

### w/SHEAR RELEASE BOTTOM

7" X 2-7/8"

Manual No: **DL-603-7000-064** 

Revision: G

Revision Date: **04/09/2020** 

Approved by: D. Hushbeck

#### A) DESCRIPTION

Authored by: S. White

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.

In the event the packer will not release in the normal manner, the J-pin ring is equipped with an emergency shear release.

#### **B) RELATED TOOLS** (sold separately)

- B-1) 2-7/8" DT-2 On/Off Tool—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 TURK AR GOVERNOONS			
SIZE (INCHES)	WEIGHT (LBS/FT)	RECOMMENDED HOLE SIZE (INCHES)	GAGE OD (INCHES)	NOMINAL ID (INCHES)	THREAD CONNECTIONS BOX UP / PIN DOWN	PART NUMBER
7	17.0 - 26.0	6.276 – 6.538	6.000	2.50	2-7/8 EUE	60372SR 60372SRH <sup>1</sup> 60372SRV <sup>2</sup>
	26.0 - 32.0	6.094 – 6.276	5.875	2.50	2-7/8 EUE	60370SR 60370SRH <sup>1</sup> 60370SRV <sup>2</sup>

Elastomer Trim Options: <sup>1</sup>HSN, <sup>2</sup>Viton

**NOTE<sub>1</sub>**: Tools listed are right-hand set / right-hand release.

**NOTE**<sub>2</sub>: 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	TENSILE LOAD	HANGING WEIGHT ON	TORQUE
PRESSURE	THRU TOOL	SET TOOL	THRU TOOL
(MAX)	(MAX)	(MAX)	(MAX)
7,000 PSI	87,000 LBS	87,000 LBS*	2,000 FT-LBS

<sup>\*</sup>Casing must be cemented for this load rating.

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

**CAUTION**<sub>1</sub>: 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 /	INTERNAL TAPI	ERED TUBING THREADS	PREMIUM THREADS		
ACME THREADS	UP TO 2-3/8"	GREATER THAN 2-3/8"	TREMIENT TIRE		
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

CAUTION<sub>2</sub>: 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 sufficient weight to set the packer (14,000 lbs). 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 tension to set upper slips and pack off elements (14,000 lbs). After setting the packer, the work 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 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<sub>3</sub>: 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.

#### F-1) EMERGENCY RELEASE

In the event the packer will not release in the normal manner, the J-pin ring is equipped with an emergency shear release. The shear screws can be sheared with straight pickup above tubing weight. The shear release value is adjustable from 5,500 lbs to 66,000 lbs (in 5,500 lb/screw increments - See illustration) by adding or removing screws from the J-pin ring. When released in this manner, the packer will reset when moved down the hole.

#### G) 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	TUBING SIZE	PRESSURE AFFECTED AREA (SQ. INCHES)		
(INCHES)	(INCHES)	ABOVE	BELOW	
	2.375	3.87 (DOWN)	-5.17 (UP)	
7	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.

#### H) 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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#### I) ELASTOMER TRIM TEMPERATURE GUIDE

NITRILE (STD)				
TEMPERATURE	DUROMETER			
RANGE (F°)	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
Ī	T1	1	DRAG BLOCK ASSEMBLY TOOL	AT070110

#### **K) DISASSEMBLY**

- K-1) Clamp top sub (1) in vise.
  - K-1.1) Remove external ring (34) from J-pin bottom sub (23).
  - K-1.2) Unscrew and remove set screws (35) from J-pin bottom sub (23). Move J-body (20) as needed to access screws
  - K-1.3) Unscrew and remove J-pin bottom sub (23) from inner mandrel (2).

NOTE<sub>3</sub>: Drag block body assembly must be free to rotate.

- K-1.3.1) Remove o-ring (38) from J-pin bottom sub (23).
- K-1.3.2) Unscrew and remove shear screws (33) from J-pin ring (28).
- K-1.3.3) Remove J-pin ring (28) from J-pin bottom sub (23).
- K-1.4) Compress drag blocks (22) with drag block assembly tool (T1).
- K-1.5) Unscrew and remove set screws (36) from drag block body (18). Move J-body (20) as needed to access .
- K-1.6) Unscrew and remove J-body (20) from drag block body (18) (**NOTE**<sub>4</sub>: Left-hand threads.).
  - K-1.6.1) Remove retaining ring (31) from J-body (20).
- K-1.7) Remove drag block retainer (21) from drag block body (18).
- K-1.8) Release drag block (22). Remove drag blocks (22) and drag block springs (3) from drag block body (18).



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#### K) DISASSEMBLY (cont'd)

K-1.9) Unscrew and remove rubber mandrel cap (19) from rubber mandrel (11).

