



ASI-X PACKER

7-5/8" X 3-1/2"

Manual No:
DL-603-7625-082

Revision: **E**

Revision Date:
11/03/2015

Authored by: S. White

Approved by: J. McArthur

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) 3-1/2" DT-2 On/Off Tool—refer to technical manual *DL-512-3500-131*.

B-2) 3-1/2" 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)		
7-5/8	24.0 - 29.7	6.875 – 7.025	6.672	3.00	3-1/2 EUE	60378 60378H ¹ 60378V ²
	33.7 - 39.0	6.625 – 6.765	6.453	3.00	3-1/2 EUE	60377 60377H ¹ 60377V ²

Elastomer Trim Options: ¹HSN, ²Viton

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

NOTE₂: Use of 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)
7,000 PSI	105,000 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.

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.

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 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 (16,000 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) TENSION 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 (16,000 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 pick up while holding 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 slips, relax the elements and release the lower slips thus allowing the packer to be reset or removed from the well.

CAUTION₃: 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, 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.



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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, designated 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 (SQ. INCHES)	
		ABOVE	BELOW
7-5/8 X 3-1/2	2.375	6.43 (DOWN)	-7.74 (UP)
	2.875	4.37 (DOWN)	-6.18 (UP)
	3.500	1.24 (DOWN)	-3.83 (UP)

Example: Consider a 7-5/8" X 3-1/2" 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 7-5/8" X 3-1/2" ASI-X Packer set 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 4.37 in². Multiplying the differential pressure (3,000 psi) by the pressure affected area (4.37 in²) results in a force of 13,110 lbs. The piston effect on the packer mandrel is a downward force of 13,110 lbs.

I) ELASTOMER TRIM TEMPERATURE GUIDE

NITRILE (STD)			
TEMPERATURE RANGE (F°)	DUROMETER		
	END	MIDDLE	END
70° - 125°	80	70	80
125° - 250°	90	70	90
250° - 300°	90	80	90
300° +	Contact D&L Sales		

RUBBER TYPE	TEMPERATURE RANGE
NITRILE	70° - 300°F
HSN (HNBR)	70° - 325°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	DRAG BLOCK ASSEMBLY TOOL	AT070110

K) DISASSEMBLY

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

K-1.1) Move J-body (20) as needed to unscrew and remove set screws (30) from J-pin bottom sub (23).

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

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

K-1.2.1) Remove o-ring (36) from J-pin bottom sub (23).

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

K-1.4) Unscrew and remove set screws (31) from J-body.

K-1.5) Unscrew and remove J-body (20) from drag block body (18) (**NOTE₅:** Left-hand threads.).

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

K-1.7) Release drag blocks (22). 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).

NOTE₇: For added leverage, insert a rod thru rubber retainer (15) and rubber mandrel (11) as needed.

K-1.9) Remove drag block body assembly and disassemble:

K-1.9.1) Unscrew and remove socket cap screws (34) from drag block body (18).

K-1.9.2) Wedge lower slips (17) outward (if needed). Remove lower slip support (32) from drag block body (18).

K-1.9.3) Remove wedges. Remove lower slips (17) and lower slip springs (25) from drag block body (18).

K-1.10) Unscrew and remove lower cone (16) from rubber retainer (15).

K-1.11) Unscrew rubber mandrel (11) from center coupling (10).

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

K-1.12) Remove rubber mandrel assembly and disassemble:

K-1.12.1) Remove elements (13, 14), rubber spacers (12) and rubber retainer (15) from rubber mandrel (11).

K-1.12.1.1) Unscrew and remove gage ring (29) from rubber retainer (15).

K-1.13) Unscrew and remove gage ring (29) from center coupling (10).



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K) DISASSEMBLY (cont'd)

K-1.14) Unscrew and remove center coupling (10) from upper cone (9).

K-1.14.1) Remove bonded seal (24) and o-ring (37) from center coupling (10)

K-1.14.1.1) Remove o-ring (35) from bonded seal (24).

K-1.15) 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.

CAUTION₇: Do **NOT** wrench or clamp on seal surface.

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

CAUTION₄: 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 support (33).

K-2.5) Remove upper slip body assembly and disassemble:

K-2.5.1) Remove spring retainer ring (28) from upper slip support (33).

K-2.5.2) Wedge releasing slip (7) and upper slips (8) outwards (if needed). Unscrew and remove upper slip support (33) from upper slip body (6).

K-2.5.3) Remove wedges. Remove releasing slip (7), upper slips (8) and upper slip springs (26) from upper slip body (6).

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

L) 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.

CAUTION₅: 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.

CAUTION₇: 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 place in upper slip support (33).

L-1.1.2) Screw spring cage (5) into upper slip support (33).

L-1.1.3) Install upper slips (8), releasing slip (7), and upper slip springs (26) into upper slip body (6).

NOTE₈: Install two (2ea) springs per slip (Fig. 3).

L-1.1.4) Wedge releasing slip (7) and upper slips (8) outwards. Screw upper slip support (33) into upper slip body (6). Remove wedges.

