



# ASI-X PACKER

## 6-5/8" X 3-1/2"

Manual No:  
**DL-603-6625-032**

Revision: **F**

Revision Date:  
**12/02/2016**

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 and Stinger — refer to technical manual *DL-512-7000-414*.

### 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)		
6-5/8	20.0 – 24.0	5.921 – 6.049	5.750	3.00	3-1/2 EUE	60368 60368H <sup>1</sup> 60368V <sup>2</sup>
	24.0 – 32.0	5.675 – 5.921	5.500	3.00	3-1/2 EUE	60369 60369H <sup>1</sup> 60369V <sup>2</sup>

<sup>1</sup>HSN Option      <sup>2</sup>Viton Option

**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 PRESSURE (MAX)	TENSILE LOAD THRU TOOL (MAX)
7,000 PSI	112,000 LBS

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



# ASI-X PACKER 6-5/8" X 3-1/2"

Manual No:  
**DL-603-6625-032**

Revision: **F**

Revision Date:  
**12/02/2016**

Authored by: S.White

Approved by: J. McArthur

## 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 / 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.

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 (see setting force guide). After setting the packer, the tubing can be left in compression, tension or neutral.



# ASI-X PACKER

## 6-5/8" X 3-1/2"

Manual No:  
**DL-603-6625-032**

Revision: **F**

Revision Date:  
**12/02/2016**

Authored by: S.White

Approved by: J. McArthur

### 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.

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.

**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.

### 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

PACKER SIZE (INCHES)	TUBING SIZE (INCHES)	PRESSURE (SQ. INCHES)	
		ABOVE	BELOW
6-5/8 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<sub>1</sub>:** Consider a 6-5/8" 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 6-5/8" X 3-1/2" 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 4.37 in<sup>2</sup>. Multiplying the differential pressure (3,000 psi) by the pressure affected area (4.37 in<sup>2</sup>) results in a force of 13,110 lbs. The piston effect on the packer mandrel is a downward force of 13,110 lbs.



# ASI-X PACKER

## 6-5/8" X 3-1/2"

Manual No:  
**DL-603-6625-032**

Revision: **F**

Revision Date:  
**12/02/2016**

Authored by: S.White

Approved by: J. McArthur

### I) ELASTOMER TRIM TEMPERATURE GUIDE

NITRILE (STD)			
TEMPERATURE RANGE (F°)	DUROMETER		
	END	MIDDLE	END
70° - 125°	80	70	80
125° - 250°	90	70	90
150° - 250°	90	80	90
250° +	Contact D&L Sales		

RUBBER TYPE	TEMPERATURE RANGE
NITRILE	70° - 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	DRAG BLOCK ASSEMBLY TOOL	AT070110

### K) DISASSEMBLY

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

K-1.1) Unscrew and remove set screws (31) 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).

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

K-1.2.1) Remove o-ring (34) 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 (32) from J-body (20).

K-1.5) Unscrew and remove J-body (20) from drag block body (18) (**NOTE<sub>4</sub>:** 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).

**NOTE<sub>5</sub>:** For added leverage, insert a rod through rubber retainer (15) and rubber mandrel (11) as needed.

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).



