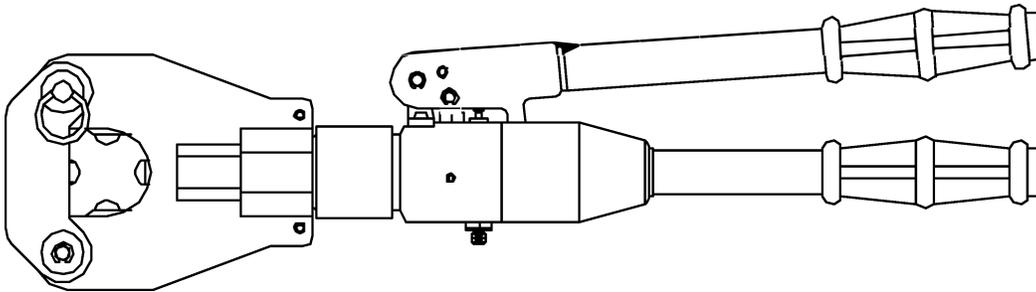


SERVICE AND OPERATION MANUAL

SEE PAGE i FOR IMPORTANT INFORMATION CONCERNING
LIMITED WARRANTY, AND LIMITATION OF LIABILITY.



HC134 4-INDENT DIE-LESS CRIMP TOOL



DANIELS MANUFACTURING CORP.
ORLANDO, FLORIDA
CAGE 11851

DATE: 12/01
REVISION: C
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INVALIDATION OF LIMITED WARRANTY

This repair manual is provided to those owners of Daniels Manufacturing Corp. (DMC) products who have elected to conduct in-house repairs of such products and who thereby consent to waive rights which they otherwise might have had under the DMC Limited Warranty applicable to such products.

DMC provides complete repair and maintenance service for all of its products. Owners of DMC products are warned that any tampering, including partial or complete disassembly of the product will invalidate the Limited Warranty applicable to said product.

LIMITED WARRANTY AND LIMITATION OF LIABILITY

- (a) LIMITED WARRANTY: DMC warrants each new product sold by DMC to be free from defects in material and workmanship under normal use and service. The sole obligation and liability of DMC under this warranty is limited to, at its option, the repair of, the refund of the purchase price of, or the replacement at its factory of any such product which proves defective within 90 days after delivery to the first end user, and is found to be defective in material or workmanship by DMC inspection.
- (b) In no case shall this warranty be effective unless delivery to the end user occurs within 180 days after delivery by DMC to the original purchaser, and written notice of any defect shall have been given to DMC within 30 days from the date such defect is first discovered.
- (c) Products for warranty consideration shall be returned with all transportation charges prepaid to DMC. Products repaired or replaced under this limited warranty are warranted for the unexpired portion of the original warranty and shall be returned F.O.B. factory, Orlando, Florida.
- (d) DMC disclaims any liability whether under this warranty or otherwise for any failure of its products which is caused, in whole or in part, by the use in or with that product of component parts not manufactured by DMC, or if said failure has, in the opinion of DMC inspection, been caused by tampering, misuse, neglect, improper storage, normal wear and tear or improper operation.
- (e) The terms of this limited warranty are the sole and exclusive warranty terms that shall have any force and effect in this order and such terms are in lieu of all other warranties expressed or implied including, but not limited to the implied warranties of or merchantability and fitness for a particular purpose, which are herewith expressly excluded. NO WARRANTY, EXPRESS OR IMPLIED, IS MADE OR AUTHORIZED TO BE MADE OR ASSUMED WITH RESPECT TO THE PRODUCTS OF DMC OTHER THAN HEREIN SET FORTH.
- (aa) LIMITATION OF LIABILITY: Other than the liability set forth in the above expressed warranty applicable to the products sold to the purchaser, DMC SHALL NOT BE LIABLE FOR CONSEQUENTIAL, INCIDENTAL, SPECIAL, OR OTHER TYPES OF DAMAGES AND EXPRESSLY EXCLUDES AND DISCLAIMS SUCH DAMAGES RESULTING FROM OR CAUSED BY THE USE, OPERATION, FAILURE, MALEFACTION OR DEFECTS OF ANY PRODUCTS SOLD TO THE PURCHASER AND THROUGH PURCHASER TO ANY OTHER PURCHASERS OR END USERS UNDER THIS OR ANY OTHER ORDER, IT BEING UNDERSTOOD THAT THE PRODUCTS SOLD HEREUNDER ARE NOT CONSUMER PRODUCTS.
Orange County, Florida, U.S.A. shall be the proper venue for any action or claim arising because of any alleged defect of any product, service or information manufactured or supplied by DMC. In the event of litigation, Florida law shall govern and DMC, if it prevails, in whole or in part, shall be entitled to reasonable attorney's fees, witness fees, and court costs.

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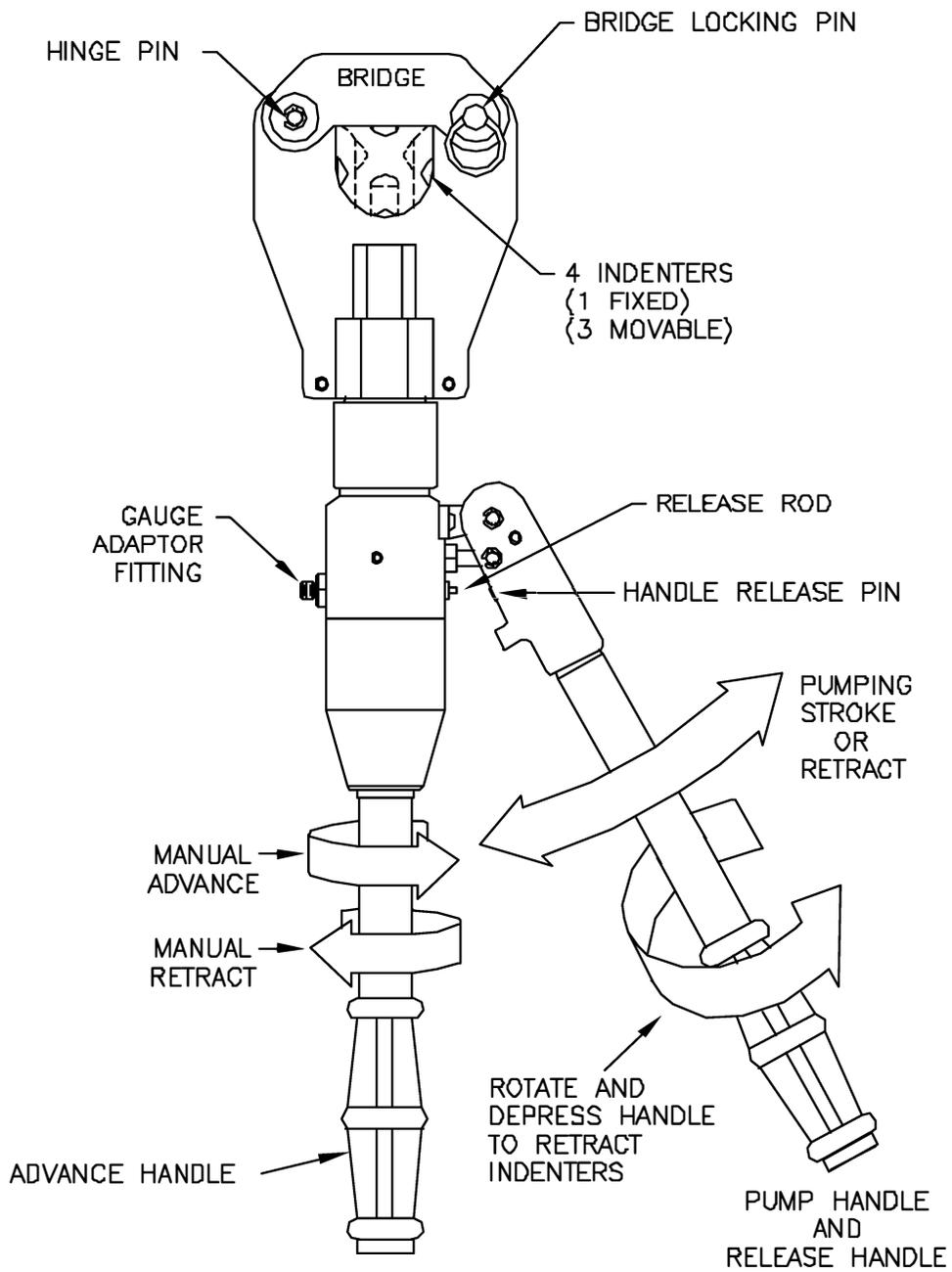


FIGURE 1

GENERAL OPERATION AND MAINTENANCE

WARNING:

The fiberglass handles and neoprene grips are NOT designed to protect the operator in "HOT" line work!

COLD WEATHER NOTE:

This tool and tool kit is supplied with Drydene Paradene 32AW hydraulic oil. For operation below 20°F (-7°C), refill reservoir with Drydene 22AW hydraulic oil. In cold weather and non-use, O-Ring seal sticking may cause non-pumping. rotate the advance handle clockwise to advance the indenters and free any sticking O-Rings.

STORAGE:

When tool is to be stored for any extended period of time, the tool should be pumped up approximately every three (3) weeks to keep the O-Rings and seals lubricated. The tool should also be stored with the indenters in the fully open position.

CAUTION: CRIMPING SMALL DIAMETERS SPLICES AND TERMINALS:

Extra care should be taken when positioning and crimping small diameter splices and terminals. These items can become lodged between the tool head and the indenter system (see Figure 4).

GENERAL MAINTENANCE:

The HC134 is a hydraulic crimp tool which requires well trained, experienced personnel having a clean work area equipped with adequate tools for major repairs, adjustments or maintenance.

PREVENTATIVE MAINTENANCE TOOL REQUIREMENTS

1. Hydraulic oil: Drydene Oil Co. Paradene hydraulic oil 32AW or 22AW depending upon ambient temperature (see Cold Weather Note). DO NOT USE BRAKE FLUID!
2. DMC part number HP1036-RK Repair Kit.
3. An environmentally approved degreasing solvent.
4. Bench type vise having a 4" minimum opening and soft jaws.
5. Hex wrench set.
6. Pin punch set.
7. 10" standard (flat blade) screwdriver.
8. 9/16", 3/8" and 5/8" open-end wrenches.
9. Lightweight hammer.
10. Oil catch pan.
11. DMC part number HPG1 Pressure Gauge.
12. Truarc® series 5133-25 E-Ring applicator.

