



ASI-X PACKER

7" X 2-7/8"

Manual No:
DL-603-7000-078

Revision: **L**

Revision Date:
07/11/2023

Authored by: B.Mathis

Approved by: H.Bringham

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) 2-7/8" DT-2 On/Off Tool (P/N varies)—refer to technical manual *DL-512-2875-146*.

B-2) 2-7/8" 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)		
7	17.0 - 26.0	6.276 – 6.538	6.000 6.062*	2.50	2-7/8 EUE	60372 60372H ¹ 60372V ² 60372C ³ 60372HC ⁴ 60372VC ⁵
	26.0 - 32.0	6.094 – 6.276	5.875	2.50	2-7/8 EUE	60370 60370H ¹ 60370V ² 60370C ³ 60370HC ⁴ 60370VC ⁵
	29.0 - 35.0	6.004 – 6.184	5.812	2.50	2-7/8 EUE	60371 60371H ¹ 60371V ² 60371C ³ 60371HC ⁴ 60371VC ⁵

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

* OD over compressed drag blocks

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

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C) SPECIFICATION GUIDE (cont'd)

DIFFERENTIAL PRESSURE (MAX)	TENSILE LOAD THRU TOOL (MAX)
7,000 PSI	92,600 LBS

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) 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) COMPRESSION SET

Run the packer to setting depth. Pick up the tubing string to allow for setting stroke (12-13") plus desired tubing string load. Rotate the tubing string 1/4 right-hand turn at the packer, and then lower the tubing string while releasing torque. Slack off on the tubing string sufficient weight to set the packer (14,000 lbs). Pull tension to assure that the upper slips are set. The tubing 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 tubing string and rotate 1/4 turn to the right at the packer then lower the tubing string slacking off available weight to set the packer lower slips. Pull tension to set upper slips and pack off elements (14,000 lbs). After setting the packer, the tubing string can be left in compression, tension or neutral.



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F) RELEASING PROCEDURES

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 tubing 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

In the event, the packer will not release in the normal manner, hard right-hand torque can be applied (800-1,000 Ft-lbs) which will break the tack weld on the J-pin ring. Continued rotation of approximately 15 turns will release the J-pin ring and allow the packer to be pulled. 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
7	2.375	3.87 (DOWN)	-5.17 (UP)
	2.875	1.80 (DOWN)	-3.62 (UP)
	3.500	-1.33 (UP)	-1.26 (UP)

Example: Consider a 7" X 2-7/8" ASI-X Packer set on 2.875" 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 7" X 2-7/8" ASI-X Packer run on 2.875" 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 1.80 in². Multiplying the differential pressure (3,000 PSI) by the pressure affected area (1.80 in²) results in a force of 5,400 lbs. The piston effect on the packer mandrel is a downward force of 5,400 lbs.



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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

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	AT070110

K) DISASSEMBLY

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

K-1.1) Unscrew and remove set screws (32) from J-pin bottom sub (23). Move J-body (20) as needed.

K-1.2) Unscrew and remove J-pin bottom sub (23) from inner mandrel (2).

NOTE4: Drag block body assembly must be free to rotate.

K-1.2.1) Remove o-ring (35) from J-pin bottom sub (23).

K-1.3) Compress drag blocks (22) with drag block assembly tool (T1).

K-1.4) Unscrew and remove set screws (33) from drag block body (18). Rotate drag block retainer (21) as needed to gain access to set screws.

K-1.5) Unscrew and remove J-body (20) from drag block body (18) (**NOTE3:** Left-hand threads).

K-1.5.1) Remove retaining ring (31) from J-body (20).

K-1.6) Remove drag block retainer (21) from drag block body (18).

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

K-1.8) 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).

K-1.9) Wedge lower slips (17) outward (if needed). Remove drag block body assembly and disassemble:

K-1.9.1) Remove wedges (if needed). Remove lower slips (17) and lower slip springs (25) from drag block body (18).