# ASI-X PACKER

## 6-5/8" X 3-1/2"

Manual No:  
**DL-603-6625-032**

Revision: **F**

Revision Date:  
**12/02/2016**

Authored by: S.White

Approved by: J. McArthur

### K) DISASSEMBLY (cont'd)

- K-1.10) Unscrew and remove lower cone (16) from rubber retainer (15).
- K-1.11) Unscrew rubber mandrel (11) from center coupling (10).
- K-1.12) Remove rubber mandrel assembly and disassemble:
  - K-1.12.1) If applicable, remove gage ring (29) from rubber mandrel (11).
  - K-1.12.2) Remove elements (13, 14), rubber spacers (12), and rubber retainer (15) from rubber mandrel (11).
    - K-1.12.2.1) If applicable, unscrew and remove gage ring (29) from rubber retainer (15).
- K-1.13) If applicable, unscrew and remove gage ring (29) from center coupling (10).
- K-1.14) Unscrew and remove center coupling (10) from upper cone (9).
  - K-1.14.1) Remove bonded seal (24) and o-ring (35) from center coupling (10).
    - K-1.14.1.1) Remove o-ring (33) from bonded seal (24).
- K-1.15) If applicable, remove bearing bushing (30) from inner mandrel (2).
- K-1.16) Remove upper cone (9) from inner mandrel (2).
- K-2) Unclamp and remove top sub (1) from vise. Clamp lower end of inner mandrel (2) in vise.
  - CAUTION<sub>4</sub>:** Do **NOT** wrench or clamp on seal surface.
  - K-2.1) Unscrew and remove spring cage cap (27) from spring cage (5).
    - CAUTION<sub>5</sub>:** 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

**NOTE<sub>6</sub>:** Clean and inspect all parts. Replace all worn and damaged parts. Install parts in proper order, and orientation 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 (Fig. 2).

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

**CAUTION<sub>4</sub>:** 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 (26) into upper slip body (6).
    - NOTE<sub>7</sub>:** Uses two (2ea) springs per slip (Fig. 3).
  - L-1.1.2) Install spring retainer ring (28) into upper slip body (6).
  - L-1.1.3) Screw spring cage (5) into upper slip body (6).
  - L-1.1.4) Wedge releasing slip (7) and upper slips (8) outwards. Install upper slip body assembly onto inner mandrel (2). Remove wedges.

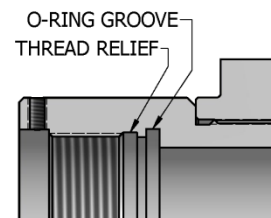


Fig. 2

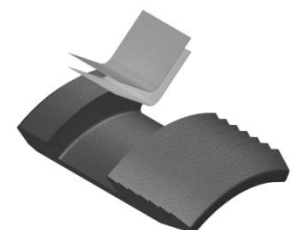


Fig. 3



# ASI-X PACKER

## 6-5/8" X 3-1/2"

Manual No:  
**DL-603-6625-032**

Revision: **F**

Revision Date:  
**12/02/2016**

Authored by: S.White

Approved by: J. McArthur

### L) ASSEMBLY (cont'd)

L-1.2) Install compression spring (4) 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).

**CAUTION<sub>5</sub>:** 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) If applicable, install bearing bushing (30) onto inner mandrel (2).

L-2.3) Install o-ring (35) in groove in center coupling (10).

L-2.4) Install o-ring (33) in groove in bonded seal (24).

L-2.5) Install bonded seal (24) into center coupling (10).

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

L-2.6) If applicable, screw gage ring (29) onto center coupling (10). (Refer to Detail A on technical illustration.)

L-2.7) Screw center coupling (10) into upper cone (9).

L-2.8) Assemble rubber mandrel assembly and install:

L-2.8.1) If applicable, screw gage ring (29) onto rubber retainer (15).

L-2.8.2) Install rubber retainer (15), elements (13, 14) and rubber spacers (12) onto rubber mandrel (11).

L-2.8.3) If applicable, install gage ring (29) onto rubber mandrel (11). (Refer to Detail A on technical illustration.)

L-2.8.4) Install rubber mandrel assembly onto inner mandrel (2).

L-2.8.5) Screw rubber mandrel (11) into center coupling (10).

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

L-2.9) Screw lower cone (16) into rubber retainer (15).

L-2.10) Assemble drag block body assembly and install:

L-2.10.1) 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-2.10.2) Install drag block body assembly onto rubber mandrel (11).

L-2.11) Screw rubber mandrel cap (19) onto rubber mandrel (11).

L-2.12) Install drag blocks (22) and drag block springs (3) into 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-2.13) Install drag block retainer (21) onto drag block body (18) to capture ends of drag blocks (22).

