



DLH PACKER

9-5/8" X 4-1/2"

Manual No:
DL-935-9625-170

Revision: F

Revision Date:
07/23/2021

Authored by: B.Mathis

Approved by: B.Oligschlaeger

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 DLH Packer is designed for differential pressures up to 7,500 psi.

B) RELATED TOOLS (sold separately)

B-1) 4-1/2" 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)	NOMINAL ID (INCHES)		
9-5/8	32.3 – 43.5	8.755 – 9.001	8.500	4.00	4-1/2 EUE	93596 93596H ¹ 93596V ² 93596C ³ 93596HC ⁴ 93596VC ⁵
	43.5 – 53.5	8.535 – 8.755	8.250	4.00	4-1/2 EUE	93595 93595H ¹ 93595V ² 93595C ³ 93595HC ⁴ 93595VC ⁵

Tool Options: ¹HSN, ²Viton, ³Nitrile, Carbide, ⁴HSN, Carbide, ⁵Viton, Carbide

DIFFERENTIAL PRESSURE (MAX)	TENSILE LOAD THRU TOOL (MAX)
7,500 PSI	190,000 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. 14

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.

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

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

GENERAL SCREW TORQUE RECOMMENDATIONS									
SCREW SIZE (INCHES)	#6	#8	#10	1/4	5/16	3/8	7/16	1/2	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

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

CAUTION2: Do not run the tool without properly tightening connections. Running the tool with loose connections may damage the tool and cause malfunction.

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.

CAUTION3: 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.



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E) SETTING PROCEDURES (cont'd)

E-2) SETTING SEQUENCE

Internal tubing pressure enters the setting chamber through the setting port and acts upward on the setting sleeve and downwards 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 pins 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 pins 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.

NOTE1: 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.

F) RELEASING PROCEDURES

The packer is released by tension on the work 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 a groove in the inner mandrel, 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.

NOTE2: 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 = 58,000 lbs
 - Upper shear screws = Two (2ea) for 10,000 lbs shear
 - Lower shear screws (brass) = Eight (8ea) for 48,000 lbs shear

G) 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)				
4.750	4.760 (DOWN)	17.391 (UP)	238	23.071	1,100	2,500



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H) 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.

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 (F°)
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, 3 FT (2 EA)
- "CHEATER" PIPE, 4 FT LONG
- ADJUSTABLE WRENCH, 12 INCH
- STRAP WRENCH
- CORDLESS DRILL, 18V
- SNAP 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

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

K-1.1) Unscrew and remove bottom sub (28) from inner mandrel (2).

NOTE3: Place back-up wrench on inner mandrel above bottom sub while wrenching on bottom sub.

K-1.2) Unscrew and remove shear screws (34) from lower slip body (18).

K-1.3) Remove lower slip body assembly and disassemble:

K-1.3.1) Unscrew and remove socket cap screws (31) from lower slip body (18).

K-1.3.2) Wedge lower slips (17) outward (if needed). Remove lower slip support (32) from lower slip body (18).

K-1.3.3) Remove wedges. Remove lower slips (17) and lower slip springs (25) from lower slip body (18).

K-1.3.4) Remove internal ring (38) from lower slip body (18).

K-1.4) Unscrew setting chamber (30) from lower cone (16). Move setting chamber assembly up out of way temporarily.

K-1.5) Unscrew and remove shear screws (35) from setting piston (19).



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K) DISASSEMBLY (cont'd)