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K) DISASSEMBLY (cont'd)

- K-1.10) Unscrew and remove lower cone (16) from rubber retainer (15).
- K-1.11) Insert a punch (or other tool) through rubber retainer (15) and upper rubber mandrel (11a) to prevent damaging set screws (11c). Unscrew rubber mandrel sub-assembly (11) from center coupling (10).
- K-1.12) Remove rubber mandrel assembly and disassemble:
 - K-1.12.1) Remove gage ring (29), elements (13, 14), rubber spacers (12) and rubber retainer (15) from rubber mandrel (11).
 - K-1.12.2) Unscrew and remove set screws (11c) from upper rubber mandrel (11a).
 - K-1.12.3) Unscrew and remove upper rubber mandrel (11a) from lower rubber mandrel (11b).
- K-1.13) Unscrew and remove center coupling (10) from upper cone (9).
 - K-1.13.1) Remove bonded seal (24) and o-ring (36) from center coupling (10).
 - K-1.13.1.1) Remove o-ring (34) from bonded seal (24).
 - K-1.13.2) Remove bearing bushing (30) and upper cone (9) from inner mandrel (2).
- K-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.

 - K-2.1) Unscrew and remove spring cage cap (27) from spring cage (5).

CAUTION5: 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 spring cage (5).
 - K-2.4) Unscrew and remove spring cage (5) from upper slip body (6).
 - K-2.5) Wedge releasing slip (7) and upper slips (8) outwards (if needed). Remove upper slip body assembly and disassemble:
 - K-2.5.1) Remove spring retainer ring (28) from upper slip body (6).
 - K-2.5.2) Remove wedges (if needed). Remove releasing slip (7), upper slips (8) and upper slip springs (26) from upper slip body (6).
- K-3) Unclamp and remove inner mandrel (2) from vise.

L) 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).

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

CAUTION4: Do NOT wrench or clamp on seal surface.

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

- L-1.1.1) Install spring retainer ring (28) into upper slip body (6).
 - L-1.1.2) Install upper slips (8), releasing slip (7), and upper slip springs (26) into upper slip body (6). Wedge slips outwards.

NOTE7: Install two (2ea) springs per slip (Fig. 3).

- L-1.1.3) Install upper slip body assembly onto inner mandrel (2). Remove wedges.
- L-1.2) Screw spring cage (5) into upper slip body (6).
- L-1.3) Install compression spring (4) into spring cage (5).

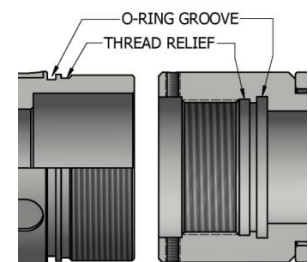


Fig. 2

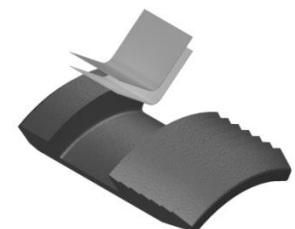


Fig. 3



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L) ASSEMBLY (cont'd)

L-1.4) Screw top sub (1) onto inner mandrel (2).

L-1.5) Screw spring cage cap (27) onto spring cage (5).

CAUTION₅: Compression spring (4) is compressed with spring tension against upper slip body assembly.

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

L-2.1) Install upper cone (9) and bearing bushing (30) onto inner mandrel (2).

L-2.2) Install o-ring (36) in o-ring groove in center coupling (10).

L-2.3) Install o-ring (34) in o-ring groove in bonded seal (24).

L-2.4) Install bonded seal (24) into center coupling (10).

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

L-2.5) Screw center coupling (10) onto upper cone (9).

L-2.6) Assemble rubber mandrel sub-assembly:

L-2.6.1) Screw upper rubber mandrel (11a) onto lower rubber mandrel (11b).

L-2.6.2) Screw set screws (11c) into upper rubber mandrel (11a).

L-2.7) Assemble rubber mandrel assembly and install:

L-2.7.1) Install rubber retainer (15), elements (13, 14), rubber spacers (12), and gage ring (29) onto rubber mandrel (11).

L-2.7.2) Install rubber mandrel assembly onto inner mandrel (2).

L-2.7.3) Screw rubber mandrel (11) into center coupling (10).

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

L-2.8) Screw lower cone (16) into rubber retainer (15).

L-2.9) Assemble drag block body assembly and install:

L-2.9.1) Install lower slips (17) and lower slip springs (25) into drag block body (18). Wedge slips outward.

NOTE₇: Install two (2ea) springs per slip (Fig. 4).

L-2.9.2) Install drag block body assembly onto rubber mandrel (11). Remove wedges.

L-2.10) Screw rubber mandrel cap (19) onto rubber mandrel (11).

