



DLH PACKER

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

Manual No:
DL-935-8625-169

Revision: **D**

Revision Date:
11/04/2022

Written by: Bruce Mathis

Approved by: Brian Oligschlaeger

A) DESCRIPTION

The D&L 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 Packers are 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)		
8-5/8	24.0 – 40.0	7.725 – 8.097	7.500	4.00	4-1/2 EUE	93585 93585H ¹ 93585V ² 93585C ³ 93585HC ⁴ 93585VC 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. 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.

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.

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 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-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 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.

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 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 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 (2 qty) for 10,000 lbs shear
 - Lower shear screws (brass) = Eight (8 qty) for 48,000 lbs shear

G) AREA GUIDE

SIZE (INCHES)	VALVE ID (INCHES)	BALANCE AREA		SETTING AREA (SQ INCHES)	SETTING INITIATION (PSI)	RECOMMENDED SETTING (PSI)
		ABOVE (SQ INCHES)	BELOW (SQ INCHES)			
8-5/8	4.750	4.760	6.984	15.119	1,455	2,950



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H) 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

I) 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
- 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

J) DISASSEMBLY

NOTE3: Ensure vise is capable of handling weight of tool.

NOTE4: Support tool during disassembly and assembly with jack stands as necessary.

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

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

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

J-1.2) Unscrew and remove shear screws (38) from lower slip body (18).

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

J-1.3.1) Unscrew and remove cap screws (39) from lower slip support (32).

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

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

J-1.3.4) Remove internal ring (31) from lower slip body (18).

J-1.4) Unscrew setting chamber (30) from lower cone (16). Slide setting chamber assembly up and out of the way temporarily.

J-1.5) Unscrew and remove shear screws (36) from setting piston (21).

J-1.6) Remove lower cone (16) from setting piston (21).

J-1.6.1) Remove o-rings (43, 47) from lower cone (16).

J-1.7) Unscrew and separate setting chamber cap (22) from setting chamber (30).

J-1.8) Unscrew and remove setting chamber (30) from lock ring (3).

J-1.9) Remove snap ring (23) from inner mandrel (2).

J-1.10) Unscrew and remove shear screws (35) from upper end of setting sleeve (27).

J-1.11) Unscrew setting sleeve (27) from rubber retainer (15).



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J) DISASSEMBLY (cont'd)

- J-1.12) Remove setting sleeve assembly from inner mandrel (2) and disassemble.
 - J-1.12.1) Remove setting chamber cap (22) from setting sleeve (27).
 - J-1.12.2) Unscrew and/or slide lock ring (3) from setting sleeve (27) (**NOTE₆**: Left-hand threads).
NOTE₇: Using snap ring spreader pliers, the lock ring (3) may be spread slightly to be removed from setting sleeve (27).
 - J-1.12.3) Unscrew and remove setting piston (21) from setting sleeve (27).
 - J-1.12.3.1) Remove o-rings (43, 47) from setting piston (21).
- J-1.13) Unscrew rubber mandrel (11) from seal retainer (19).
- J-1.14) Remove rubber mandrel assembly from inner mandrel (2) and disassemble:
 - J-1.14.1) Remove elements (13, 14), rubber spacers (12), and rubber retainer (15) off of rubber mandrel (11).
- J-1.15) Unscrew and remove gage ring (29) from seal retainer (19).
- J-1.16) Unscrew and remove seal retainer (19) from center coupling (10).
 - J-1.16.1) Remove o-ring (40) from seal retainer (19).
- J-1.17) Unscrew and remove center coupling (10) from by-pass housing (20).
 - J-1.17.1) Remove o-rings (42, 45) and bonded seal (24) from center coupling (10).
 - J-1.17.1.1) Remove o-ring (41) from bonded seal (24).
- J-1.18) Unscrew and remove by-pass housing (20) from upper cone (9)
- J-1.19) Unscrew and remove set screws (34) from valve piston (5).
- J-1.20) Unscrew and remove valve piston (5) from inner mandrel (2).
 - J-1.20.1) Remove o-ring (46) from valve piston (5).
- J-2) Unclamp and remove top sub (1) from vise. Clamp inner mandrel (2) in vise.
CAUTION₄: Do **NOT** wrench or clamp on seal surface.
 - J-2.1) Unscrew and remove shear screws (37) from upper slip support (33).
 - J-2.2) Unscrew and remove top sub (1) from inner mandrel (2).
 - J-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).
 - J-2.4) Remove upper slip body assembly from inner mandrel (2) and disassemble:
 - J-2.4.1) Remove wedges (if needed). Remove releasing slip (7), upper slips (8), and upper slip springs (26) from upper slip body (6).
 - J-2.5) Remove upper cone (9) from inner mandrel (2).
 - J-2.6) Remove balance piston (4) from inner mandrel (2).
 - J-2.6.1) Remove o-rings (44, 46) from balance piston (4).
- J-3) Unclamp and remove inner mandrel (2) from vise.

