



ASI-X PACKER HT, ECNER AFLAS, CARBIDE 4-1/2" X 2-3/8"

Manual No:
DL-603-4500-1509

Revision: **B**

Revision Date:
08/19/2022

Authored by: *J.Anderson*

Approved by: *J.Johnson*

A) DESCRIPTION

The ASI-X HT 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 ASI-X HT Packer 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) 2-3/8" DT-2 On/Off Tool (P/N varies)—refer to technical manual *DL-512-2375-360*.

B-2) 2-3/8" Stinger—actual P/N varies depending on customer requirements.

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)		
4-1/2	9.5 - 13.5	3.920 - 4.090	3.750	1.94	2-3/8 EUE	60345HTBAC
	13.5 - 15.1	3.826 - 3.902	3.650	1.94	2-3/8 EUE	60344HTBAC

DIFFERENTIAL PRESSURE (MAX)	TENSILE LOAD THRU TOOL (MAX)	TEMPERATURE RATING (MIN - MAX)
10,000 PSI	55,000 LBS	100 - 440°F

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.

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 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 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) COMPRESSION SET

Run the packer to setting depth. Pick up the work string to allow for setting stroke (12-13") plus desired work string load. Rotate the work string 1/4 right-hand turn at the packer, and then lower the work string while releasing torque. Slack off on the work string a minimum of 10,000 lbs to set the packer. Pull tension to assure that the upper slips are set. The work string 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) TENSION SET

Run to setting depth, pick up on the work string and rotate 1/4 turn to the right at the packer then lower the work string slacking off available weight to set the packer lower slips. Pull a minimum of 10,000 lbs tension to set upper slips and pack off elements. After setting the packer, the work string can be left in compression, tension or neutral.



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F) RELEASING PROCEDURES

CAUTION: Packers with ECNER packing elements are single-use tools and must be redressed following initial set.

The releasing procedures are the same whether the packer has been tension or compression set. Set down weight on the packer to unseat the J-pin from the tension shoulder of the J-slot. Refer to the Pressure Affected Area Guide to determine necessary set down weight on the packer. Rotate the work string 1/4 right-hand turn at the packer and pick up while holding right-hand torque. Weight in addition to pipe weight may be required to pick up on packer—refer to Pressure Affected Area Guide. The internal by-pass will open, allowing pressure to equalize. After pressure is equalized, continue to pick up to release the upper slips, relax the elements and release the lower slips thus allowing the packer to be re-set or removed from the well.

CAUTION: High differential pressure below the packer may cause the upper slips to wedge in tighter, requiring an extra amount of tension to release the upper slips.

F-1) EMERGENCY RELEASE

As a last resort, if the packer will not release in the normal manner, a minimum straight pull of 47,500 lbs (may have to pull as high as 56,000 lbs) over work string weight can be applied – this will shear the J-pins on the J-pin bottom sub allowing the packer to be pulled. Tensile strength of tubing and connections should be considered. When released in this manner, the packer will reset when moved down the hole.

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, designated as a negative (-) value, acts to push the packer mandrel up hole and must be accounted for to ensure that the packer remains set. 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
4-1/2	1.900	1.48 (DOWN)	-2.28 (UP)
	2.063	0.97 (DOWN)	-1.91 (UP)
	2.375	-0.11 (UP)	-1.19 (UP)

Example: Consider a 4-1/2" X 2-3/8" ASI-X Packer set on 2.375" 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 4-1/2" X 2-3/8" ASI-X Packer run on 2.375" 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 -0.11 in². Multiplying the differential pressure (3,000 PSI) by the pressure affected area (-0.11 in²) results in a force of -330 lbs. The piston effect on the packer mandrel is an upward force of 330 lbs.



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I) RECOMMENDED TOOLS

I-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

I-2) SPECIAL TOOLS

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

J) DISASSEMBLY

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

J-1.1) Unscrew and remove bottom nipple (6) from solid bottom (23).

J-1.2) Move J-body (20) as needed to unscrew and remove set screws (25) from solid bottom (23).

J-1.3) Unscrew and remove solid bottom (23) from inner mandrel (2).

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

J-1.3.1) Remove o-ring (27) from solid bottom (23).

J-1.4) Unscrew and remove set screws (25) from J-body (20).

J-1.5) Compress drag blocks (22) with drag block assembly tool (T1). Unscrew and remove J-body (20) from drag block body (18) (**NOTE₄:** Left-hand threads).

J-1.6) Unscrew and remove rubber mandrel cap (19) from rubber mandrel (11).

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

J-1.7) Release and remove drag blocks (22) and drag block springs (3) from drag block body (18).

