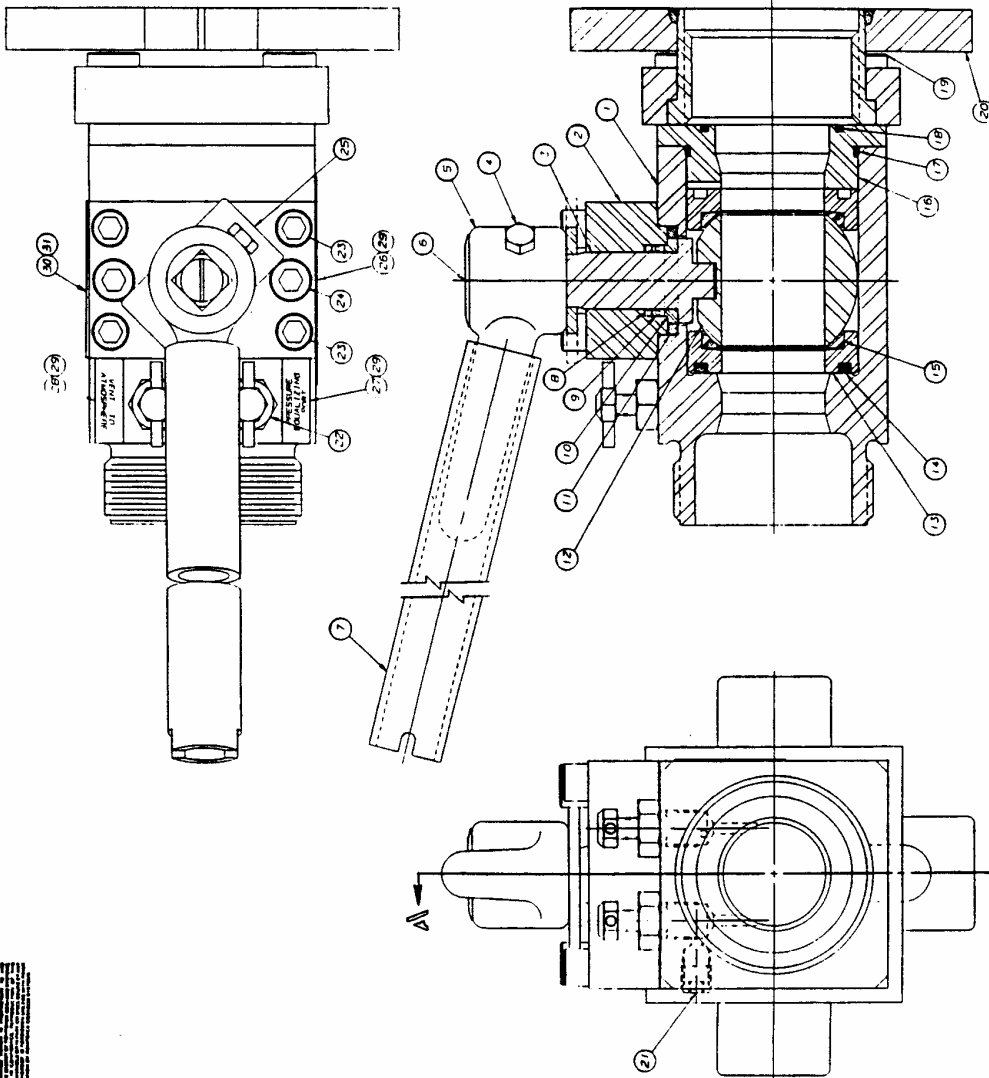
8. Further disassemble the stem (3) from the bonnet (2) (previously removed in paragraph 5) and remove the stem seal (9), its back-up ring (8), and the thrust ring (10), which are now exposed.
9. Remove the by-pass or vent valves (22) only if necessary for seal replacement. To remove; turn the large bleed screw retaining lock nuts counterclockwise and completely disengage from the service valve body (1). To disassemble the bleed screws from their retaining lock nuts, it is necessary to remove the roll pins and the small nylock hex nuts from the bleed screw tops. By turning clockwise on the bleed screws they will thread out through the bottom of their retaining lock nuts.

9.3 Service Valve Assembly.

1. Clean all parts. Examine all seals and o-rings. It is highly recommended that seals and o-rings be replaced each time the service valve is disassembled and reassembled. Even then, prior to assembly, they should be thoroughly inspected for nicks, cuts or abrasions.
2. Install the carrier seal (14) one of the two set seal rings (15) and its carrier (13) into the service valve body (1). (NOTE: There are two seat seal rings (15) and carriers (13); and, that they are interchangeable.) If the seats (15) are not being replaced, install the better of the two seats (15) in the acme threaded end of the service valve. Grease the face of the seat seal ring (15).
3. Grease the valve ball (12) and install the better side in the acme threaded end of the valve body. Install the other seat seal ring (15) and carrier (13) into the valve body (1) and in firm contact with the valve ball (12).
4. Lubricate the swivel on the hammer nut adapter assembly (20). Install the retainer-to-valve body o-ring (17) and retainer-to-access fitting body o-ring (18) on the retainer (16). Assemble the hammer nut adapter assembly (20) and retainer (16) onto the valve body (1) with the four 3/4" Allen head cap screws (19) using a 5.8" Allen wrench. **DO NOT** tighten them securely at this stage.
5. Partially assemble the bonnet by installing the back-up ring (8) and stem seal (9) in the bonnet (2).
6. Install the thrust washer (10) and stem (3) in the bonnet (2). Position the bonnet-to-valve body o-ring (11) in the valve body (1) stem recess.
7. Carefully position the bonnet (2) onto the valve body (1), ensuring that the thrust washer (10) is eased into position concentric with the o-ring (11). Torque the four 7/16" Allen head cap screws (23) to 30 ft. lb. and the two 1/2" Allen head cap screws (24) retaining the bonnet (2) to the valve body (1) to 50 ft. lb. Use a 5/16" and 3/8" Allen wrench, respectively.

