



**DLH PACKER, ANTI-ROTATION,  
2,085 PSI INITIATION, P-110  
13-3/8" X 5-1/2", 6-5/8" FULL HOLE BOX  
X 5-1/2" LTC PIN**

Manual No:  
**DL-935-13375-1301**

Revision: **C**

Revision Date:  
**12/15/2020**

Authored by: *J.Anderson*

Approved by: *D.Hushbeck*

**A) DESCRIPTION**

The DLH Packer is a hydraulic set single-string retrievable packer and may be used in virtually any production application. Tubing pump pressure is used to set the packer and the setting force is locked into the packer by a body lock ring. A large internal by-pass reduces swabbing when running and retrieving. The by-pass closes when the packer is set, and opens during the releasing process to allow pressure equalization. Shear screws are used to control the packer release. The standard 13-3/8" DLH Packer is designed for differential pressures up to 6,000 psi.

**B) RELATED TOOLS** (sold separately)

B-1) 6-5/8" Pump-Out Plug (P/N varies) — refer to technical manual *DL-597-0000-431*.

**C) SPECIFICATION GUIDE**

CASING			TOOL		THREAD CONNECTION BOX UP / PIN DOWN	PART NUMBER
SIZE (INCHES)	WEIGHT (LBS/FT)	RECOMMENDED HOLE SIZE (INCHES)	GAGE OD (INCHES)	ID (INCHES)		
13-3/8	54.5 – 77.0	12.275 – 12.615	12.000	5.000	6-5/8 FULL HOLE / 5-1/2 LTC	93513AR-2-CBGF 93513ARH-2-CBGF <sup>1</sup> 93513ARV-2-CBGF <sup>2</sup>

Elastomer Trim Options: <sup>1</sup>HSN, <sup>2</sup>Viton

DIFFERENTIAL PRESSURE (MAX)	TENSILE LOAD THRU TOOL (MAX)	TORQUE THRU TOOL (MAX)
6,000 PSI	380,000 LBS	20,000 FT-LBS

**D) PRE-INSTALLATION INSPECTION PROCEDURES**

**CAUTION:** D&L ships tool connections made-up **HAND TIGHT**—labeled with hand-tight tape on the tool (Fig. 1)—unless stated otherwise. Tighten/torque all connections properly before operating tool.



Fig. 1

GENERAL THREAD CONNECTION TORQUE RECOMMENDATIONS			
STUB ACME / ACME THREADS	INTERNAL TAPERED TUBING THREADS		PREMIUM THREADS
	UP TO 2-3/8"	GREATER THAN 2-3/8"	
600 – 800 FT-LBS	600 – 800 FT-LBS	800 – 1,200 FT-LBS	Consult thread manufacturer's recommendations.

GENERAL SCREW TORQUE RECOMMENDATIONS									
SCREW SIZE (INCHES)	#6	#8	#10	¼	5/16	3/8	7/16	½	5/8 and larger
TORQUE RANGE (INCH-POUNDS)	5 – 8	10 – 15	18 – 25	25 – 40	50 – 80	90 – 135	160 – 210	250 – 330	450 – 650

**D & L OIL TOOLS**  
P.O. BOX 52220 TULSA, OK 74152  
PHONE: (800) 441-3504 [www.dloiltools.com](http://www.dloiltools.com)



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## **D) PRE-INSTALLATION INSPECTION PROCEDURES (cont'd)**

Before first use, D&L recommends disassembly and inspection of the tool unless stated otherwise. Ensure parts have not been damaged during shipping. Replace damaged parts with D&L replacement parts. Contact D&L sales for replacement part information.

Re-assemble the tool after inspection. Install parts in the correct order and orientation. Properly tighten connections.

Before re-using the tool, D&L recommends disassembly and inspection of the tool. Clean parts and ensure parts are in good working condition. Replace worn or damaged parts with D&L replacement parts.

When redressing the tool, D&L recommends replacement of all seals, elements, o-rings, shear screws, etc. Contact D&L sales for redress kit and/or other replacement part information.

## **E) SETTING PROCEDURES**

### **E-1) RUNNING SEQUENCE**

Running speed is critical, especially in heavy or viscous fluid where excess speed can result in swabbing off the packing element or in creating pressure waves which could lead to creating a preset condition. As a guide it is recommended that running speed should not be more than 30 seconds per joint (range II or 30 feet). **Do not exceed this speed**, particularly when running the packer in the heaviest weight casing for the range for which the packer is dressed.

