



ASI-X PACKER

3-1/2" X 1.315"/1.660"

Manual No:
DL-603-3500-088

Revision: **G**

Revision Date:
03/04/2022

Authored by: S. White

Approved by: D. Hushbeck

A) DESCRIPTION

The ASI-X Single String Double-Grip Production Packer is the most versatile of the mechanically set retrievable packers and may be used in any production application. This packer is suited for treating, testing, or injection applications, in pumping or flowing wells, either deep or shallow. This packer can be left in tension or compression depending on well conditions and the required application.

A large internal by-pass reduces swabbing when running and retrieving. The by-pass closes when the packer is set and opens prior to releasing the upper slips when retrieving to allow pressure equalization. The J-slot design allows easy setting and releasing; 1/4 turn right-hand set, 1/4 turn right-hand release.

The standard ASI-X Packer is designed for differential pressures up to 7,000 PSI (unless noted otherwise). This packer is also available in an HT version which is designed for differential pressures up to 10,000 PSI (unless noted otherwise). The HT version allows this packer to be utilized in completions where high pressure treating operations are performed and it is desirable to leave the tool in the well for production.

B) RELATED TOOLS (sold separately)

B-1) 1.660" DT-2 On/Off Tool and Stinger—refer to technical manual *DL-512-1660-505*.

C) SPECIFICATION GUIDE

			TOOL		THREAD CONNECTION BOX UP / PIN DOWN	PART NUMBER
SIZE (INCHES)	WEIGHT (LBS/FT)	RECOMMENDED HOLE SIZE (INCHES)	GAGE OD (INCHES)	NOMINAL ID (INCHES)		
3-1/2	12.95	2.750	2.562	1.00	1.315 EUE / 1.660 EUE	60337 60337H ¹ 60337V ² 60337C ³ 60337HC ⁴ 60337VC ⁵

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

NOTE1: Tools listed are right-hand set / right-hand release.

NOTE2: Use of a Double Hook J-slot Packer is recommended when running with a pumpjack to help prevent the packer from unsetting during well production.

DIFFERENTIAL PRESSURE (MAX)	TENSILE LOAD THRU TOOL (MAX)
10,000 PSI	21,900 LBS

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

CAUTION₁: 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

Before first use, D&L recommends disassembly and inspection of the tools 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 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) TENSION SET

Run to setting depth. Pick up the tubing to allow for setting stroke (12-13") plus desired tubing load. Rotate the tubing 1/4 right-hand turn at the packer, and then lower the tubing while releasing torque. Slack off on the tubing sufficient weight to set the packer (8,000 lbs). Pull tension to assure that the upper slips are set. The tubing can then be left in tension, compression or neutral. If insufficient weight is available to set the packer with compression, tension can be applied after slack-off to pack off the elements.

E-2) COMPRESSION SET

Run to setting depth, pick up on the tubing and rotate 1/4 turn to the right at the packer then lower the tubing slacking off available weight to set the packer lower slips. Pull tension to set upper slips and pack off elements (8,000 lbs). After setting the packer, the tubing can be left in compression, tension or neutral.

F) RELEASING PROCEDURES

The releasing procedures are the same whether the packer has been tension or compression set. Set down weight on the packer and rotate the tubing 1/4 turn to the right at the packer and then pick up while holding the right hand torque. The internal by-pass will open, allowing pressure to equalize. After pressure is equalized, continue to pick up to release the upper slip, relax the elements and release the lower slips thus allowing the packer to be re-set or removed from the well.

CAUTION₁: High differential pressure below the ASI-X Packer may cause the upper slips to wedge in tighter, requiring an extra amount of tension to release the upper slips.



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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) PRESSURE AFFECTED AREA GUIDE

When set downhole, the packer mandrel is subjected to a force created by differential pressure above or below the packer that acts on the pressure affected area (i.e., the piston effect). Depending on the tubing size and weight and the seal area of the packer the force created by differential pressure acts upwards or downwards on the packer mandrel. An upward force, represented as a negative (-) value, acts to push the packer mandrel up hole and must be accounted for when releasing the packer. A downward force, designated as a positive value, acts to push the packer mandrel down hole and must be accounted for when releasing the packer. Other factors (e.g., tubing movement due to temperature change) must be considered separately to determine all the forces acting on the packer.

PACKER SIZE (INCHES)	TUBING SIZE (INCHES)	PRESSURE AFFECTED AREA (SQ. INCHES)	
		ABOVE	BELOW
3-1/2	1.315	0.250 (DOWN)	-0.744 (UP)
	1.660	-0.556 (UP)	-0.113 (UP)
	1.900	-1.227 (UP)	0.428 (DOWN)

Example: Consider a 3-1/2" X 1.315"/1.660" ASI-X Packer set on 1.315" tubing with a differential pressure of 3,000 PSI in the annulus around the tubing above the packer. What is the force acting on the seal area of the mandrel?