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

- K-1.10) Wedge lower slips (17) outwards (if needed). Remove drag block body assembly and disassemble:
  - K-1.10.1) Remove wedges (if needed). Remove lower slips (17) and lower slip springs (25) from drag block body (18).
- K-1.11) Unscrew and remove lower cone (16) from rubber retainer (15).
- K-1.12) Unscrew rubber mandrel (11) from center coupling (10).

**NOTE**<sub>6</sub>: For added leverage, insert a rod thru upper cone (9) as needed.

- K-1.13) Remove rubber mandrel assembly and disassemble:
  - K-1.13.1) Remove gage ring (29), elements (13, 14), rubber spacers (12) and rubber retainer (15) from rubber mandrel (11).
- K-1.14) Unscrew and remove center coupling (10) from upper cone (9).
  - K-1.14.1) Remove bonded seal (24) and o-ring (39) from center coupling (10).

K-1.14.1.1) Remove o-ring (37) from bonded seal (24).

- K-1.15) Remove bearing bushing (30) and upper cone (9) from inner mandrel (2).
- K-2) Unclamp and remove top sub (1) from vise. Clamp inner mandrel (2) in vise.

**CAUTION**<sub>4</sub>: Do <u>NOT</u> wrench or clamp on seal surface.

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

**CAUTIONs:** 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 wedges (if needed). Remove releasing slip (7), upper slips (8), and upper slip springs (26) from upper slip body (6).
  - K-2.5.2) Remove spring retainer ring (32) from upper slip body (6).
- K-3) Unclamp and remove inner mandrel (2) from vise.

#### L) 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.

**CAUTION**<sub>6</sub>: To ensure tool operates properly, install o-rings in o-ring grooves **NOT** thread reliefs unless stated otherwise (Fig. 2).

L-1) Clamp 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 (32) 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.

NOTE<sub>8</sub>: Uses two (2ea) springs per slip (Fig. 3).

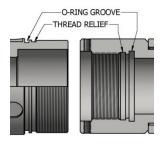


Fig. 2

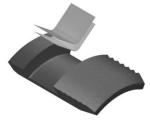


Fig. 3



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#### L) ASSEMBLY (cont'd)

- 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).
- L-1.4) Screw top sub (1) onto inner mandrel (2).
- L-1.5) Screw spring cage cap (27) onto spring cage (5).
  - CAUTIONs: Compression spring (4) is compressed with spring tension against upper slip body.
- L-2) Unclamp and remove inner mandrel (2) from vise. Clamp top sub (1) in vise.
  - L-2.1) Install bearing bushing (30) and upper cone (9) onto inner mandrel (2).
  - L-2.2) Install o-ring (39) in o-ring groove in center coupling (10).
  - L-2.3) Install o-ring (37) in o-ring groove in bonded seal (24).
  - L-2.4) Install bonded seal (24) into center coupling (10).
    - **CAUTION**<sub>7</sub>: Do not rip or tear o-ring during installation.
  - L-2.5) Screw center coupling (10) onto upper cone (9).
    - NOTE<sub>6</sub>: For added leverage, insert a rod thru upper cone (9) as needed.
  - L-2.6) Assemble rubber mandrel assembly and install:
    - L-2.6.1) Install rubber retainer (15), elements (13, 14), rubber spacers (12) and gage ring (29) onto rubber mandrel (11).
    - L-2.6.2) Install rubber mandrel assembly onto inner mandrel (2).
    - L-2.6.3) Screw rubber mandrel (11) into center coupling (10).
      - CAUTION7: Do not rip or tear o-ring during installation.
  - L-2.7) Screw lower cone (16) into rubber retainer (15).
  - L-2.8) Assemble drag block body assembly and install:
    - L-2.8.1) Install lower slips (17) and lower slip springs (25) into drag block body (18). Wedge slips outward.
      - **NOTE**<sub>8</sub>: Uses two (2ea) springs per slip (Fig. 4).
    - L-2.8.2) Install drag block body assembly onto rubber mandrel (11).
  - L-2.9) Screw rubber mandrel cap (19) onto rubber mandrel (11).
    - NOTE<sub>5</sub>: For added leverage, insert a rod thru rubber retainer (15) and rubber mandrel (11) as needed.
  - L-2.10) Install drag blocks (22) and drag block springs (3) in drag block body (18).
    - Compress drag blocks (22) with drag block assembly tool (T1).
    - NOTE<sub>9</sub>: Uses six (6ea) drag block springs per drag block (Fig. 5).
  - L-2.11) Install drag block retainer (21) capturing ends of drag blocks (22).
  - L-2.12) Install retaining ring (31) onto J-body (20).
  - L-2.13) Screw J-body (20) into drag block body (18) (**NOTE**<sub>4</sub>: Left-hand threads.).
  - L-2.14) Screw set screws (36) into drag block body (18). Release drag blocks (22).
  - L-2.15) Assemble J-pin assembly and install:
    - L-2.15.1) Install o-ring (38) in o-ring groove in J-pin bottom sub (23).
    - L-2.15.2) Install J-pin ring (28) onto J-pin bottom sub (23). Align threaded holes in J-pin ring (28) with pocket holes in J-pin bottom sub (23).
    - L-2.15.3) Screw shear screws (33) into J-pin ring (28). Tighten until shear screws (33) make contact with J-pin bottom sub (23). Back shear screws (33) out 1/4 turn.

