



VSI-X PACKER

7" X 3-1/2"

Manual No:
DL-601-7000-072

Revision: **D**

Revision Date:
07/10/2012

Authored by: S. White

Approved by: B. Oligschlaeger

A) DESCRIPTION

The VSI-X Single String Double Grip Production Packer is one of the most versatile packers on the market today. The VSI-X is a modification of the popular ASI-X packer with the added advantage of being able to set on electric line or hydraulically.

An On-Off Tool Stinger with a Wireline Plug installed can be attached to the top of the packer. The packer can then be lubricated in the hole and set under pressure. Once the packer is set, casing pressure can be bled off, and the tubing with the On-Off Tool Overshot is run and latched onto the packer. The wireline plug can then be retrieved.

The VSI-X packer can be easily converted to a mechanically set ASI-X by removing the shear screws and installing drag blocks. The ASI-X packer is set with 1/4 right-hand rotation and is released with 1/4 right-hand.

The standard 7" X 3-1/2" VSI-X Packer is designed for differential pressures up to 7,000 PSI.

NOTE₁: Stinger and setting equipment sold separately.

NOTE₂: This packer requires at least a 30 second burn on the wireline setting tool to ensure a proper set. A burn time less than 30 seconds may shear the setting tool off of the packer before fully setting the packer.

B) SPECIFICATION GUIDE

CASING		RECOMMENDED HOLE SIZE (INCHES)	TOOL OD (INCHES)	TOOL ID (INCHES)	THREAD CONNECTION BOX UP / PIN DOWN	PART NUMBER
SIZE (INCHES)	WEIGHT (LBS/FT)					
7	17.0 – 26.0#	6.276 – 6.538	6.000	3.00	3-1/2 EUE	60174
	26.0 – 32.0#	6.094 – 6.276	5.875	3.00	3-1/2 EUE	60173

NOTE₃: Tools listed are right-hand set / right-hand release.

C) RELEASING PROCEDURES

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.

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.

CAUTION₁: High differential pressure below the VSI-X may cause the upper slips to wedge in tighter, requiring an extra amount of tension to release the upper slips.

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

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D) PRESSURE AFFECTED AREA GUIDE

PACKER SIZE (INCHES)	TUBING SIZE (INCHES)	PRESSURE ABOVE	PRESSURE BELOW
7" X 3-1/2"	2.375	6.43 DOWN	7.74 UP
	2.875	4.37 DOWN	6.19 UP
	3.500	1.24 DOWN	3.82 UP

Example: Consider a 7" X 3-1/2" VSI-X Packer run on 2-3/8" tubing with the backside loaded and the tubing swabbed down to cause a 4000 PSI differential on the backside of the packer.

Referring to pressure affected area guide above for a 7" X 3-1/2" VSI-X Packer run on 2.375" tubing, pressure from above acts down on the mandrel across 6.43 in². Multiply the pressure by the area (4,000 PSI X 6.43 in²) results in 25,720 lbs tension at the packer over tubing weight required to open the by-pass valve.

E) ELEMENT SELECTION 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

F) DISASSEMBLY

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

F-1.1) Unscrew and remove shear screws (3) from J-body (20).

F-1.2) Move J-body assembly as needed to unscrew and remove set screws (28) from J-pin bottom sub (23).

F-1.3) Unscrew and remove J-pin bottom sub (23) from inner mandrel (2).

NOTE₄: The drag block body assembly must be free to rotate.

F-1.3.1) Remove o-ring (33) from J-pin bottom sub (23).

F-1.4) Unscrew and remove set screws (31) from J-body (20).

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

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

F-1.7) Unscrew and remove rubber mandrel cap (19) from rubber mandrel (11).

NOTE₆: For added leverage, insert a rod thru rubber retainer (15) and rubber mandrel (11) as needed.

F-1.8) Wedge lower slips (17) outwards (if needed). Remove drag block body assembly and disassemble:

F-1.8.1) Remove lower slips (17) and lower slip springs (25) from drag block body (18).

F-1.9) Unscrew and remove lower cone (16) from rubber retainer (15).

F-1.10) Unscrew rubber mandrel (11) from center coupling (10).

NOTE₇: For added leverage, insert a rod thru upper cone (9) as needed.



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F) DISASSEMBLY (cont'd)

F-1.11) Remove rubber mandrel assembly and disassemble:

F-1.11.1) Remove elements (13, 14), rubber spacers (12), and rubber retainer (15) from rubber mandrel (11).

F-1.11.2) Unscrew and remove gage ring (29) from rubber retainer (15).

F-1.12) Unscrew and remove gage ring (29) from center coupling (10).

F-1.13) Unscrew and remove center coupling (10) from upper cone (9).