8. Install the position stop plate (25) over the top of the stem (3) and position the valve ball handle (5) onto the square head of the stem. Ensure that handle positioning points away from the hammer nut end (20) when the valve ball (12) is in the open position. Tighten the 5/16" Allen head cap screw (4) retaining the handle (5) to the stem (3) by using a 1/4" Allen wrench.
9. Torque the four 3/4" Allen head cap screws (14) that were initially installed as indicated in paragraph 4 to retain the hammer nut adapter assembly (20) and retainer (10), to 130 ft. lb.
10. Install the by-pass or vent valves (22) if they were removed for seal replacement. Back-off the bleed screws several turns before tightening the large bleed screw retaining lock nuts. This avoids bottoming out the bleed screws on their seats before the retaining lock nuts are securely tight.
11. Check the service valve for smooth operation by opening and closing the ball (12).
12. Pressure test the service valve. Rated working pressure is 3600 psi (248 BAR) at temperatures to +200°F (+93°C).

| | |
|-----------|--------------------------------|
| REVISIONS | |
| NO. | DATE |
| 1 | INITIAL RELEASE |
| 2 | CONTRACTOR'S COPY OF REVISIONS |



| ITEM | QTY | DESCRIPTION | MATERIAL |
|------|-----|-----------------------------------|-----------------------------------|
| 1 | 1 | BODY | 1050 H.R. |
| 2 | 1 | ROCKET | 1018 |
| 3 | 1 | STEM | 17-4 PH SS (H190-M) |
| 4 | 1 | CAPSCREW | AUSTINITE S.S. |
| 5 | 1 | HANDLE | DUCTILE IRON (G.A.S. 65-35-12) |
| 6 | 1 | BUTTON | POLYETHYLENE |
| 7 | 1 | EXTENSION HANDLE | SECTION 40 PIPE |
| 8 | 1 | SEAL O-RING | SECTION 40 PIPE |
| 9 | 1 | SEAT | SECTION 40 PIPE |
| 10 | 1 | O-RING | MITRONIC 60 |
| 11 | 1 | O-RING | MILLENE PROPANE |
| 12 | 1 | CARRIER SEAT | 17-4 PH SS (H190-M) CHROME PLATED |
| 13 | 2 | O-RING | 17-4 PH SS (H190-M) |
| 14 | 1 | O-RING | 17-4 PH SS (H190-M) |
| 15 | 2 | RING SEAT SEM. | 17-4 PH SS (H190-M) |
| 16 | 1 | RETAINER | PEER |
| 17 | 1 | O-RING | 1050 H.R. |
| 18 | 1 | O-RING | 1050 H.R. |
| 19 | 1 | FLANGE/UNION ASSY. | 1018 FLG. - 4150 NIT. T1 LUG |
| 20 | 1 | FLANGE/UNION ASSY. | 1018 FLG. - 4150 NIT. T1 LUG |
| 21 | 1 | BLEEDER VALVE SIZE "A" | ALLOY STL. XTLAN COATED |
| 22 | 2 | BLEEDER VALVE SIZE "A" | ALLOY STL. XTLAN COATED |
| 23 | 4 | CAPSCREW 7/16 - 14 X 2 - L6 | ALLOY STL. XTLAN COATED |
| 24 | 2 | CAPSCREW 1/2 - 13 X 1-3/4 - L6 | ALLOY STL. XTLAN COATED |
| 25 | 1 | PLATE POSITION STOP | 1045-1050 PLASTIC COATED |
| 26 | 1 | NAMEPLATE | 302 S.S. |
| 27 | 1 | NAMEPLATE PRESS EMULGIZING PORT # | 302 S.S. |
| 28 | 1 | NAMEPLATE "VENT TO ATMOSPHERE" | 302 S.S. |
| 29 | 1 | AIR ADHESIVE | SCOTCH # Y 4845 |
| 30 | 1 | AIR ADHESIVE | STAINLESS STEEL |
| 31 | 1 | AIR ADHESIVE | 3M SPARY ADHESIVE SUPER 77 |

- △ OVERHAUL KIT PART - KIT # 601001
- REPAIR KIT PART - KIT # 601008
- SEAL KIT PART - KIT # 601009
- (2) O-RINGS & (1) BACK-UP RING PER PAIR FOR BLEEDER VALVE IN SEAL & REPAIR KIT. (2 PAIRS - 8TY)

SECTION A-A

| | |
|-------------|---|
| DATE | 1/17 |
| BY | 6601005 |
| FOR | 3/4 ASSY - STEAM SERVICE, 3600', WACC. 1030/EPONDS, 170' E. I. BYVA P. 307' DIA. 4-50' DIA. |
| PROJECT | 6601005 |
| SCALE | AS SHOWN |
| DESIGNED BY | |
| CHECKED BY | |
| APPROVED BY | |

NOTES UNLESS OTHERWISE SPECIFIED:
 1. UNLESS OTHERWISE SPECIFIED, ALL DIMENSIONS ARE IN INCHES.
 2. UNLESS OTHERWISE SPECIFIED, ALL DIMENSIONS ARE TO BE TAKEN TO THE CENTER OF THE PART.
 3. UNLESS OTHERWISE SPECIFIED, ALL DIMENSIONS ARE TO BE TAKEN TO THE SURFACE OF THE PART.
 4. UNLESS OTHERWISE SPECIFIED, ALL DIMENSIONS ARE TO BE TAKEN TO THE CENTER OF THE HOLE.
 5. UNLESS OTHERWISE SPECIFIED, ALL DIMENSIONS ARE TO BE TAKEN TO THE CENTER OF THE HOLE.
 6. UNLESS OTHERWISE SPECIFIED, ALL DIMENSIONS ARE TO BE TAKEN TO THE CENTER OF THE HOLE.
 7. UNLESS OTHERWISE SPECIFIED, ALL DIMENSIONS ARE TO BE TAKEN TO THE CENTER OF THE HOLE.
 8. UNLESS OTHERWISE SPECIFIED, ALL DIMENSIONS ARE TO BE TAKEN TO THE CENTER OF THE HOLE.

SECTION 10.0
6000 PSI SERVICE VALVE MAINTENANCE

The maintenance interval required for the service valve will be determined by the media acting upon the valve. Sand, grit, or metal chips may damage seats causing leaks which will require seat replacement. Occasional lubrication will be necessary to reduce opening torque. The use of a synthetic lubricant, such as Rohrback Cosasco Systems #201688, is recommended.