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CARE OF HYDRAULIC TOOLS

This tool requires well trained, experienced personnel for major repairs, adjustments or maintenance. The following rules for use in the field will prolong the time between major repair work and help assure the dependability of the tool.

1. KEEP THE TOOL CLEAN.

Dirt and grit are the worst enemies of hydraulic equipment. Keep the tool in its case when not in use. Do not lay the tool on the ground. Particularly avoid joint compound from building up on the indenters. Most such compounds are highly abrasive and will work into the hydraulic mechanism if not regularly removed. Wipe entire tool thoroughly with a clean dry or slightly oily cloth after daily use.

2. DO NOT MAKE ADJUSTMENTS TO THE TOOL.

There are no adjustments on this tool that can be made in the field. If a tool becomes inoperative and the instructions in this manual do not help identify the malfunction, return it to the storeroom or other designated place and exchange it for another tool.

3. STORE TOOL PROPERLY.

Before storing the tool in its case for any length of time, back the rapid advance handle to the fully open position and depress the pump release handle to fully retract the crimping indenters. This protects the operating ram from moisture condensation and will help assure correct operation at the next period of use.

OPERATING INSTRUCTIONS

CONDUCTOR PREPARATION:

1. Using a proper insulation stripping tool, strip the insulation from the conductor, being careful not to nick the wire strands. Thoroughly clean the conductor by wire brushing a bright and shiny surface is obtained. All oxides and foreign matter must be removed.

NOTE: Do not wire brush tin plated copper conductors or tinned connectors.

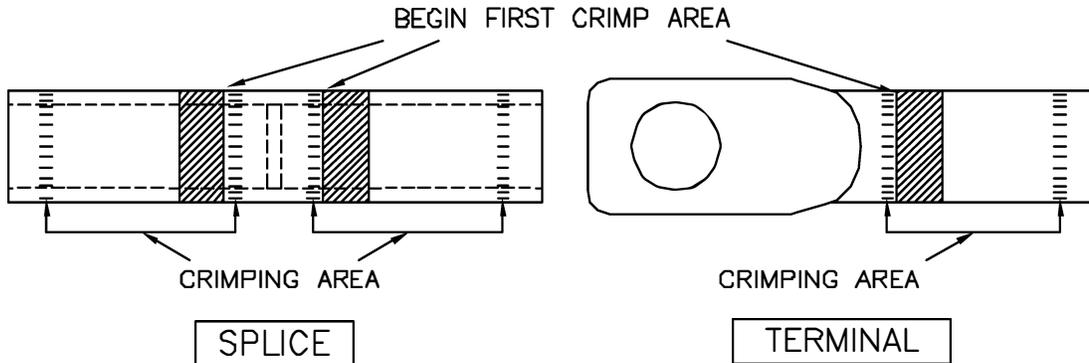


FIGURE 2

CRIMPING A SLEEVE CONNECTOR:

2. Place a sleeve in the indenter opening and rotate the advance handle clockwise (see Figure 1) until the indenters loosely clamp the sleeve or terminal. Position the sleeve or terminal so that the indenters will make the first crimp at the edge of the scored crimp line marked on the barrel (see Figure 2). Rotate each successive crimp 45°. NOTE: The number of crimps will vary with each size sleeve or terminal.
3. Insert the conductor into the connector socket making sure that the conductor is pushed fully against the center or end barrier.
4. Actuate the pump handle and the indenters will start compressing the sleeve (see Figure 3). A positive trip accompanied by a distinct "click" will occur when the crimp is completed. Stop pumping. Back off the rapid advance handle (rotate counter-clockwise) approximately one-half to one turn.
5. Release the indenters from the compressed sleeve by partially raising the pump handle. Then rotate the handle fully clockwise and push inward (see Figure 1). The indenters will open sufficiently to allow the sleeve to be repositioned for the next crimping operation.

CAUTION: DO NOT OPERATE TOOL WITHOUT PRODUCT (LUG, SLEEVE, ETC.) IN PLACE. SEVERE DAMAGE TO THE TOOL WILL RESULT.

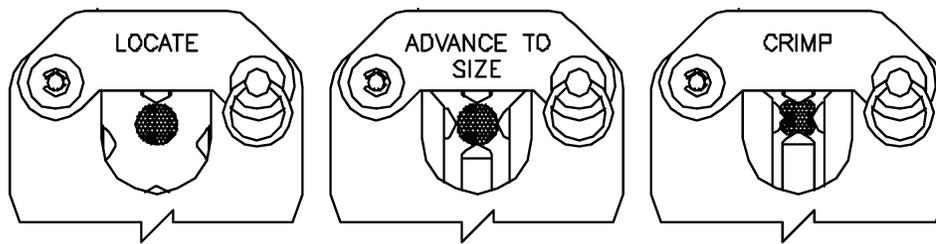


FIGURE 3

WARNING

Certain small connectors when not properly positioned, can severely damage this tool by becoming wedged between the indenters and the tool head (see Figure 4). The rapid advance handle, which controls the indenters setting, should always be advanced per the instructions above before crimping small sleeves.

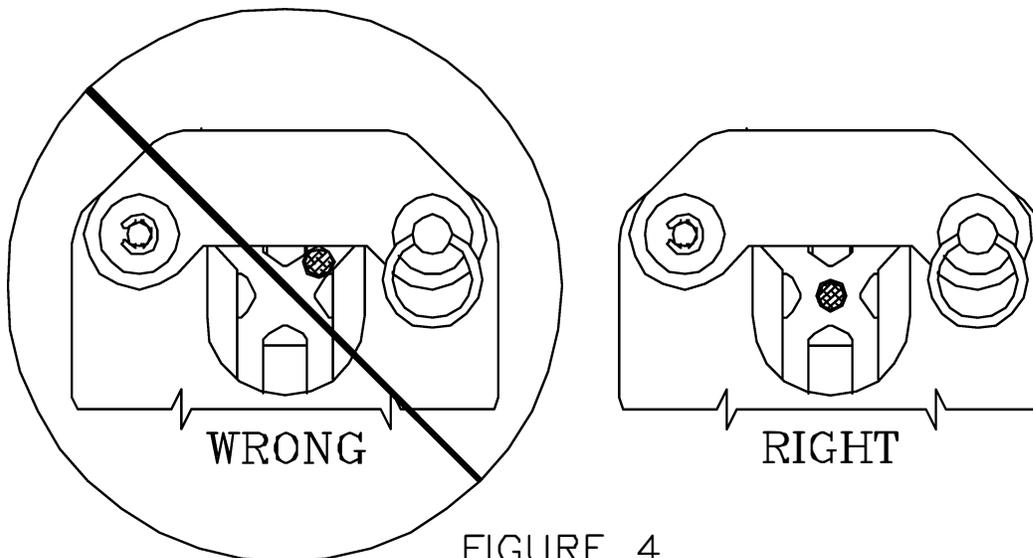


FIGURE 4

REMOVING A SPLICED CABLE:

6. Rotate bridge locking pin clockwise and pull pin to open upper bridge (see Figure 1) and remove the crimped splice. Close bridge and rotate lock pin counterclockwise to lock the bridge in position.

CAUTION: FAILURE TO LOCK THE BRIDGE CAN CAUSE SEVERE DAMAGE TO THE TOOL!
AFTER CRIMPING, ALWAYS LEAVE TOOL INDENTERS IN THE FULLY OPENED POSITION!

PREVENTATIVE MAINTENANCE

It is recommended that the following maintenance be performed at 30 day intervals on all HC134 tools which are in REGULAR DAILY SERVICE.

CLEANING AND LUBRICATING THE TOOL HEAD:

Inhibitor with grit is a highly abrasive compound which must be cleaned from the tool head at frequent intervals. The procedure shown in LUBRICATING THE TOOL HEAD should be followed to prevent excessive wear on the internal parts of the tool head.

CHECK THE SYSTEM PRESSURE:

1. Check relief valve pressure setting using a DMC HPG-1 Pressure Gauge (see ADJUSTING PUMP SYSTEM PRESSURE).

CHECKING PUMP OIL LEVEL:

1. Check reservoir oil level of tool by rotating the advance handle clockwise. Oil supply is adequate if the indenters touch before the advance handle is completely advanced. Add oil if required (see ADDITION OF HYDRAULIC OIL).

LOSS OF HYDRAULIC OIL:

Hydraulically actuated tools will gradually lose their hydraulic oil over a period of time. This loss is caused by the adherence of small amounts of oil to the moving parts exposed to the outside, such as the plungers, pistons, and rams, and from occasional leakage around mechanical seals. A small loss of hydraulic oil is normal and will not affect the operation of the HC134 tool. However, if the level drops too low air can become trapped in the hydraulic system causing the tool to develop a "spongy" feel, preventing it from operating. Occasional hydraulic oil checks can be performed as follows.

PREVENTATIVE MAINTENANCE PROCEDURES

LUBRICATING THE TOOL HEAD:

1. Disassemble the tool head (see TOOL HEAD DISASSEMBLY steps 1 through 6) and clean parts thoroughly by washing in an environmentally approved solvent. Wipe parts clean and apply a coating of grease (see LUBRICATION RECOMMENDATIONS) to the bearing and pin surfaces of Slide 4 (see Figure 5) and the bearing surfaces of each indenter (see Figure 6).
2. Place bearing case 11 on the bearing surfaces of the indenter and apply a small amount of grease in each roller cavity of the bearing case. Place bearing 16 in each slot of case 11 and pack a small amount of grease after all the rollers are installed.
3. Follow steps 1 through 2 of TOOL HEAD ASSEMBLY.
4. Wipe lubricant from indenter crimping surfaces.

