A) DESCRIPTION

The ASI-X Anchor is a mechanically-set double-grip tubing anchor designed to be exceptionally durable and debris tolerant. This anchor is based on the proven ASI-X Packer design, but has been shortened, simplified and does not have a sealing element. This anchor is suited for treating, testing, injecting, pumping wells, and flowing wells, deep or shallow. This anchor is built using durable ASI-X Packer parts making redress both quick and economical.

The double-slip design allows the anchor to be left in tension or compression, depending on well conditions and the required application. The J-slot design allows easy setting and releasing; 1/4 turn right-hand set, right-hand release. With the variety of J-body configurations available, this anchor can also be set with other packers in tandem. This anchor is also equipped with an adjustable straight pickup emergency shear release and when released in this manner, the anchor will reset when moved down the hole.

B) 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)		
4-1/2	9.5 – 13.5	3.920 – 4.090	3.750	1.94	2-3/8 EUE	32345 32345H[1] 32345V[2]
	13.5 – 15.1	3.826 – 3.920	3.650 3.656*	1.94	2-3/8 EUE	32344 32344H[1] 32344V[2]

Elastomer Trim Options: [1]HSN, [2]Viton
*Max OD is across retracted drag blocks

NOTE$_1$: Tools listed are right-hand set / right-hand release.

DIFFERENTIAL PRESSURE (MAX)	TENSILE LOAD THRU TOOL (MAX)	TORQUE THRU TOOL (MAX)
10,000 PSI	55,000 LBS	800 FT-LBS

C) PRE-INSTALLATION INSPECTION PROCEDURES

CAUTION$_1$: 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.

C) PRE-INSTALLATION INSPECTION PROCEDURES (cont'd)

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 tool 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 o-rings, shear screws, etc. Contact D&L sales for redress kit and/or other replacement part information.

D) SETTING PROCEDURES

CAUTION[2]: Do not run the tool without properly tightening connections. Running the tool with loose connections may damage the tool and cause malfunction.

D-1) COMPRESSION SET

Run the anchor 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 anchor, and then lower the work string while releasing torque. Slack off on the work string with enough weight to set the anchor (10,000 lbs). Pull tension (10,000 lbs) to assure that the upper slips are set. The work string can then be left in tension or compression.

D-2) TENSION SET

Run to setting depth, pick up on the work string and rotate 1/4 turn to the right at the anchor then lower the work string slacking off available weight to set the anchor lower slips. Pull tension to set upper slips (10,000 lbs). After setting the anchor, the work string can be left in compression or tension.

E) RELEASING PROCEDURES

The releasing procedures are the same whether the anchor has been tension or compression set. Set down weight on the anchor to unseat the J-pin from the tension shoulder of the J-slot. Rotate the work string 1/4 right-hand turn at the anchor and pick up while holding right-hand torque. Continue to pick up to release the slips thus allowing the anchor to be re-set or removed from the well.

E-1) EMERGENCY RELEASE

In the event the anchor 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 work string weight. The shear release value is adjustable from 20,000 lbs to 50,000 lbs (5,000 lbs/screw) by adding or removing shear screws from the J-pin ring. When released in this manner, the anchor will reset automatically when moved down the hole.

NOTE[2]: D&L Oil Tools recommends using a minimum of four (4 qty) releasing shear screws.

F) 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.

Store the tool, if possible, in an enclosed, temperature and humidity controlled environment. Avoid excessively high temperatures over long periods of time. 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.

G) ELASTOMER TRIM TEMPERATURE GUIDE

RUBBER TYPE	TEMPERATURE RANGE
NITRILE	40° - 250°F
HSN (HNBR)	70° - 300°F
VITON	100° - 350°F

H) RECOMMENDED TOOLS

H-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

H-2) SPECIAL TOOLS

ITEM	QTY	DESCRIPTION	PART NUMBER
T1	1	DRAG BLOCK ASSEMBLY TOOL	AT045110

I) DISASSEMBLY

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

I-1.1) Unscrew and remove crossover (16) from shear bottom sub (21)

I-1.2) Unscrew and remove set screws (15) from shear bottom sub (21). Move J-body (20) as needed to access set screws (15).

