



HYDRAULIC PERMAPAK PACKER

7" X 4.000"

Manual No:
DL-683-7000-432

Revision: **D**

Revision Date:
04/01/2020

Authored by: *B.Mathis*

Approved by: *H.Bringham*

A) DESCRIPTION

The Hydraulic Permapak Packer is a hydraulic set seal bore packer and is the hydraulic set equivalent of the Permapak Seal Bore Packer. The full range of Permapak Seal Bore Accessories may be used with the Hydraulic Permapak.

Pressure sets the packer via a setting chamber built into the tool. Pressure enters the setting chamber via holes in the polished bore of this packer. These holes can be isolated with a ball-operated sub so other hydraulic operated tools can be functioned before setting the packer.

NOTE: Bottom sub sold separately. Contact D&L Sales for more information.

B) SPECIFICATION GUIDE

CASING			TOOL OD (INCHES)	THROUGH SEALS (INCHES)	SEAL BORE (INCHES)	PART NUMBER
SIZE (INCHES)	WEIGHT (LBS/FT)	RECOMMENDED HOLE SIZE (INCHES)				
7	23.0 - 32.0	6.094 – 6.366	5.875	3.00	4.000	68371 68371H ¹ 68371V ²
	32.0 – 38.0	5.920 – 6.094	5.813	3.00	4.000	68372 68372H ¹ 68372V ²

Elastomer Trim Options: ¹HSN, ²Viton

DIFFERENTIAL PRESSURE (MAX)	TENSILE RATING (MAX)
10,000 PSI	86,000 LBS

C) 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	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

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



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

Before 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) SETTING PROCEDURES

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

D-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. 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 pre-set conditions by pressure waves through the fluid. A slow steady running speed should be used. 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.

- Typically the tubing/casing 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/casing to the recommended pressure for the given size of packer hold for 5 minutes. Pick up tubing to check that upper slips set then set down weight to check that lower slips set. Re-apply pressure to the tubing/casing to lock locknut in place.

E) SETTING AREA GUIDE

PART NUMBER	PACKER SIZE (INCHES)	SETTING AREA (SQ INCHES)	SHEAR VALUE (PSI/SCREW)	SETTING INITIATION (PSI)	MINIMUM SETTING PRESSURE (PSI)
68371	7 X 4.000	5.809	344	2,750	3,500
68372	7 X 4.000	4.276	467	3,750	4,750

F) 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.



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G) ELASTOMER TRIM TEMPERATURE GUIDE

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

H) 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

I) DISASSEMBLY

- I-1) Clamp upper end of mandrel (1) in vise.
- I-1.1) From lower end of tool, unscrew and remove set screws (15) from setting chamber cap (10).
- I-1.2) Unscrew and remove set screws (6) from lock ring housing (13).
- I-1.3) Remove setting chamber assembly from mandrel (1) and disassemble:
- I-1.3.1) Unscrew and remove setting chamber (9) from setting chamber cap (10).
- I-1.3.2) Unscrew and remove shear screws (20) from setting sleeve (8).
- I-1.3.3) Separate setting sleeve (8) from setting chamber cap (10).
- I-1.3.3.1) Remove o-rings (22, 23, 24, 25) from setting sleeve (8).
- I-1.3.3.2) Remove o-rings (22, 24, 25) from setting chamber cap (10).
- I-1.4) Unscrew and remove shear screw (18) from lock ring housing (13).
- I-1.5) Unscrew and remove lock ring housing (13) from lock ring (11).
- I-1.6) Unscrew and remove lock ring (11) from mandrel (1) (**NOTE₂**: Left-hand threads).
- I-1.7) Remove Belleville spring (12) and slip ring (3) from mandrel (1).
- I-1.8) Unscrew and remove shear screws (19) from lower cone (4).
- I-1.9) Remove lower cone (4) from inner mandrel (1).
- I-1.10) Remove male expansion rings (17), female expansion rings (16), rubber retainers (14), and element (7) from mandrel (1).
- I-1.11) Unscrew and remove shear screws (19) from upper cone (5).
- I-1.12) Remove upper cone (5) from inner mandrel (1).
- I-1.13) Remove key (21) from mandrel (1).
- I-1.14) Remove slip ring (3) from mandrel (1).
- I-1.15) Unscrew and remove upper gage ring (2) from mandrel (1).
- I-2) Unclamp and remove inner mandrel (1) from vise.