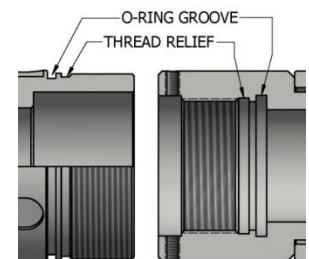


Fig. 2

K) ASSEMBLY

- NOTE₃**: Ensure vise is capable of handling weight of tool.
- NOTE₄**: Support tool during disassembly and assembly with jack stands as necessary.
- CAUTION₅**: To ensure tool operates properly, install o-rings in o-ring grooves **NOT** thread reliefs unless stated otherwise (Fig. 2).
- NOTE₈**: Clean and inspect all parts. Replace all worn and damaged parts. Install parts in proper order, and orientation and tighten/torque all connections properly.



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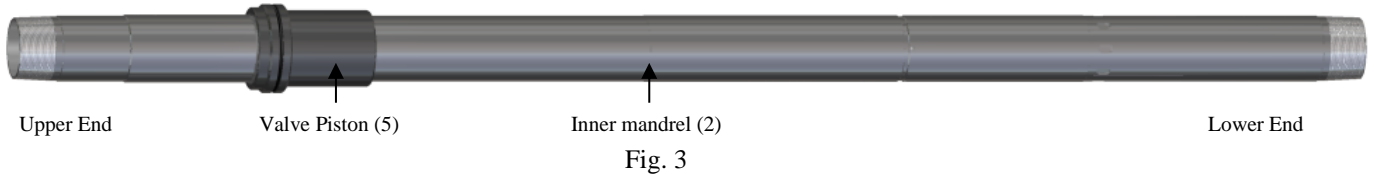
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K) ASSEMBLY (cont'd)



K-1) Install o-ring (46) in groove in valve piston (5).

K-2) From lower end of inner mandrel (2), slide valve piston (5) onto inner mandrel (2). Screw valve piston (5) onto inner mandrel (2) (Fig. 3).

K-3) Screw set screws (34) into valve piston (5).

K-4) Install o-rings (44, 46) into grooves on balance piston (4).

K-5) From upper end of inner mandrel (2), slide balance piston (4) onto inner mandrel (2) until it contacts/stops at the first shoulder.

NOTE₉: Stand inner mandrel (2) on end if needed.

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



Fig. 4

CAUTION₆: Do not rip or tear o-ring during installation.

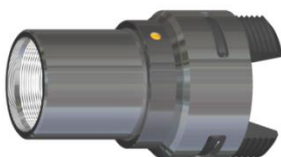


Fig. 5



Fig. 6

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

K-7.1) 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. 5).

NOTE₁₀: Install two (2ea) springs per slip (Fig. 7).

K-7.2) Screw upper slip support (33) into upper slip body (6). Remove wedges.

K-7.3) Install top sub (1) into upper slip support (33). Align groove in top sub (1) with threaded holes in upper slip support (33).

K-7.4) Screw shear screws (37) into upper slip support (33). Tighten until shear screws (37) make contact with top sub (1). Back shear screws (37) out 1/4 turn.

K-7.5) Install upper slip body assembly onto inner mandrel (2). Screw top sub (1) onto inner mandrel (2) (Fig. 6).

NOTE₁₁: Be sure shear screws were backed out properly allowing top sub to screw on easily.

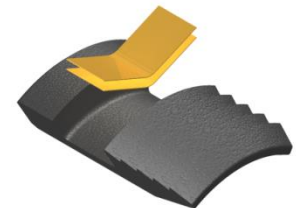


Fig. 7

K-8) Assemble by-pass housing assembly:

K-8.1) Install o-rings (42, 45) in grooves in center coupling (10).