A run in the well with a junk basket and suitable sized gauge ring or a bit and scraper is strongly recommended prior to running. The location of any tight spots should be noted and the running speed for the packer through these spots should be reduced.

Being a hydraulically set packer, it can be subject to preset conditions by pressure waves through the fluid. A slow steady running speed should be used and sudden stops and starts, such as when setting or pulling slips, should be avoided. Make up the packer to the tubing string in the desired position and to the required torque-transmission of make-up torque through the packer should be avoided.

Run the packer to the desired setting depth at the recommended speed and taking precautions listed above. While running in the hole, the packer body is rigidly connected to the packer mandrel and external forces caused by debris or tight spots are transmitted directly to the tubing. These forces load the mandrel through the chamber and body locks. Unless the string sequence is initiated by tubing pressure, the packer will not set.

Typically the tubing will be landed prior to setting. Establish a plug in the tubing below the packer using a drop ball, wireline plug, or other device. Apply pressure to the tubing to the recommended pressure for the given size of packer and hold for 5 minutes. If the well completion allows, apply annulus pressure to test the packer.

**CAUTION<sub>3</sub>:** If the packer is used in a multi-zone completion above a permanent packer and locator type seal, care should be taken to ensure that no set down weight can be exerted on the locator as this will act on the shear system and try to unset the packer.

### **E-2) SETTING SEQUENCE**

Internal tubing pressure enters the setting chamber through the setting port and acts upward on the setting sleeve and downward on the setting chamber/lower cone. When the applied load acting on these pistons exceeds the value of the setting initiation shear screws, they will shear and allow the setting process to proceed.

The setting sleeve pushes up through the setting shear screws between the rubber mandrel and setting sleeve closing the valve and setting the upper slips. The setting chamber/lower cone pushes down setting the lower slips.

Further pressuring shears the setting shear screws and packs off the packer elements. All this setting force is mechanically locked in place by the packer lock ring as it slides over the threads on the setting sleeve.

**NOTE<sub>1</sub>:** No mandrel movement occurs during the setting sequence. However, some residual tension will remain in the tubing due to the tubing elongation caused by piston effects. This should be taken into consideration when deciding on field shear-out adjustments.



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**F) RELEASING PROCEDURES**

The packer is released by tension on the tubing string which triggers the following sequence of events:

- The upper and lower shear screws shear as the tension exceeds the shear value. The mandrel begins to move up relative to the packer body. The by-pass valve opens and movement upward raises the upper slip support thereby releasing the upper slips. Continued upward movement lifts the packer body, relaxing the packer elements and pulling the bottom cone upwards releasing the lower slips.
- The final stage of un-setting occurs when the lower section (lower slip body and lower slips) reach the bottom sub. They are then latched down by a split ring snapping into the shoulder/groove on the bottom sub, thus allowing the tool to move freely up or down.
- After unsetting, wait 10 minutes to allow the rubber to relax and then pull out of the hole. The valve will be open allowing fluid to by-pass the rubber through the passage under the rubber mandrel.
- The shear release value is adjustable by adding or removing shear screws from the shear housing, or by using steel screws. The upper brass shear screws (P/N 32045910) are rated to 5,000 lbs/screw, the lower brass shear screws (P/N DL60442) are rated to 6,000 lbs/screw.

**NOTE<sub>2</sub>:** An alternate lower shear screw made of steel is available and is rated to 10,000 lbs/screw.

- Two (2) upper shear screws should always be used in the upper slip support.
- The recommended shear screw arrangement:
  - o Total shear value = 68,000 lbs
    - Upper shear screws = Four (4 qty) for 20,000 lbs shear
    - Lower shear screws = Eight (8 qty) for 48,000 lbs shear

**G) STORAGE RECOMMENDATIONS**

When preparing the tool for storage, follow the Pre-Installation Inspection Procedures. Re-assemble the tool with connections hand-tight only and in running position if applicable. Elements should be in a relaxed state—free from tension, compression, and other stresses that could cause deformation.

Store the tool, if possible, in an enclosed, temperature and humidity controlled environment. Avoid excessively high temperatures over long periods of time. Shield elastomeric parts from ultraviolet light sources. Keep tool dry and protected from condensation. Do not store in contact with or near volatile or corrosive chemicals. Do not store near ozone generating equipment or operations such as welding.