10.1 Sour Gas Service.

On both the 3600 PSI and 6000 PSI service valves, applicable materials comply with the requirements of NACE standard MR0175, "Sulfide Stress Cracking Resistant Metallic Materials for Oil Field Equipment." As stated in this standard. "Materials ... are resistant to, but not necessarily immune to (sulfide stress cracking) under all service conditions." Thus, when the valve is used in sour environments, it must be thoroughly cleaned after use to help prevent corrosion and/or damage to internal materials.

10.2. Service Valve Disassembly.

Applicable to 6000 pound service valve kit P/N 210262, valve P/N 210257.

The RBS 6000 Service Valve has a valve ball that is removable only from the service valve hammer nut end (access fitting body connection). Normally, for routine maintenance, disassembly instructions indicated in paragraphs 8 and 9 need not be done.

1. Loosen and remove the eight 5/8" Allen head cap screws (14) at the acme thread end, using a 1/2" Allen wrench.
2. Remove the bleed adapter end plate (24), from the valve body (20), exposing the first of two seat seal rings (18), and their carriers (17). Remove the seat seal ring (18), and its carrier (17), from the valve body (20).
3. Remove the 3/8" Allen head cap screw (4), securing the valve handle (2) to the square head of the stem (3), by using a 5/16" Allen wrench. Remove the position stop plate (5) which is now exposed.
4. Remove the six 1/2" Allen head cap screws retaining the bonnet (7), to the valve body (20), by using a 3/8" Allen wrench.
5. Remove the bonnet and stem (3 and 7), intact from the valve body (20). Remove the bonnet-to-valve body o-ring seal (11) which is now exposed.
6. Remove the valve ball (19) from the valve body (20).

7. Remove both the second seat seal ring (18) and its carrier (17) from the service valve body (20).
8. Remove the eight 5/8" Allen head cap screws (14) retaining the hammer nut adapter assembly (13) to the valve body (20), by using a 1/2" Allen wrench. Remove the hammer nut adapter assembly (13).
9. Remove the hammer nut-to-body retainer (15) from the valve body (20).
10. Further disassembly of the stem (3), from the bonnet (7), (previously removed in paragraph 5) is done by removing the stem seal (9), its back-up ring (8), its o-ring (11), and the thrust ring (10), which are now exposed.
11. Remove the by-pass (21) and bleed valve (27) only if necessary for seal replacement. To remove, turn the large bleed screw retaining lock nut counterclockwise and completely disengage from the service valve body (20). To disassemble the bleed screw from its retaining lock nut, it is necessary to remove the roll pin and the small nylock hex nut from the bleed screw top. By turning clockwise on the bleed screw, it will thread out through the bottom of its retaining lock nut. Seal replacement can now be accomplished.

10.3. Service Valve Assembly.

1. Clean all parts. Examine all seals and o-rings. It is highly recommended that seals and o-rings be replaced each time the service valve is disassembled and reassembled. Even then, prior to assembly, they should be thoroughly inspected for nicks, cuts, or abrasions.
2. Lubricate the swivel on the hammer nut adapter assembly (13). Install the hammer nut seal adapter-to-access fitting body o-ring (12) in the hammer nut to body retainer (15).
3. Install the retainer to body o-ring (16) in the enclosed end of the valve body (20).
4. Install the seal adapter plate (15) and the hammer nut adapter assembly (13) to the valve body (20), using 5/8" Allen head cap screws (14). Use a 1/2" Allen wrench and torque to 90 ft. lb.
5. Install one of the two seat seal rings (18) and its carrier (17) into the valve body (20). (NOTE: There are two seat seal rings and 2 carriers; and, they are interchangeable). If the seats are not being replaced, install the better of the two seats in the acme threaded end of the valve. Grease the face of the seat seal ring (18).
6. Grease the valve ball (19) and install the better side in the acme threaded end of the valve body (20). Install the other seat seal ring (18) and carrier (17) into the valve body (20) and in firm contact with the valve ball (19).