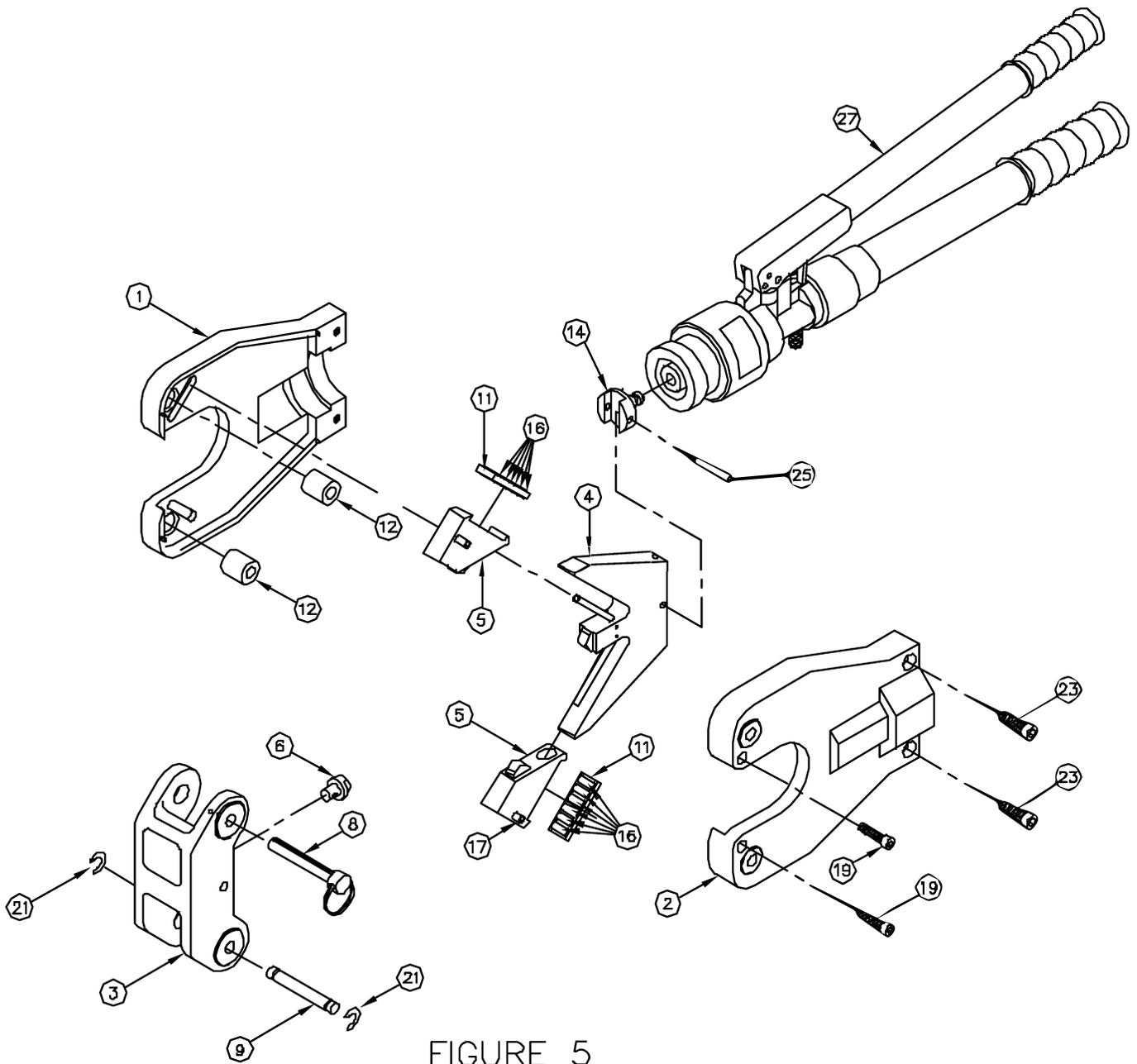


FIGURE 5

27	HP1036	1	HYDRAULIC PUMP
25	6-1244	1	Ø5/32 X 1.125 LG. SPRING PIN
23	1-1079	2	1/4-20 X 1 LG. SOCKET CAP SCR.
21	4-1058	2	E-RING (5133-31)
19	1-1621	2	10-32 X 1 LG SOCKET CAP SCR.
16	6-1003	12	ROLLER, BEARING
14	HC134-14	1	SWIVEL
12	HC134-12	2	BUSHING, ROLLER
11	HC134-11	2	CASE, BEARING
9	HC134-9	1	PIN, HINGE
8	HC134-8	1	PIN, LOCK
6	HC134-6	1	INDENTER
5	HC134-5	2	JAW
4	HC134-4	1	SLIDE
3	HC134-3	1	HINGE
2	HC134-2	1	HOUSING (RIGHT)
1	HC134-1	1	HOUSING (LEFT)
ITEM	PART NO.	QTY.	DESCRIPTION/REMARKS

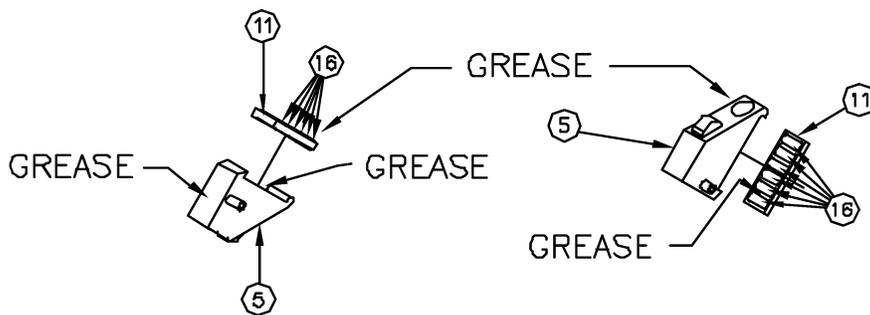


FIGURE 6

TOOL HEAD DISASSEMBLY: (SEE FIGURE 1)

1. Fully retract the indenters by turning the advance handle counterclockwise to the STOP position.
2. Rotate and depress the pump release handle to fully retract the indenters (see Figure 5).
3. Rotate and pull bridge locking Pin 8 and open bridge 3.
4. Remove E-ring 21 and pull hinge pin 9.
5. Remove screws 23 and 19 to open left and right covers.
6. Carefully remove items 12, 5, 11 and 16. Care should be taken to ensure that the roller bearings in case 11 do not drop out and get lost.
7. Check spring pin 25 making sure the ends of the pin are flush or below the surface of swivel 14.

TOOL HEAD ASSEMBLY:

1. Reassemble the tool by reversing the step by step sequence recommended for disassembly.
NOTE: Be sure that the 1/4" cap screws, item 23, holding the covers to the cylinder, should be tightened snugly to the extent that the tool head can still rotate (see Figure 5).

ADDITION OF HYDRAULIC OIL:

Each kit contains a bottle of hydraulic oil to be used in the HC134 tool. For cold weather regions, an oil with a viscosity of SUS 114 @ 100°F should be used. Caution should be exercised to assure that oil of different types are not mixed when tool reservoirs are replenished.

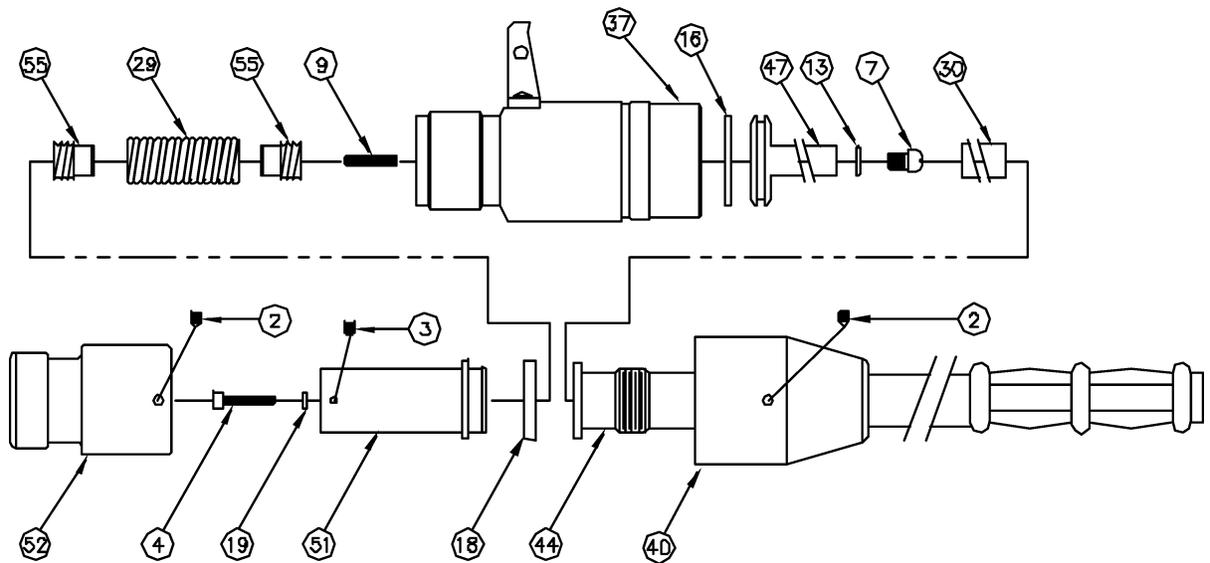


FIGURE 7

55	HP1036-22	SPRING RETAINER
52	HP1036-19	HEAD ADAPTOR
51	HP1036-18	RAM
47	HP1036-12	PLUNGER
44	HP1036-9	ADVANCE HANDLE
40	HP1036-4	COVER
37	HP1036-1	PUMP BODY
30	8-1185	PLUNGER SPRING
29	8-1184	RAM RETURN SPRING
19	4-1453	COPPER CRUSH WASHER
18	4-1452	VARISEAL
16	4-1422	O-RING
13	4-1487	O-RING
9	1-1644	10-32 X 1" CUP PT. SOC. SET SCR.
7	1-1653	FILLER SCREW
4	1-1260	10-32 X 1-1/4 SOC. HD. CAP SCR.
3	1-1201	8-32 X 3/8 DOG PT. SET SCR.
2	1-1180	8-32 X 1/8 CUP PT. SET SCR
ITEM	PART NO.	DESCRIPTION/REMARKS

CAUTION: THE OIL SUPPLIED IN EACH KIT IS NOT FOR COLD WEATHER OPERATION (SEE COLD WEATHER NOTE). DO NOT USE BRAKE FLUID!