- K-1.6) Remove lower cone (16) from setting piston (19) and off of inner mandrel (2).
 - K-1.6.1) Remove o-rings (41, 44) from lower cone (16).
 - K-1.7) Unscrew setting chamber cap (22) from setting chamber (30).
 - K-1.8) Unscrew and remove shear screw (45) from setting chamber (30).
 - K-1.9) Unscrew and remove setting chamber (30) from lock ring (3).
 - K-1.10) Remove stop ring (27) from inner mandrel (2).
 - K-1.11) Unscrew and remove shear screws (36) from upper end of setting sleeve (21).
 - K-1.12) Unscrew and remove setting piston (19) from setting sleeve (21).
 - K-1.12.1) Remove o-rings (41, 44) from setting piston (19).
 - K-1.13) Unscrew and remove setting sleeve (21) from rubber retainer (15).
 - K-1.13.1) Remove setting chamber cap (22) from setting sleeve (21).
 - K-1.13.2) Unscrew and remove lock ring (3) from setting sleeve (21) (**NOTE4:** Internal threads are left-hand threads).
 - K-1.14) Unscrew rubber mandrel (11) from center coupling (10).
 - K-1.15) Remove rubber mandrel assembly and disassemble:
 - K-1.15.1) Remove elements (13, 14), rubber spacers (12), and rubber retainer (15) from rubber mandrel (11).
 - K-1.16) Unscrew and remove gage ring (29) from center coupling (10).
 - K-1.17) Unscrew and remove center coupling (10) from by-pass housing (20).
 - K-1.17.1) Remove o-rings (40, 43) and bonded seal (24) from center coupling (10).
 - K-1.17.1.1) Remove o-ring (39) from bonded seal (24).
 - K-1.18) Unscrew and remove by-pass housing (20) from upper cone (9).
 - K-1.19) Unscrew and remove set screws (23) from valve piston (5).
 - K-1.20) Unscrew and remove valve piston (5) from inner mandrel (2).
 - K-1.20.1) Remove o-ring (44) from valve piston (5).
- K-2) Remove top sub (1) from vise and clamp inner mandrel (2) in vise.
- NOTE5:** Do NOT wrench or clamp on seal surface.
- K-2.1) Unscrew top sub (1) from inner mandrel (2).
 - K-2.2) Remove upper slip body assembly and disassemble:
 - K-2.2.1) Unscrew and remove shear screws (37) from upper slip support (33).
 - K-2.2.2) Remove top sub (1) from upper slip support (33).
 - K-2.2.3) Wedge releasing slip (7) and upper slips (8) outward (if needed). Unscrew and remove upper slip support (33) from upper slip body (6).
 - K-2.2.4) Remove wedges. Remove releasing slip (7), upper slips (8), and upper slip springs (26) from upper slip body (6).
 - K-2.3) Remove upper cone (9) from inner mandrel (2).
 - K-2.4) Remove balance piston (4) from inner mandrel (2).
 - K-2.4.1) Remove o-rings (42, 44) from balance piston (4).
- K-3) Remove inner mandrel (2) from vise.



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L) ASSEMBLY

NOTE6: Clean and inspect all parts. Replace all worn and damaged parts. Install parts in proper order, and orientation and tighten/torque all connections properly.

- L-1) Install o-ring (44) in groove in valve piston (5).



- L-2) From lower end of inner mandrel (2), install valve piston onto inner mandrel (2). Screw valve piston (5) onto inner mandrel (2) (Fig 1).

NOTE5: Do NOT wrench or clamp on seal surface.

- L-3) Screw set screws (23) into valve piston (5).

- L-4) Install o-rings (42, 44) into grooves on balance piston (4).

- L-5) From upper end of inner mandrel (2), install balance piston (4) onto upper end of inner mandrel (2).

NOTE7: Stand inner mandrel (2) on end if needed.

- L-6) Install upper cone (9) onto inner mandrel (2). Using upper cone (9), tap balance piston (4) down into position against valve piston (5) (Fig 2).

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

- L-7) Assemble upper slip body assembly and install:



Fig 3



Fig 4



- L-7.1) Screw upper slip support (33) into upper slip body (6).

- L-7.2) Install top sub (1) into upper slip support (33).

- L-7.3) Screw shear screws (37) into upper slip support (33). Make contact and back out 1/4 turn.



Fig 5

- L-7.4) Install upper slip springs (26), releasing slip (7), and upper slips (8) into upper slip body (6). Wedge releasing slip (7) and upper slips (8) outwards (Fig 3).

- L-7.5) Install upper slip body assembly onto inner mandrel (2). Screw top sub (1) onto inner mandrel (2) (Fig 4).

NOTE8: Shear screws MUST be backed out properly allowing top sub to screw on easily.

- L-7.6) Remove wedges from slips.

- L-8) Screw by-pass housing (20) onto upper cone (9).

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

- L-9) Assemble rubber mandrel assembly and install:

- L-9.1) Install o-rings (40, 43) in grooves in center coupling (10).

- L-9.2) Clamp center coupling (10) in vise.

- L-9.2.1) Install o-ring (39) in groove in bonded seal (24).

- L-9.2.2) Install bonded seal (24) in center coupling (10).

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

- L-9.3) Screw gage ring (29) onto center coupling (10).

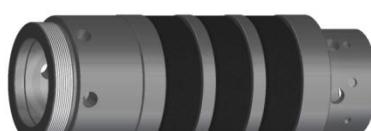


Fig 6

- L-9.4) Install rubber retainer (15), elements (13, 14), and rubber spacers (12) onto rubber mandrel (11) – if needed, stand rubber mandrel (11) on end with outer threads facing up.

NOTE9: Do not damage threads - use plastic or rubber hammer as needed.



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L) ASSEMBLY (cont'd)

- L-9.5) Screw rubber mandrel assembly into center coupling (Fig 6).