I-1.3) Unscrew and remove shear bottom sub (21) from inner mandrel (2).

NOTE$_3$: Drag block body assembly must be free to rotate.

I-1.3.1) Remove o-ring (23) from shear bottom sub (21).

I-1.3.2) Unscrew and remove shear screws (14) from J-pin ring (10).

I-1.3.3) Remove J-pin ring (10) from shear bottom sub (21).

I-1.4) Compress drag blocks (22) using drag block body assembly tool (T1).

I-1.5) Unscrew and remove set screws (15) from J-body (20).

I-1.6) Unscrew and remove J-body (20) from drag block body (18) (**NOTE$_4$**: Left-hand threads).

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

I) DISASSEMBLY (cont'd)

I-1.8) Unscrew and remove rubber mandrel cap (19) from rubber mandrel (11).

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

I-1.9.1) Remove wedges (if needed). Remove lower slips (17) and lower slip springs (12) from drag block body (18).

I-1.10) Unscrew and remove rubber mandrel (11) from upper cone (9).

I-1.11) Remove upper cone (9) from inner mandrel (2).

I-2) Unclamp top sub (1) from vise. Clamp lower part of inner mandrel (2) in vise.

CAUTION$_3$: Do NOT wrench or clamp on seal surface.

I-2.1) Unscrew and remove spring cage cap (6) from spring cage (5).

CAUTION$_4$: Compression spring (4) is compressed with spring tension against spring cage assembly.

I-2.2) Unscrew and remove top sub (1) from inner mandrel (2).

I-2.3) Remove compression spring (4) from inner mandrel (2).

I-2.4) Wedge releasing slip (7) and upper slips (8) outwards (if needed). Remove spring cage assembly and disassemble:

I-2.4.1) Remove wedges (if needed). Remove releasing slip (7), upper slips (8) and upper slip springs (13) from spring cage (5).

I-3) Unclamp and remove inner mandrel (2) from vise.

J) ASSEMBLY

NOTE$_5$: 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$_4$: To ensure tool operates properly, install o-rings in o-ring grooves **NOT** thread reliefs (Fig. 2).

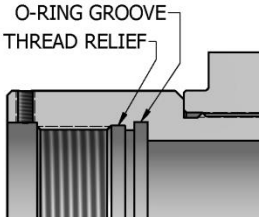


Fig. 2

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

CAUTION$_3$: Do NOT wrench or clamp on seal surface.

J-1.1) Assemble spring cage assembly and install:

J-1.1.1) Install upper slips (8), releasing slip (7), and upper slip springs (13) into spring cage (5).

NOTE$_6$: Install one (1ea) spring per slip (Fig. 3).

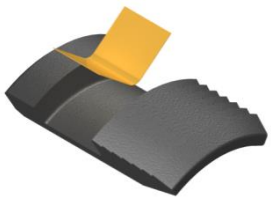


Fig. 3

J-1.1.2) Wedge releasing slip (7) and upper slips (8) outwards. Install spring cage assembly onto inner mandrel (2). Remove wedges.

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

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

J-1.4) Screw spring cage cap (6) into spring cage (5).

CAUTION$_4$: Compression spring (4) will be compressed with spring tension against spring cage assembly.

J-2) Remove inner mandrel (2) from vise. Clamp top sub (1) in vise.

J-2.1) Install upper cone (9) onto inner mandrel (2).

J-2.2) Screw rubber mandrel (11) into cone (9).

J-2.3) Assemble drag block body assembly and install:

J-2.3.1) Install lower slips (17) and lower slip springs (12) into drag block body (18). Wedge slips outward.

NOTE$_6$: Install one (1ea) spring per slip (Fig. 4).


Fig. 4

J) ASSEMBLY (cont'd)

J-2.3.2) Install drag block body assembly onto rubber mandrel (11).

J-2.4) Screw rubber mandrel cap (19) onto rubber mandrel (11).

J-2.5) 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).

NOTE7: Install three (3ea) springs per drag block (Fig. 5).