1. Rotate the advance handle fully counterclockwise to retract the indenters and return the oil to the oil chamber.
2. Actuate the pump release handle and confirm that the indenters are in the fully open position (see Figure 1).
3. Hold the tool with the crimping head down on a clean surface and remove set screw 2 (see Figure 7), and unscrew cover 40 along with the handle assembly.
4. Remove plunger spring 30 and loosen oil filler screw 7. Do not remove at this time.
5. Grasp the stem of plunger 47 and lift it so the plunger is no higher than the oil reservoir section of the body 37 (see Figure 8).
6. Remove filler screw 7. O-ring 13 will also be removed with the filler screw.
7. Fill the reservoir with the proper hydraulic oil (see COLD WEATHER NOTE for choice of oils).
8. Apply slight pressure to the plunger to allow the oil to just reach the surface of the full hole and replace the filler screw 7 and O-ring 13.
9. Reassemble the tool by reversing the order of operation described above (steps 3 through 5).

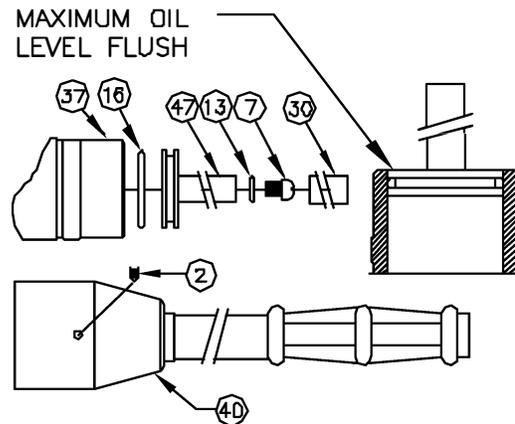


FIGURE 8

REPLACING OIL PLUNGER O-RING: (SEE FIGURE 8)

1. Follow steps 1 through 5 of ADDITION OF HYDRAULIC OIL paragraph.
2. Grasp the stem of plunger 47 and pull it out of the oil reservoir.
3. Apply a light coating of hydraulic oil or grease to the new O-ring 16 and install it in the plunger groove.
4. Fill the reservoir with about 1" of the proper hydraulic oil (see COLD WEATHER NOTE).
5. Pump the handle ten (10) to fifteen (15) times to transfer some oil into the ram section of the pump.

- NOTE:** Cover the open end of the oil cylinder with a cloth or paper towel!
 Slowly apply pressure to the relief rod (see Figure 1) to bleed any air out of the system. This procedure may have to be repeated several times to remove all of the air that may be trapped in the system.
7. Once assured the system is free of air, fill the reservoir with the proper hydraulic oil (see COLD WEATHER NOTE).
 8. Apply slight pressure to plunger 47 (see Figure 8) to allow the oil to just reach the surface of the fill hole, then replace the filler screw 7 and O-ring 13.
 9. Reassemble the tool by reversing the order of operations described in steps 3 through 5 in ADDITION OF HYDRAULIC OIL.

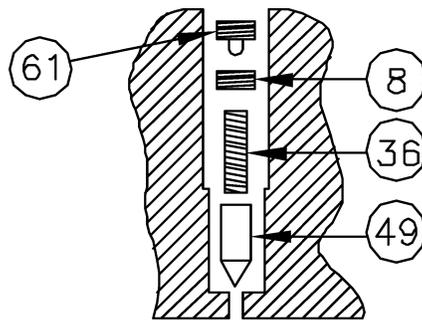


FIGURE 9

INSPECTION/REPLACEMENT OF PRESSURE ADJUSTING VALVE:

1. Follow recommended steps of ADDITION OF HYDRAULIC OIL.
2. With the pump securely held in a soft jaw vise, remove the locking screw 61 and adjusting screw 8 (see Figure 9).
3. Invert the pump over a work tray or absorbent paper towel. With the open end facing the tray or towel, shake the tool slightly to remove spring 36 and PSI valve 49.
4. Inspect PSI valve 49 surface for wear on the conical shaped area of the valve.

CAUTION: IF DAMAGE IS OBSERVED, DO NOT ATTEMPT TO REPAIR THIS VALVE.
 A NEW VALVE SHOULD BE INSTALLED!

INSTALLION OF PSI VALVE:

1. Install PSI valve 49 in the pump cavity and place the PSI spring 36 in the bore of the PSI valve (see Figure 9).
2. Tighten adjusting screw 8 so it is fully bottomed out.
3. After tightening adjusting screw 8, loosen it 3/4 to 1 turn for a preliminary adjustment position.

4. Tighten jam screw 61 securely onto adjustment screw 8.
5. Reassemble the tool by reversing the order of operation described in steps 1 through 4 in ADJUSTING PUMP SYSTEM PRESSURE.
6. To assemble remainder of pump, follow steps 1 through 9 in REPLACING OIL PLUNGER.

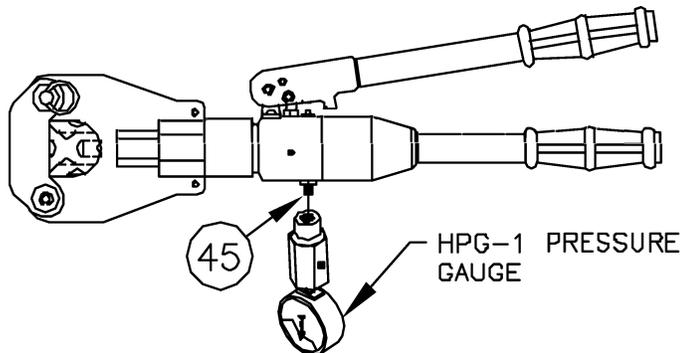


FIGURE 10

ADJUSTMENT OF PUMP SYSTEM PRESSURE:

1. Adjusting the system pressure requires a DMC HPG1 Pressure Gauge.
2. Screw the HPG-1 Gauge onto the gauge adapter 45 located on the bottom side of the pump (see Figure 10).

CAUTION: HAND TIGHTEN GAUGE TO THE PUMP ADAPTOR ONLY! DO NOT OVERTIGHTEN!

3. Place a connector in the indenter area and perform a crimp. Observe the needle position when the pump clicks and release is heard. The needle should be in the "GREEN" area of the gauge.
4. If adjustment is needed, follow steps 1 through 7 of ADDITION OF HYDRAULIC OIL.
5. Hold the pump in a vertical position with the oil reservoir up, remove locking screw 61 and tighten adjusting screw 8 to raise the pressure or loosen screw 8 to lower the pressure.
6. Replace locking screw 61 and follow steps 8 through 10 of ADDITION OF HYDRAULIC OIL.

REMOVAL OF RAM LIP SEAL: (SEE FIGURE 7)

CAUTION: REMOVAL OF RAM LIP SEAL SHOULD NOT BE ROUTINELY UNDERTAKEN. THIS SEAL SHOULD BE REMOVED ONLY AS A LAST RESORT. WHEN HANDLING THIS SEAL, PARTICULAR CARE SHOULD BE TAKEN TO PROTECT THE SEALING SURFACE AND NOT TO DISTORT THE SPRING ENERGIZER DURING THE REMOVAL OR INSTALLATION PROCESS.

1. Follow steps 1 through 6 of TOOL HEAD DISASSEMBLY.
2. Pump the tool handle several strokes to expose screw 3 located in ram 51 (see Figure 7). Fully remove screw 3 and withdraw swivel 14 and slide 4 (see Figure 5).

CAUTION: AFTER REMOVING SLIDE ASSEMBLY, FULLY RETRACT RAM 51 (SEE FIGURE 7).

3. Using a hex wrench, fully remove screw 2 located in head adaptor 52 and unscrew head adaptor.
4. Place pump assembly in a pan and remove screw 4 and crush washer 19.
5. Grasp ram 51 and slowly pull to remove ram and seal assembly.
6. Remove spent seal 18, being careful not to damage any part of the ram's sealing surface.

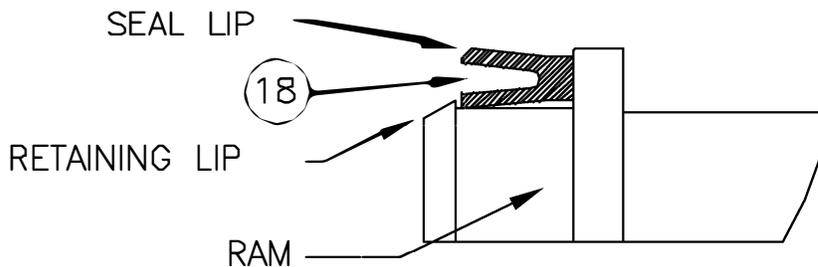


FIGURE 11

INSTALLATION OF RAM LIP SEAL:

1. Follow steps 1 through 6 of REMOVAL OF RAM LIP SEAL.
2. Apply a small amount of grease to the interior (I.D.) section of the seal 18 (see Figure 11). Slide the seal over the retaining lip of ram with the lip end of the seal away from the ram (see Figure 11).
3. Place the pump assembly in a vertical position in a soft jaw equipped vise.
4. Fill the ram cylinder approximately half full using the appropriate hydraulic oil for the season.
5. Apply a small amount of grease to the lip sections (O.D.) of the seal. Carefully insert the ram into the cylinder (being careful not to damage the lip surfaces of the seal 18 (see Figure 11)).

NOTE: Cover the top of the ram with a clean cloth as some oil may be forced out of the hole when pushing the ram to the bottom of the cylinder.