L-1.1.5) Install upper slip body assembly onto inner mandrel (2).

L-1.2) Install compression spring (4) onto inner mandrel (2) and into spring cage (5).

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

L-1.4) Screw spring cage cap (27) onto spring cage (5).

CAUTION₄: Compression spring (4) will be 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-ring (37) in groove in center coupling (10).

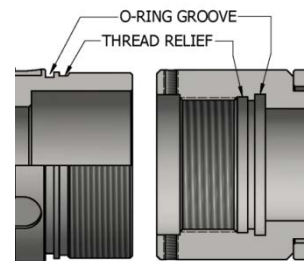


Fig. 2

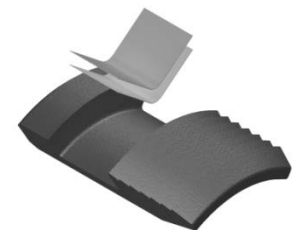


Fig. 3



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L) ASSEMBLY (cont'd)

L-2.3) Install o-ring (35) in groove in bonded seal (24).

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

CAUTION₆: Do not rip or tear o-ring during installation.

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

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

L-2.6) Screw gage ring (29) onto center coupling (10).

L-2.7) Assemble rubber mandrel assembly and install:

L-2.7.1) Screw gage ring (29) onto rubber retainer (15).

L-2.7.2) Install rubber retainer (15), elements (13, 14) and rubber spacers (12) onto rubber mandrel (11).

L-2.7.3) Install rubber mandrel assembly onto inner mandrel (2).

L-2.7.4) Screw rubber mandrel (11) into center coupling (10).

CAUTION₆: 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.

NOTE₈: Install two (2ea) springs per slip (Fig. 4).

L-2.9.2) Install lower slip support (32) into drag block body (18).

L-2.9.3) Align holes in lower slip support (32) with threaded holes in drag block body (18). Screw socket cap screws (34) into drag block body (18). Remove wedges.

L-2.9.4) Install drag block body assembly onto rubber mandrel (11).

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

NOTE₇: For added leverage, insert a rod thru rubber retainer (15) and rubber mandrel (11) as needed.

L-2.11) 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 six (6ea) springs per drag block (Fig. 5).

L-2.12) Install drag block retainer (21) capturing ends of drag blocks (22).

L-2.13) Screw J-body (20) onto drag block body (18) (**NOTE₅:** Left-hand threads).

L-2.14) Screw set screws (31) into J-body (20). Release drag blocks (22).

L-2.15) Install o-ring (36) in groove in J-pin bottom sub (23).

L-2.16) Screw J-pin bottom sub (23) onto inner mandrel (2).

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

CAUTION₆: Do not rip or tear o-ring during installation.

L-2.17) Move J-body (20) as needed to screw set screws (30) into J-pin bottom sub (23).

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

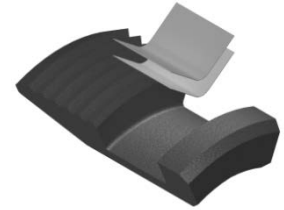


Fig. 4



Fig. 5



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M) PARTS LIST

ITEM	QTY	DESCRIPTION	MATERIAL	33.7 - 39.0# P/N 60377	24.0 - 29.7# P/N 60378
1	1	TOP SUB	1026	60173610 (60073610*)	
2	1	INNER MANDREL	1026	60373210	
3	24	DRAG BLOCK SPRING	INCONEL	9101900	
4	1	COMPRESSION SPRING	CHROME VANADIUM	60373920	
5	1	SPRING CAGE	1026	60174310 (60373310*)	60173310 (60373310*)
6	1	UPPER SLIP BODY	1026	60377320	
7	1	RELEASING SLIP	P-110	60075125	
8	2	UPPER SLIP	1026	60075115	
9	1	UPPER CONE	1026	60377410	
10	1	CENTER COUPLING	1026	60273620	
11	1	RUBBER MANDREL	1026	60073220	
12	2	RUBBER SPACER	1026	60277840	60378840
13	1	ELEMENT	70 DURO NITRILE	60277511	60278511
14	2	ELEMENT	90 DURO NITRILE	60277513	60278513
15	1	RUBBER RETAINER	1026	60377850	
16	1	LOWER CONE	1026	60377421	
17	4	LOWER SLIP	1026	60075135	
18	1	DRAG BLOCK BODY	1026	60377335	
19	1	RUBBER MANDREL CAP	1026	60173230 (60073230*)	
20	1	J-BODY	1026	60173340 (60373340*)	
21	1	DRAG BLOCK RETAINER	1026	60377910	
22	4	DRAG BLOCK	8620	9070900	
23	1	J-PIN BOTTOM SUB	P-110/1026	60373650	
24	1	BONDED SEAL	90 DURO NITRILE	60073520	
25	8	LOWER SLIP SPRING	ELGILOY	7170901	



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M) PARTS LIST (cont'd)