K-8.2) Install o-ring (41) in groove in bonded seal (24).

K-8.3) Install bonded seal (24) in center coupling (10).

CAUTION₆: Do not rip or tear o-ring during installation.

K-8.4) Install o-ring (40) in groove in seal retainer (19).



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K) ASSEMBLY (cont'd)

K-8.5) Screw seal retainer (19) into center coupling (10) (Fig. 8).

CAUTION₆: Do not rip or tear o-ring during installation.

K-8.6) Screw gage ring (29) onto seal retainer (19) (Fig. 8).

K-8.7) Screw center coupling (10) into by-pass housing (20) (Fig. 8).

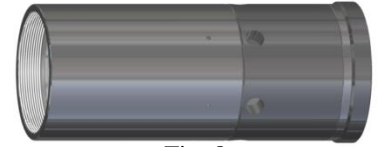


Fig. 8

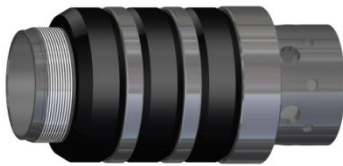


Fig. 9

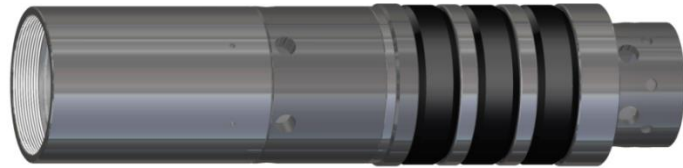


Fig. 10

K-9) Assemble rubber mandrel assembly:

K-9.1) 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) (Fig. 9).

NOTE₁₂: Do not damage threads - use plastic or rubber hammer as needed.

K-10) Assemble rubber mandrel assembly into by-pass housing assembly:

K-10.1) Clamp by-pass housing assembly in vise - clamp on by-pass housing (20).

K-10.2) Screw rubber mandrel (11) (of rubber mandrel assembly) into seal retainer (19) (of by-pass housing assembly). Hand-tighten until rubber mandrel (11) makes contact with o-ring (40) (Fig. 10).

CAUTION₆: Do not rip or tear o-ring during installation.

K-10.3) Tighten rubber mandrel (11) (of rubber mandrel assembly) by wrenching on rubber mandrel (11) to tighten connections in sub-assembly.

K-11) Assemble setting chamber assembly:

K-11.1) Install o-rings (43, 47) in grooves in setting piston (21).

K-11.2) Screw setting piston (21) into setting sleeve (27).

K-11.3) Stand setting sleeve (27) on end with upper end facing upwards.

K-11.4) Install setting chamber (30) over setting sleeve (27).

K-11.5) Install lock ring (3) onto setting sleeve (27) until outer threads contact threads in setting chamber (30). Rotate setting chamber (30) to thread lock ring (3) into setting chamber leaving enough room for setting chamber cap (22) to be installed (Fig. 11).

NOTE₁₃: ID threads **MUST NOT** engage with threads on setting sleeve (21).

NOTE₁₄: Threads on lock ring (3) are directional - it **MUST** be installed in correct direction for tool to work properly.

K-11.6) Screw setting chamber cap (22) into setting chamber (30) (Fig. 12, setting sleeve not shown for clarity).

K-12) Assemble setting chamber assembly onto rubber mandrel assembly:

K-12.1) During the sub-assembly process, the rubber retainer (15) and elements (13, 14) get in a slight bind. Using a plastic or rubber hammer, tap upwards on rubber retainer (15) to unbind them enough to thread onto setting chamber assembly.

NOTE₁₂: Do not damage threads - use plastic or rubber hammer as needed.

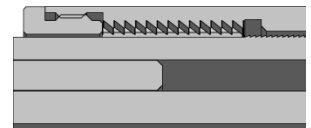


Fig. 11

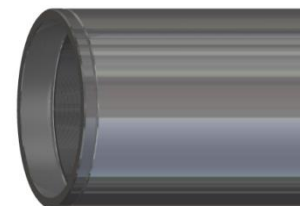


Fig. 12



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K) ASSEMBLY (cont'd)

Fig. 13



K-12.2) Install setting chamber assembly onto rubber mandrel (11). Screw rubber retainer (15) onto setting sleeve (27) (Fig. 13).