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J) ASSEMBLY

NOTE7: Clean and inspect all parts. Replace all worn and damaged parts. Install parts in proper order, and orientation and tighten/torque all connections properly.

CAUTION4: To ensure tool operates properly, install o-rings in o-ring grooves, **NOT** thread reliefs (Fig. 2).

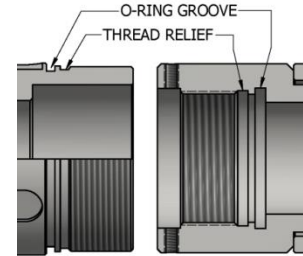


Fig. 2

J-1) Clamp upper end of mandrel (1) in vise.

J-1.1) Screw gage ring (2) onto mandrel (1).

J-1.2) Install slip ring (3) onto mandrel (1).

J-1.3) Install keys (21) onto key flats on mandrel (1).

J-1.4) Install upper cone (5) onto mandrel (1). Align key slots in upper cone (5) with keys (21) and install upper cone (5) onto keys (21).

J-1.5) Align threaded holes in upper cone (5) with pocket holes in mandrel (1). Screw shear screws (19) into upper cone (5). Tighten until shear screws (19) make contact with mandrel (1). Back shear screws (19) out 1/4 turn.

J-1.6) Install female and male expansion rings (16, 17), rubber retainers (14) and element (7).

J-1.7) Install lower cone (4) onto mandrel (1). Align threaded holes in lower cone (4) with pocket holes in mandrel (1).

J-1.8) Screw shear screws (19) into lower cone (4). Tighten until shear screws (19) make contact with lower cone (4). Back shear screws (19) out 1/4 turn.

J-1.9) Install slip ring (3) onto mandrel (2).

J-1.10) Install Belleville spring (12) onto mandrel (2).

J-1.11) Screw and/or slide lock ring (11) onto lower end of ratchet threads on mandrel (1) (**NOTE2:** Left-hand threads)

NOTE3: Threads on lock ring (11) are directional—it MUST be installed in correct direction for tool to work properly.

J-1.12) Install lock ring housing (13) onto mandrel (1) and screw onto lock ring (11). Align threaded hole for shear screw in lock ring housing (13) with gap in lock ring (11).

J-1.13) Screw shear screw (18) into lock ring housing (13). Tighten until shear screw (18) makes contact with mandrel (1). Back shear screw (18) out 1/4 turn.

J-1.14) Assemble setting chamber assembly and install:

J-1.14.1) Install o-rings (22, 24, 25) in o-ring grooves in setting chamber cap (10).

J-1.14.2) Install o-rings (22, 23, 24, 25) in o-ring grooves in setting sleeve (8).

J-1.14.3) Install setting sleeve (8) onto setting chamber cap (10). Align threaded holes in setting sleeve (8) with holes in setting chamber cap (10).

CAUTION3: Do NOT rip or tear o-rings during installation.

J-1.14.4) Screw shear screws (20) into setting sleeve (8) until flush with OD of setting sleeve (8).

J-1.14.5) Install setting chamber cap (9) onto setting sleeve (8) and screw into setting chamber cap (10).

J-1.14.6) Install setting chamber assembly onto mandrel (1).

CAUTION3: Do NOT rip or tear o-rings during installation.

J-1.15) Align screw groove with threaded holes in lock ring housing (13). Screw set screws (6) into lock ring housing (13).

J-1.16) Align threaded holes in setting chamber cap (10) with screw groove in mandrel (1). Screw set screws (15) into setting chamber cap (10).

J-2) Unclamp mandrel (1) from vise and remove assembled tool.



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J) ASSEMBLY (cont'd)

NOTE: If pressure testing of the packer is desired, refer to technical manual *DL-683-7000-1331*. Pressure testing of the packer is not mandatory.