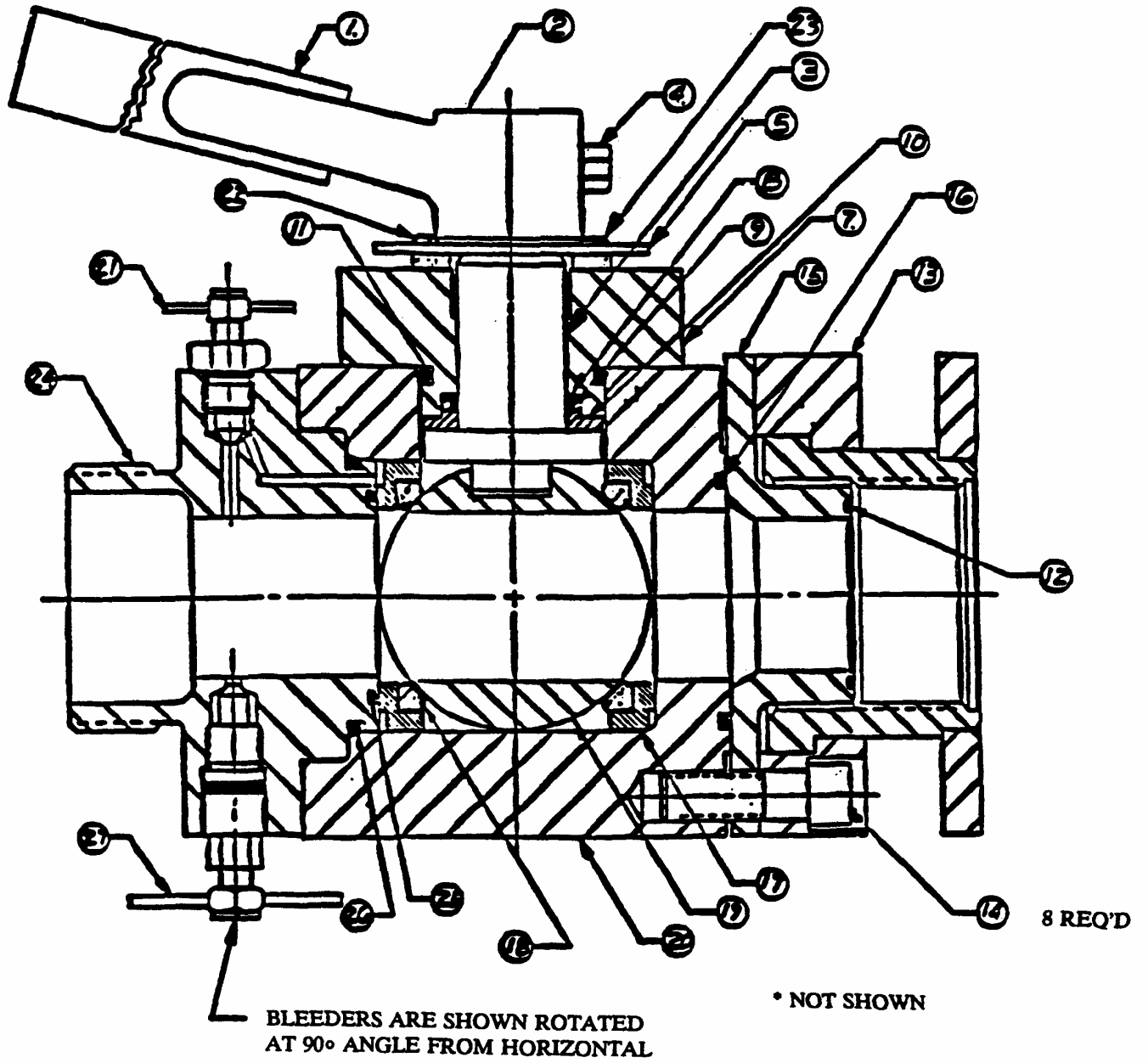
7. Install the bleed adapter-to-valve body o-rings (25 and 26) in the bleed adapter end plate (24).
8. Install the bleed adapter end plate (24) onto the valve body (20) using the 5/8" Allen head cap screws (14), by using a 1/2" Allen wrench. **DO NOT** tighten them securely at this stage.
9. Partially assemble the bonnet (7), by installing back-up ring (8), insert stem seal (9) and o-ring seal (11) in the bonnet (7).
10. Install the thrust washer (10), on to the stem (3), in bonnet (7). Position the bonnet and stem into the valve body (20) stem recess.
11. Carefully position the bonnet (7), onto the valve body (20), ensuring that the thrust washer (10) is eased into position concentric with the o-ring (11). Torque the six 1/2" Allen head cap screws (22) (23) retaining the bonnet (7) to the valve body, by using a 3/8" Allen wrench to 50 ft. lb.
12. Install the position stop plate (5), over the top of the stem (3) and position the valve ball handle (2) onto the square head of the stem (3). Ensure that handle positioning points are away from the hammer nut end when the valve ball is in the open position. Tighten the 3/8" Allen head cap screw retaining the handle (2) to the stem (3), by using a 5/16" Allen wrench.
13. Torque the eight 5/8" Allen head cap screws (14), that were initially installed as indicated in paragraph 8, to retain the bleed adapter end plate (24) to 90 ft. lb.
14. Install the by-pass (21) or vent valve (27), if it was removed for seal replacement. Back-off the bleed screw several turns before tightening the large bleed screw retaining lock nut. This avoids bottoming out the bleed screw on its seat before the retaining lock nut is securely tight.
15. Check the service valve for smooth operation by opening and closing the ball.
16. Pressure test the service valve. Rated working pressure is 6000 PSI (413 BAR) at temperatures to +200°F (+93°C).

FIGURE 10-1
RBS 6000 SERVICE VALVE

| | | |
|-----|---|---------|
| 27 | Bleed Valve | 1 each |
| 26 | O-ring, Bleed Adapter to Valve Body | 1 each |
| 25 | O-ring, Bleed Adapter to Valve Ball Carrier | 1 each |
| 24 | Plate, Bleed Adapter End | 1 each |
| 23 | Screw Allen Head Cap 1/2" | 2 each |
| 22 | Screw Allen Head Cap 1/2" | 1 each |
| 21 | Valve, By-pass | 1 each |
| 20 | Body, Valve | 1 each |
| 19 | Ball | 1 each |
| 18 | Ring, Seat Seal | 2 each |
| 17 | Carrier, Ball | 2 each |
| 16 | O-ring, Retainer-to-Body | 1 each |
| 15 | Retainer, Hammer Nut-to-Body | 1 each |
| 14* | Screw, Allen Socket Head Cap 5/8" | 16 each |
| 13 | Nut, Hammer O-Ring, Hammer Nut Seal | 1 each |
| 12 | O-ring | 5 each |
| 11 | O-ring, Bonnet-to-Valve Body | 1 each |
| 10 | Ring, Thrust | 1 each |
| 9 | Seal, Stem | 1 each |
| 8 | Back-up Ring, Stem | 1 each |
| 7 | Bonnet | 1 each |
| 6* | Plug Pipe | 1 each |
| 5 | Plate, Position Stop | 1 each |
| 4 | Screw, Allen Head Cap 3/8" | 1 each |
| 3 | Stem | 1 each |
| 2 | Handle, Valve Ball Control | 1 each |
| 1 | Handle, Extension | 1 each |

* Not Shown

FIGURE 10-1 RBS SERVICE VALVE



LIMITED WARRANTY

Rohrback Cosasco Systems, Inc. ("RCS") warrants this RCS Corrosion Monitoring Product ("Product") to be free from defects in material and workmanship for a period of eighteen months from the date of purchase from RCS or an authorized RCS distributor or one year from the date first placed in service, whichever comes first, with the following exceptions:

- RCS Corrosion Monitoring Products are routinely exposed to process fluids under a variety of operating conditions. Because RCS cannot anticipate all possible combinations of process fluid composition, operating conditions and materials of construction, RCS makes no warranty as to compatibility of its products in the application conditions.
- CORROSOMETER® probe sensing elements, CORRATER® electrodes and COSASCO® coupons are designed to corrode. As corrosion proceeds, the structural integrity of the corroding surfaces is unavoidably affected. RCS makes no warranty (and specifically disclaims all warranties) as to structural integrity of any of these products left exposed to the process beyond their intended service life.
- RCS does not warrant Products not manufactured by RCS.