K-12.3) Remove assembly from vise and set aside temporarily.

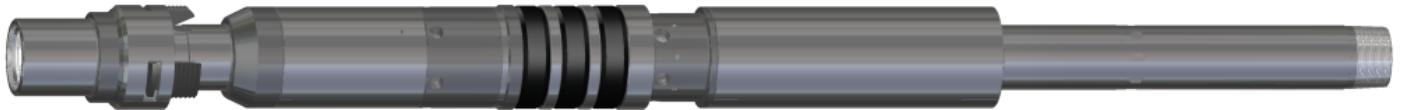


Fig. 14

K-13) Clamp top sub (1) and mandrel assembly in vise.

K-13.1) While gripping in the element area, slide pre-assembled assemblies (by-pass housing assembly, rubber mandrel assembly, and setting chamber assembly) onto mandrel assembly past making contact with o-rings and on upwards to upper cone (9) (Fig. 14).

NOTE₁₅: DO NOT grip on the setting chamber assembly as this may cause the lock ring to prematurely lock in place.

K-13.2) Tap setting chamber assembly upwards to rubber retainer (15).

NOTE₁₂: Do not damage threads. Use plastic or rubber hammer as needed.

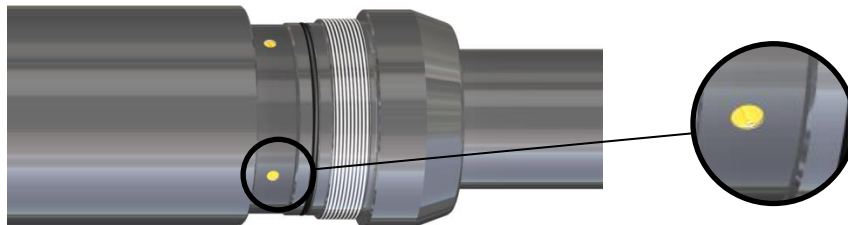
K-14) Install snap ring (23) in groove in inner mandrel (2).

K-15) Screw upper cone (9) into by-pass housing (20).

NOTE₁₆: For added leverage, insert a rod or punch tool into holes in center coupling (10) as needed.

K-16) Install o-rings (43, 47) in grooves in lower cone (16).

Fig. 15



K-17) Install lower cone (16) onto inner mandrel (2). Tap lower cone (16) into place. Align threaded holes in setting piston (21) with holes in lower cone (16).

CAUTION₆: Do not rip or tear o-ring during installation.

K-18) Screw shear screws (36) into setting piston (21). Tighten until shear screws (36) make contact with inner mandrel (2). Back shear screws (36) out 1/4 turn (Fig. 15).



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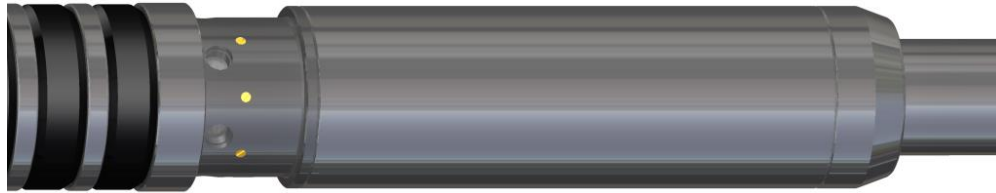
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K) ASSEMBLY (cont'd)

Fig. 16



K-19) Slide setting chamber assembly down and tap assembly onto lower cone (16) over o-rings (47). Screw setting chamber (30) onto lower cone (16) (Fig. 16).

K-20) Wrench on setting chamber (30) to tighten. May have to put downward pressure to get threads started. Back up on lower cone (16) with wrench as needed.

K-21) Align threaded holes in setting sleeve (27) with pocket holes in rubber mandrel (11).

NOTE₁₇: Align large hole in setting sleeve (27) with large hole in rubber mandrel (11).

K-22) Screw shear screws (35) into upper end of setting sleeve (27). Tighten until shear screws (35) make contact with rubber mandrel (11). Back shear screws (35) out 1/4 turn (Fig. 16).