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

L-2.11) Install drag blocks (22) and drag block springs (3) into drag block body (18). Compress drag blocks (22) with drag block assembly tool (T1).

NOTE₈: Install six (6ea) drag block springs per drag block (Fig. 5).

L-2.12) Install drag block retainer (21) onto drag block body (18) capturing ends of drag blocks (22). Align holes in drag block retainer (21) with threaded holes in drag block body (18).

L-2.13) Install retaining ring (31) onto J-body (20).

L-2.14) Screw J-body (20) into drag block body (18) (**NOTE₃:** Left-hand threads).

L-2.15) Screw set screws (33) into drag block body (18). Release drag blocks (22).

L-2.16) Install o-ring (35) in o-ring groove in J-pin bottom sub (23).

L-2.17) Screw J-pin bottom sub (23) onto inner mandrel (2).

NOTE₄: Drag block body assembly must be free to rotate.

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

L-2.18) Screw set screws (32) into J-pin bottom sub (23). Move J-body (20) as needed to access threaded holes in bottom sub.

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

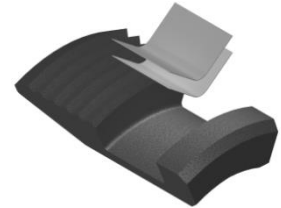



Fig. 4




Fig. 5

	<h1>ASI-X PACKER</h1> <h2>7” X 2-7/8”</h2>	Manual No: DL-603-7000-078
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M) PARTS LIST

ITEM	QTY	DESCRIPTION	MATERIAL	P/N 60370	P/N 60371	P/N 60372
1	1	TOP SUB	DLMS80	60170610 (STD) (60070610*)		
2	1	INNER MANDREL	DLMS80	60370210	60367210	60370210
3	24	DRAG BLOCK SPRING	-	9101900		
4	1	COMPRESSION SPRING	DLMCRSP	60370920		
5	1	SPRING CAGE	DLMS60	60170310 (STD) (60370310*)		
6	1	UPPER SLIP BODY	DLMS35 / DLMS60	60070320		
7	1	RELEASING SLIP	DLMS110	60070125		
8	2	UPPER SLIP	DLMS35	60070115		
9	1	UPPER CONE	DLMS80	60370410		
10	1	CENTER COUPLING	DLMS35	60370620		
11	1	RUBBER MANDREL SUB-ASSEMBLY	-	60370220	60371220	60370220
11a	1	UPPER RUBBER MANDREL	DLMS60	60070220A	60070220A	60070220A
11b	1	LOWER RUBBER MANDREL	DLMS60	60370220B	60371220B	60370220B
11c	4	SET SCREW 1/4-20 UNC X 7/16	STEEL	SSS025C043	SSS025C043	SSS025C043
12	2	RUBBER SPACER	DLMS35	60270840	60271840	60272840
13	1	ELEMENT	70 DURO NITRILE	60270511		60272511
14	2	ELEMENT	90 DURO NITRILE	60270513		60272513
15	1	RUBBER RETAINER	-	60370850	60271850	60372850
16	1	LOWER CONE	DLMS80	60070420		
17	4	LOWER SLIP	DLMS35	60070135		
18	1	DRAG BLOCK BODY	DLMS60 / DLMS35	60070335		
19	1	RUBBER MANDREL CAP	DLMS60	60170230 (STD) (60070230*)		

* P/N may be substituted.


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M) PARTS LIST (cont'd)

ITEM	QTY	DESCRIPTION	MATERIAL	P/N 60370	P/N 60371	P/N 60372
20	1	J-BODY	DLMS60	60170340 (STD) (60370340*)		
21	1	DRAG BLOCK RETAINER	DLMS60	60070910	60071910	60070910
22	4	DRAG BLOCK	DLMSDB8	9070900	9060900	9080900
23	1	J-PIN BOTTOM SUB	DLMS110 / DLMS60	60370650		
24	1	BONDED SEAL	90 DURO NITRILE	60070520		
25	8	LOWER SLIP SPRING	-	7170901		
26	6	UPPER SLIP SPRING	-	7170902		
27	1	SPRING CAGE CAP	DLMS35	60170810 (STD) (60070810*)	60071810 (STD) (60071810*)	60170810 (STD) (60070810*)
28	1	SPRING RETAINER RING	DLMS35	60070820		
29	1	GAGE RING	-	60270830	60271830	60272830
30	1	BEARING BUSHING	DLMS60	60370224		
31	1	RETAINING RING	DLMS60	60070911		
32	2	SET SCREW 1/4-20 UNC X 3/8	STEEL	SSS025C037		
33	3	SET SCREW 5/16-18 UNC X 1/2	STEEL	SSS031C050		
34	1	153 O-RING	90 DURO NITRILE	90153		
35	1	233 O-RING	90 DURO NITRILE	90233		
36	1	242 O-RING	90 DURO NITRILE	90242		

* P/N may be substituted.