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

- L-9.6) Remove center coupling (10) from vise.

- L-9.7) Install rubber mandrel assembly onto inner mandrel (2).

- L-10) Screw center coupling (10) into by-pass housing (20)

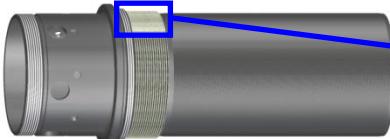


Fig 7a

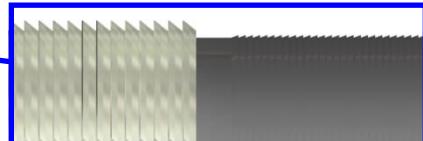


Fig 7b

- L-11) Assemble setting chamber assembly and install:

- L-11.1) Stand setting chamber (21) on end with upper end facing upwards. Install lock ring (3) and setting chamber cap (22) onto setting sleeve (21) (Fig 7a and Fig 7b).

NOTE10: Lock ring I.D. threads MUST NOT ENGAGE with threads on setting sleeve (21).

NOTE11: Inner and outer threads on lock ring are directional – it MUST be installed in correct direction for tool to operate properly.

- L-11.2) Install o-rings (41, 44) in grooves in setting piston (19).

- L-11.3) Screw setting sleeve (21) onto setting piston (19).

- L-11.4) Install setting sleeve (21) onto setting piston (19) onto inner mandrel (2). Screw setting sleeve (21) into rubber retainer (15).

- L-11.5) Align threaded holes in setting sleeve (21) with pocket holes in rubber mandrel (11). Screw shear screws (36) into setting sleeve (21). Make contact and back out 1/4 turn.

- L-11.6) Install setting chamber (30) over setting sleeve (21). Screw setting chamber (30) onto lock ring (3) until upper end of lock ring (3) is flush with top of threads in setting chamber (30).

NOTE10: Lock ring I.D. threads MUST NOT ENGAGE with threads on setting sleeve (21).

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

- L-11.7) Align threaded hole in setting chamber (30) with gap in lock ring (3). Screw shear screw (45) into setting chamber (30). Tighten until screw (45) contacts setting mandrel (21). Back off 1/4 turn.

- L-11.8) Screw setting chamber cap (22) into setting chamber (30).

- L-11.9) Install snap ring (27) in groove in inner mandrel (2).

- L-11.10) Install o-rings (41, 44) in grooves in lower cone (16).

- L-11.11) Install lower cone (16) onto inner mandrel (2). Using hammer and soft block (brass or wood), tap lower cone (16) onto inner mandrel (2). Tap into place - align threaded holes in setting piston (19) with holes in lower cone (16).

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



Fig 8



Fig 9



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L) ASSEMBLY (cont'd)

- L-11.12) Screw shear screws (35) into setting piston (19) (Fig. 8). Contact inner mandrel (2). Back shear screws (34) out 1/4 turn.
- L-11.13) Slowly slide setting chamber assembly down. Screw setting chamber (30) onto lower cone (16) (Fig 9).
- NOTE₁₀:** Lock ring I.D. threads MUST NOT ENGAGE with threads on setting sleeve (21).
- CAUTION₄:** Do not rip or tear o-ring during installation.

Fig 10



- L-11.14) Assemble lower slip body assembly and install:

- L-11.14.1) Install lower slip springs (25) and lower slips (17) into lower slip body (18).
- L-11.14.2) Wedge lower slips (17) outward. Install lower slip support (32) into lower slip body (18).
- L-11.14.3) Remove wedges from slips.
- L-11.14.4) Align threaded holes in lower slip body (18) with holes in lower slip support (32). Screw socket cap screws (31) into lower slip body (18).
- L-11.14.5) Install internal ring (38) in groove in lower slip body (18).
- L-11.14.6) Install lower slip body assembly onto inner mandrel (2).

- L-11.15) Align threaded holes in lower slip body (18) with pocket holes in inner mandrel (2). Screw shear screws (34) into lower slip body (18). Contact inner mandrel (2). Back shear screws (34) out 1/4 turn (Fig 10).

Fig 11



- L-11.16) Screw bottom sub (28) onto inner mandrel (2) (Fig 11).

- L-12) Unclamp top sub (1) from vise and remove assembled tool.

NOTE₁₂: If pressure testing of the packer is desired, refer to technical manual *DL-937-9625-1197*. Pressure testing of the packer is not mandatory.