NOTE₁₈: Shear screws (35) **MUST** be below the OD surface of the setting sleeve (27). Adjust shear screws (35) as required.

Fig. 17



K-23) Assemble lower slip body assembly and install:

K-23.1) Install internal ring (31) in groove in lower slip body (18) (Fig. 17).

K-23.2) Install lower slip springs (25) and lower slips (17) into lower slip body (18).

NOTE₁₉: Install two (2ea) springs per slip (Fig. 18).

K-23.3) Wedge lower slips (17) outward. Install lower slip support (32) into lower slip body (18).

K-23.4) Align holes in lower slip support (32) with threaded holes in lower slip body (18). Screw cap screws (39) into lower slip body (18). Remove wedges.

K-23.5) Install lower slip body assembly onto inner mandrel (2).

K-23.6) Align threaded holes in lower slip body (18) with recessed holes in inner mandrel (2). Screw shear screws (38) into lower slip body (18). Tighten until shear screws (38) make contact with inner mandrel (2). Back shear screws (38) out 1/4 turn (Fig. 14).

K-24) Screw bottom sub (28) onto inner mandrel (2) (Fig. 14).

K-25) Unclamp top sub (1) from vise and remove assembled tool.

NOTE₂₀: If pressure testing of the packer is desired, refer to technical manual *DL-937-8625-1373*. Pressure testing of the packer is not mandatory.

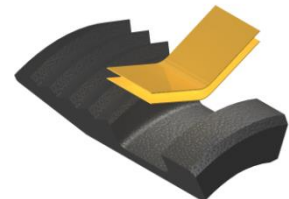


Fig. 18



DLH PACKER

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

Manual No:
DL-935-8625-169

Revision: **D**

Revision Date:
11/04/2022

Written by: Bruce Mathis

Approved by: Brian Oligschlaeger

L) PARTS LIST

ITEM	QTY	DESCRIPTION	MATERIAL	P/N 93585
1	1	TOP SUB	DLMS80	93595610
2	1	INNER MANDREL	DLMS80	93595210
3	1	LOCK RING	DLMS80	93585005
4	1	BALANCE PISTON	DLMS35	93585918
5	1	VALVE PISTON	DLMS80	93585960
6	1	UPPER SLIP BODY	DLMS80	93585320
7	1	RELEASING SLIP	DLMS110	93585125
8	2	UPPER SLIP	DLMS35	93585115
9	1	UPPER CONE	DLMS80	93585410
10	1	CENTER COUPLING	DLMS80	93585230
11	1	RUBBER MANDREL	DLMS80	93585220
12	2	RUBBER SPACER	DLMS35	60285840
13	1	ELEMENT	70 DURO NITRILE	60285511
14	2	ELEMENT	90 DURO NITRILE	60285513
15	1	RUBBER RETAINER	DLMS35	93585850
16	1	LOWER CONE	DLMS80	93585420
17	4	LOWER SLIP	DLMS35	60082135
18	1	LOWER SLIP BODY	DLMS80	93585325
19	1	SEAL RETAINER	DLMS80	93585332
20	1	BY-PASS HOUSING	DLMS80	93585311
21	1	SETTING PISTON	DLMS80	93585751
22	1	SETTING CHAMBER CAP	DLMS35	93585315
23	1	SNAP RING	DLMS80	93595980
24	1	BONDED SEAL	DLMS60 / 90 DURO NITRILE	93595520
25	8	LOWER SLIP SPRING	-	7170901
26	6	UPPER SLIP SPRING	-	7170902
27	1	SETTING SLEEVE	DLMS80	93585752
28	1	BOTTOM SUB	DLMS80	93595630
29	1	GAGE RING	DLMS80	60282830
30	1	SETTING CHAMBER	DLMS80	93585312
31	1	SMALLEY MEDIUM HEAVY DUTY INTERNAL RING	DLMSC	WHT-525
32	1	LOWER SLIP SUPPORT	DLMS60	93585912
33	1	UPPER SLIP SUPPORT	DLMS80	93585810
34	2	SET SCREW 1/4-20 UNC X 1/2	STEEL	SSS025C050
35	8	SHEAR SCREW (364 PSI) 1/2-13 UNC X 1/2	DLM360BRS	BSSSLT050C050
36	4	SHEAR SCREW (364 PSI) 1/2-13 UNC X 3/4	DLM360BRS	BSSSLT050C075
37	2	SHEAR SCREW (5000#) 5/8-18	DLM360BRS	32045910



