



ASI-X PACKER

6-5/8" X 2-7/8"

Manual No:
DL-603-6625-024

Revision: **J**

Revision Date:
03/28/2018

Authored by: S.White

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 — 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)		
6-5/8	17.0 – 24.0	5.921 – 6.135	5.750	2.50	2-7/8 EUE	60367 60367H ¹ 60367V ²
	24.0 – 32.0	5.675 – 5.921	5.500	2.50	2-7/8 EUE	60365 60365H ¹ 60365V ²

Elastomer Trim Options: HSN¹ Viton²

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.

DIFFERENTIAL PRESSURE (MAX)	TENSILE LOAD THRU TOOL (MAX)
7,000 PSI	101,505 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.

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 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 minimum). 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 minimum). 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.

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: 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

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
6-5/8"	2.375	3.87 (DOWN)	-5.17 (UP)
	2.875	1.80 (DOWN)	-3.62 (UP)
	3.500	-1.33 (UP)	-1.27 (UP)

Example: Consider a 6-5/8" 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 6-5/8" 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 3.87 in². Multiplying the differential pressure (3,000 PSI) by the pressure affected area (3.87 in²) results in a force of 11,610 lbs. The piston effect on the packer mandrel is a downward force of 11,610 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	DRAG 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).

NOTE₃: 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). Move drag block retainer (21) as needed.

K-1.5) Unscrew and remove J-body (20) from drag block body (18) (**NOTE₄:** 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 (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).

NOTE₅: For added leverage, insert 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. 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).



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K) DISASSEMBLY (cont'd)

K-1.11) Unscrew rubber mandrel (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-1.13) Unscrew and remove center coupling (10) from upper cone (9).

K-1.13.1) Remove o-ring (36) from center coupling (10).

K-1.13.2) Remove bonded seal (24) from center coupling (10).

K-1.13.2.1) Remove o-ring (34) from bonded seal (24).

K-1.14) Remove upper cone (9) and bearing bushing (30) from inner mandrel (2).

K-2) Unclamp and remove top sub (1) from vise. Clamp lower end 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 retaining 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.

NOTE6: To redress tool assembly, follow disassembly instructions. It is recommended by D&L Oil Tools to replace bonded seals, elements, o-rings, shear screws, etc. when redressing tool.

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.

CAUTION6: 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.

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 retaining ring (28) into upper slip body (6).

L-1.1.2) Screw spring cage (5) into upper slip body (6).

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. Install upper slip body assembly onto inner mandrel (2). Remove wedges.

L-1.2) Install compression spring (4) into spring cage (5).

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

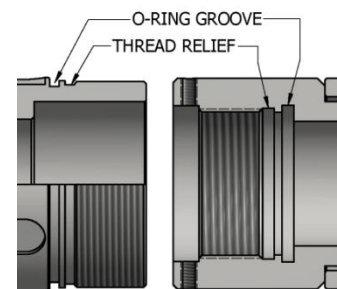


Fig. 2

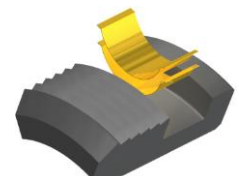


Fig. 3



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L) ASSEMBLY (cont'd)

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

CAUTIONs: 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) into o-ring groove in center coupling (10).

L-2.3) Install o-ring (34) into 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 or bonded seal during installation.

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

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). Screw rubber mandrel assembly into center coupling (10).

CAUTIONs: 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.

NOTE8: Install 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).

NOTE9: For added leverage, insert rod through rubber retainer (15) and rubber mandrel (11) as needed.

L-2.10) Install drag blocks (22) and drag block springs (3) into drag block body (18). Compress drag blocks (22) with drag block assembly tool (T1).

NOTE10: Install six (6ea) springs per drag block (Fig. 5).

L-2.11) 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-2.12) Install retainer ring (31) onto J-body (20).

L-2.13) Screw J-body (20) into drag block body (18) (**NOTE4:** Left-hand threads).

L-2.14) Screw set screws (33) into drag block body (18). Release drag blocks (22).

L-2.15) Install o-ring (35) in o-ring groove in J-pin bottom sub (23).