L-2.14) Screw J-body (20) onto drag block body (18) (**NOTE<sub>4</sub>:** Left-hand threads).

L-2.15) Screw set screws (32) into J-body (20). Release drag blocks (22).

L-2.16) Install o-ring (34) in groove in J-pin bottom sub (23).

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

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

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

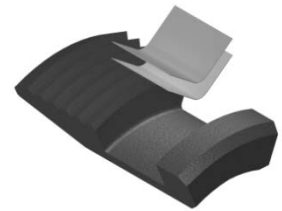


Fig. 4



Fig. 5



# ASI-X PACKER 6-5/8" X 3-1/2"

Manual No:  
**DL-603-6625-032**

Revision: **F**

Revision Date:  
**12/02/2016**

Authored by: S.White

Approved by: J. McArthur

## L) ASSEMBLY (cont'd)

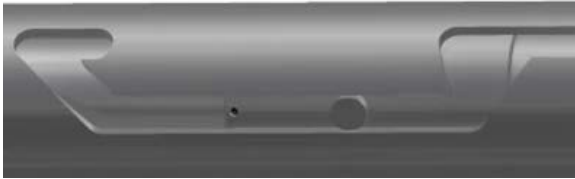


Fig. 6



Fig. 7

L-2.18) Rotate J-body (20) as needed to position J-pin of J-pin bottom sub (23) along J-slot to access threaded holes (Fig. 6). Screw set screws (31) into J-pin bottom sub (23).

L-2.19) Position J-pin of J-pin bottom sub (23) in running position in J-slot of J-body (20) (Fig. 7).

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

## M) PARTS LIST

ITEM	QTY	DESCRIPTION	MATERIAL	20.0 - 24.0# P/N 60368	24.0 - 32.0# P/N 60369
1	1	TOP SUB	DLMS80	60073610	
2	1	INNER MANDREL	L-80	60368210	60373210
3	24	DRAG BLOCK SPRING	-	9101900	
4	1	COMPRESSION SPRING	DLMCRSP	60373920	
5	1	SPRING CAGE	DLMS60	60174310	60369310
6	1	UPPER SLIP BODY	P-110/1026	60068320	60369320
7	1	RELEASING SLIP	DLMS110	60073125	60369125
8	2	UPPER SLIP	DLMS35	60073115	60369115
9	1	UPPER CONE	DLMS60	60373410	60369410
10	1	CENTER COUPLING	DLMS80	60273620	60369620
11	1	RUBBER MANDREL	DLMS60	60073220	60369220
12	2	RUBBER SPACER	DLMS35	60268840	60265840
13	1	ELEMENT	70 DURO NITRILE	60268511	60265511
14	2	ELEMENT	90 DURO NITRILE	60268513	60265513
15	1	RUBBER RETAINER	DLMS60	60273850	60369850
16	1	LOWER CONE	DLMS60	60073420	60369420
17	4	LOWER SLIP	DLMS35	60068135	60369135
18	1	DRAG BLOCK BODY	DLMS35 / DLMS60	60068335	60369335
19	1	RUBBER MANDREL CAP	DLMS60	60173230	60169230