Fig. 5

J-2.6) Screw J-body (20) onto drag block body (18) (**NOTE4**: Left-hand threads) capturing ends of drag blocks (22).

J-2.7) Screw set screws (15) into J-body (20). Release drag blocks (22).

J-2.8) Install J-pin ring (10) onto shear bottom sub (21). Align threaded holes in J-pin ring (10) with recessed holes in shear bottom sub (21)

J-2.9) Screw shear screws (14) into J-pin ring (10). Tighten until shear screws (14) contact shear bottom sub (21). Back shear screws (14) out 1/4 turn.

J-2.10) Install o-ring (23) in o-ring groove in shear bottom sub (21).

J-2.11) Screw shear bottom sub (21) onto inner mandrel (2).

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

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

J-2.12) Screw crossover (16) onto shear bottom sub (21).

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

K) PARTS LIST

ITEM	QTY	DESCRIPTION	MATERIAL	13.5 – 15.1# P/N 32344	9.5 – 13.5# P/N 32345
1	1	TOP SUB	DLMS80	60145610	
2	1	INNER MANDREL	DLMS110	32344210	32345210
3	12	DRAG BLOCK SPRING	-	9100900	
4	1	COMPRESSION SPRING	DLMCRSP	71011920	
5	1	SPRING CAGE	DLMS80	32344325	32345325
6	1	SPRING CAGE CAP	DLMS80	60144810	60145810
7	1	RELEASING SLIP	DLMS110	60045125	
8	2	UPPER SLIP W/ CARBIDE	DLMS110	60045115C	
9	1	UPPER CONE	DLMS110	32344410	32345410
10	1	J-PIN RING	DLMS125	32345875	
11	1	RUBBER MANDREL	DLMS80	32344220	32345220
12	4	LOWER SLIP SPRING	-	7145901	
13	3	UPPER SLIP SPRING	-	7145902	
14	10	SHEAR SCREW (5000#) 1/2-13 UNC X 3/8	DLM464BRS	65050902	

K) PARTS LIST (cont'd)

ITEM	QTY	DESCRIPTION	MATERIAL	13.5 – 15.1# P/N 32344	9.5 – 13.5# P/N 32345
15	6	SET SCREW 1/4-20 UNC X 3/8	STEEL	SSS025C037	
16	1	CROSSOVER	DLMS60	CH2375N2375E	
17	4	LOWER SLIP W/CARBIDE	DLMS110	60045135C	
18	1	DRAG BLOCK BODY	DLMS60	60045335	
19	1	RUBBER MANDREL CAP	DLMS60	60145230	
20	1	J-BODY	DLMS80	32344345	32345345
21	1	SHEAR BOTTOM SUB	DLMS80	32344655	
22	4	DRAG BLOCK W/ CARBIDE	DLMSDB4	9040900C	9045900C
23	1	228 O-RING	90 DURO NITRILE	90228	

REDRESS KIT (RDK)		32344050	32345050
ASSEMBLED WEIGHT		70 LBS	75 LBS

K-1) ELASTOMER TRIM OPTIONS

NOTE8: For temperature range, refer to Elastomer Trim Temperature Guide.