K) PARTS LIST

ITEM	QTY	DESCRIPTION	MATERIAL	23.0 - 32.0# P/N 68371	32.0 - 38.0# P/N 68372
1	1	MANDREL	DLMS110	68370210	
2	1	GAGE RING	DLMS80	68171850	68172850
3	2	SLIP RING	DLMCIG2	67071111	67072111
4	1	UPPER CONE	DLMCIG2	67071014	67072014
5	1	LOWER CONE	DLMCIG2	67071023	67072023
6	6	SET SCREW 5/16-18 UNC	STEEL	SSS031C050 (1/2" LONG)	SSS031C043 (7/16" LONG)
7	1	ELEMENT	80 DURO NITRILE	67071512	67072512
8	1	SETTING SLEEVE	DLMS80	68170751	68172751
9	1	SETTING CHAMBER	DLMS125	68170314	68172314
10	1	SETTING CHAMBER CAP	DLMS80	68170315	68172315
11	1	LOCK RING	DLMS80	67070011	
12	1	BELLEVILLE SPRING	DLMS110	68171910	
13	1	LOCK RING HOUSING	DLMS80	68171012	68172012
14	2	RUBBER RETAINER	DLMCIG2	67071015	67072015
15	4	SET SCREW 5/16-18 UNC X 5/16	STEEL	SSS031C031	
16	2	FEMALE EXPANSION RING	DLM660BRZ	67071013	67072013
17	2	MALE EXPANSION RING	DLM660BRZ	67071020	67072020
18	1	SHEAR SCREW (750#) #10-32 UNF X 3/8	DLM360BRS	BSSSLT1032F037	
19	8	SHEAR SCREW (1200#) 1/4-20 UNC X 1/2	DLM360BRS	BSSSLT025C050	
20	8	SHEAR SCREW (2000#) 5/16-18 UNC	DLM360BRS	BSSSLT031C031 (5/16" LONG)	BSSSLT031C025 (1/4" LONG)
21	2	KEY 3/16 X 3/16 X 1"	DLMS110	KS018X018X100	
22	-	247 O-RING	90 DURO NITRILE	90247 (2 QTY)	(3 QTY)
23	1	O-RING	90 DURO NITRILE	90250	90249
24	-	350 O-RING	90 DURO NITRILE	90350 (2 QTY)	(1 QTY)
25	2	O-RING	90 DURO NITRILE	90353	90351

ASSEMBLED WEIGHT *	130 LBS *	121 LBS *
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* (w/o BOTTOM SUB)



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K) PARTS LIST (cont'd)

K-1) ELASTOMER TRIM OPTIONS

NOTE4: For temperature range, refer to Elastomer Trim Temperature Guide.

K-1.1) HSN

ITEM	QTY	DESCRIPTION	MATERIAL	23.0 - 32.0# P/N 68371H	32.0 - 38.0# P/N 68372H
7	1	ELEMENT	80 DURO HSN	67071512H	67072512H
22	-	247 O-RING	90 DURO HSN	90247H (2 QTY)	(3 QTY)
23	1	O-RING	90 DURO HSN	90250H	90249H
24	-	350 O-RING	90 DURO HSN	90350H (2 QTY)	(1 QTY)
25	2	O-RING	90 DURO HSN	90353H	90351H

K-1.2) VITON

ITEM	QTY	DESCRIPTION	MATERIAL	23.0 - 32.0# P/N 68371V	32.0 - 38.0# P/N 68372V
7	1	ELEMENT	80 DURO VITON	67071512V	67072512V
22	-	247 O-RING	90 DURO VITON	90247V (2 QTY)	(3 QTY)
23	1	O-RING	90 DURO VITON	90250V	90249V
24	-	350 O-RING	90 DURO VITON	90350V (2 QTY)	(1 QTY)
25	2	O-RING	90 DURO VITON	90353V	90351V

L) ACCESSORIES - BOTTOM SUBS

NOTE5: Standard bottom subs are listed. Other tubing sizes/configurations and threads are available. All sold separately.