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

J-1.8.1) Remove wedges (if needed). Remove lower slips (17) and lower slip springs (14) from drag block body (18).

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

J-1.10) Unscrew and remove rubber mandrel (11) from center coupling (10).

NOTE₆: For added leverage, insert a rod through upper cone (9) as needed.

J-1.11) Remove rubber mandrel assembly from inner mandrel (2) and disassemble:

J-1.11.1) Remove element (13) and rubber retainer (15) from rubber mandrel (11).

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

J-1.12.1) Remove dual pack seal (24) and o-ring (26) from center coupling (10).

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

J-2) Unclamp and remove top sub (1) from vise. Clamp lower part of inner mandrel (2) in vise.

CAUTION₄: Do NOT wrench or clamp on seal surface.

J-2.1) Unscrew and remove spring cage cap (12) from spring cage (5).

CAUTION₅: Compression spring (4) is compressed and has spring tension against spring cage assembly.

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



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J) DISASSEMBLY (cont'd)

J-2.3) Remove compression spring (4) from spring cage (5).

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

J-2.4.1) Remove wedges (if needed). Remove releasing slip (7), upper slips (8) and upper slip springs (21) from spring cage (5).

J-3) Unclamp and remove inner mandrel (2) from vise.

K) 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.

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

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

CAUTION₄: Do **NOT** wrench or clamp on seal surface.

K-1.1) Assemble spring cage assembly and install:

K-1.1.1) Install upper slips (8), releasing slip (7) and upper slip springs (21) into spring cage (5).

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

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

K-1.2) Install compression spring (4) into spring cage assembly.

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

K-1.4) Screw spring cage cap (12) into spring cage (5).

CAUTION₅: Compression spring (4) will be compressed with spring tension against spring cage assembly.

K-2) Unclamp and remove inner mandrel (2) from vise. Clamp top sub (1) in vise.

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

K-2.2) Install dual pack seal (24) into center coupling (10).

CAUTION₇: Do not rip or tear o-ring during installation.

K-2.3) Install o-ring (26) in groove in center coupling (10).

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

NOTE₆: For added leverage, insert a rod through upper cone (9) as needed.

K-2.5) Assemble rubber mandrel assembly and install:

K-2.5.1) Install rubber retainer (15) and element (13) onto rubber mandrel (11).

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

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

CAUTION₇: Do not rip or tear o-ring during installation.

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

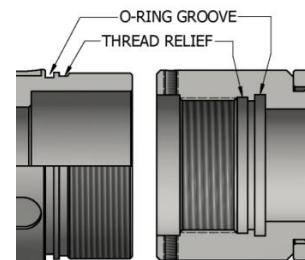


Fig. 2

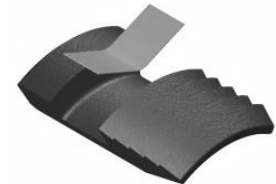


Fig. 3



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K) ASSEMBLY (cont'd)

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

K-2.7.1) Install lower slips (17) and lower slip springs (14) into drag block body (18). Wedge lower slips (17) outwards.

NOTE₈: Install one (1ea) spring per slip (Fig. 4).

K-2.7.2) Install drag block body assembly onto rubber mandrel (11). Remove wedges.

K-2.8) Screw rubber mandrel cap (19) onto rubber mandrel (11).

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

K-2.9) Install drag blocks (22) and drag block springs (3) into drag block body (18).

NOTE₉: Install three (3ea) springs per drag block (Fig. 5).

K-2.10) Compress drag blocks (22) with drag block assembly tool (T1).

K-2.11) Screw J-body (20) onto drag block body (18) capturing ends of drag blocks (22) (**NOTE₄:** Left-hand threads).

K-2.12) Screw set screws (25) into J-body (20). Release drag blocks (22).

K-2.13) Install o-ring (27) in groove in solid bottom (23).

K-2.14) Screw solid bottom (23) onto inner mandrel (2).

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

CAUTION₇: Do not rip or tear o-ring during installation.

K-2.15) Move J-body assembly as needed to screw set screws (6) into solid bottom (23).

K-2.16) Screw bottom nipple (6) into solid bottom (23).

K-3) Unclamp top sub (1) from vise and remove assembled tool.