**H) SETTING AREA GUIDE**

VALVE ID (INCHES)	BALANCE AREA UNPLUGGED		SHEAR VALUE (PSI/SCREW)	SETTING AREA (SQ INCHES)	SETTING INITIATION (PSI)	RECOMMENDED SETTING (PSI)
	ABOVE (SQ INCHES)	BELOW (SQ INCHES)				
6.150	11.577 (DOWN)	47.382 (UP)	139	60.15	2,085	1,000



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**I) ELASTOMER TRIM TEMPERATURE GUIDE**

NITRILE (STD)			
TEMPERATURE RANGE (F°)	DUROMETER		
	END	MIDDLE	END
40° - 125°	80	70	80
125° - 250°	90	70	90
150° - 250°	90	80	90
250° +	Contact D&L Sales		

RUBBER TYPE	TEMPERATURE RANGE
NITRILE	40° - 250°F
HSN (HNBR)	70° - 300°F
VITON	100° - 350°F

**J) RECOMMENDED HAND TOOLS**

- VISE
- GLOVES
- ALLEN WRENCHES
- TAPE MEASURE
- O-RING PICK
- BAR
  - 1/2-INCH
  - 3/4-INCH
- PAINT BRUSH, 2-INCH
- PIPE WRENCH, 4-FT (2 EA)
- "CHEATER" PIPE, 4-FT LONG
- ADJUSTABLE WRENCH, 12-INCH
- CORDLESS DRILL, 18V
- STOP RING SPREADER PLIERS
- ALIGNING PUNCH
- SCREWDRIVER SET, FLAT-TIPPED
- SOCKET SETS
  - 3/8-INCH DRIVE
  - 1/2-INCH DRIVE
- HAMMERS
  - SLEDGE
  - BALL PEEN
  - DEAD BLOW

**K) DISASSEMBLY**

**NOTE<sub>18</sub>**: Ensure vise is capable of handling weight of tool.

**NOTE<sub>19</sub>**: Support tool during disassembly and assembly with jack stands as necessary.

K-1) Clamp top sub (1) in vise.

K-1.1) From lower end of tool, unscrew and remove set screws (38) from bottom sub (28).

K-1.2) Unscrew and remove bottom sub (28) from inner mandrel (2).

**NOTE<sub>3</sub>**: Place back-up wrench on inner mandrel above bottom sub while wrenching on bottom sub.

K-1.2.1) Remove o-ring (43) from bottom sub (28).

K-1.3) Unscrew and remove shear screws (34) from lower slip body (18).

K-1.4) Remove lower slip body assembly and disassemble:

K-1.4.1) Wedge lower slips (17) outward (if needed). Unscrew and remove cap screws (38) from lower slip body (18).

K-1.4.2) Remove lower slip support (32) from lower slip body (18).

K-1.4.3) Remove wedges (if needed). Remove lower slips (17) and lower slip springs (25) from lower slip body (18).

K-1.4.4) Remove internal ring (23) from lower slip body (18).

K-1.5) Unscrew setting chamber (30) from lower cone (16). Move setting chamber assembly up and temporarily out of way.

K-1.6) Remove lower cone (16) from inner mandrel (2).

K-1.6.1) Remove o-rings (45, 48) from lower cone (16).

K-1.7) Remove stop ring (36) from inner mandrel (2).

K-1.8) Unscrew setting piston (19) from setting sleeve (21). Remove setting piston (19) from inner mandrel (2).

K-1.8.1) Remove o-rings (45, 48) from setting piston (19).