This Limited Warranty does not include service to repair damage to the Product resulting from shipping, improper installation or use, accident, disaster, abuse, attempts to service the Product by unauthorized personnel, or non-RCS modification of the Product. Should RCS determine that the Product has failed within the warranty period RCS will, as its option, repair or replace the Product at no charge except as set forth below. Repair parts will be either reconditioned or new. All replaced parts and Products become the property of RCS.

To obtain Limited Warranty service you must contact RCS's Customer Service Department to obtain a Return Authorization Number and Shipping Instructions. NO PRODUCTS WILL BE ACCEPTED FOR RETURN WITHOUT A RETURN AUTHORIZATION NUMBER. You agree to be solely responsible for all costs of removing the Product from service, shipment (including insurance) to and from the designated RCS Service Center and reinstallation. RCS will be responsible for the cost of return shipment for any valid warranty claim. RCS reserves the right to inspect an allegedly defective Product at the place of installation or use. If RCS determines that there is a valid claim, there will be no charge for such inspection. In all other cases, any inspection by RCS will be at the rates specified in RCS's then current published Field Service Rate Schedule.

THE FOREGOING WARRANTIES ARE IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. This Limited Warranty is extended to the original user for industrial use only and is not a consumer product warranty extended under the Magnuson-Mass Warranty Act.

IF THIS PRODUCT IS NOT IN GOOD WORKING ORDER AS WARRANTED ABOVE, YOUR SOLE REMEDY SHALL BE REPAIR OR REPLACEMENT AS PROVIDED ABOVE. IN NO EVENT WILL RCS BE LIABLE TO YOU FOR ANY DAMAGES WHETHER BASED UPON BREACH OF WARRANTY, BREACH OF CONTRACT, NEGLIGENCE, STRICT TORT OR ANY OTHER LEGAL THEORY, INCLUDING ANY LOST PROFITS, LOST SAVINGS OR REVENUE, LOSS OF USE OF THE PRODUCT OR ANY ASSOCIATED EQUIPMENT, LOSS OF SUBSTITUTE EQUIPMENT OR OTHER INCIDENTAL OR CONSEQUENTIAL DAMAGES ARISING OUT OF THE USE OF OR INABILITY TO USE SUCH PRODUCT. EVEN IF RCS OR AN AUTHORIZED RCS DISTRIBUTOR HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES, OR FOR ANY CLAIM BY ANY OTHER PARTY, INCLUDING CUSTOMERS OF THE ORIGINAL USER.

Any action for breach of warranty must be commenced with three (3) months of the expiration of the warranty period.

To obtain Limited Warranty Service or other assistance, contact your nearest RCS office or distributor or contact RCS Customer Service directly at:

| | | |
|--------------------------------|------|----------------|
| Rohrback Cosasco Systems, Inc. | Tel: | (562) 949-0123 |
| 11841 East Smith Avenue | Fax: | (562) 949-3065 |
| Santa Fe Springs, CA 90670 | Tlx: | 09-8701 |
| U.S.A. | | |

C:\WP50\RSO\WARRANTY

| REV | ECN | DESCRIPTION | BY | APPROV | DATE |
|-----|------|------------------|----|--------|----------------|
| D | 6831 | REWORK ON C.A.D. | | | RECTOR |
| E | 9378 | CHD. NOTE 14 | | | S.S. 21 JAN 88 |

