



HYDROSET IV PACKER

4" X 2-3/8"

Manual No:
DL-654-4000-108

Revision: **E**

Revision Date:
03/23/2023

Written by: Bruce Mathis

Approved by: Brian Oligschlaeger

A) DESCRIPTION

The Hydroset IV Packer is a hydraulic set single string retrievable packer. Tubing pump pressure is used to set the packer and the setting force is locked into the packer by a body lock ring. Its design allows for multiple zone completions. It can be run with other hydraulic packers or mechanical set packers.

This packer is ideal to run as a tandem packer with double grip packers that will lock the tubing in place. This packer is released with a straight pull to shear releasing screws.

This packer features a three element packing arrangement, a lock ring mechanism to lock in setting force, and field adjustable shear screws to allow adjustment of setting initiation and releasing force required to release the packer.

B) 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)		
4	9.5 – 11.0	3.476 – 3.548	3.250	1.75	2-3/8 EUE	65440 65440H ¹ 65440V ²
	12.95	3.340	3.187	1.75	2-3/8 EUE	65441 65441H ¹ 65441V ²

Elastomer Trim Options: ¹HSN, ²Viton

DIFFERENTIAL PRESSURE (MAX)	TENSILE LOAD THRU TOOL (MAX)
7,000 PSI	35,000 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.

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.

NOTE: Tool is shipped with steel cap screws (15) to prevent damaging shear screws (12) during shipment. Replace steel screws (15) with shear screws (12) before initial use.

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

D & L OIL TOOLS
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C) PRE-INSTALLATION INSPECTION PROCEDURES (cont'd)

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.

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. 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 makeup torque through the packer should be avoided. Run the packer to the desired setting depth at the recommended speed and taking precautions listed above.

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.

D-2) SETTING SEQUENCE

Internal tubing pressure enters the setting chamber through the setting port and acts upward on the setting sleeve. When the applied load acting on the piston exceeds the value of the setting initiation shear screws, they will shear and allow the setting process to proceed and pack off the 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: 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.

E) RELEASING PROCEDURES

To release, pull 19,000 lbs at the packer to shear the shear screws (2,375# per screw) to allow the elements to relax.

F) SETTING AREA GUIDE

PACKER SIZE (INCHES)	SETTING AREA (SQ INCHES)	SHEAR VALUE (PSI/SCREW)	SETTING INITIATION (PSI)	RECOMMENDED SETTING (PSI)
4	2.393	500	6,000*	3,800

*with all 12 shear screws. Removing shear screws will reduce the setting initiation pressure.



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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) 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

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

J-1) Clamp inner mandrel (1) in vise.

J-1.1) Unscrew and remove shear screws (6) from lock ring housing (8).

J-1.2) Unscrew and remove lock ring housing (8) from lock ring (9) (**NOTE₂**: Left-hand threads).

J-1.3) Unscrew and remove bottom sub (11) from inner mandrel (1).

J-1.3.1) Remove o-ring (13) from bottom sub (11).

J-1.4) Unscrew and remove setting piston seal (10) from setting piston (7).

J-1.4.1) Remove o-rings (13, 14) from setting piston seal (10).

J-1.5) Unscrew and remove lock ring (9) from setting piston (7).

J-1.6) Unscrew and remove shear screws (12) or cap screws (15), if disassembling after shipment, from setting piston (7).

NOTE₃: Tool is shipped with steel cap screws (15) to prevent damaging shear screws (12) during shipment.

J-1.7) Remove setting piston (7) from inner mandrel (1).

J-1.8) Remove elements (3, 5) and rubber spacers (4) from inner mandrel (1).

J-1.9) Unscrew and remove gage ring (2) from inner mandrel (1).

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



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K) ASSEMBLY

NOTE₄: Clean and inspect all parts. Replace all worn and damaged parts. Install parts in proper order, and orientation and tighten/torque all connections properly.

K-1) Clamp inner mandrel (1) in vise.

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

K-1.2) Install elements (3, 5) and rubber spacers (4) onto inner mandrel (1).

K-1.3) Install setting piston (7) onto rubber retainer (6). Align threaded holes in setting piston (7) counterbores in inner mandrel (1)

K-1.4) Screw shear screws (12) into setting piston (7). Tighten until screws (12) contact mandrel (1). Back out 1/4 turn.

K-1.5) Screw and/or slide lock ring (9) onto upper end of ratchet threads on setting piston (7).

NOTE₅: Threads on lock ring (9) are directional and must be installed in correct direction for tool to work properly.

K-1.6) Install o-rings (13, 14) in o-ring grooves on setting piston seal (10).

K-1.7) Screw setting piston seal (10) into setting piston (7).

CAUTION₃: Do not rip or tear o-ring(s) during installation.

K-1.8) Install o-ring (13) in o-ring groove in bottom sub (11).

K-1.9) Screw bottom sub (11) onto inner mandrel (1).

CAUTION₃: Do not rip or tear o-ring(s) during installation.

K-1.10) Screw lock ring housing (8) onto lock ring (9) (**NOTE₂:** Left-hand threads).

CAUTION₃: Do not rip or tear o-ring(s) during installation.

K-1.11) Screw shear screws (6) into lock ring housing (8). Tighten until screws (6) contact bottom sub (11). Back out 1/4 turn.

K-2) Unclamp inner mandrel (1) and remove assembly from vise.