# ASI-X PACKER

## 6-5/8" X 3-1/2"

Manual No:  
**DL-603-6625-032**

Revision: **F**

Revision Date:  
**12/02/2016**

Authored by: S.White

Approved by: J. McArthur

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

ITEM	QTY	DESCRIPTION	MATERIAL	20.0 - 24.0# P/N 60368	24.0 - 32.0# P/N 60369
20	1	J-BODY	DLMS60	60373340	60369340
21	1	DRAG BLOCK RETAINER	1018	60068910	60369910
22	4	DRAG BLOCK	DLMSDB8	9060900	
23	1	J-PIN BOTTOM SUB	DLMS110 / DLMS60	60373650	
24	1	BONDED SEAL	DLMS60 / 90 DURO NITRILE	60073520	
25	8	LOWER SLIP SPRING	-	7170901	
26	6	UPPER SLIP SPRING	-	7170902	
27	1	SPRING CAGE CAP	1026	60068810	60369810
28	1	SPRING RETAINING RING	DLMS35	60073820	60369820
29	-	GAGE RING	DLMS60	60268830 (2 QTY)	60265830 (1 QTY)
30	1	BEARING BUSHING	DLMS35	60373224	N/A
31	2	SET SCREW 1/4-20 X 3/8	STEEL	SSS025C037	
32	3	SET SCREW 3/8-16	STEEL	SSS037C037 (3/8" LONG)	SSS025C050 (1/2" LONG)
33	1	155 O-RING	90 DURO NITRILE	90155	
34	1	237 O-RING	90 DURO NITRILE	90237	
35	1	O-RING	90 DURO NITRILE	90243	90242

REDRESS KIT (RDK)		60368050	60369050
ASSEMBLED WEIGHT		309 LBS	282 LBS





# ASI-X PACKER

## 6-5/8" X 3-1/2"

Manual No:  
**DL-603-6625-032**

Revision: **F**

Revision Date:  
**12/02/2016**

Authored by: S.White

Approved by: J. McArthur

### 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	20.0 - 24.0# P/N 60368H	24.0 - 32.0# P/N 60369H
13	1	ELEMENT	70 DURO HSN	60268511H	60265511H
14	2	ELEMENT	90 DURO HSN	60268513H	60265513H
24	1	BONDED SEAL	90 DURO HSN	60073520H	
33	1	155 O-RING	90 DURO HSN	90155H	
34	1	237 O-RING	90 DURO HSN	90237H	
35	1	O-RING	90 DURO HSN	90243H	90242H

REDRESS KIT (RDK)		60368050H	60369050H
-------------------	--	-----------	-----------

##### M-1.2) VITON

ITEM	QTY	DESCRIPTION	MATERIAL	20.0 - 24.0# P/N 60368V	24.0 - 32.0# P/N 60369V
13	1	ELEMENT	70 DURO VITON	60268511V	60265511V
14	2	ELEMENT	90 DURO VITON	60268513V	60265513V
24	1	BONDED SEAL	90 DURO VITON	60073520V	
33	1	155 O-RING	90 DURO VITON	90155V	
34	1	237 O-RING	90 DURO VITON	90237V	
35	1	O-RING	90 DURO VITON	90243V	90242V