DESCRIPTION	MATERIAL	THREAD CONNECTION	23.0 - 32.0# P/N 67071	32.0 - 38.0# P/N 67072
PLAIN BOTTOM	DLMS80	-	67071018	67072018
CONCENTRIC BOTTOM	DLMS80	3.875-8 STUB ACME	67071610	67072610
BOX TUBING BOTTOM	-	2.875-8 RD EUE	67071620	67072620
PIN TUBING BOTTOM	-	-	67071630 (3.500-8 RD EUE)	67072630 (2.875-8 RD EUE)



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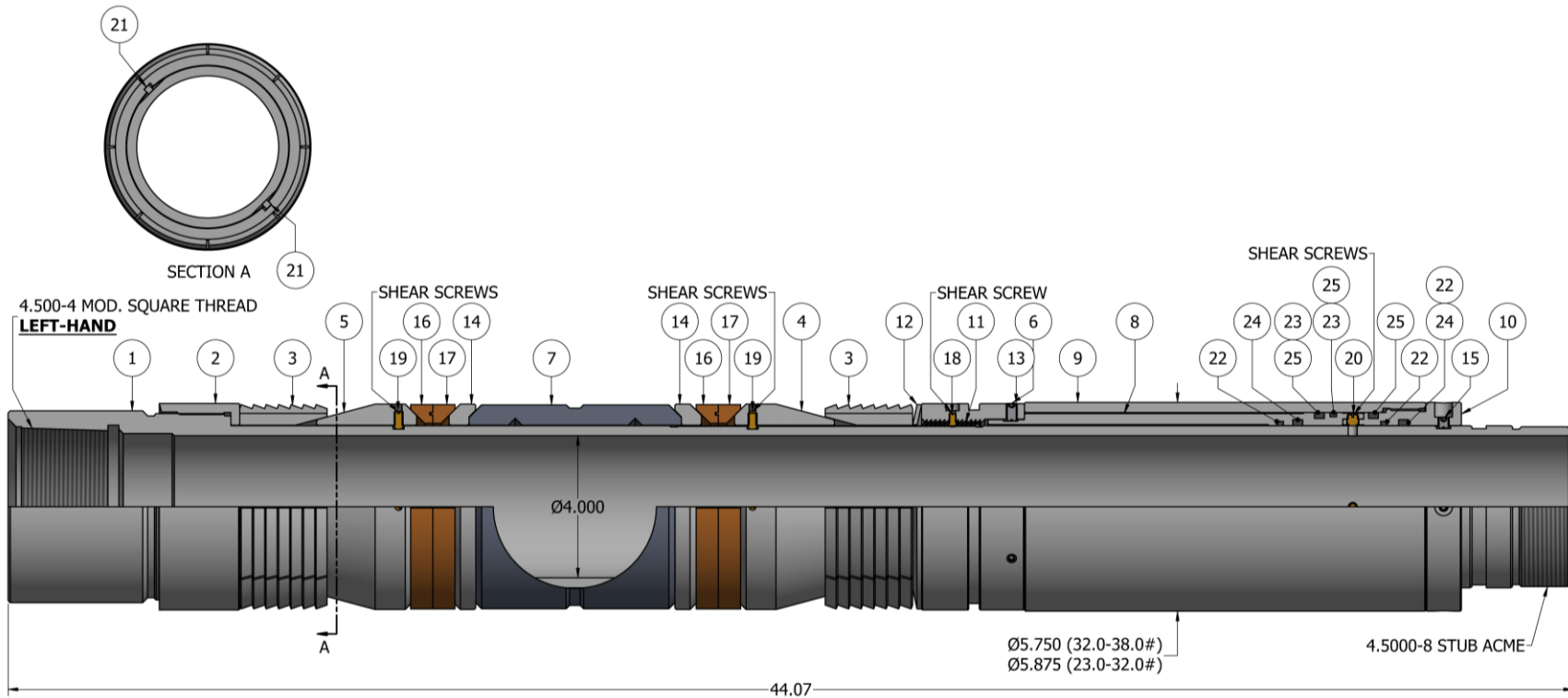
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M) TECHNICAL ILLUSTRATION



NOTE: Bottom sub not shown.

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N) REVISION HISTORY

DATE	REVISION	DESCRIPTION OF CHANGES	REVISED BY	APPROVED BY
04/01/2020	D	Added max. tensile load; Revised nitrile temp. rating	J.Anderson	K.Plunkett
10/05/2016	C	Revised BSSSLT031C031 and BSSSLT031C025 8 qty was 4	J.Anderson	K.Riggs
08/02/2016	B	Revised entire manual	J.Anderson	K.Riggs