ITEM	QTY	DESCRIPTION	MATERIAL	33.7 - 39.0# P/N 60377	24.0 - 29.7# P/N 60378
26	6	UPPER SLIP SPRING	ELGILOY	7170902	
27	1	SPRING CAGE CAP	1026	60174810 (60073810*)	
28	1	SPRING RETAINER RING	1026	60073820	
29	2	GAGE RING	1026	60277830	60378830
30	2	SET SCREW 1/4-20 UNC X 3/8	STEEL	SSS025C037	
31	3	SET SCREW 3/8-16 UNC X 1/2	STEEL	SSS037C050	
32	1	LOWER SLIP SUPPORT	1026	60377912	
33	1	UPPER SLIP SUPPORT	1026	60377880	
34	2	CAP SCREW 3/8-16 UNC X 3/4	STEEL	SCS037C075	
35	1	155 O-RING	90 DURO NITRILE	90155	
36	1	237 O-RING	90 DURO NITRILE	90237	
37	1	243 O-RING	90 DURO NITRILE	90243	

REDRESS KIT (RDK)		60377050	60378050
ASSEMBLED WEIGHT		361 LBS	364 S

* P/N may be substituted.

M-1) ELASTOMER TRIM OPTIONS

NOTE₁₀: For temperature range, refer to Elastomer Trim Temperature Guide.

M-1.1) HSN

ITEM	QTY	DESCRIPTION	MATERIAL	33.7 - 39.0# P/N 60377H	24.0 - 29.7# P/N 60378H
13	1	ELEMENT	70 DURO HSN	60277511H	60278511H
14	2	ELEMENT	90 DURO HSN	60277513H	60278513H
24	1	BONDED SEAL	90 DURO HSN	60073520H	
35	1	155 O-RING	90 DURO HSN	90155H	
36	1	237 O-RING	90 DURO HSN	90237H	
37	1	243 O-RING	90 DURO HSN	90243H	

REDRESS KIT (RDK)		60377050H	60378050H
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M) PARTS LIST (cont'd)

M-1.2) VITON

ITEM	QTY	DESCRIPTION	MATERIAL	33.7 - 39.0# P/N 60377V	24.0 - 29.7# P/N 60378V
13	1	ELEMENT	70 DURO VITON	60277511V	60278511V
14	2	ELEMENT	90 DURO VITON	60277513V	60278513V
24	1	BONDED SEAL	90 DURO VITON	60073520V	
35	1	155 O-RING	90 DURO VITON	90155V	
36	1	237 O-RING	90 DURO VITON	90237V	
37	1	243 O-RING	90 DURO VITON	90243V	

REDRESS KIT (RDK)		60377050V	60378050V
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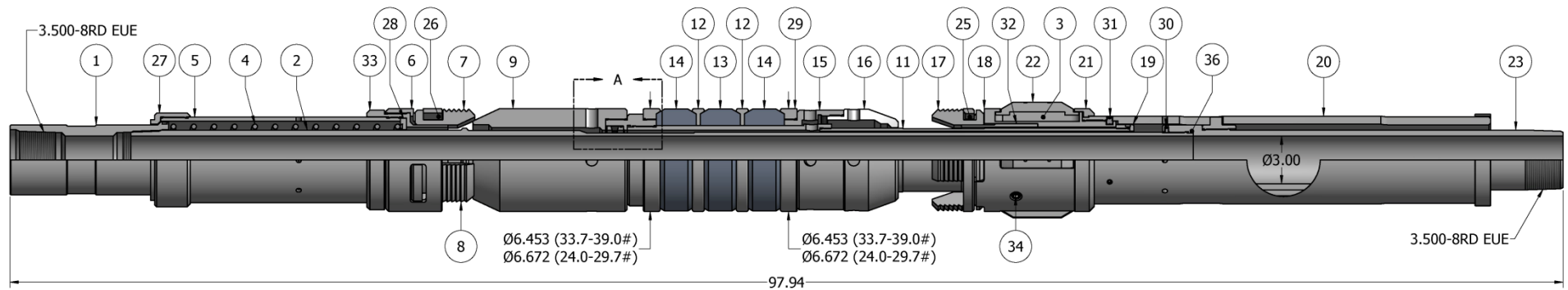
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N) TECHNICAL ILLUSTRATION



DETAIL A



	<div>ASI-X PACKER</div> <div>7-5/8” X 3-1/2”</div>		Manual No:	
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O) REVISION HISTORY

DATE	REVISION	DESCRIPTION OF CHANGES	REVISED BY	APPROVED BY
11/03/2015	E	Added Related Tools, Pre-Installation Inspection Procedures, Storage Recommendations, P/Ns 60073610, 60373310, 60073230, 60373340, 60073810; Revised Pressure Affected Area Guide	J.Anderson	B.Bishop
06/25/13	D	Revised P/N 60173610 was 60073610, 60174310 & 60173310 was 60373310, 60278511 was 60378511, 60278513 was 60378513, 60173230 was 60073230, 60173340 was 60373340. 60174810 was 60073810; Added HSN and Viton Options (P/N 60378H, 60378V, 60377H, 60377V), Recommended Tools, HSN and Viton Options Parts List;	S.McEntire	D.Hushbeck