To calculate the force (lbs) acting on the seal area of the mandrel, refer to the Pressure Affected Area Guide for a 3-1/2" X 1.315"/1.660" ASI-X Packer run on 1.315" tubing. In this example, the differential pressure from above the packer acts on the seal area of the packer mandrel across a pressure affected area of 0.250 in². Multiplying the differential pressure (3,000 PSI) by the pressure affected area (0.250 in²) results in a force of 750 lbs. The piston effect on the packer mandrel is a downward force of 750 lbs.

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



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J) RECOMMENDED TOOLS

J-1) 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-2) SPECIAL TOOLS

ITEM	QTY	DESCRIPTION	PART NUMBER
T1	1	DRAW BLOCK ASSEMBLY TOOL	AT045110

K) DISASSEMBLY

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

K-1.1) Unscrew and remove J-pin bottom sub (23) from inner mandrel (2).

NOTE₃: Drag block body assembly must be free to rotate.

K-1.1.1) Remove o-ring (27) from J-pin bottom sub (23).

K-1.2) Compress drag blocks (22) using drag block body assembly tool (T1).

K-1.3) Unscrew and remove set screws (26) from J-body (20).

K-1.4) Unscrew and remove J-body (20) from drag block body (18) (**NOTE₄:** Left-hand threads.).

K-1.5) Remove drag block retainer (21) from drag block body (18).

K-1.6) Release drag blocks (22). Remove drag blocks (22) and drag block springs (3) from drag block body (18).

K-1.7) Unscrew and remove rubber mandrel cap (19) from rubber mandrel (11).

NOTE₅: For added leverage, insert a rod thru rubber retainer (15) and rubber mandrel (11) as needed.

K-1.8) Wedge lower slips (17) outward (if needed). Remove drag block body assembly and disassemble:

K-1.8.1) Remove wedges. Remove lower slips (17) and lower slip springs (25) from drag block body (18).

K-1.9) Unscrew and remove lower cone (16) from rubber retainer (15).

K-1.10) Unscrew rubber mandrel (11) from center coupling (10).

K-1.11) Remove rubber mandrel assembly and disassemble:

K-1.11.1) Remove elements (13, 14), rubber spacers (12) and rubber retainer (15) from rubber mandrel (11).

K-1.12) Unscrew and remove center coupling (10) from upper cone (9).

K-1.12.1) Remove bonded seal (24) and o-rings (28, 29) from center coupling (10).

K-1.13) Remove upper cone (9) from inner mandrel (2).

K-2) Remove top sub (1) from vise. Clamp lower part of inner mandrel (2) in vise.

NOTE₆: Do NOT wrench or clamp on seal surface.

K-2.1) Unscrew and remove spring cage (5) from upper slip body (6).

CAUTION₂: Compression spring (4) is compressed with spring tension against upper slip body assembly.

K-2.2) Unscrew and remove top sub (1) from inner mandrel (2).

K-2.3) Remove compression spring (4) from inner mandrel (2).



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K) DISASSEMBLY (cont'd)

K-2.4) Wedge releasing slip (7) and upper slips (8) outwards (if needed). Remove upper slip body assembly and disassemble:

K-2.4.1) Remove wedges. Remove releasing slip (7), upper slips (8) and upper slip springs (30) from upper slip body (6).

K-3) Remove inner mandrel (2) from vise.

L) ASSEMBLY

NOTE₃: Clean and inspect all parts. Replace all worn and damaged parts. Install parts in proper order, and orientation and tighten/torque all connections properly.

CAUTION₆: To ensure tool operates properly, install o-rings in o-ring grooves **NOT** thread reliefs (Fig. 2).

L-1) Clamp inner mandrel (2) in vise.

NOTE₆: Do **NOT** wrench or clamp on seal surface.

L-1.1) Assemble upper slip body assembly and install:

L-1.1.1) Install upper slips (8), releasing slip (7), and upper slip springs (30) into upper slip body (6).

NOTE₈: Install one (1 ea) slip spring per slip (Fig. 3).

L-1.1.2) Wedge releasing slip (7) and upper slips (8) outwards. Install upper slip body assembly onto inner mandrel (2). Remove wedges.

L-1.2) Install compression spring (4) onto inner mandrel (2).

L-1.3) Screw top sub (1) onto inner mandrel (2).

L-1.4) Screw spring cage (5) onto upper slip body (6).

CAUTION₂: Compression spring (4) is compressed with spring tension against upper slip body assembly.

L-2) Remove inner mandrel (2) from vise. Clamp top sub (1) in vise.

L-2.1) Install upper cone (9) onto inner mandrel (2).

L-2.2) Install o-rings (28, 29) in grooves in center coupling (10).

L-2.3) Install bonded seal (24) into center coupling (10).