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M) PARTS LIST

ITEM	QTY	DESCRIPTION	MATERIAL	P/N 93595	P/N 93596
1	1	TOP SUB	DLMS80	93595610	
2	1	INNER MANDREL	DLMS80	93595210	
3	1	LOCK RING	DLMS80	93595005	
4	1	BALANCE PISTON	DLMS35	93595918	
5	1	VALVE PISTON	DLMS80	93595960	
6	1	UPPER SLIP BODY	DLMS110 / DLMS80	60395320	
7	1	RELEASING SLIP	DLMS110	60095125	
8	2	UPPER SLIP	DLMS35	60095115	
9	1	UPPER CONE	DLMS80	93595410	
10	1	CENTER COUPLING	DLMS80	93595230	
11	1	RUBBER MANDREL	DLMS80	93595220	
12	2	RUBBER SPACER	DLMS35	60295840S	60296840S
13	1	ELEMENT	70 DURO NITRILE	60295511S	60296511S
14	2	ELEMENT	90 DURO NITRILE	60295513S	60296513S
15	1	RUBBER RETAINER	DLMS35	93595850	93596850
16	1	LOWER CONE	DLMS80	93595420	
17	4	LOWER SLIP	DLMS35	60095135	
18	1	LOWER SLIP BODY	DLMS80	93595325	
19	1	SETTING PISTON	DLMS80	93595751	
20	1	BY-PASS HOUSING	DLMS80	93595311	
21	1	SETTING SLEEVE	DLMS80	93595752	
22	1	SETTING CHAMBER CAP	DLMS60	93595315	
23	2	SET SCREW 1/4-20 UNC X 3/8	STEEL	SSS025C037	
24	1	BONDED SEAL	DLMS60 / 90 DURO NITRILE	93595520	
25	8	LOWER SLIP SPRING	-	7170901	
26	6	UPPER SLIP SPRING	-	7170902	
27	1	STOP RING	DLMS80	93595980	
28	1	BOTTOM SUB	DLMS80	93595630	
29	1	GAGE RING	DLMS35	93595830	93596830
30	1	SETTING CHAMBER	DLMS80	93595312	
31	2	CAP SCREW 1/2-13 UNC X 1"	STEEL	SCS050C100	
32	1	LOWER SLIP SUPPORT	DLMS35	93595912	
33	1	UPPER SLIP SUPPORT	DLMS80	93595810	
34	8	SHEAR SCREW (6000#)	DLM360BRS	DL60442	



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M) PARTS LIST (cont'd)

ITEM	QTY	DESCRIPTION	MATERIAL	P/N 93595	P/N 93596
35	4	SHEAR SCREW (5500#) 1/2-13 UNC X 1"	DLM360BRS	BSSSLT050C100	
36	8	SHEAR SCREW (5500#) 1/2-13 UNC X 1/2	DLM360BRS	BSSSLT050C050	
37	2	SHEAR SCREW 5/8-18 (5000#)	DLM360BRS		32045910
38	1	SMALLEY MEDIUM HEAVY DUTY INTERNAL RING	DLMSC		WHT-525
39	1	162 O-RING	90 DURO NITRILE		90162
40	1	259 O-RING	90 DURO NITRILE		90259
41	2	350 O-RING	90 DURO NITRILE		90350
42	1	351 O-RING	90 DURO NITRILE		90351
43	1	356 O-RING	90 DURO NITRILE		90356
44	4	364 O-RING	90 DURO NITRILE		90364
45	1	1/4-20 UNC X 1/2 SLOTTED SHEAR SCREW (1200#)	DLM360BRS		BSSSLT025C050

REDRESS KIT (RDK)		93595050	93596050
ASSEMBLED WEIGHT		632 LBS	637 LBS

M-1) ELASTOMER TRIM OPTIONS

NOTE₁₃: For temperature range, refer to Elastomer Trim Temperature Guide.

M-1.1) HSN

ITEM	QTY	DESCRIPTION	MATERIAL	P/N 93595H	P/N 93596H
13	1	ELEMENT	70 DURO HSN	60295511SH	60296511SH
14	2	ELEMENT	90 DURO HSN	60295513SH	60296513SH
24	1	BONDED SEAL	DLMS60 / 90 DURO HSN		93595520H
39	1	162 O-RING	90 DURO HSN		90162H
40	1	259 O-RING	90 DURO HSN		90259H
41	2	350 O-RING	90 DURO HSN		90350H
42	1	351 O-RING	90 DURO HSN		90351H
43	1	356 O-RING	90 DURO HSN		90356H
44	4	364 O-RING	90 DURO HSN		90364H

REDRESS KIT (RDK)		93595050H	93596050H
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DLH PACKER
9-5/8" X 4-1/2"