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**K) DISASSEMBLY (cont'd)**

- K-1.9) Unscrew and separate setting chamber cap (22) from setting chamber (30).
- K-1.10) Unscrew and remove shear screw (49) from setting chamber (30).
- K-1.11) Unscrew setting chamber (30) from lock ring (3) and remove from setting sleeve (21).
- K-1.12) Unscrew and remove shear screws (31) from upper end of setting sleeve (21).
- K-1.13) Unscrew setting sleeve (21) from rubber retainer (15).
- K-1.14) Remove setting sleeve assembly and disassemble.
  - K-1.14.1) Remove setting chamber cap (22) from setting sleeve (21).
  - K-1.14.2) Unscrew and/or slide lock ring (3) from setting sleeve (21) (**NOTE4:** Left-hand threads).  
**NOTES:** Using stop ring spreader pliers, lock ring (3) may be spread slightly to be removed from setting sleeve (21).
- K-1.15) Unscrew rubber mandrel (11) from center coupling (10).
- K-1.16) Remove rubber mandrel assembly and disassemble:
  - K-1.16.1) Remove elements (13, 14), rubber spacers (12), and rubber retainer (15) from rubber mandrel (11).
- K-1.17) Unscrew and remove gage ring (29) from center coupling (10).
- K-1.18) Unscrew and remove center coupling (10) from by-pass housing (20).
  - K-1.18.1) Remove o-rings (41, 42) from center coupling (10).
  - K-1.18.2) Remove bonded seal (24) from by-pass housing (20).
    - K-1.18.2.1) Remove o-ring (41) from bonded seal (24).
- K-1.19) Unscrew and remove by-pass housing (20) from upper cone (9).
- K-1.20) Unscrew and remove set screws (37) from valve piston (5).
- K-1.21) Unscrew and remove valve piston (5) from inner mandrel (2).  
**CAUTION5:** Do NOT mar or damage seal surface.
  - K-1.21.1) Remove o-rings (45) from valve piston (5).
- K-2) Unclamp and remove top sub (1) from vise. Clamp inner mandrel (2) in vise.  
**CAUTION6:** Do NOT wrench or clamp on seal surface.
  - K-2.1) From upper end of tool, unscrew and remove shear screws (27) from upper slip support (6).
  - K-2.2) Unscrew and remove set screws (37) from top sub (1). Slide upper slip body assembly downwards to access set screws.
  - K-2.3) Unscrew and remove top sub (1) from inner mandrel (2).
    - K-2.3.1) Remove o-ring (43) from top sub (1).
  - K-2.4) Wedge slips (7, 8) outwards (if needed). Remove upper slip body assembly from inner mandrel (2) and disassemble:
    - K-2.4.1) Remove wedges (if needed). Remove slip assemblies and disassemble:
      - K-2.4.1.1) Unscrew and remove button head cap screws (46) from slips (7, 8).
      - K-2.4.1.2) Remove slip springs (26) from slips (7, 8).
  - K-2.5) Remove upper cone (9) from inner mandrel (2).
  - K-2.6) Remove balance piston (4) from inner mandrel (2).
    - K-2.6.1) Remove o-rings (44, 45) from balance piston (4).
- K-3) Unclamp and remove inner mandrel (2) from vise.



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## L) ASSEMBLY

**NOTE<sub>7</sub>**: Clean and inspect all parts. Replace all worn and damaged parts. Install parts in proper order, and orientation and tighten/torque all connections properly.

**CAUTION<sub>7</sub>**: To ensure tool operates properly, install o-rings in o-ring grooves **NOT** thread relief (Fig. 2).

**NOTE<sub>18</sub>**: Ensure vise is capable of handling weight of tool.

**NOTE<sub>19</sub>**: Support tool during disassembly and assembly with jack stands as necessary.

L-1) Install o-rings (45) in o-ring groove in valve piston (5).

L-2) From lower end of inner mandrel (2), slide valve piston (5) onto inner mandrel (2). Screw valve piston (5) onto inner mandrel (2).

L-3) Screw set screws (37) into valve piston (5).

L-4) Install o-rings (44, 45) in o-ring grooves on balance piston (4).

L-5) Clamp lower end of inner mandrel (2) in vise.

L-6) From upper end of inner mandrel (2), slide balance piston (4) onto inner mandrel (2) until it contacts/stops at the first shoulder.

L-7) Install upper cone (9) onto inner mandrel (2) and onto balance piston (4). Use upper cone (9) to tap balance piston (4) down into position against valve piston (5).

**CAUTION<sub>4</sub>**: Do not rip or tear o-ring during installation.

**CAUTION<sub>6</sub>**: Do **NOT** wrench or clamp on seal surface.

L-8) Assemble upper slip body assembly and install:

L-8.1) Assemble slip assemblies and install:

L-8.1.1) Install slip springs (26) into slips (7, 8).