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L) PARTS LIST (cont'd)

ITEM	QTY	DESCRIPTION	MATERIAL	P/N 93585
38	8	SHEAR SCREW (6000#)	DLM360BRS	DL60442
39	2	CAP SCREW 1/2-13 UNC X 3/4	STEEL	SCS050C075
40	1	160 O-RING	90 DURO NITRILE	90160
41	1	162 O-RING	90 DURO NITRILE	90162
42	1	259 O-RING	90 DURO NITRILE	90259
43	2	350 O-RING	90 DURO NITRILE	90350
44	1	351 O-RING	90 DURO NITRILE	90351
45	1	356 O-RING	90 DURO NITRILE	90356
46	2	359 O-RING	90 DURO NITRILE	90359
47	2	361 O-RING	90 DURO NITRILE	90361

REDRESS KIT (RDK)	93585050
ASSEMBLED WEIGHT	505 LBS

L-1) ELASTOMER TRIM OPTIONS

NOTE₂₁: For temperature range, refer to Elastomer Trim Temperature Guide.

L-1.1) HSN

ITEM	QTY	DESCRIPTION	MATERIAL	P/N 93585H
13	1	ELEMENT	70 DURO HSN	60285511H
14	2	ELEMENT	90 DURO HSN	60285513H
24	1	BONDED SEAL	90 DURO HSN	93595520H
40	1	160 O-RING	90 DURO HSN	90160H
41	1	162 O-RING	90 DURO HSN	90162H
42	1	259 O-RING	90 DURO HSN	90259H
43	2	350 O-RING	90 DURO HSN	90350H
44	1	351 O-RING	90 DURO HSN	90351H
45	1	356 O-RING	90 DURO HSN	90356H
46	2	359 O-RING	90 DURO HSN	90359H
47	2	361 O-RING	90 DURO HSN	90361H

REDRESS KIT (RDK)	93585050H
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L) PARTS LIST (cont'd)

L-1.2) VITON

ITEM	QTY	DESCRIPTION	MATERIAL	P/N 93585V
13	1	ELEMENT	70 DURO VITON	60285511V
14	2	ELEMENT	90 DURO VITON	60285513V
24	1	BONDED SEAL	90 DURO VITON	93595520V
40	1	160 O-RING	90 DURO VITON	90160V
41	1	162 O-RING	90 DURO VITON	90162V
42	1	259 O-RING	90 DURO VITON	90259V
43	2	350 O-RING	90 DURO VITON	90350V
44	1	351 O-RING	90 DURO VITON	90351V
45	1	356 O-RING	90 DURO VITON	90356V
46	2	359 O-RING	90 DURO VITON	90359V
47	2	361 O-RING	90 DURO VITON	90361V

REDRESS KIT (RDK)		93585050V
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L-2) CARBIDE OPTIONS

ITEM	QTY	DESCRIPTION	MATERIAL	P/N 93585C
8	2	CARBIDE UPPER SLIP	DLMS110	93585115C
17	4	CARBIDE LOWER SLIP	DLMS110	60082135C