6. Reassemble by reversing the order of operations described in steps 1 through 4 of REMOVAL OF RAM LIP SEAL.

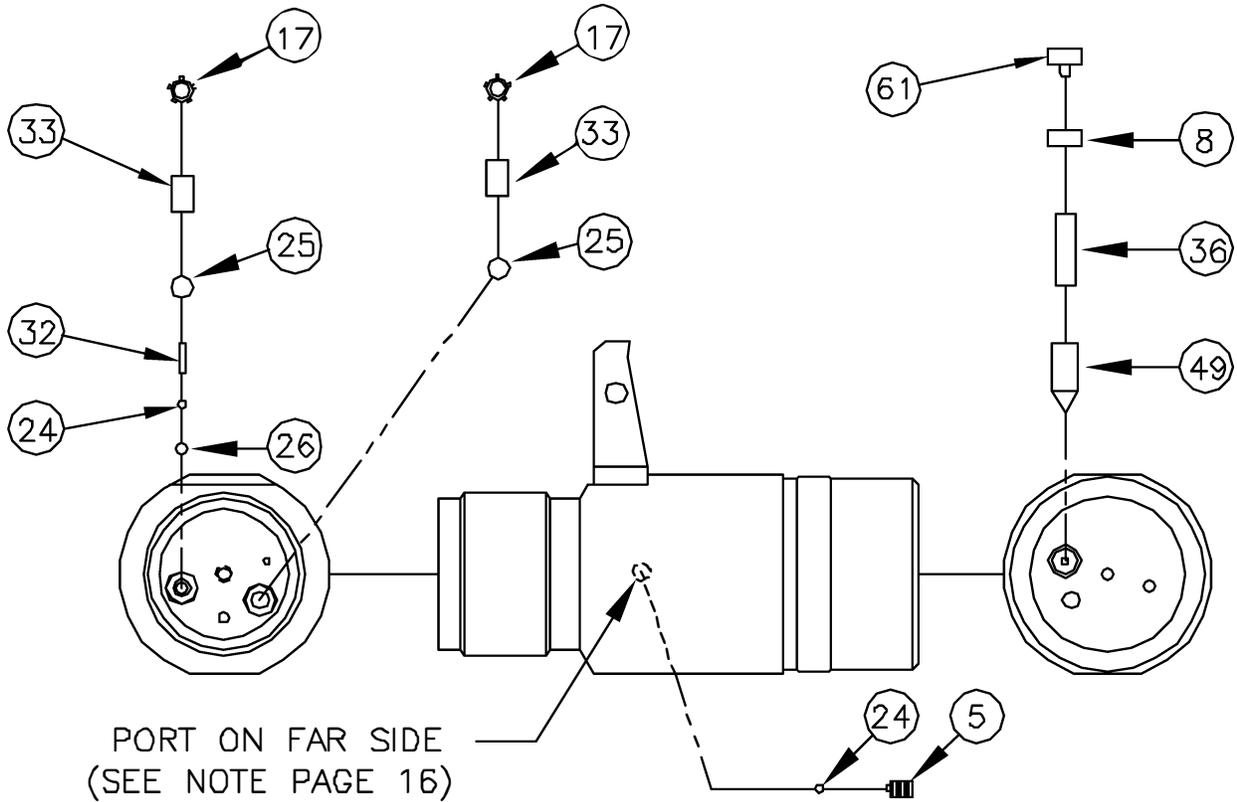


FIGURE 12

61	1-1657	1	3/8-24 X 5/8
49	HP1036-15	1	PSI VALVE
36	8-1191	1	SPRING, PSI
33	8-1188	2	SPRING, OUTSIDE
32	8-1187	1	SPRING, INLET
26	4-1460	2	3/16" DIA. STEEL BALL
25	4-1459	2	9/32" DIA. STEEL BALL
24	4-1458	3	5/32" DIA. STEEL BALL
17	4-1445	2	RETAINING RING
8	1-1643	1	3/8-24 X 3/8 SET SCR.
5	1-1269	1	10-32 X 1/4 FLT. PT. SET SCR.

NOTE: Care should be taken to ensure that crush washer 19 is replaced (see Figure 7).

REMOVAL OF RAM RETURN SPRING:

1. Follow steps for the REMOVAL OF RAM LIP SEAL steps 1 through 6.
2. Grasp the top of the spring 29 with an appropriate pair of pliers and remove spring assembly.

SERVICE OF INLET AND OUTLET BALL VALVES:

1. Follow steps 1 and 2 of REMOVAL OF RAM RETURN SPRING.
2. With the pump securely held in a vise, locate the inlet-outlet port (see Figure 12) and remove retaining ring 17.
3. Invert the pump over a work tray or an absorbent paper towel. With the bore of the pump facing toward the tray or towel, shake the tool slightly to remove balls, 24, 25, 26, and springs 32 and 33.

NOTE: Tool may be flushed to some degree by rotating the advance handle or pushing down on plunger 47 (see Figure 8) to force oil through the inlet passages, thus forcing any material out of the tool.

CAUTION: THE NEED FOR A CLEAN WORK PLACE CAN NOT BE OVERSTATED WHEN ASSEMBLING THE HYDRAULIC PUMP.

4. Wash balls 24, 25, 26, and springs 32 and 33 in an approved cleaning solvent and dry thoroughly (see Figure 13).
5. Place the pump body in a vertical position in a soft jaw equipped vise.
6. Confirm that the ball cavity area is clean and free of foreign matter. Place ball 26 (3/16" dia.) in cavity and centered on the seat.
7. Place spring 32 directly on ball 26. Place ball 24 (5/32" dia.) inside of spring 32.
8. Locate ball 25 (9/32" dia.) on top of spring 32 and spot spring 33 over ball 25.
9. Use a new retaining ring 17 to secure balls and springs (see Figure 14).

NOTE: Retaining ring 17 should face with the concave side away from the spring (see Figure 14).

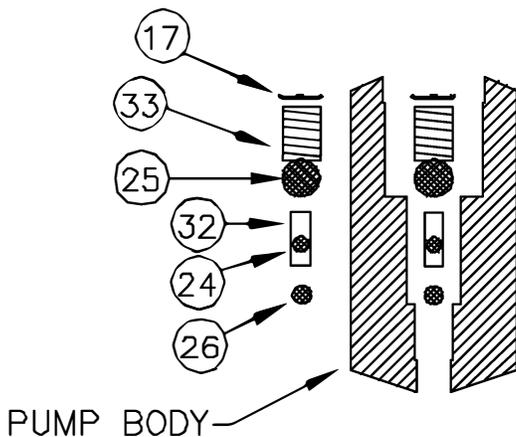


FIGURE 13

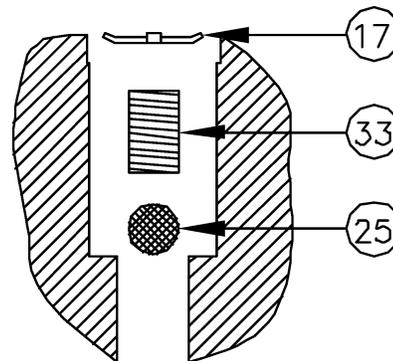


FIGURE 14

10. Push retaining ring 17 down firmly with a suitable pin punch BY HAND ONLY until it bottoms out on the shoulder.

REMOVAL OF BYPASS VALVE BALL:

1. Follow steps 1 through 4 of SERVICE OF INLET AND OUTLET BALL VALVES (see Figure 14).
2. Remove retaining ring 17, spring 33 and ball 25.

INSTALLATION OF BYPASS VALVE BALL:

1. Assemble the bypass valve by reversing steps 1 and 2 of REMOVAL OF BYPASS VALVE BALL (see Figure 13).

NOTE REGARDING THE BODY PORT: This part is placed in the body during the manufacturing process and serves no purpose. Ball 24 is held to its seat by screw 5 (see Figure 12).

REMOVAL OF PUMP PISTON SEALS (SEE FIGURES 15 & 16):

1. Before disassembly, first remove advance handle coil spring following steps 1 through 5 of ADDITION OF HYDRAULIC OIL.
2. To remove pump handle from pump body, remove the two retaining rings 11 and pull handle pin 54. Grasp handle grip and slightly lift and pull the handle rearward.
3. Hold pump body in a soft jaw equipped vise in an upward position. Using a 9/16" open-end wrench, remove the piston seal nut 43 and gently pull piston 50 from the pump body.
4. Remove the piston seal nut 43 and lift out the steel backup ring 59, two backup washers 22 and O-ring 21.

NOTE: A small hook formed from wire is handy for this purpose.