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

L-2.4) Screw center coupling (10) onto upper cone (9).

L-2.5) Assemble rubber mandrel assembly and install:

L-2.5.1) Install rubber retainer (15), elements (13, 14) and rubber spacers (12) onto rubber mandrel (11).

L-2.5.2) Install rubber mandrel assembly onto inner mandrel (2).

L-2.5.3) Screw rubber mandrel (11) into center coupling (10).

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

L-2.6) Screw lower cone (16) into rubber retainer (15).

L-2.7) Assemble drag block body assembly and install:

L-2.7.1) Install lower slips (17) and lower slip springs (25) into drag block body (18). Wedge slips outward.

NOTE₈: Install three (3 ea) springs per slip (Fig. 4).

L-2.7.2) Install drag block body assembly onto rubber mandrel (11).

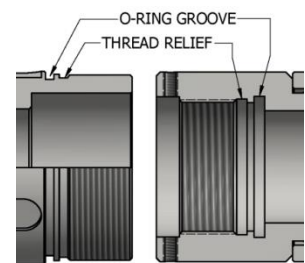


Fig. 2

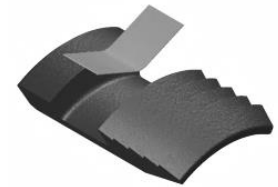


Fig. 3

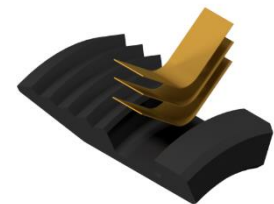


Fig. 4



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L) ASSEMBLY (cont'd)

L-2.8) Screw rubber mandrel cap (19) onto rubber mandrel (11)

L-2.9) Install drag blocks (22) and drag block springs (3) into drag block body (18). Compress drag blocks (22) using drag block body assembly tool (T1).

NOTE₉: Install two (2ea) drag block springs per drag block (Fig. 5).

L-2.10) Install drag block retainer (21) onto drag block body (18) capturing ends of drag blocks (22).

L-2.11) Screw J-body (20) onto drag block body (18) (**NOTE₄:** Left-hand threads.).
Release drag blocks (22).

L-2.12) Screw set screws (26) into J-body (20).

L-2.13) Install o-ring (27) in groove in J-pin bottom sub (23).

L-2.14) Screw J-pin bottom sub (23) onto inner mandrel (2).

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

L-3) Unclamp top sub (1) from vise and remove tool assembly.

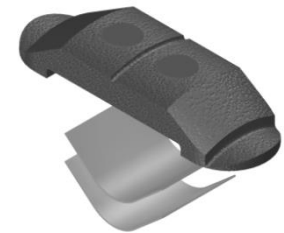


Fig. 5

M) PARTS LIST

ITEM	QTY	DESCRIPTION	MATERIAL	P/N 60337
1	1	TOP SUB	DLMS80	60037610
2	1	INNER MANDREL	DLMS80	60037210
3	8	DRAG BLOCK SPRING	.014 INCONEL	9102900
4	1	COMPRESSION SPRING	DLMCRSP	60337920
5	1	SPRING CAGE	DLMS60	60037310
6	1	UPPER SLIP BODY	DLMS60	60037320
7	1	RELEASING SLIP	DLMS110	60030125
8	2	UPPER SLIP	DLMS60	60030115
9	1	UPPER CONE	DLMS60	60037410
10	1	CENTER COUPLING	DLMS60	60037621
11	1	RUBBER MANDREL	DLMS60	60037220
12	2	RUBBER SPACER	DLMS60	60037841
13	1	ELEMENT	70 DURO NITRILE	60237511
14	2	ELEMENT	90 DURO NITRILE	60237513
15	1	RUBBER RETAINER	DLMS60	60037851
16	1	LOWER CONE	DLMS60	60037420
17	4	LOWER SLIP	DLMS60	60030135
18	1	DRAG BLOCK BODY	DLMS60	60037335
19	1	RUBBER MANDREL CAP	DLMS60	60037230
20	1	J-BODY	DLMS60	60037340
21	1	DRAG BLOCK RETAINER	DLMS60	60037910
22	4	DRAG BLOCK	DLMSDB4	9028900C
23	1	J-PIN BOTTOM SUB	DLMS110	60037630
24	1	BONDED SEAL	90 DURO NITRILE	60037520



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M) PARTS LIST (cont'd)

ITEM	QTY	DESCRIPTION	MATERIAL	P/N 60337
25	12	LOWER SLIP SPRING	-	7125900
26	3	SET SCREW #10-24 UNC X 3/16	STEEL	SSS1024C018
27	1	124 O-RING	90 DURO NITRILE	90124
28	1	131 O-RING	90 DURO NITRILE	90131
29	1	225 O-RING	90 DURO NITRILE	90225
30	3	UPPER SLIP SPRING	-	61345975