REDRESS KIT (RDK)		60370050	60371050	60372050
ASSEMBLED WEIGHT		291 LBS	286 LBS	294 LBS

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M) PARTS LIST (cont'd)

M-2) ELASTOMER TRIM OPTIONS

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

M-2.1) HSN


ITEM	QTY	DESCRIPTION	MATERIAL	P/N 60370H	P/N 60371H	P/N 60372H
13	1	ELEMENT	70 DURO HSN	60270511H		60272511H
14	2	ELEMENT	90 DURO HSN	60270513H		60272513H
24	1	BONDED SEAL	90 DURO HSN	60070520H		
34	1	153 O-RING	90 DURO HSN	90153H		
35	1	233 O-RING	90 DURO HSN	90233H		
36	1	242 O-RING	90 DURO HSN	90242H		

REDRESS KIT (RDK)		60370050H	60371050H	60372050H
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M-2.2) VITON

ITEM	QTY	DESCRIPTION	MATERIAL	P/N 60370V	P/N 60371V	P/N 60372V
13	1	ELEMENT	70 DURO VITON	60270511V		60272511V
14	2	ELEMENT	90 DURO VITON	60270513V		60272513V
24	1	BONDED SEAL	90 DURO VITON	60070520V		
34	1	153 O-RING	90 DURO VITON	90153V		
35	1	233 O-RING	90 DURO VITON	90233V		
36	1	242 O-RING	90 DURO VITON	90242V		

REDRESS KIT (RDK)		60370050V	60371050V	60372050V
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M) PARTS LIST (cont'd)

M-1) CARBIDE OPTIONS

ITEM	QTY	DESCRIPTION	MATERIAL	P/N 60370C	P/N 60371C	P/N 60372C
8	2	CARBIDE UPPER SLIP	DLMS110	60070115C		
17	4	CARBIDE LOWER SLIP	DLMS110	60070135C		
22	4	CARBIDE DRAG BLOCK	DLMSDB4	9070900C	9060900C	9080900C



ASI-X PACKER

7" X 2-7/8"