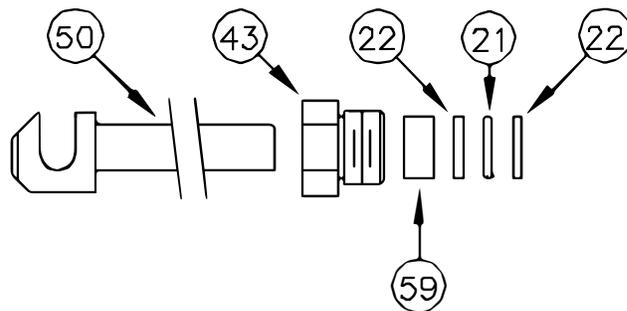


FIGURE 15

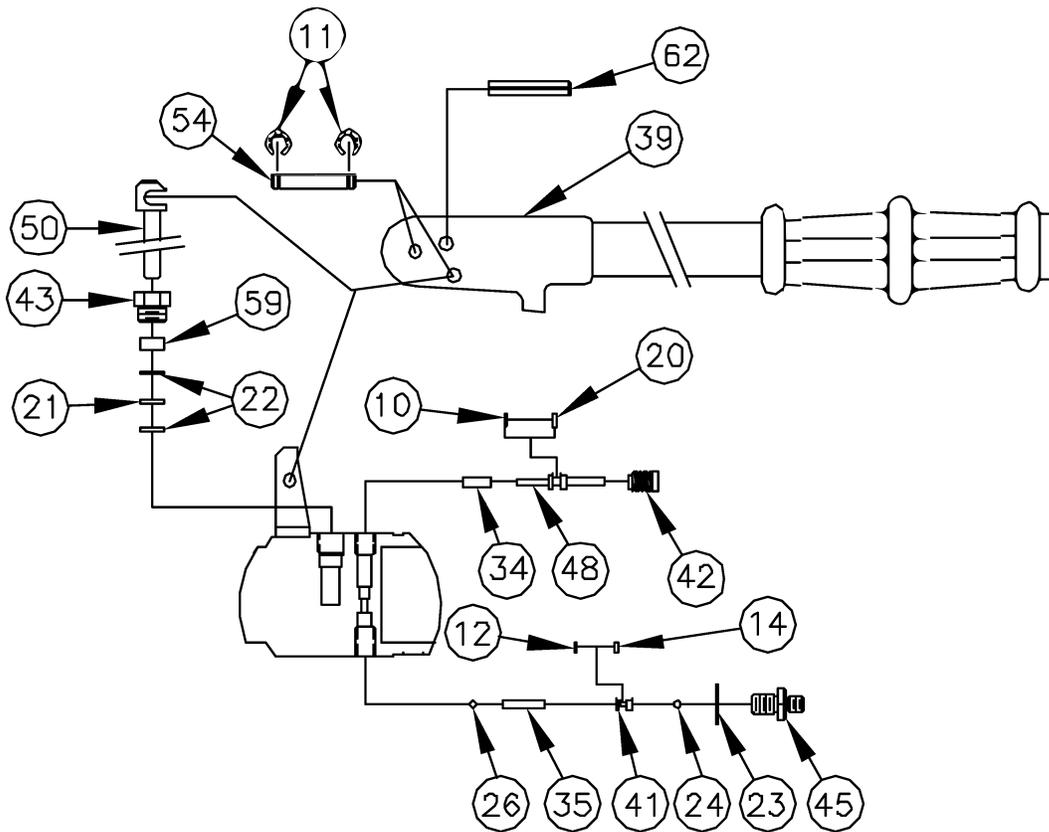


FIGURE 16

62	6-1258	1	1/4 X 1-1/8 LG. SPRING PIN
59	HP1036-5	1	STEEL BACKUP RING
54	HP1036-21	2	HANDLE PIN
50	HP1036-17	1	PISTON
48	HP1036-13	1	RELIEF ROD
45	HP1036-10	1	GAUGE ADAPTER
43	HP1036-8	1	PISTON SEAL NUT
42	HP1036-7	1	RELIEF VALVE NUT
41	HP1036-6	1	GAUGE PISTON
39	HP1036-3	1	PUMP HANDLE
35	8-1190	1	SPRING BALL RELEASE
34	8-1189	1	SPRING RELEASE ROD
26	4-1460	2	3/16" DIA. STEEL BALL
24	4-1458	3	5/32" DIA. STEEL BALL
23	4-1457	1	COPPER CRUSH WASHER
22	4-1456	2	BACKUP WASHER
21	4-1455	1	O-RING, TEFLON
20	4-1454	1	BACKUP WASHER
14	4-1413	1	BACKUP WASHER
12	4-1364	1	O-RING
11	4-1024	4	RETAINING RING
10	4-1488	1	O-RING
ITEM	PART NO.	QTY.	DESCRIPTION/REMARKS

INSTALLATION OF PUMP PISTON SEALS:

1. Inspect pump piston cavity and piston for damage (see Figures 15 & 16). There should be no scratches, holes or any surface imperfections.
2. Lubricate the O-ring 21, two backup washers 22 and the pump cavity bore with the proper hydraulic oil.
3. Place one backup washer 22 in the bottom of the pump cavity making sure it is seated squarely on the bottom surface of the cavity. Place O-ring 21 in the cavity directly on the top of the backup washer just installed. Place the last backup washer in the cavity on top of the O-ring.
4. Lubricate piston 50 and place seal nut 43 on the piston followed by steel backup ring 59 (see Figure 15 for correct order of installation).
5. Gently push the piston with the nut and ring into the cavity.

CAUTION: IN ORDER TO AVOID DAMAGE, GREAT CARE SHOULD BE TAKEN WHEN PUSHING THE PISTON THROUGH THE SEAL AND BACKUP RINGS.

6. Tighten seal nut 43 snugly using a 9/16" open wrench.
7. Reassemble tool by reversing the order of operations described in REMOVAL OF PUMP PISTON SEALS steps 1 and 2.

REMOVAL OF RELIEF ROD (SEE FIGURES 16 & 17):

1. Follow steps 1 and 2 of REMOVAL OF PUMP PISTON SEALS.
2. Using a 3/8" open-end wrench, remove the relief valve nut 42.
3. Pull the relief rod 48 and relief rod spring 34 from the pump cavity.
4. Remove O-ring 10, backup washer 20 and spring 34 from the relief rod.
5. Carefully inspect the seal area of the relief rod 48 for surface defects. The relief rod should also be straight with no visible mushrooming of either end.

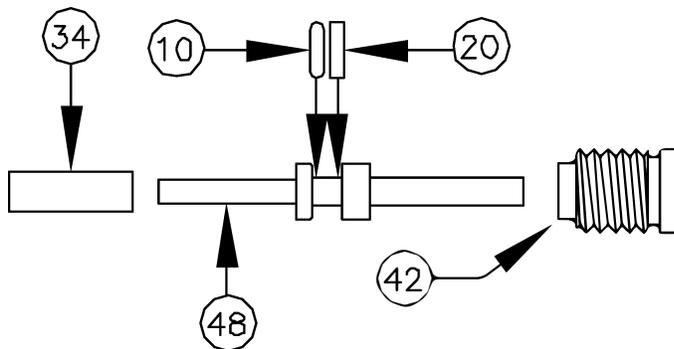


FIGURE 17

REPLACEMENT OF RELIEF ROD SEAL (SEE FIGURE 17):

1. Clean relief rod 48 and apply a coating of hydraulic oil or grease to the ring groove area of the rod.
2. Place backup washer 20 and O-ring 10 in the ring groove of the relief rod. **CAUTION:** Note placement of seal and backup washer. Place relief rod spring 34 on the lower end of the rod (see Figure 17 for correct order of installation).
3. Check relief rod bore for surface finish and cleanliness.
4. Lubricate the relief rod O-rings and coat the bore with hydraulic oil (see O-RING INSTALLATION).
5. Install the relief rod with its respective seals and spring in the bore. Place the relief valve nut 42 onto the relief rod and tighten the nut.
6. To complete the tool assembly, reverse the order of operations described in REMOVAL OF PUMP PISTON SEALS steps 1 and 2.
7. Check relief rod actuator adjustment by following step 1 of ADJUSTMENT OF RELIEF ROD ACTUATOR.

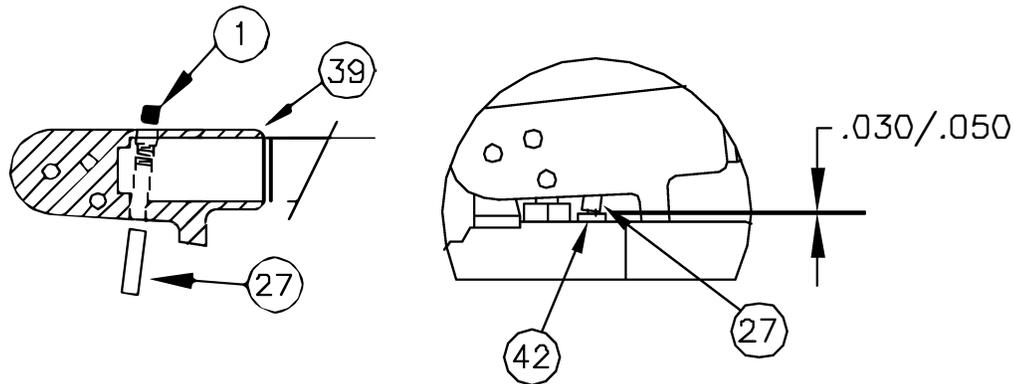


FIGURE 18

ADJUSTMENT OF RELEASE ROD ACTUATOR:

1. Rotate and push pump handle down as you would to release the tool after making a crimp. Hold the handle in the release position and using a feeler gauge, measure the space between the top of the nut 42 and the bottom of pin 27 (see Figure 18). Clearance should be between .030" and .050".
2. **IF CLEARANCE IS OVER .050"**, tighten screw 1 (see Figure 18) reaching through the hole in the top of pump handle 39. This procedure will lower the actuator pin and decrease the clearance.
3. **IF CLEARANCE IS UNDER .050"**, remove one number 11 retaining ring and pull handle pins 54. Grasp handle grip and slightly lift and pull the handle rearward (see Figure 16).
4. Loosen adjustment screw 1 several turns. While holding the pump handle tap pin 27 several times to move it toward screw 1, increasing the clearance (see Figure 18).
5. Install the handle by reversing step 3 and once again follow step 1 to check your final adjustment.

INSPECTION OF RELIEF BALL VALVE:

1. Before disassemble, first remove advance handle coil spring following steps 1 through 5 of ADDITION OF HYDRAULIC OIL.
2. Loosen relief valve nut 42 until almost out but **DO NOT REMOVE!** (see Figure 16).
3. Clamp pump body upside down in a soft jaw equipped vise.
4. Using a 5/8" open-end wrench, remove gauge adaptor 45, crush washer 23, spring 35 and ball 26.

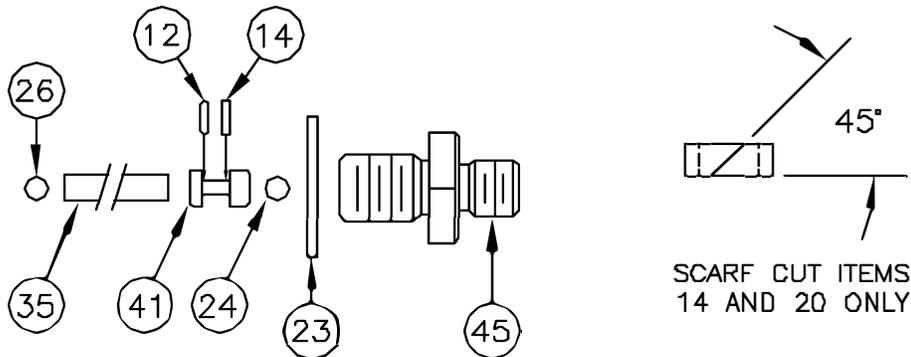


FIGURE 19

REPLACEMENT OF GAUGE ADAPTOR SEALS:

1. Follow INSPECTION OF RELIEF VALVE BALL steps 1 through 4.
2. Place a 3/32" pin punch through the outside hole of the gauge adaptor and push out piston 41 and ball 24 (see Figure 19).
3. Remove backup washer 14 and O-Ring 12 from the gauge piston.

ASSEMBLY OF GAUGE ADAPTOR:

1. Lubricate O-ring 12, backup washer 14 and gauge piston 41. Install O-ring 12 and backup washer 14 as shown in Figure 19. NOTE: Backup washer may be scarf cut as shown to expedite installation.
2. Place gauge adaptor 46 on a clean surface with the large bore facing up. Place ball 24 in the cavity and gauge piston 41 with O-ring and backup washer installed. See Figure 19 for correct order of installation.