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

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

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

L-2.17) Screw set screws (32) into J-pin bottom sub (23). Move J-body (20) as needed to access threaded holes (Fig. 6).

L-2.18) Move J-body (20) and drag block body assembly as needed to position J-pin in running position in J-slot (Fig. 7).

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



Fig. 4

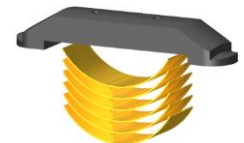


Fig. 5

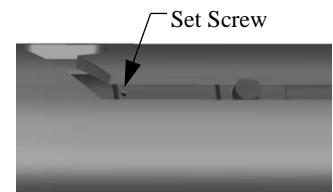


Fig. 6

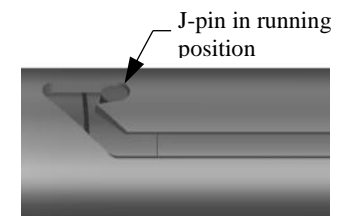


Fig. 7



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M) PARTS LIST

ITEM	QTY	DESCRIPTION	MATERIAL	17.0 – 24.0# P/N 60367	24.0 – 32.0# P/N 60365
1	1	TOP SUB	DLMS80	60170610 (60070610*)	
2	1	INNER MANDREL	DLMS80	60367210	60370210
3	24	DRAG BLOCK SPRING	DLMELG	9101900	
4	1	COMPRESSION SPRING	CHROME VANADIUM	60370920	
5	1	SPRING CAGE	DLMS60	60170310 (60370310*)	
6	1	UPPER SLIP BODY	DLMS35	60067320	60065320
7	1	RELEASING SLIP	DLMS110	60070125	60065125
8	2	UPPER SLIP	DLMS35	60070115	60065115
9	1	UPPER CONE	DLMS35	60367410	60365410
10	1	CENTER COUPLING	DLMS80	60370620	60365620
11	1	RUBBER MANDREL	DLMS60	60367220	60370220
12	2	RUBBER SPACER	DLMS35	60267840	60265840
13	1	ELEMENT	70 DURO NITRILE	60267511	60265511
14	2	ELEMENT	90 DURO NITRILE	60267513	60265513
15	1	RUBBER RETAINER	DLMS80	60367850	60365850
16	1	LOWER CONE	DLMS35	60067420	60065420
17	4	LOWER SLIP	DLMS35	60070135	60065135
18	1	DRAG BLOCK BODY	DLMS35 / DLMS60	60067335	60065335
19	1	RUBBER MANDREL CAP	DLMS60	60170230 (60070230*)	
20	1	J-BODY	DLMS60	60170340 (60370340*)	60165340 (60365340*)
21	1	DRAG BLOCK RETAINER	DLMS60	60067910	60065910
22	4	DRAG BLOCK	DLMSDB8	9060900	
23	1	J-PIN BOTTOM SUB	DLMS110 / DLMS60	60370650	
24	1	BONDED SEAL	90 DURO NITRILE	60070520	
25	8	LOWER SLIP SPRING	DLMELG	7170901	
26	6	UPPER SLIP SPRING	DLMELG	7170902	
27	1	SPRING CAGE CAP	DLMS80	60167810 (60067810*)	60165810 (60065810*)
28	1	SPRING RETAINING RING	DLMS35	60070820	
29	1	GAGE RING	DLMS80	60267830	60265830
30	1	BEARING BUSHING	DLMS60	60370224	

* P/N may be substituted.



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M) PARTS LIST (cont'd)

ITEM	QTY	DESCRIPTION	MATERIAL	17.0 – 24.0# P/N 60367	24.0 – 32.0# P/N 60365
31	1	RETAINING RING	DLMS60	60070911	60065911
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	

REDRESS KIT (RDK)		60367050	60365050
ASSEMBLED WEIGHT		282 LBS	269 LBS

M-1) ELASTOMER TRIM OPTIONS

NOTE₁₁: For temperature range, refer to Elastomer Trim Temperature Guide.