**NOTE<sub>9</sub>**: Install three (3ea) springs per slip (Fig. 3).

L-8.1.2) Screw set screws (46) into slips (7, 8) securing slip springs (26) (Fig. 3).

L-8.1.3) Install slip assemblies into upper slip body (6). Wedge slips (7, 8) outwards.

L-8.2) Install upper slip body assembly onto inner mandrel (2). Remove wedges. Move upper slip body assembly downwards temporarily.

L-8.3) Install o-ring (43) in o-ring groove in top sub (1).

L-8.4) Screw top sub (1) onto inner mandrel (2).

L-8.5) Screw set screws (37) into top sub (1).

L-8.6) Install upper slip body (6) onto top sub (1). Align threaded holes in upper slip body (6) with shear screw groove in top sub (1).

**NOTE<sub>6</sub>**: Only two (2 qty) shear screws are to be installed. A third threaded hole in upper slip body (6) is provided to allow for proper alignment.

**CAUTION<sub>11</sub>**: Do not align threaded holes in upper slip body (6) with set screws (37) in top sub (1). Shear screws (27) must be properly seated in shear screw groove in top sub (1) for tool to work properly.

L-8.7) Screw shear screws (27) into upper slip body (6). Tighten until shear screws (27) contact top sub (1). Back shear screws (27) out ¼ turn.

L-9) Unclamp and remove inner mandrel (2). Clamp top sub (1) in vise.

L-9.1) Install by-pass housing (20) onto inner mandrel (2) and screw onto upper cone (9).

**CAUTION<sub>4</sub>**: Do not rip or tear o-rings during installation.

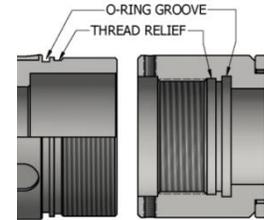


Fig. 2



Fig. 3



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**L) ASSEMBLY (cont'd)**

L-9.2) Assemble center coupling assembly and install:

L-9.2.1) Install o-rings (41, 42) in o-ring grooves in center coupling (10).

L-9.2.2) Install o-ring (41) in o-ring groove in bonded seal (24).

L-9.2.3) Install bonded seal (24) in center coupling (10).

**CAUTION4:** Do not rip or tear o-ring during installation.

L-9.2.4) Screw gage ring (29) onto center coupling (10).

L-9.2.5) Install center coupling assembly onto inner mandrel (2). Screw center coupling (10) into by-pass housing (20).

**CAUTION4:** Do not rip or tear o-ring during installation.

L-9.3) Assemble rubber mandrel assembly and install:

L-9.3.1) Stand rubber mandrel (11) on end with threads facing upwards. Install rubber retainer (15), elements (13, 14), and rubber spacers (12) onto rubber mandrel (11).

**CAUTION8:** Do not damage threads – use plastic or rubber hammer as needed.

L-9.3.2) Install rubber mandrel assembly onto inner mandrel (2). Screw rubber mandrel (11) into center coupling (10).

**CAUTION4:** Do not rip or tear o-ring during installation.

L-9.4) Install setting sleeve (21) onto rubber mandrel (11) and screw into rubber retainer (15).

L-9.5) Align threaded holes in upper end of setting sleeve (21) with counterbores in rubber mandrel (11).

**NOTE13:** Align bypass holes—align large hole in setting sleeve (21) with large hole in rubber mandrel (11).

L-9.6) Screw shear screws (31) into upper end of setting sleeve (21). Tighten until shear screws (31) contact rubber mandrel (11). Back shear screws (31) out 1/4 turn.

**NOTE14:** Shear screws must be below the OD surface of the setting sleeve (21). Adjust shear screws as required.

L-9.7) Install setting chamber cap (22) onto upper end of setting sleeve (21) above ratchet threads on setting sleeve (21).

L-9.8) Install lock ring (3) onto upper end of setting sleeve (21) above ratchet threads on setting sleeve (21) (**NOTE2:** Left-hand threads).

**NOTE3:** Using snap ring spreader pliers, lock ring (3) may be spread slightly to be installed onto setting sleeve (21).

**NOTE11:** Threads on lock ring (3) are directional – it MUST be installed in correct direction for tool to work properly.

L-9.9) Install setting chamber (30) onto setting sleeve (21). Rotate setting chamber (30) to thread lock ring (3) down into setting chamber (30). Align threaded hole in setting chamber (30) with gap of lock ring (3).