K-1.1) HSN

ITEM	QTY	DESCRIPTION	MATERIAL	13.5 – 15.1# P/N 32344H	9.5 – 13.5# P/N 32345H
23	1	228 O-RING	90 DURO HSN	90228H	

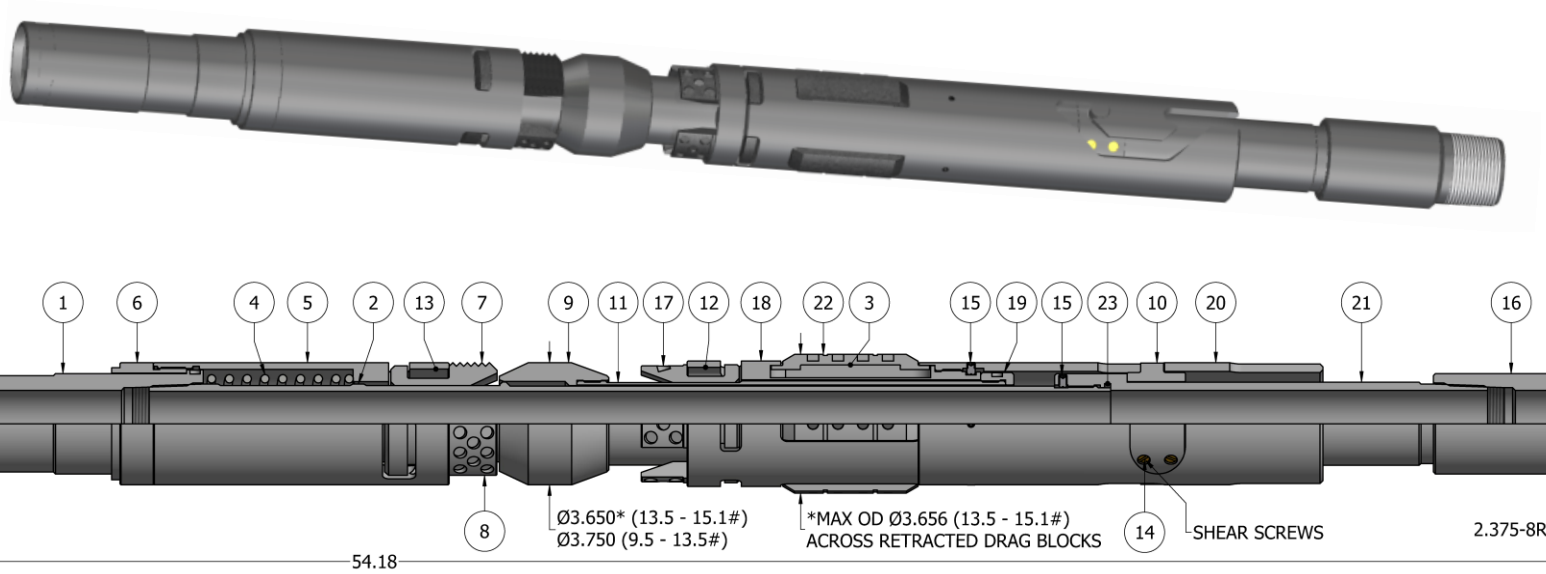
REDRESS KIT (RDK)		32344050H	32345050H

K-1.2) VITON

ITEM	QTY	DESCRIPTION	MATERIAL	13.5 – 15.1# P/N 32344V	9.5 – 13.5# P/N 32345V
23	1	228 O-RING	90 DURO VITON	90228V	

REDRESS KIT (RDK)		32344050V	32345050V

L) TECHNICAL ILLUSTRATION



M) REVISION HISTORY

DATE	REVISION	DESCRIPTION OF CHANGES	REVISED BY	APPROVED BY
06/10/2021	G	Revised 71011920 was 60345920	J.Anderson	E.Visaez
07/18/2019	F	Revised Elastomer Trim Temp. Guide nitrile rating, P/N 60145610 was 60145610HT, P/N CH2375N2375E was CH2375N2375EHT, P/N 60045335 was 60044335, 32345875 was 60044875, 65050902 qty 10 was BZSSSLT043F037 qty 9	J.Anderson	J.Johnson
0/16/2017	E	Revised P/N BZSSSLT043F037 was BSSSLT043F037, qty 9 was 12, shear rating 5,500 lbs was 4,300 lbs, Releasing Procedures; Added HSN and Viton options, General Screw Torque Recommendations, Elastomer Trim Temperature Guide, P/N 60044875	J.Anderson	K.Plunkett
03/11/15	D	Revised max. tensile load	J.Anderson	K.Plunkett
01/27/2015	C	Added – Max OD across retracted drag blocks, Note2; Revised – Description, Note7, P/N 60145810 was P/N 60144810 for (9.5-13.5#); Material was 8620 (P/N’s 9040900C, 9045900C	B.Mathis	K.Plunkett
08/22/2014	B	Revised - P/N 32345345 was 32344340, 32344345 was 32345340, tech illustration; Removed - Carbide option part numbers	J.Anderson	K.Plunkett
07/29/2014	A	Created new tech manual	-	-