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L) PARTS LIST

ITEM	QTY	DESCRIPTION	MATERIAL	P/N 65440	P/N 65441
1	1	MANDREL	DLMS80	65440210	
2	1	GAGE RING	DLMS35	65440830	65441830
3	2	ELEMENT	90 DURO NITRILE	60240513	
4	2	RUBBER SPACER	DLMS60	60240840	60241840
5	1	ELEMENT	70 DURO NITRILE	60240511	
6	8	SHEAR SCREW (2375#)	DLM360BRS	60100990	
7	1	SETTING PISTON	DLMS80	65440750	65441750
8	1	LOCK RING HOUSING	DLMS80	65440725	
9	1	LOCK RING	DLMS41X80	65440720	
10	1	SETTING PISTON SEAL	DLMS80	65440751	
11	1	BOTTOM SUB	DLMS80	65440630	
12	12	1/4-20 UNC X 1/2 SLOTTED SHEAR SCREW (1200#)	DLM360BRS	BSSSLT025C050	
13	2	230 O-RING	90 DURO NITRILE	90230	
14	1	227 O-RING	90 DURO NITRILE	90227	
15	2	SOCKET CAP SCREW	STEEL	SCS025C100	SSS025C050

REDRESS KIT (RDK)		65440050	65441050
ASSEMBLED WEIGHT		27 LBS	27 LBS

L-1) ELASTOMER TRIM OPTIONS

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

L-1.1) HSN

ITEM	QTY	DESCRIPTION	MATERIAL	P/N 65440H	P/N 65441H
3	2	ELEMENT	90 DURO HSN	60240513H	
5	1	ELEMENT	70 DURO HSN	60240511H	
13	2	230 O-RING	90 DURO HSN	90230H	
14	1	227 O-RING	90 DURO HSN	90227H	

REDRESS KIT (RDK)		65440050H	65441050H
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L-1.2) VITON

ITEM	QTY	DESCRIPTION	MATERIAL	P/N 65440V	P/N 65441V
3	2	ELEMENT	90 DURO VITON	60240513V	
5	1	ELEMENT	70 DURO VITON	60240511V	
13	2	230 O-RING	90 DURO VITON	90230V	
14	1	227 O-RING	90 DURO VITON	90227V	

REDRESS KIT (RDK)		65440050V	65441050V
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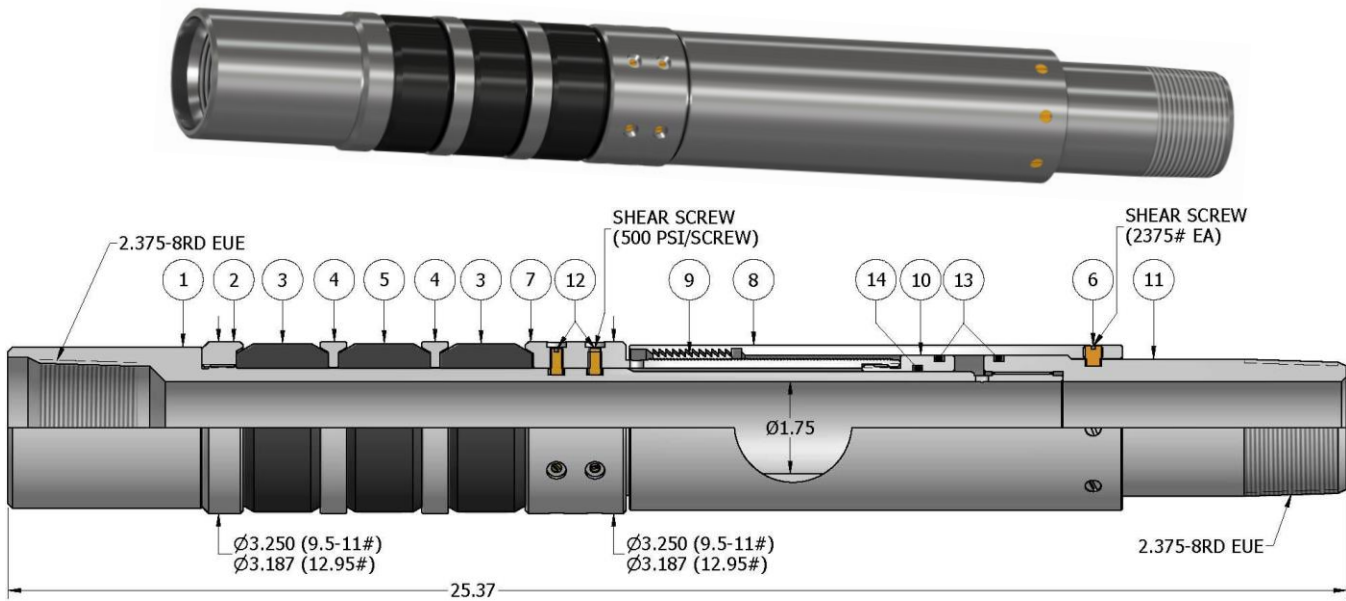
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M) TECHNICAL ILLUSTRATION



N) REVISION HISTORY

DATE	REVISION	DESCRIPTION OF CHANGES	REVISED BY	APPROVED BY
03/23/2023	E	Added number of shear screws to area guide	J.Anderson	E.Visaez
10/26/2022	D	Revised entire manual	J.Anderson	E.Visaez