**CAUTION9:** Lock ring (3) MUST NOT engage with ratchet threads on setting sleeve (21).

L-9.10) Screw shear screw (49) into setting chamber (30). Tighten until screw (49) contacts setting sleeve (21). Back off 1/4 turn.

L-9.11) Screw setting chamber cap (22) onto setting chamber (30).

L-9.12) Move setting chamber, cap and lock ring (30, 22, 3) upwards to rubber retainer (15). Ensure lower end of setting sleeve (21) is accessible for installation of setting piston (19).

L-9.13) Install o-rings (45, 48) in o-ring grooves in setting piston (19).

L-9.14) Install setting piston (19) onto inner mandrel (2). Move setting piston (19) upwards and screw into setting sleeve (21).

**CAUTION4:** Do not rip or tear o-rings during installation.



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**L) ASSEMBLY (cont'd)**

L-9.15) With setting piston (19) installed, move outer assembly of tool upwards as needed to gain access to groove in inner mandrel (2) for stop ring (36).

L-9.16) Install stop ring (36) in groove in inner mandrel (2).

L-9.17) Move outer assembly of tool downwards until setting piston (19) is over stop ring (36).

L-9.18) Install o-rings (45, 48) in o-ring grooves in lower cone (16).

L-9.19) Install lower cone (16) onto inner mandrel (2). Move lower cone (16) upwards until it contacts setting piston (19).

**CAUTION4:** Do not rip or tear o-ring during installation.

L-9.20) Screw setting chamber (30) onto lower cone (16). Back up on lower cone (16) as needed.

**CAUTION4:** Do not rip or tear o-ring during installation.

L-9.21) Align threaded holes in setting chamber cap (22) with counterbores in setting sleeve (21). Screw set screws (39) into setting chamber cap (22).

L-9.22) Assemble lower slip body assembly and install:

L-9.22.1) Install internal ring (23) in groove in lower slip body (18).

L-9.22.2) Install lower slip springs (25) and lower slips (17) into lower slip body (18). Wedge slips outwards.

**NOTE10:** Install two (2ea) springs per slip (Fig. 5).

L-9.22.3) Install lower slip support (32) into lower slip body (18). Align holes in lower slip support (32) with threaded holes for cap screws in lower slip body (18).

L-9.22.4) Screw cap screws (38) into lower slip body (18). Remove wedges.

L-9.22.5) Install lower slip body assembly onto inner mandrel (2). Align threaded holes for shear screws in lower slip body (18) with slot in inner mandrel (2).

L-9.23) Screw shear screws (34) into lower slip body (18). Tighten until shear screws (34) contact inner mandrel (2). Back shear screws (34) out 1/4 turn.

L-9.24) Install o-ring (43) in o-ring groove in bottom sub (28).

**CAUTION4:** Do not rip or tear o-ring during installation.

L-9.25) Screw bottom sub (28) onto inner mandrel (2).

L-9.26) Screw set screws (37) into bottom sub (28).

L-10) Unclamp top sub (1) from vise and remove assembled tool.

**NOTE17:** If pressure testing of the packer is desired, refer to technical manual *DL-937-13375-1308*. Pressure testing of the packer is not mandatory.