M-1.1) HSN

ITEM	QTY	DESCRIPTION	MATERIAL	17.0 – 24.0# P/N 60367H	24.0 – 32.0# P/N 60365H
13	1	ELEMENT	70 DURO HSN	60267511H	60265511H
14	2	ELEMENT	90 DURO HSN	60267513H	60265513H
24	1	BONDED SEAL	90 DURO HSN	60070520H	
37	1	153 O-RING	90 DURO HSN	90153H	
38	1	233 O-RING	90 DURO HSN	90233H	
39	1	242 O-RING	90 DURO HSN	90242H	

REDRESS KIT (RDK)		60367050H	60365050H
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M-1.2) VITON

ITEM	QTY	DESCRIPTION	MATERIAL	17.0 – 24.0# P/N 60367V	24.0 – 32.0# P/N 60365V
13	1	ELEMENT	70 DURO VITON	60267511V	60265511V
14	2	ELEMENT	90 DURO VITON	60267513V	60265513V
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)		60367050V	60365050V
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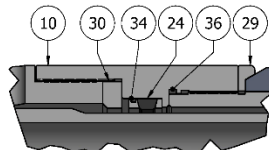
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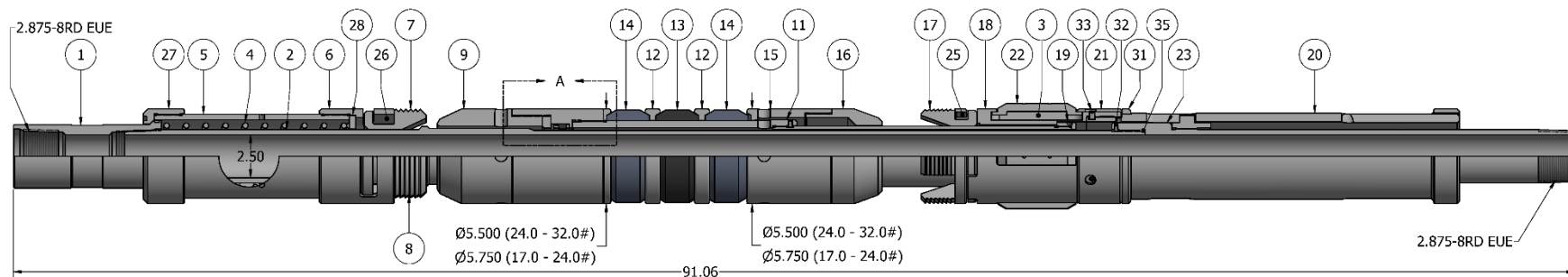
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Approved by: *H.Bringham*

N) TECHNICAL ILLUSTRATION



DETAIL A



	<h1 style="text-align: center;">ASI-X PACKER</h1> <h2 style="text-align: center;">6-5/8" X 2-7/8"</h2>		Manual No: DL-603-6625-024
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O) REVISION HISTORY

DATE	REVISION	DESCRIPTION OF CHANGES	REVISED BY	APPROVED BY
03/28/2018	J	Revised Elastomer Trim Temp Guide Nitrile temp rating	J.Anderson	C.Colvin
06/27/2016	H	Added General Screw Torque Recommendations; Removed tool drift ID; Revised Elastomer Trim Temperature Guide Nitrile and HSN temperature ranges; Revised Parts List for parts that may be substituted	J.Anderson	D.Hushbeck
05/04/2015	G	Added Related Tools, Drift ID, Pre-Installation Instructions, Fig. 1, Caution2, Storage Procedures, Caution6, Note6, Fig. 2, Fig. 6, Fig. 7; Revised Description, ELASTOMER TRIM TEMPERATURE GUIDE was ELEMENT SELECTION GUIDE, Note7, Fig. 3, Material was 1026 (P/N's 60170610, 60070610, 60365620, 60370620), P/N 90153 was P/N 90152 (O-ring), P/N 90153H was P/N 90152H (O-ring), P/N 90153V was P/N 90152V (O-ring)	B.Mathis	K.Riggs
02/20/2014	F	Revised P/N 60170610 was 60070610, 60165810 was 60065810, 60170310 was 60370310, 60170230 was 60070230, 60165340 was 60365340	J.Anderson	K.Riggs
06/28/2013	E	Added HSN and Viton options, recommended hand tools; Revised P/N 60365 assembled weight was 262 lbs, Removed AFLAS from element selection guide	J.Anderson	K.Plunkett