Manual No:
DL-935-9625-170
Revision: F
Revision Date:
07/23/2021

Authored by: B.Mathis

Approved by: B.Oligschlaeger

M) PARTS LIST (cont'd)

M-1.2) VITON

ITEM	QTY	DESCRIPTION	MATERIAL	P/N 93595V	P/N 93596V
13	1	ELEMENT	70 DURO VITON	60295511SV	60296511SV
14	2	ELEMENT	90 DURO VITON	60295513SV	60296513SV
24	1	BONDED SEAL	DLMS60 / 90 DURO VITON	93595520V	
39	1	162 O-RING	90 DURO VITON	90162V	
40	1	259 O-RING	90 DURO VITON	90259V	
41	2	350 O-RING	90 DURO VITON	90350V	
42	1	351 O-RING	90 DURO VITON	90351V	
43	1	356 O-RING	90 DURO VITON	90356V	
44	4	364 O-RING	90 DURO VITON	90364V	

REDRESS KIT (RDK)		93595050V	93596050V
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M-2) CARBIDE OPTIONS

ITEM	QTY	DESCRIPTION	MATERIAL	P/N 93595C	P/N 93596C
8	2	CARBIDE UPPER SLIP	DLMS110	60095115C	
17	4	CARBIDE LOWER SLIP	DLMS110	60095135C	



DLH PACKER
9-5/8" X 4-1/2"

Authored by: B.Mathis

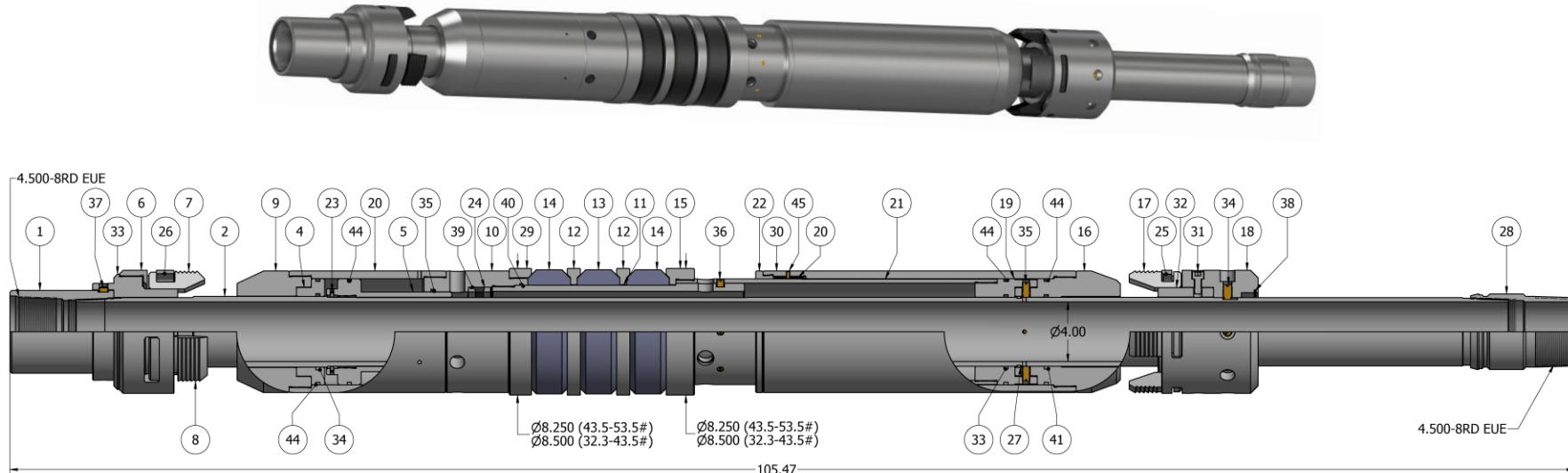
Manual No:
DL-935-9625-170

Revision: F

Revision Date:
07/23/2021

Approved by: B.Oligschlaeger

N) TECHNICAL ILLUSTRATION



O) REVISION HISTORY

DATE	REVISION	DESCRIPTION OF CHANGES	REVISED BY	APPROVED BY
07/23/2021	F	Added carbide options, BSSSLT025C050	J.Anderson	E.Visaez
08/08/2019	E	Remove tool drift ID, Pressure Test section, General Screw Torque Recommendation; Revised Elastomer Trim Temp Guide ratings; Added Note12	J.Anderson	J.Johnson
09/17/14	D	Revised P/N 32045910 was DL51775; Added related tools, drift ID, max. tensile load, pre-installation inspection and storage procedures, element selection guide, recommended tools, revision history, HSN and Viton options	J.Anderson	K.Riggs