Fig. 5



**DLH PACKER, ANTI-ROTATION,  
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**12/15/2020**

Authored by: *J.Anderson*

Approved by: *D.Hushbeck*

**M) PARTS LIST**

ITEM	QTY	DESCRIPTION	MATERIAL	P/N 93513AR-2-CBGF
1	1	TOP SUB	DLMS110	93513610-CBGF
2	1	INNER MANDREL	DLMS80	93513211AR
3	1	LOCK RING	DLMS80	93513011
4	1	BALANCE PISTON	DLMS80	93513918
5	1	VALVE PISTON	DLMS80	93513960
6	1	UPPER SLIP CAGE	DLMS80	93513321AR
7	3	UPPER SLIP	DLMS110	93513110ARC
8	3	UPPER SLIP	DLMS110	93513110C
9	1	UPPER CONE	DLMS80	93513411AR
10	1	CENTER COUPLING	DLMS80	93513230
11	1	RUBBER MANDREL	DLMS80	93513220
12	2	RUBBER SPACER	DLMS35	60313840
13	1	ELEMENT	70 DURO NITRILE	60213511
14	2	ELEMENT	90 DURO NITRILE	60213513
15	1	RUBBER RETAINER	DLMS80	93513850
16	1	LOWER CONE	DLMS80	93513420
17	6	LOWER SLIP	DLMS35	60013135
18	1	LOWER SLIP BODY	DLMS80	93513325
19	1	SETTING PISTON	DLMS80	93513751
20	1	BY-PASS HOUSING	DLMS80	93513311
21	1	SETTING SLEEVE	DLMS80	93513753
22	1	SETTING CHAMBER CAP	DLMS80	93513316
23	1	SMALLEY MEDIUM HEAVY DUTY INTERNAL RING	-	WHM-750
24	1	BONDED SEAL	90 DURO NITRILE	93513520
25	12	LOWER SLIP SPRING	-	7170901
26	12	UPPER SLIP SPRING	-	72470950
27	4	SHEAR SCREW (5000#)	DLM360BRS	32045910
28	1	BOTTOM SUB	DLMS80	93513630
29	1	GAGE RING	DLMS80	93513830



**DLH PACKER, ANTI-ROTATION,  
2,085 PSI INITIATION, P-110  
13-3/8" X 5-1/2", 6-5/8" FULL HOLE BOX  
X 5-1/2" LTC PIN**

Manual No:  
**DL-935-13375-1301**

Revision: **C**

Revision Date:  
**12/15/2020**

Authored by: *J.Anderson*

Approved by: *D.Hushbeck*

**M) PARTS LIST (cont'd)**

ITEM	QTY	DESCRIPTION	MATERIAL	P/N 93513AR-2-CBGF
30	1	SETTING CHAMBER	DLMS80	93513314
31	8	SLOTTED SHEAR SCREW (5500#) 1/2-13 UNC X 1/2	DLM360BRS	BSSSLT050C050
32	1	LOWER SLIP SUPPORT	DLMS80	93513912
33	1	UPPER SLIP SUPPORT	DLMS80	93513820AR
34	8	SHEAR SCREW (6000#)	DLM360BRS	DL60442
35	1	SEAL RETAINING RING	DLMS35	93513950
36	1	STOP RING	DLMS110	93513980
37	8	SOCKET SET SCREW 1/2-13 UNC X 1/2	STEEL	SSS050C050
38	1	SOCKET CAP SCREW 1/2-13 UNC X 1-1/2	STEEL	SCS050C150
39	15	SLOTTED SHEAR SCREW (8400#) 1/2-13 UNC X 5/8	DLMSLS	SSSSTL050C062
40	1	169 O-RING	90 DURO NITRILE	90169
41	1	366 O-RING	90 DURO NITRILE	90366
42	1	273 O-RING	90 DURO NITRILE	90273
43	2	359 O-RING	90 DURO NITRILE	90359
44	2	362 O-RING	90 DURO NITRILE	90362
45	6	377 O-RING	90 DURO NITRILE	90377
46	6	BUTTON HEAD SOCKET CAP SCREW #10-24 UNC X 3/8	STEEL	BHSC1024C037
47	2	KEY	DLMSFB4	93513001
48	3	361 O-RING	90 DURO NITRILE	90361
49	1	SLOTTED SHEAR SCREW (1200#) 1/4-20 UNC X 1/4	DLM360BRS	BSSSLT025C025

REDRESS KIT (RDK)		93513AR050
ASSEMBLED WEIGHT		1,676 LBS



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**M) PARTS LIST (cont'd)**

**M-1) ELASTOMER TRIM OPTIONS**

**NOTE<sub>2</sub>:** For temperature range, refer to Elastomer Trim Temperature Guide.

M-1.1) HSN

ITEM	QTY	DESCRIPTION	MATERIAL	P/N 93513ARH-2-CBGF
13	1	ELEMENT	70 DURO HSN	60213511H
14	2	ELEMENT	90 DURO HSN	60213513H
24	1	BONDED SEAL	90 DURO HSN	93513520H
40	1	169 O-RING	90 DURO HSN	90169H
41	1	366 O-RING	90 DURO HSN	90366H
42	1	273 O-RING	90 DURO HSN	90273H
43	2	359 O-RING	90 DURO HSN	90359H
44	2	362 O-RING	90 DURO HSN	90362H
45	6	377 O-RING	90 DURO HSN	90377H
48	3	361 O-RING	90 DURO HSN	90361H