REDRESS KIT (RDK)		60368050V	60369050V
-------------------	--	-----------	-----------



# ASI-X PACKER

## 6-5/8" X 3-1/2"

Manual No:  
**DL-603-6625-032**

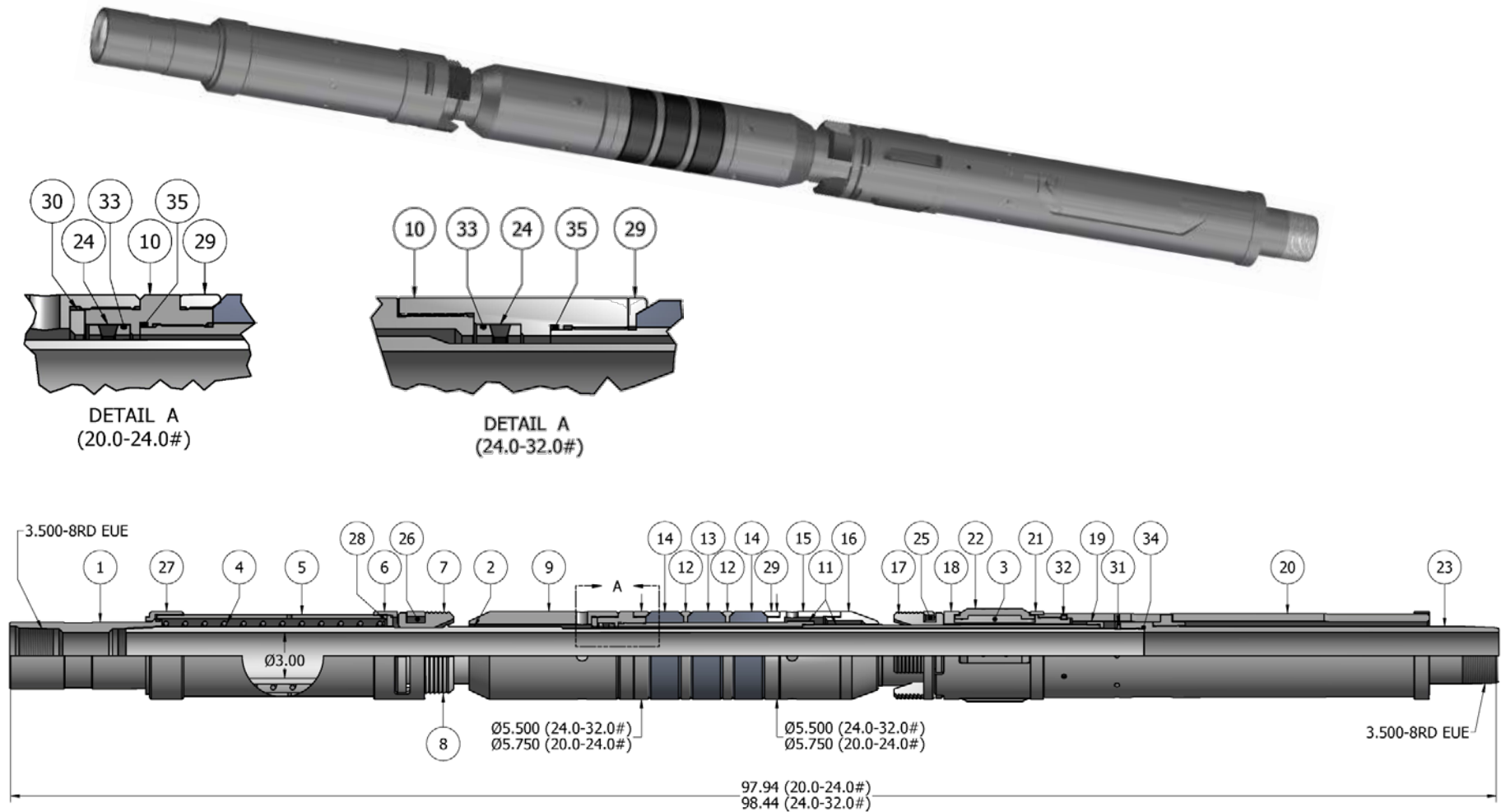
Revision: **F**

Revision Date:  
**12/02/2016**


Authored by: S.White

Approved by: J. McArthur

### N) TECHNICAL ILLUSTRATION



This document is uncontrolled when printed. For the current revision, refer to the electronic copy in the Vault database.

	<h1>ASI-X PACKER</h1> <h2>6-5/8” X 3-1/2”</h2>		Manual No:
			DL-603-6625-032
			Revision: F
			Revision Date:
			12/02/2016
Authored by: S.White			Approved by: J. McArthur

### O) REVISION HISTORY

DATE	REVISION	DESCRIPTION OF CHANGES	REVISED BY	APPROVED BY
12/02/2016	F	Added General Screw Torque Recommendations; Revised Elastomer Trim Temperature Guide Nitrile and HSN temp. ratings; Removed tool drift ID	J.Anderson	D.Hushbeck
08/07/14	E	Revised P/N 60174310 was 60173310, 60169230 was 60073230; Added related tools, drift ID to specifications guide, pre-installation inspection procedure, storage procedure and figures 2, 6 and 7 to assembly instructions.	D. Barlow	K.Riggs-
06/28/13	D	Added HSN and Viton options, recommended hand tools, double hook j-slot packer note,	J.Anderson	K.Plunkett