Manual No:
DL-603-7000-078

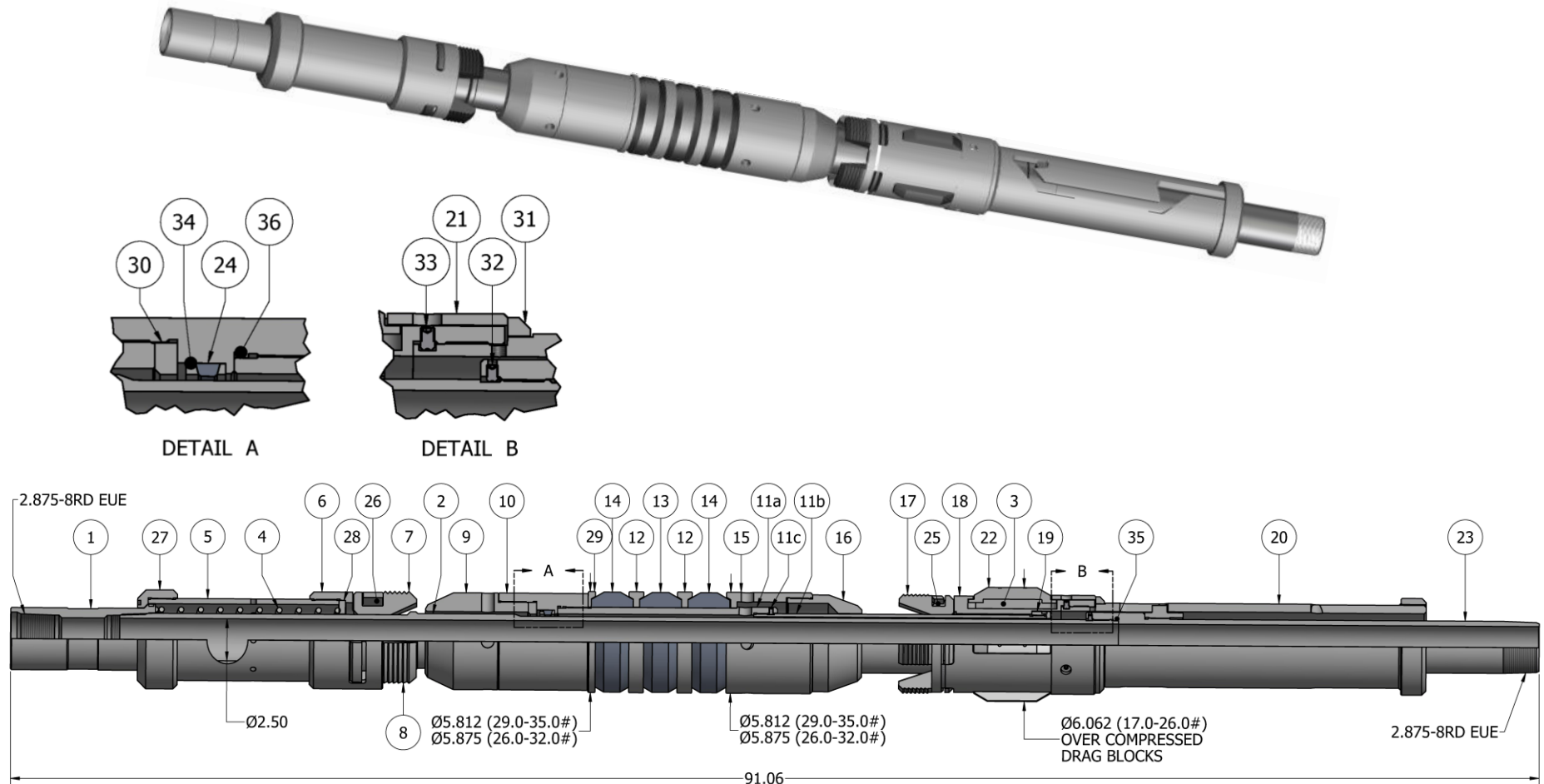
Revision: **L**


Revision Date:
07/11/2023

Authored by: B.Mathis

Approved by: H.Bringham

N) TECHNICAL ILLUSTRATION



	<div>ASI-X PACKER</div> <div>7" X 2-7/8"</div>		Manual No:
			DL-603-7000-078
			Revision: L
			Revision Date:
			07/11/2023
Authored by: B.Mathis			Approved by: H.Bringham

O) REVISION HISTORY

DATE	REVISION	DESCRIPTION OF CHANGES	REVISED BY	APPROVED BY
07/11/2023	L	Added carbide options	J.Anderson	E.Visaez
08/15/2018	K	Added rubber mandrel sub-assembly disassembly instructions and parts to Parts List	J.Anderson	K.Plunkett
05/22/2018	J	Revised Elastomer Trim Temp. Guide Nitrile rating was 70-250; Updated tech. illustration	J.Anderson	C.Colvin
04/19/2016	H	Revised Elastomer Durometer Temperatures – Nitrile (90/80/90 Duro) was 250° - 300°F, Nitrile (Contact D&L Sales) was 300°F +, Rubber Type Temperature Ranges – Nitrile was 70° - 300°F, HSN was 70° - 325°F; Removed tool drift ID	J.Anderson	C.Colvin
04/29/15	G	Added Related Tools, tool drift ID, Pre-Installation Inspection and Storage Procedures; Revised Pressure Affected Area Guide	J.Anderson	K.Riggs
12/13/13	F	Added double hook j-slot note	J.Anderson	K.Riggs
04/12/13	E	Updated Parts List – P/N 60170610 was 60070610, 60170310 was 60370310, 60170230 was 60070230, 60170340 was 60370340, 60170810 was 60070810, 60071810 was 60071810; Added P/N's for HSN and Viton options (Assembly No.'s and Parts Lists), Recommended Hand Tools, Note for substitute parts; Removed Aflas from Element Selection Guide;	B.Mathis	D.Hushbeck