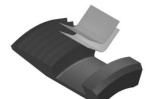


Fig. 4



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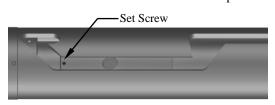
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#### L) ASSEMBLY (cont'd)

L-2.15.4) Screw J-pin bottom sub (23) onto inner mandrel (2).

NOTE<sub>3</sub>: Drag block body assembly must be free to rotate.

CAUTION<sub>7</sub>: Do not rip or tear o-ring during installation.



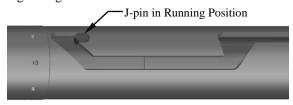


Fig. 6

Fig. 7

- L-2.16) Screw set screws (33) into J-pin bottom sub (23). Move J-body (20) as needed (Fig. 6).
- L-2.17) Position J-pin in running position in J-slot of J-body (20) (Fig. 7).
- L-2.18) Install external ring (34) in groove in J-pin bottom sub (23).
- L-3) Unclamp top sub (1) from vise and remove assembled tool.

#### M) PARTS LIST

ITEM	QTY	DESCRIPTION	MATERIAL	26.0 - 32.0# P/N 60370SR	17.0 - 26.0# P/N 60372SR
1	1	TOP SUB	DLMS80	6017	0610
2	1	INNER MANDREL	DLMS80	6037	0210
3	24	DRAG BLOCK SPRING	INCONEL	910	1900
4	1	COMPRESSION SPRING	DLMCRSP	6037	0920
5	1	SPRING CAGE	DLMS60	6017	0310
6	1	UPPER SLIP BODY	DLMS35/DLMS60	6007	0320
7	1	RELEASING SLIP	DLMS110	6007	0125
8	2	UPPER SLIP	DLMS35	60070115	
9	1	UPPER CONE	DLMS80	60370410	
10	1	CENTER COUPLING	DLMS35	6037	0620
11	1	RUBBER MANDREL	DLMS60	6037	0220
12	2	RUBBER SPACER	DLMS35	60270840	60272840
13	1	ELEMENT	70 DURO NITRILE	60270511	60272511
14	2	ELEMENT	90 DURO NITRILE	60270513	60272513
15	1	RUBBER RETAINER	DLMS60	60370850	60372850
16	1	LOWER CONE	DLMS80	6007	0420
17	4	LOWER SLIP	DLMS35	6007	0135
18	1	DRAG BLOCK BODY	DLMS60 / DLMS35	6007	0335
19	1	RUBBER MANDREL CAP	DLMS60	6017	0230



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ITEM	QTY	DESCRIPTION	MATERIAL	26.0 - 32.0# P/N 60370SR	17.0 - 26.0# P/N 60372SR
20	1	J-BODY	DLMS60	6017	70340
21	1	DRAG BLOCK RETAINER	DLMS60	6007	70910
22	4	DRAG BLOCK	-	9070900	9080900
23	1	J-PIN BOTTOM SUB	DLMS80	6037	0655
24	1	BONDED SEAL	90 DURO NITRILE	6007	70520
25	8	LOWER SLIP SPRING	ELGILOY	7170	0901
26	6	UPPER SLIP SPRING	ELGILOY	7170	0902
27	1	SPRING CAGE CAP	DLMS35	6017	70810
28	1	J-PIN RING	P-110	6007	0875
29	1	GAGE RING	-	60270830	60272830
30	1	BEARING BUSHING	DLMS60	6037	0224
31	1	RETAINING RING	DLMS60	6007	0911
32	1	SPRING RETAINER RING	DLMS60	6007	0820
33	12	SHEAR SCREW (5500#) 1/2-13 UNC X 1/2	DLM360BRS	BSSSLT	050C050
34	1	SMALLEY EXTERNAL RING	-	WST	Г-325
35	2	SET SCREW 1/4-20 UNC X 3/8	STEEL	SSS02	5C037
36	3	SET SCREW 5/16-18 UNC X 1/2	STEEL	SSS03	1C050
37	1	153 O-RING	90 DURO NITRILE	90	153
38	1	233 O-RING	90 DURO NITRILE	902	233
39	1	242 O-RING	90 DURO NITRILE	902	242

REDRESS KIT (RDK)	60370050SR	60372050SR
ASSEMBLED WEIGHT	295 LBS	298 LBS

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#### M) PARTS LIST (cont'd)

#### M-1) ELASTOMER TRIM OPTIONS

NOTE<sub>10</sub>: For temperature range, refer to Elastomer Trim Temperature Guide.