INSTALLATION OF RELIEF VALVE BALL:

1. Reassemble the tool by reversing the order of operations in INSPECTION OF RELIEF VALVE BALL, steps 1 through 4.

MAINTENANCE TIPS:

1. Grease: Magnalube®-G.
Magnalube®-G is a multipurpose extreme pressure lubricant containing Teflon®, manufactured by: Saunders Enterprises, Inc.
11-51 44th Road
Long Island City, NY 11101
PH: (718) 729-1000 FX: (718) 729-2690
2. Hydraulic oil: Drydene Paradene.
Tool supplied with Drydene Paradene AW32 hydraulic oil.
see COLD WEATHER NOTE, page 2.
Manufactured by: Dryden Oil Company
9300 Pulaski Highway
Baltimore, MD 21220
PH: (410) 574-5000 FX: (410) 682-9408

O-RING INSTALLATION:

1. Clean each ring groove, then apply a light coating of hydraulic oil or grease to the groove or packing chamber.
2. Completely seat ring in groove or packing chamber.
3. Apply a light coat of hydraulic oil or grease to the ram lip seal and all O-ring surfaces.

RESEATING OF BALL VALVE SEATS (SEE FIGURE 20):

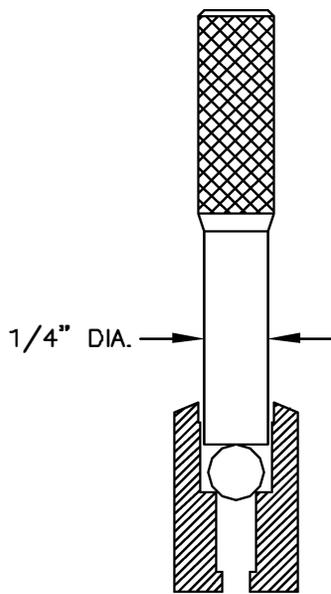
The reseating of the ball valve seats must be accomplished each time a ball valve is replaced.

BALL 25 (9/32" DIA.)

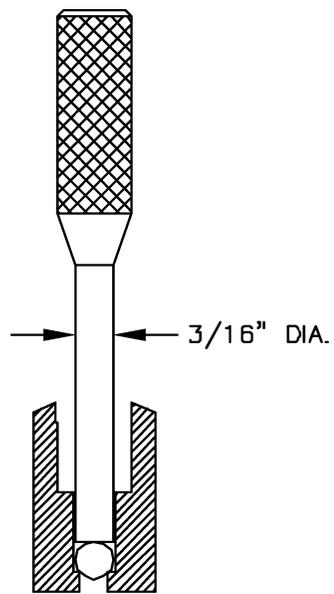
1. Before performing any valve work, securely position pump body 37 in a soft jaw equipped vise. Place a new ball 25 (9/32" dia.) on the valve seat. Position a 1/4" dia. pin punch over the ball and strike the punch with a sharp blow.
2. **REMOVE AND DISCARD THIS DAMAGED BALL! DO NOT USE!**
3. Use a new ball 25 (9/32" dia.) when reassembling the tool.

BALL 26 (3/16" DIA.)

1. Before performing any valve work, securely position pump body 37 in a soft jaw equipped vise. Place a new ball 26 (3/16" dia.) on the valve seat. Position a 3/16" dia. pin punch over the ball and strike the punch with a sharp blow.
2. **REMOVE AND DISCARD THIS DAMAGED BALL! DO NOT USE!**
3. Use a new ball 26 (3/16" dia.) when reassembling the tool.



ALL POSITIONS
USING BALL 25
(9/32" DIA.) USE
1/4" DIA. PIN
PUNCH.



ALL POSITIONS
USING BALL 26
(3/16" DIA.) USE
3/16 DIA. PIN
PUNCH.

FIGURE 20

FIGURE 21A

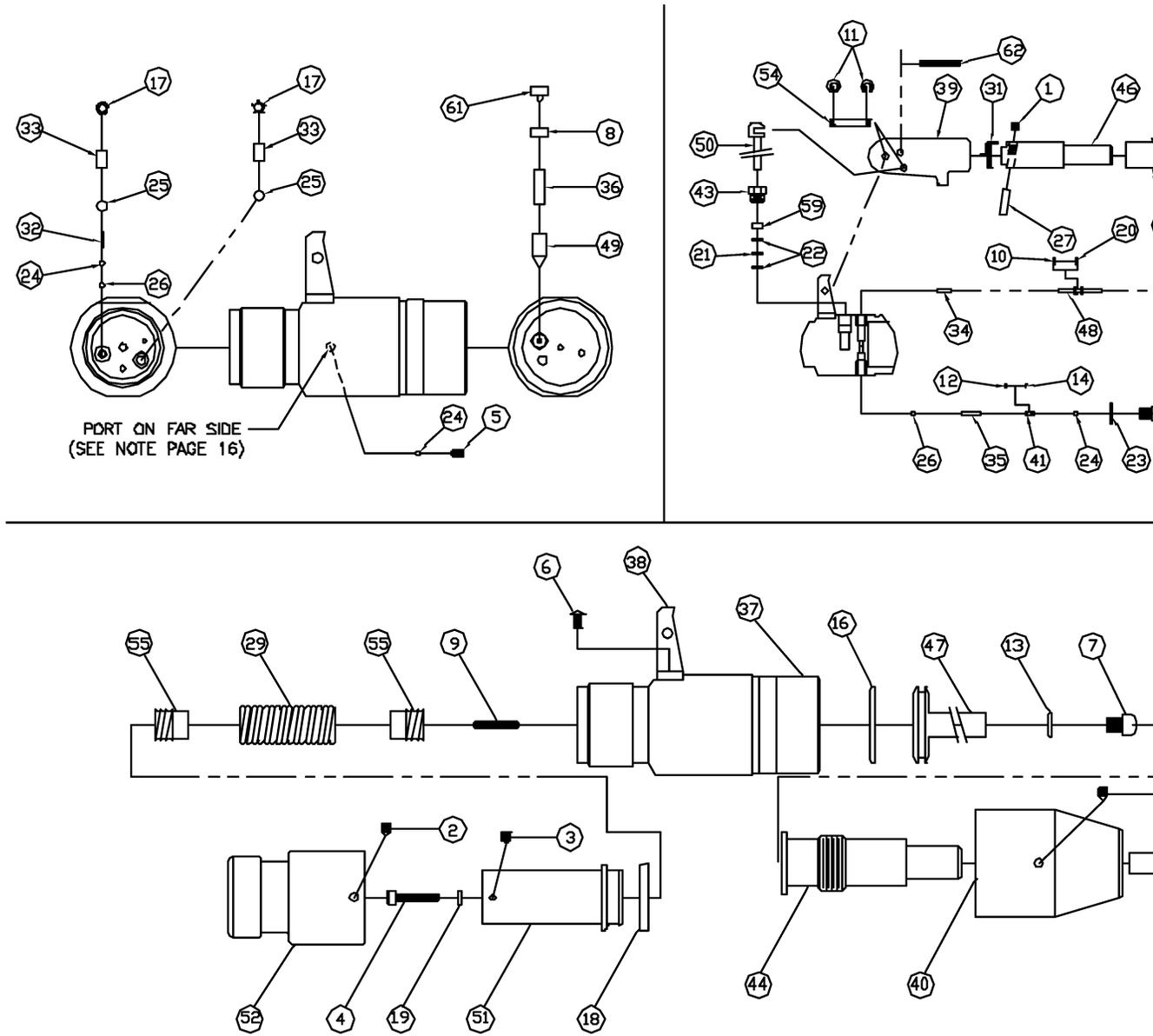


FIGURE 21B

33	8-1186	2	SPRING, OUT	
32	8-1187	1	SPRING, INLET	
31	8-1186	1	SPRING, HANDLE RETURN	
30	8-1185	1	SPRING, PLUNGER	
29	8-1184	1	SPRING, RAM RETURN	
28				
27	8-1145	1	1/4" X 1" LONG DOWEL PIN	
26	4-1480	2	3/16" DIA. STEEL BALL	CHROME Rc 58-65
25	4-1458	2	9/32" DIA. STEEL BALL	CHROME Rc 58-65
24	4-1458	3	5/32" DIA. STEEL BALL	CHROME Rc 58-65
23	4-1457	1	COPPER CRUSH WASHER	.750 X .379 X .040 (4)
22	4-1456	2	BACK-UP WASHER	MS28774-011 (3)
21	4-1455	1	O-RING, TEFLON	S11732-011 (3)
20	4-1454	1	BACK-UP WASHER	8-006-N300-90 (7)
19	4-1453	1	COPPER CRUSH WASHER	.311 X .191 X .040 (4)
18	4-1452	1	VARSEAL	S32240-218-Y1106S (5)
17	4-1445	2	RETAINING RING	5005-37 (6)
16	4-1422	1	O-RING	2-222 N70 (8)
15	4-1418	2	HANDLE GRIP	21D3-36024 (2)
14	4-1413	1	BACK-UP WASHER	8-004-N300-90 (7)
13	4-1407	1	O-RING	2-011 N70 (8)
12	4-1364	1	O-RING	2-004 N70 (8)
11	4-1024	4	RETAINING RING	5133-25 (6)
10	4-1488	1	O-RING	2-006 N70 (8)
9	1-1844	1	10-32 X 1" CUP PT. SOC. SET SCR.	
8	1-1843	1	3/8-24 X 3/8 SET SCR.(MODIFY)	
7	1-1853	1	FILLER SCREW	
6	1-1282	2	1/4-20 X 1/2 BUT.HOLD.SOC.CAP SCR.	
5	1-1269	1	10-32 X 1/4 FLT. PT. SET SCR.	
4	1-1260	1	10-32 X 1-1/4 SOC. HD. CAP SCR.	
3	1-1201	1	8-32 X 3/8 ODG FT. SET SCR.	
2	1-1190	2	8-32 X 1/8 CUP PT. SET SCR.	
1	1-1016	1	1/4-28 X .25 FLT. PT. SET.SCR.	
ITEM	PART NO.	QTY.	DESCRIPTION/REMARKS	MFG.'S PART NUMBER