DLH PACKER

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

Manual No:
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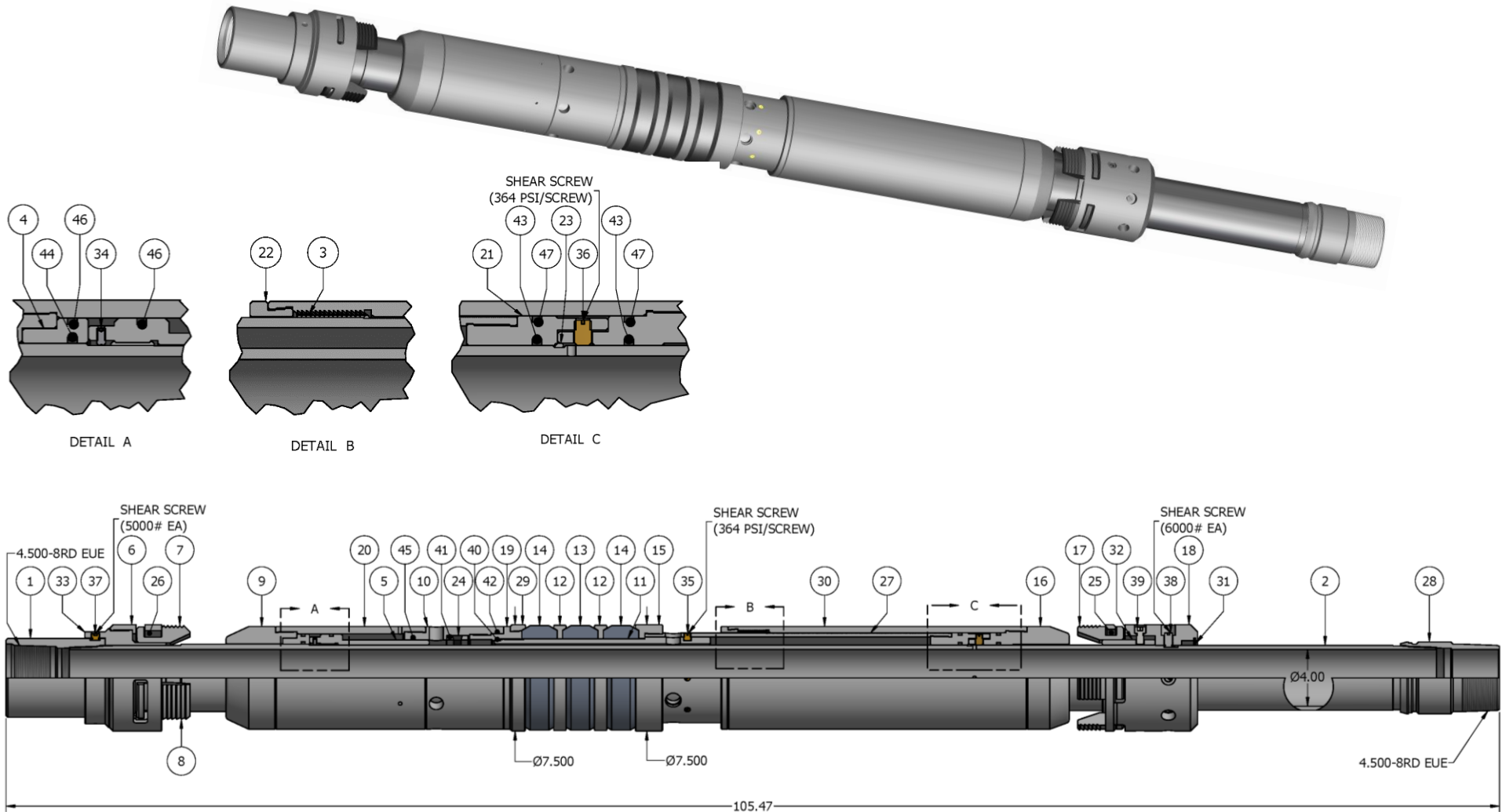
Revision: **D**


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11/04/2022

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Approved by: Brian Oligschlaeger

M) TECHNICAL ILLUSTRATION



	DLH PACKER 8-5/8" X 4-1/2"	Manual No: DL-935-8625-169
		Revision: D
		Revision Date: 11/04/2022
<i>Written by: Bruce Mathis</i>		<i>Approved by: Brian Oligschlaeger</i>

N) REVISION HISTORY

DATE	REVISION	DESCRIPTION OF CHANGES	REVISED BY	APPROVED BY
11/04/2022	D	Added carbide options; Removed tool drift ID; Revised initiation and recommended setting pressures, elastomer temp. ratings	J.Anderson	K.Plunkett
02/04/15	C	Revised P/N 32045910 was DL51775; Added Related Tools, HSN and Viton options, tool Drift ID, Pre-Installation Inspection and Storage Procedures, Elastomer Trim Temperature Guide	J.Anderson	K.Riggs
11/30/12	B	Revised (or Updated) casing weight range from 32.0 - 42.0# to 24.0 - 40.0#, technical illustration, part BSSSLT050F075 to BSSSLT050C075, shear screw psi value from 275 psi to 364 psi; Added, recommended hand tools and options parts lists sections and revision history; Rewrote disassembly and assembly instructions.	J.Anderson	J.McArthur