M-1.1) HSN

ITEM	QTY	DESCRIPTION	MATERIAL	26.0 - 32.0# P/N 60370SRH	17.0 - 26.0# P/N 60372SRH
13	1	ELEMENT	70 DURO HSN	60270511H	60272511H
14	2	ELEMENT	90 DURO HSN	60270513H	60272513H
24	1	BONDED SEAL	90 DURO HSN	60070520Н	
37	1	153 O-RING	90 DURO HSN	90153Н	
38	1	233 O-RING	90 DURO HSN	90233Н	
39	1	242 O-RING	90 DURO HSN	90242Н	

REDRESS KIT (RDK)		60370050SRH	60372050SRH
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#### M-1.2) VITON

ITEM	QTY	DESCRIPTION	MATERIAL	26.0 - 32.0# P/N 60370SRV	17.0 - 26.0# P/N 60372SRV
13	1	ELEMENT	70 DURO VITON	60270511V	60272511V
14	2	ELEMENT	90 DURO VITON	60270513V	60272513V
24	1	BONDED SEAL	90 DURO VITON	60070520V	
37	1	153 O-RING	90 DURO VITON	90153V	
38	1	233 O-RING	90 DURO VITON	90233V	
39	1	242 O-RING	90 DURO VITON	90242V	

REDRESS KIT (RDK)	60370050SRV	60372050SRV
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## w/SHEAR RELEASE BOTTOM

7" X 2-7/8"

Manual No: **DL-603-7000-064** 

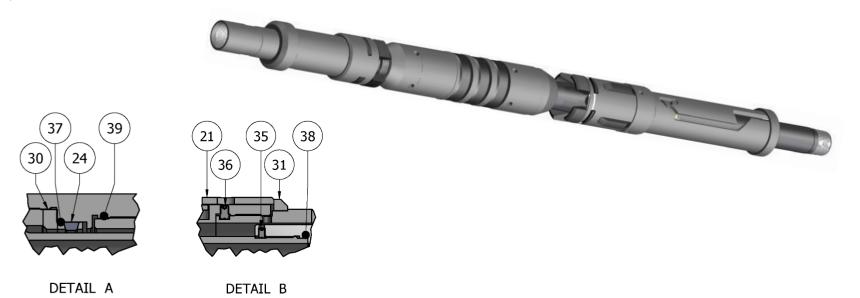
Revision: G

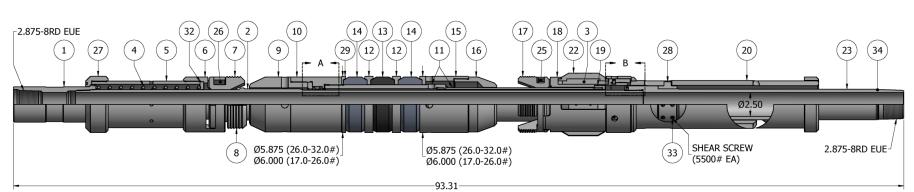
Revision Date: **04/09/2020** 

Approved by: D. Hushbeck

Authored by: S. White

#### N) TECHNICAL ILLUSTRATION







# **ASI-X PACKER**

## w/SHEAR RELEASE BOTTOM

7" X 2-7/8"

Manual No: **DL-603-7000-064** 

Revision: G

Revision Date: **04/09/2020** 

Approved by: D. Hushbeck

#### O) REVISION HISTORY

DATE	REVISION	DESCRIPTION OF CHANGES	REVISED BY	APPROVED BY
04/09/2020	G	Revised 90153 was 90152	J.Anderson	Z.Speer
11/10/2017	F	Revised Elastomer Trim Temp. Guide nitrile temp. rating	J.Anderson	K.Riggs
07/28/2016	E	Added Related Tools, Pre-Installation Inspection Procedures, Storage Recommendations, max. hanging weight on set tool and torque thru tool; Revised Pressure Affected Area Guide	J.Anderson	N.Banker
09/16/13	D	Revised P/N 60170610 was 60070610, P/N 60170310 was 60370310, P/N 60170230 was 60070230, P/N 60170340 was 60370340, P/N 60170810 was 60070810; Added recommended hand tools, HSN and Viton options (P/Ns 60370SRH, 60370SRV, 60372SRH, 60372SRV); Removed AFLAS from element selection guide	J.Anderson	H.Bringham