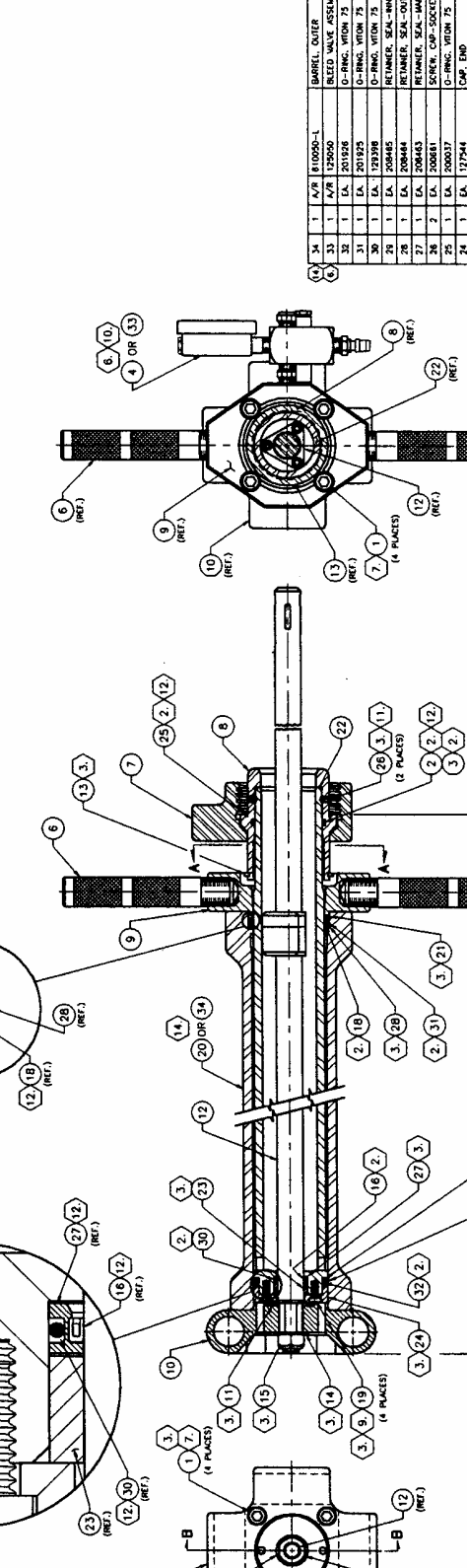
| REV | ECN | DESCRIPTION | BY | APPROV | DATE |
|-----|-----|--|----|--------|------|
| 34 | N/A | 810000-L BARREL, OUTER | | | |
| 33 | N/A | 129000 BREED VALVE ASSEMBLY | | | |
| 32 | EA | 201928 O-RING, VITON 75 | | | |
| 31 | EA | 201928 O-RING, VITON 75 | | | |
| 30 | EA | 129398 RETAINER, SEAL-INNER | | | |
| 29 | EA | 200485 RETAINER, SEAL-INNER | | | |
| 28 | EA | 200484 RETAINER, SEAL-OUTER | | | |
| 27 | EA | 200483 RETAINER, SEAL-OUTER | | | |
| 26 | EA | 200037 SCREW, CAP-SOCKET HEAD CONE POINT | | | |
| 25 | EA | 127544 O-RING, VITON 75 | | | |
| 24 | EA | 127544 O-RING, VITON 75 | | | |
| 23 | EA | 127543 RETAINER, SEAL | | | |
| 22 | EA | 810011-L BARREL, INNER | | | |
| 21 | EA | 127541 RETAINER, SEAL | | | |
| 20 | N/A | 810010-XXXX-L BARREL, OUTER | | | |
| 19 | EA | 127539 SCREW, CAP-SOCKET HEAD | | | |
| 18 | EA | 201928 SEAL, OUTER | | | |
| 17 | EA | 201928 SEAL, INNER | | | |
| 16 | EA | 201927 SEAL, WANDREL | | | |
| 15 | EA | 202015 WMT, LOCK | | | |
| 14 | EA | 202018 WISHER, 1/2 INCH | | | |
| 13 | EA | 127531 PRNG, EXT-HEAVY DUTY | | | |
| 12 | EA | 810012-L PRG, WANDREL ASSEMBLY | | | |
| 11 | EA | 127530 TAP, IMPACT-WANDREL HEAD | | | |
| 10 | EA | 127524 COLLAR, SEAL STOP | | | |
| 9 | EA | 127524 COLLAR, SEAL STOP | | | |
| 8 | EA | 127520 ADAPTER, THREAD | | | |
| 7 | EA | 127522 WMT, HAMMER | | | |
| 6 | EA | 127170 HANDLE | | | |
| 5 | EA | 210237 SEAL, KIT | | | |
| 4 | N/A | 210298 BREED VALVE ASSEMBLY | | | |
| 3 | EA | 124843 BACK-UP PRNG, ZEOLON | | | |
| 2 | EA | 124842 O-RING, VITON 90 | | | |
| 1 | B | 118209 SCREW, CAP-SOCKET HEAD | | | |

| ITEM | QTY | UNIT | DESCRIPTION |
|------|-----|------|--|
| 1 | 1 | B | 118209 SCREW, CAP-SOCKET HEAD |
| 2 | 1 | EA | 124842 O-RING, VITON 90 |
| 3 | 1 | EA | 124843 BACK-UP PRNG, ZEOLON |
| 4 | 1 | N/A | 210298 BREED VALVE ASSEMBLY |
| 5 | 1 | EA | 210237 SEAL, KIT |
| 6 | 1 | EA | 127170 HANDLE |
| 7 | 1 | EA | 127522 WMT, HAMMER |
| 8 | 1 | EA | 127520 ADAPTER, THREAD |
| 9 | 1 | EA | 127524 COLLAR, SEAL STOP |
| 10 | 1 | EA | 127524 COLLAR, SEAL STOP |
| 11 | 1 | EA | 127530 TAP, IMPACT-WANDREL HEAD |
| 12 | 1 | EA | 810012-L PRG, WANDREL ASSEMBLY |
| 13 | 1 | EA | 127531 PRNG, EXT-HEAVY DUTY |
| 14 | 1 | EA | 202018 WISHER, 1/2 INCH |
| 15 | 1 | EA | 202015 WMT, LOCK |
| 16 | 1 | EA | 201927 SEAL, WANDREL |
| 17 | 1 | EA | 201928 SEAL, INNER |
| 18 | 1 | EA | 201928 SEAL, OUTER |
| 19 | 4 | EA | 127539 SCREW, CAP-SOCKET HEAD |
| 20 | 1 | N/A | 810010-XXXX-L BARREL, OUTER |
| 21 | 1 | EA | 127541 RETAINER, SEAL |
| 22 | 1 | EA | 810011-L BARREL, INNER |
| 23 | 1 | EA | 127543 RETAINER, SEAL |
| 24 | 1 | EA | 127544 O-RING, VITON 75 |
| 25 | 1 | EA | 127544 O-RING, VITON 75 |
| 26 | 1 | EA | 200037 SCREW, CAP-SOCKET HEAD CONE POINT |
| 27 | 1 | EA | 200483 RETAINER, SEAL-OUTER |
| 28 | 1 | EA | 200484 RETAINER, SEAL-OUTER |
| 29 | 1 | EA | 200485 RETAINER, SEAL-INNER |
| 30 | 1 | EA | 129398 RETAINER, SEAL-INNER |
| 31 | 1 | EA | 201928 O-RING, VITON 75 |
| 32 | 1 | EA | 201928 O-RING, VITON 75 |
| 33 | 1 | EA | 129000 BREED VALVE ASSEMBLY |
| 34 | 1 | N/A | 810000-L BARREL, OUTER |