82	8-1258	1	1/4 X 1-1/8 LONG SPRING PIN	
81	1-1857	1	3/8-24 X 5/8 ADJ. SCREW	
80	4-1482	2	BUMPER STOP	BUMPER
58	HP1036-5	1	BACK-UP RING	
58	4-1468	.025	HYDRAULIC OIL	PARADEN
57	HP1036-24	1	MOVABLE HANDLE	M
56	HP1036-23	1	FIXED HANDLE	
55	HP1036-22	2	SPRING RETAINER	INDE
54	HP1036-21	2	HANDLE PIN	1. DR
53				BA
52	HP1036-19	1	HEAD ADAPTOR	
51	HP1036-18	1	RAM	2. AT
50	HP1036-17	1	PISTON	GO
49	HP1036-15	1	PSI VALVE	3. W.
48	HP1036-13	1	RELIEF ROD	FT
47	HP1036-12	1	PLUNGER	
46	HP1036-11	1	RELEASE HANDLE	4. BO
45	HP1036-10	1	GAUGE, ADAPTOR	MI
44	HP1036-8	1	ADVANCE HANDLE	
43	HP1036-8	1	PISTON SEAL NUT	5. AM
42	HP1036-7	1	RELIEF VALVE NUT	BR
41	HP1036-8	1	GAUGE PISTON	
40	HP1036-4	1	COVER	6. WA
39	HP1036-3	1	PUMP HANDLE	LO
38	HP1036-2	1	HANDLE STEM	
37	HP1036-1	1	PUMP BODY	7. CH
36	8-1191	1	SPRING PSI	CH
35	8-1190	1	SPRING BALL RELEASE	
34	8-1189	1	SPRING RELEASE ROD	8. PA
34	8-1189	1	SPRING RELEASE ROD	LE
ITEM	PART NO.	QTY.	DESCRIPTION/REMARKS	

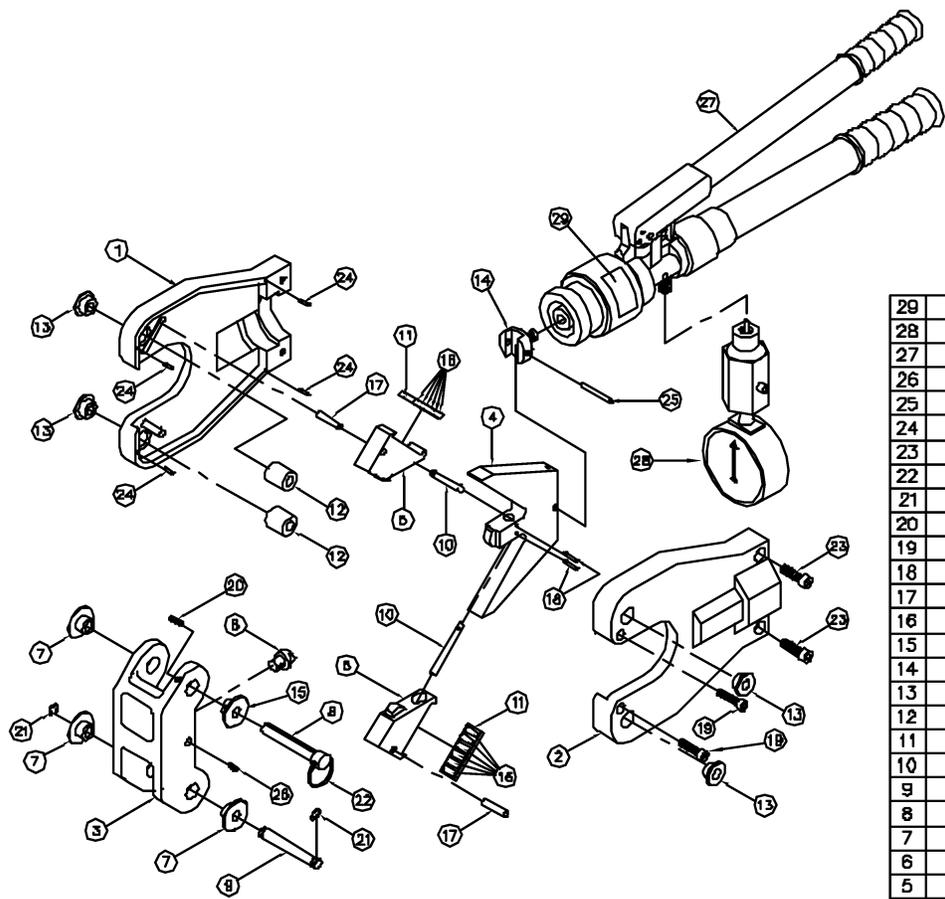


FIGURE 22

29	HC134-NP	1	NAMEPL
28	HPG1	1	HYD. P
27	HP1036	1	HYDRA
26	1-1017	1	FL. PT. SE
25	8-1244	1	SPRING P
24	8-1033	4	SPRING P
23	1-1079	2	SOCKET C
22	4-1325	1	RING, K
21	4-1058	2	E-RING
20	1-1170	1	SET SCR. a
19	1-1621	2	SOCKET C
18	6-1032	2	SPRING P
17	6-1139	2	DOWEL P
16	6-1003	12	ROLLER
15	HC134-7B	1	BUSHIN
14	HC134-14	1	SWIVEL
13	HC134-13	4	BUSHIN
12	HC134-12	2	BUSHIN
11	HC134-11	2	CASE, I
10	HC134-10	2	PINS
9	HC134-9	1	PIN, HI
8	HC134-8	1	PIN, LO
7	HC134-7A	3	BUSHIN
6	HC134-6	1	INDENTE
5	HC134-5	2	JAW
4	HC134-4	1	SLIDE
3	HC134-3	1	HINGE
2	HC134-2	1	HOUSIN
1	HC134-1	1	HOUSIN
ITEM	PART NO.	QTY.	DESC

TROUBLESHOOTING, DIAGNOSIS AND REMEDIES

TROUBLE	CAUSE OF TROUBLE	REPAIR INSTRUCTIONS
<p>1. Tool fails to retract properly.</p>	<p>1. Excess hydraulic oil (oil added with nibs not fully retracted).</p> <p>2. Ram piston binding.</p> <p>3. Spring pin 25 not flush with swivel 14 surface.</p> <p>4. Broken spring retainer stud 9.</p> <p>5. Broken ram return spring 29.</p> <p>6. Tool head slide 4 and housing binding due to accumulation of inhibitor or dirt in head.</p>	<p>1. Follow instructions of <u>ADDITION OF HYDRAULIC OIL</u>.</p> <p>2. Follow recommended procedures in <u>REMOVAL OF RAM LIP SEAL</u> steps 1 through 5.</p> <p>3. Follow recommended procedures in <u>TOOL HEAD DISASSEMBLY</u> and <u>TOOL HEAD ASSEMBLY</u>.</p> <p>4. Follow recommended procedures in <u>REMOVAL OF RAM LIP SEAL</u> steps 1 through 5, and <u>REMOVAL OF RAM RETURN SPRING</u>. Remove and replace the spring retainer stud 9.</p> <p>5. Follow recommended procedures in <u>REMOVAL OF RAM LIP SEAL</u> steps 1 through 5, and <u>REMOVAL OF RAM RETURN SPRING</u>. Remove and replace the ram return spring 29.</p> <p>6. Follow recommended procedures in <u>CLEANING AND LUBRICATING TOOL HEAD</u>.</p>
<p>2. Tool fails to build up pressure.</p>	<p>1. Release rod handle pin 27 misadjusted.</p> <p>2. O-ring sticking.</p> <p>3. Relief valve rod 48 holding ball valve open.</p>	<p>1. Follow recommended procedures in <u>ADJUSTMENT OF RELEASE ROD PIN</u>.</p> <p>2. Rotate manual advance handle to fully extend indenters. Retract indenters fully and pump unit.</p> <p>3. Follow recommended procedures in <u>REMOVAL OF RELIEF ROD SEALS</u> and <u>INSPECTION OF RELIEF VALVE BALL</u>.</p>

TROUBLE	CAUSE OF TROUBLE	REPAIR INSTRUCTIONS
	<p>4. Ball valve 26 or ball valve 25 leaking.</p> <p>5. Bypass ball valve 25 leaking.</p> <p>6. Pressure relief valve leaking.</p>	<p>4. If the handle springs back after reaching bottom of stroke when pumping, outlet ball valve 25 is leaking. Follow recommended procedures in <u>SERVICE OF INLET/OUTLET BALL VALVES</u>.</p> <p>5. Follow recommended procedures in <u>REMOVAL OF BYPASS BALL VALVE</u>. Inspect balls, ball seats and springs for damage, replacing parts as necessary. Also check for foreign matter. If all components are found in satisfactory condition, ball reseating is recommended. Follow procedures in <u>RESEATING OF BALL VALVE SEATS</u>.</p> <p>6. Follow recommended procedures in <u>ADJUSTMENT OF PUMP SYSTEM PRESSURE</u>. Check for scoring of PSI valve seat.</p>
<p>3. Tools fails to build up pressure as indicated by the HPG1 pressure gauge.</p>	<p>1. Pressure relief valve leaking.</p> <p>2. Air in hydraulic system.</p>	<p>1. Follow recommended procedures in <u>ADJUSTMENT OF PUMP SYSTEM PRESSURE</u>. Check for scoring of PSI valve seat. Make sure locking screw 61 is securely tightened against adjustment screw 8.</p> <p>2. Follow recommended procedures in <u>REPLACING OIL PLUNGER O-RING</u>.</p>
<p>4. Pump piston leaking.</p>	<p>1. Piston sealing rings failed.</p>	<p>1. Follow recommended procedures in <u>REMOVAL OF PUMP PISTON SEALS</u>.</p>

TROUBLE	CAUSE OF TROUBLE	REPAIR INSTRUCTIONS
5. Oil leak at release valve.	1. Failure of relief rod seal.	1. Follow recommended procedures in <u>THE RELIEF VALVE SEALS.</u>
6. Oil leaking inside of tool.	1. Failure of ram seal. 2. Failure of crush washer 19 under screw 4.	1. Follow recommended procedures in <u>REMOVAL OF RAM LIP SEAL.</u> 1. Follow recommended procedures in <u>REMOVAL OF PUMP PISTON SEALS</u> steps 1 through 4. Remove screw 4 and crush washer 19. Replace or anneal washer 19. Reassemble and test for leaks. <u>FOR LEAKS.</u>
7. Oil leaking around cover 40.	1. Failure of O-ring 16.	1. Follow recommended procedures in <u>REPLACEMENT OF OIL PLUNGER O-RING.</u>

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