REDRESS KIT (RDK)		93513ARH050
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M-1.2) VITON

ITEM	QTY	DESCRIPTION	MATERIAL	P/N 93513ARV-2-CBGF
13	1	ELEMENT	70 DURO VITON	60213511V
14	2	ELEMENT	90 DURO VITON	60213513V
24	1	BONDED SEAL	90 DURO VITON	93513520V
40	1	169 O-RING	90 DURO VITON	90169V
41	1	366 O-RING	90 DURO VITON	90366V
42	1	273 O-RING	90 DURO VITON	90273V
43	2	359 O-RING	90 DURO VITON	90359V
44	2	362 O-RING	90 DURO VITON	90362V
45	6	377 O-RING	90 DURO VITON	90377V
48	3	361 O-RING	90 DURO VITON	90361V

REDRESS KIT (RDK)		93513ARV050
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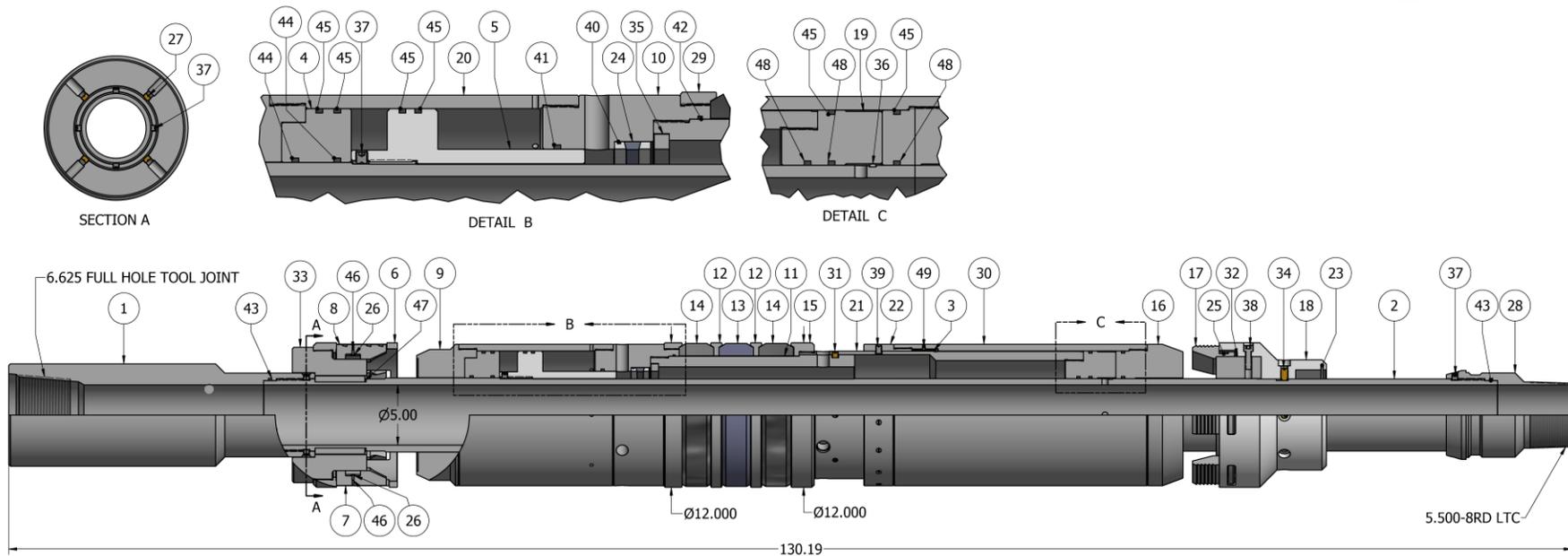
Revision: **C**

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**N) TECHNICAL ILLUSTRATION**





**DLH PACKER, ANTI-ROTATION,  
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*Authored by: J.Anderson*

**O) REVISION HISTORY**

DATE	REVISION	DESCRIPTION OF CHANGE	REVISED BY	APPROVED BY
12/15/2020	C	Added BSSSLT025C025	J.Anderson	E.Visaez
01/08/2020	B	Revised 90362 qty was 5; Added 90361	J.Anderson	H.Bringham
12/06/2019	A	Created new manual	-	-