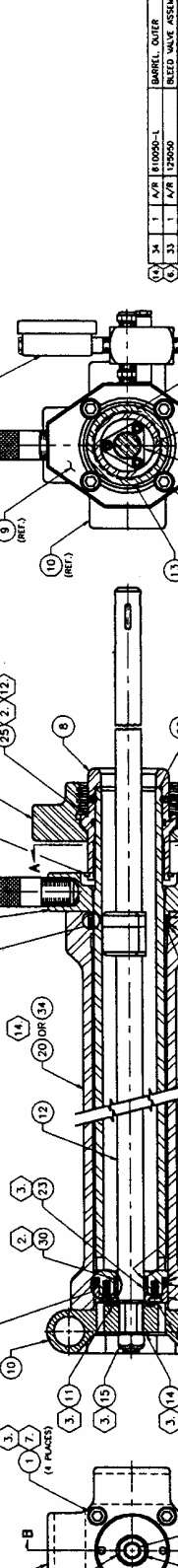
REVISIONS



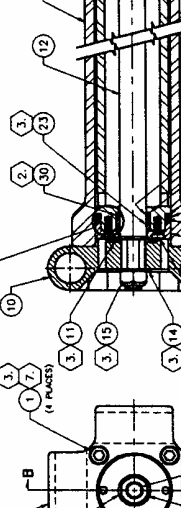
SECTION A-A



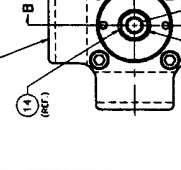
SECTION B-B



SECTION C-C



SECTION D-D



SECTION E-E



SECTION F-F

1. RETRIEVER ASSEMBLY MAY BE PURCHASED IN RETRIEVER KIT.
 2. MAY BE PURCHASED IN SEAL KIT (210237).
 3. MAY BE PURCHASED IN REPAIR KIT (210238).
 4. ITEM 5 NOT SHOWN IS INCLUDED IN REPAIR KIT (210238).
 5. DIM. A COLLAPSED = ORDER LENGTH + 7.50".
 6. DIM. B EXTENDED = ORDER LENGTH + 25.62".
 7. DIM. C COLLAPSED = ORDER LENGTH + 7.50".
 8. DIM. D EXTENDED = ORDER LENGTH + 25.62".
 9. DIM. E COLLAPSED = ORDER LENGTH + 7.50".
 10. DIM. F EXTENDED = ORDER LENGTH + 25.62".
 11. DIM. G COLLAPSED = ORDER LENGTH + 7.50".
 12. DIM. H EXTENDED = ORDER LENGTH + 25.62".
 13. DIM. I COLLAPSED = ORDER LENGTH + 7.50".
 14. DIM. J EXTENDED = ORDER LENGTH + 25.62".
 15. DIM. K COLLAPSED = ORDER LENGTH + 7.50".
 16. DIM. L EXTENDED = ORDER LENGTH + 25.62".
 17. DIM. M COLLAPSED = ORDER LENGTH + 7.50".
 18. DIM. N EXTENDED = ORDER LENGTH + 25.62".
 19. DIM. O COLLAPSED = ORDER LENGTH + 7.50".
 20. DIM. P EXTENDED = ORDER LENGTH + 25.62".
 21. DIM. Q COLLAPSED = ORDER LENGTH + 7.50".
 22. DIM. R EXTENDED = ORDER LENGTH + 25.62".
 23. DIM. S COLLAPSED = ORDER LENGTH + 7.50".
 24. DIM. T EXTENDED = ORDER LENGTH + 25.62".
 25. DIM. U COLLAPSED = ORDER LENGTH + 7.50".
 26. DIM. V EXTENDED = ORDER LENGTH + 25.62".
 27. DIM. W COLLAPSED = ORDER LENGTH + 7.50".
 28. DIM. X EXTENDED = ORDER LENGTH + 25.62".
 29. DIM. Y COLLAPSED = ORDER LENGTH + 7.50".
 30. DIM. Z EXTENDED = ORDER LENGTH + 25.62".
 31. DIM. AA COLLAPSED = ORDER LENGTH + 7.50".
 32. DIM. AB EXTENDED = ORDER LENGTH + 25.62".
 33. DIM. AC COLLAPSED = ORDER LENGTH + 7.50".
 34. DIM. AD EXTENDED = ORDER LENGTH + 25.62".

USE ITEM 34 ON RBSS RETRIEVERS 49 INCHES OR SHORTER. USE ITEM 20 ON ALL OTHERS.

OPTIONS AND SPARE PARTS FOR RETRIEVERS

OPTIONS:
 P/N: 124870-SURGE TUBE ASSEMBLY
 P/N: 124869-DIVERTER HOSE ASSEMBLY-10 FT.
 P/N: 124831-DIVERTER HOSE ASSEMBLY-25 FT.
 P/N: 124885-DIVERTER HOSE ASSEMBLY-50 FT.
 P/N: 203855-BACK PRESSURE SERVICE TOOL

SPARE PARTS:
 P/N: 210238-RBSS/RBSSA RETRIEVER REPAIR KIT
 P/N: 210237-RBSS/RBSSA RETRIEVER SEAL KIT.
 P/N: 126490-WRENCH SET
 P/N: 128371-GLYCE-IFS3451 SILICONE.

NOTE: UNLESS OTHERWISE SPECIFIED:

1. RETRIEVER ASSEMBLY MAY BE PURCHASED IN RETRIEVER KIT.

2. MAY BE PURCHASED IN SEAL KIT (210237).

3. MAY BE PURCHASED IN REPAIR KIT (210238).

4. ITEM 5 NOT SHOWN IS INCLUDED IN REPAIR KIT (210238).

5. DIM. A COLLAPSED = ORDER LENGTH + 7.50".

6. DIM. B EXTENDED = ORDER LENGTH + 25.62".

7. DIM. C COLLAPSED = ORDER LENGTH + 7.50".

8. DIM. D EXTENDED = ORDER LENGTH + 25.62".

9. DIM. E COLLAPSED = ORDER LENGTH + 7.50".

10. DIM. F EXTENDED = ORDER LENGTH + 25.62".

11. DIM. G COLLAPSED = ORDER LENGTH + 7.50".
 12. DIM. H EXTENDED = ORDER LENGTH + 25.62".
 13. DIM. I COLLAPSED = ORDER LENGTH + 7.50".
 14. DIM. J EXTENDED = ORDER LENGTH + 25.62".
 15. DIM. K COLLAPSED = ORDER LENGTH + 7.50".
 16. DIM. L EXTENDED = ORDER LENGTH + 25.62".
 17. DIM. M COLLAPSED = ORDER LENGTH + 7.50".
 18. DIM. N EXTENDED = ORDER LENGTH + 25.62".
 19. DIM. O COLLAPSED = ORDER LENGTH + 7.50".
 20. DIM. P EXTENDED = ORDER LENGTH + 25.62".
 21. DIM. Q COLLAPSED = ORDER LENGTH + 7.50".
 22. DIM. R EXTENDED = ORDER LENGTH + 25.62".
 23. DIM. S COLLAPSED = ORDER LENGTH + 7.50".
 24. DIM. T EXTENDED = ORDER LENGTH + 25.62".
 25. DIM. U COLLAPSED = ORDER LENGTH + 7.50".
 26. DIM. V EXTENDED = ORDER LENGTH + 25.62".
 27. DIM. W COLLAPSED = ORDER LENGTH + 7.50".
 28. DIM. X EXTENDED = ORDER LENGTH + 25.62".
 29. DIM. Y COLLAPSED = ORDER LENGTH + 7.50".
 30. DIM. Z EXTENDED = ORDER LENGTH + 25.62".
 31. DIM. AA COLLAPSED = ORDER LENGTH + 7.50".
 32. DIM. AB EXTENDED = ORDER LENGTH + 25.62".
 33. DIM. AC COLLAPSED = ORDER LENGTH + 7.50".
 34. DIM. AD EXTENDED = ORDER LENGTH + 25.62".

USE ITEM 34 ON RBSS RETRIEVERS 49 INCHES OR SHORTER. USE ITEM 20 ON ALL OTHERS.

OPTIONS AND SPARE PARTS FOR RETRIEVERS

OPTIONS:
 P/N: 124870-SURGE TUBE ASSEMBLY
 P/N: 124869-DIVERTER HOSE ASSEMBLY-10 FT.
 P/N: 124831-DIVERTER HOSE ASSEMBLY-25 FT.
 P/N: 124885-DIVERTER HOSE ASSEMBLY-50 FT.
 P/N: 203855-BACK PRESSURE SERVICE TOOL

SPARE PARTS:
 P/N: 210238-RBSS/RBSSA RETRIEVER REPAIR KIT
 P/N: 210237-RBSS/RBSSA RETRIEVER SEAL KIT.
 P/N: 126490-WRENCH SET
 P/N: 128371-GLYCE-IFS3451 SILICONE.

NOTE: UNLESS OTHERWISE SPECIFIED:

1. RETRIEVER ASSEMBLY MAY BE PURCHASED IN RETRIEVER KIT.

2. MAY BE PURCHASED IN SEAL KIT (210237).

3. MAY BE PURCHASED IN REPAIR KIT (210238).

4. ITEM 5 NOT SHOWN IS INCLUDED IN REPAIR KIT (210238).

5. DIM. A COLLAPSED = ORDER LENGTH + 7.50".

6. DIM. B EXTENDED = ORDER LENGTH + 25.62".

7. DIM. C COLLAPSED = ORDER LENGTH + 7.50".

8. DIM. D EXTENDED = ORDER LENGTH + 25.62".

9. DIM. E COLLAPSED = ORDER LENGTH + 7.50".

10. DIM. F EXTENDED = ORDER LENGTH + 25.62".

| REV | ECN | DESCRIPTION | BY | APPROV | DATE |
|-----|------|------------------|----|--------|----------------|
| D | 6831 | REWORK ON C.A.D. | | | RECTOR |
| E | 9378 | CHD. NOTE 14 | | | S.S. 21 JAN 88 |

| ITEM | QTY | UNIT | DESCRIPTION |
|------|-----|------|--|
| 1 | 1 | B | 118209 SCREW, CAP-SOCKET HEAD |
| 2 | 1 | EA | 124842 O-RING, VITON 90 |
| 3 | 1 | EA | 124843 BACK-UP PRNG, ZEOLON |
| 4 | 1 | N/A | 210298 BREED VALVE ASSEMBLY |
| 5 | 1 | EA | 210237 SEAL, KIT |
| 6 | 1 | EA | 127170 HANDLE |
| 7 | 1 | EA | 127522 WMT, HAMMER |
| 8 | 1 | EA | 127520 ADAPTER, THREAD |
| 9 | 1 | EA | 127524 COLLAR, SEAL STOP |
| 10 | 1 | EA | 127524 COLLAR, SEAL STOP |
| 11 | 1 | EA | 127530 TAP, IMPACT-WANDREL HEAD |
| 12 | 1 | EA | 810012-L PRG, WANDREL ASSEMBLY |
| 13 | 1 | EA | 127531 PRNG, EXT-HEAVY DUTY |
| 14 | 1 | EA | 202018 WISHER, 1/2 INCH |
| 15 | 1 | EA | 202015 WMT, LOCK |
| 16 | 1 | EA | 201927 SEAL, WANDREL |
| 17 | 1 | EA | 201928 SEAL, INNER |
| 18 | 1 | EA | 201928 SEAL, OUTER |
| 19 | 4 | EA | 127539 SCREW, CAP-SOCKET HEAD |
| 20 | 1 | N/A | 810010-XXXX-L BARREL, OUTER |
| 21 | 1 | EA | 127541 RETAINER, SEAL |
| 22 | 1 | EA | 810011-L BARREL, INNER |
| 23 | 1 | EA | 127543 RETAINER, SEAL |
| 24 | 1 | EA | 127544 O-RING, VITON 75 |
| 25 | 1 | EA | 127544 O-RING, VITON 75 |
| 26 | 1 | EA | 200037 SCREW, CAP-SOCKET HEAD CONE POINT |
| 27 | 1 | EA | 200483 RETAINER, SEAL-OUTER |
| 28 | 1 | EA | 200484 RETAINER, SEAL-OUTER |
| 29 | 1 | EA | 200485 RETAINER, SEAL-INNER |
| 30 | 1 | EA | 129398 RETAINER, SEAL-INNER |
| 31 | 1 | EA | 201928 O-RING, VITON 75 |
| 32 | 1 | EA | 201928 O-RING, VITON 75 |
| 33 | 1 | EA | 129000 BREED VALVE ASSEMBLY |
| 34 | 1 | N/A | 810000-L BARREL, OUTER |

REVISIONS

ROHRBACK COSASCO SYSTEMS
 SANTA FE SPRINGS, CA 90670
 RETRIEVER ASSEMBLY - RBSS/RBSSA
 600010
 1/2-11
 80 PER SEAL NUMBER
 SHEET 1 OF 1