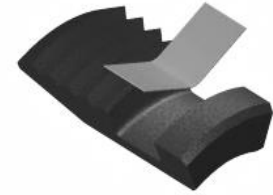


Fig. 4

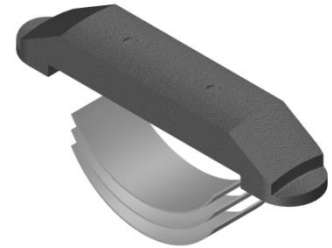


Fig. 5

L) PARTS LIST

ITEM	QTY	DESCRIPTION	MATERIAL	P/N 60344HTBAC	P/N 60345HTBAC
1	1	TOP SUB	DLMS110	60145610HT	
2	1	INNER MANDREL	DLMS110	60044210HT	60045210HT
3	12	DRAG BLOCK SPRING	-	9100900	
4	1	COMPRESSION SPRING	DLMCRSP	60345920	
5	1	SPRING CAGE	DLMS110 / DLMS60	60144325HT	60145325HT
6	1	BOTTOM NIPPLE	DLMS80	60355636	
7	1	RELEASING SLIP	DLMS110	60045125	
8	2	CARBIDE UPPER SLIP	DLMS110	60045115C	
9	1	UPPER CONE	DLMS110	60044410HT	60045410HT
10	1	CENTER COUPLING	DLMS60	60244620ECNER	60245620ECNER
11	1	RUBBER MANDREL	DLMS110	60044220ECNER	60045220ECNER
12	1	SPRING CAGE CAP	DLMS80	60144810	60145810
13	1	ECNER ELEMENT ARRAY	80 DURO AFLAS	OEM46BA	OEM45BA



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L) PARTS LIST (cont'd)

ITEM	QTY	DESCRIPTION	MATERIAL	P/N 60344HTBAC	P/N 60345HTBAC
14	4	LOWER SLIP SPRING	-	7145901	
15	1	RUBBER RETAINER	DLMS60	60244850ECNER	60245850ECNER
16	1	LOWER CONE	DLMS110	60044420HT	60045420HT
17	4	CARBIDE LOWER SLIP	DLMS110	60045135C	
18	1	DRAG BLOCK BODY	DLMS60	60044335	60045335
19	1	RUBBER MANDREL CAP	DLMS60	60145230	
20	1	J-BODY	DLMS110	60144340HT	60145340HT
21	3	UPPER SLIP SPRING	-	7145902	
22	4	CARBIDE DRAG BLOCK	DLMSDB4	9040900C	9045900C
23	1	SOLID BOTTOM	DLMS110	60045634HT	
24	1	DUAL PACK SEAL	90 DURO AFLAS	60045520BA	
25	6	1/4-20 UNC X 3/8 SOCKET SET SCREW	STEEL	SSS025C037	
26	1	231 O-RING	90 DURO AFLAS	90231A	
27	1	227 O-RING	90 DURO AFLAS	90227A	

REDRESS KIT (RDK)		60344050BA	60345050BA
ASSEMBLED WEIGHT		106 LBS	116 LBS



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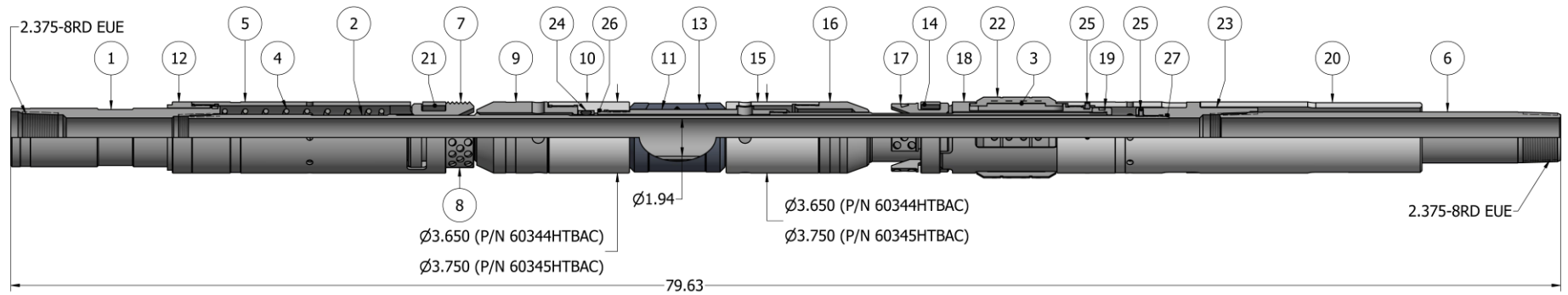
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M) TECHNICAL ILLUSTRATION



N) REVISION HISTORY

DATE	REVISION	DESCRIPTION OF CHANGES	REVISED BY	APPROVED BY
08/19/2022	B	Added P/N 60345HTBAC	J.Anderson	E.Visaez
11/16/2021	A	Created manual	-	-