REDRESS KIT (RDK)		60337050
ASSEMBLED WEIGHT		42 LBS

M-1) ELASTOMER TRIM OPTIONS

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

M-1.1) HSN

ITEM	QTY	DESCRIPTION	MATERIAL	P/N 60337H
13	1	ELEMENT	70 DURO HSN	60237511H
14	2	ELEMENT	90 DURO HSN	60237513H
24	1	BONDED SEAL	90 DURO HSN	60037520H
27	1	124 O-RING	90 DURO HSN	90124H
28	1	131 O-RING	90 DURO HSN	90131H
29	1	225 O-RING	90 DURO HSN	90225H

REDRESS KIT (RDK)		60337050H
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M-1.2) VITON

ITEM	QTY	DESCRIPTION	MATERIAL	P/N 60337V
13	1	ELEMENT	70 DURO VITON	60237511V
14	2	ELEMENT	90 DURO VITON	60237513V
24	1	BONDED SEAL	90 DURO VITON	60037520V
27	1	124 O-RING	90 DURO VITON	90124V
28	1	131 O-RING	90 DURO VITON	90131V
29	1	225 O-RING	90 DURO VITON	90225V

REDRESS KIT (RDK)		60337050V
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M-2) CARBIDE OPTION

ITEM	QTY	DESCRIPTION	MATERIAL	P/N 60337C
8	2	CARBIDE UPPER SLIP	DLMS110	60030115C
17	4	CARBIDE LOWER SLIP	DLMS110	60030135C



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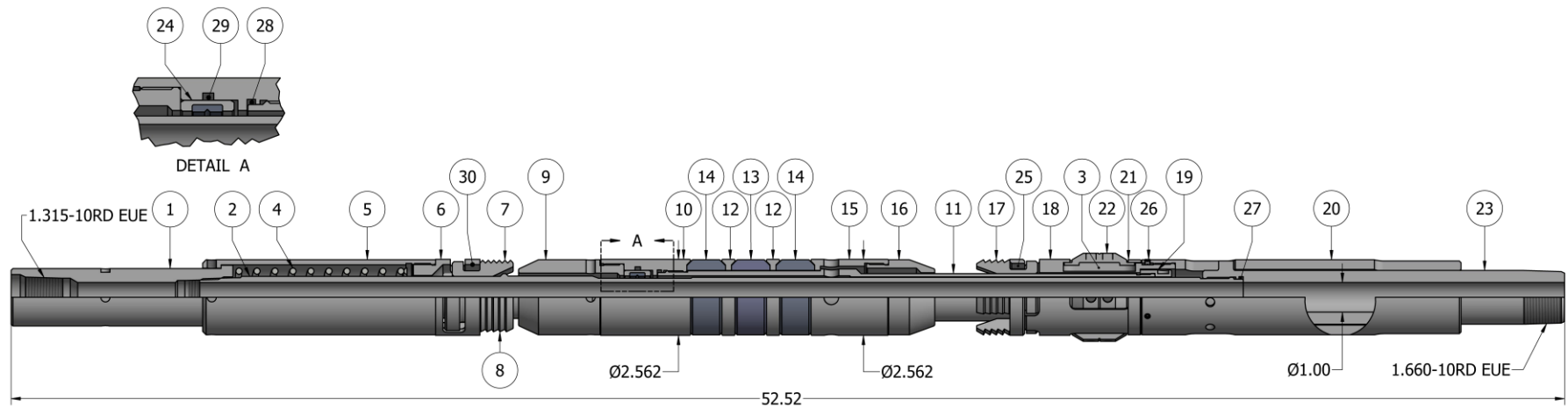
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N) TECHNICAL ILLUSTRATION



	<div>ASI-X PACKER</div> <div>3-1/2" X 1.315"/1.660"</div>	Manual No: DL-603-3500-088
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O) REVISION HISTORY

DATE	REVISION	DESCRIPTION OF CHANGES	REVISED BY	APPROVED BY
03/04/2022	G	Added carbide options, p/n 61345975, Revised 7125900 qty 12 was 14, trim temp. ratings	J.Anderson	E.Visaez
04/18/2016	F	Revised tensile rating thru tool was 26,000 lbs, Pressure Affected Area Guide, Elastomer Trim Temperature Guide; Added Related Tools	J.Anderson	C.Colvin
02/20/14	E	Revised PN 90131, 90131H and 90131V was 90134, 90134H and 90134V	J.Anderson	K.Riggs
05/23/13	D	Revised 60237511 was 60037511-3, 60237513 was 60037513-3; Added HSN and Viton Options 60337H, 60337V, Recommended Tools, Pressure Affected Area Guide tubing sizes 1.660 and 1.990, note for use of double hook J-slot packers;	S. McEntire	J. McArthur