F-1.13.1) Remove seal (24) and o-ring (34) from center coupling (10).

F-1.13.1.1) Remove o-ring (32) from seal (24).

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

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

NOTE₈: Do NOT wrench or clamp on seal surface.

F-2.1) Unscrew and remove shear screws (3) from spring cage (5).

CAUTION₂: Compression spring (4) is compressed with spring tension against upper slip body assembly.

F-2.2) Unscrew and remove spring cage cap (27) from spring cage (5).

F-2.3) Unscrew and remove top sub (1) from inner mandrel (2).

F-2.4) Unscrew and remove and remove spring cage (5) from upper slip body (6).

F-2.5) Remove compression spring (4) from spring cage (5).

F-2.6) Wedge releasing slip (7) and upper slips (8) outward (if needed). Remove upper slip body assembly disassemble:

F-2.6.1) Remove spring retainer ring (22) from upper slip body (6).

F-2.6.2) Remove upper slips (8), releasing slip (7) and upper slip springs (26) from upper slip body (6).

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

G) ASSEMBLY

NOTE₉: Clean and inspect all parts. Replace all worn and damaged parts. Install parts in proper order & orientation.

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

NOTE₈: Do NOT wrench or clamp on seal surface.

G-1.1) Assemble upper slip body assembly and install:

G-1.1.1) Install upper slips (8), releasing slip (7) and upper slip springs (26) into upper slip body (6).

G-1.1.2) Install spring retainer ring (22) into upper slip body (6).

G-1.1.3) Wedge releasing slip (7) and upper slips (8) outwards. Slide upper slip body assembly onto inner mandrel (2).

G-1.2) Screw spring cage (5) into upper slip body (6).

G-1.3) Install compression spring (4) onto inner mandrel (2) and into spring cage (5).

G-1.4) Screw top sub (1) onto inner mandrel (2).

CAUTION₂: Compression spring (4) will be compressed with spring tension against upper slip body assembly.

G-1.5) Screw spring cage cap (27) onto spring cage (5).

G-1.6) Align threaded holes in spring cage (5) with recessed holes in top sub (1). Screw shear screws (3) into spring cage (5). Tighten and back out 1/4 turn.

G-1.7) Remove wedges from releasing slip (7) and upper slips (8).



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G) ASSEMBLY (cont'd)

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

G-2.1) Install upper cone (9) and bearing bushing (30) onto inner mandrel (2).

G-2.2) Install o-ring (32) into groove in seal (24).

G-2.3) Install seal (24) into center coupling (10).

CAUTION₃: Do not rip or tear o-ring during installation.

G-2.4) Install o-ring (34) into center coupling (10).

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

NOTE₇: For added leverage, insert a rod thru upper cone (9) as needed.

G-2.6) Screw gage ring (29) on center coupling (10).

G-2.7) Assemble rubber mandrel assembly and install:

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

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

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

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

CAUTION₃: Do not rip or tear o-ring during installation.

G-2.8) Screw lower cone (16) into rubber retainer (15).

G-2.9) Assemble drag block body assembly and install:

G-2.9.1) Install lower slips (17) and lower slip springs (25) into drag block body (18).

G-2.9.2) Wedge lower slips (17) outwards and slide drag block body assembly onto rubber mandrel (11).

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

NOTE₆: For added leverage, insert a rod thru rubber retainer (15) and rubber mandrel (11) as needed.

G-2.11) Install drag block retainer (21) on drag block body (18).

G-2.12) Screw J-body (20) onto drag block body (18) (**NOTE₅:** Left-hand threads).

NOTE₄: The drag block body assembly must be free to rotate.

G-2.13) Screw set screws (31) into J-body (20).

G-2.14) Install o-ring (33) into groove in J-pin bottom sub (23).

G-2.15) Screw J-pin bottom sub (23) onto inner mandrel (2).

CAUTION₃: Do not rip or tear o-ring during installation.

G-2.16) Move J-body assembly as needed to screw set screws (28) into J-pin bottom sub (23).

G-2.17) Align threaded holes in J-body (20) with pocket holes in rubber mandrel cap (19). Screw shear screws (3) into J-body (20). Tighten and back out 1/4 turn.

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



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H) PARTS LIST

ITEM	QTY	DESCRIPTION	MATERIAL	P/N 60173 (26.0 – 32.0#)	P/N 60174 (17.0 – 26.0#)
1	1	TOP SUB	1026	60173610	
2	1	INNER MANDREL	1026	60373210	
3	16	SHEAR SCREW (2375#)	BRASS	60100990	
4	1	COMPRESSION SPRING	CHROME VANADIUM	60373920	
5	1	SPRING CAGE	1026	60174310	
6	1	UPPER SLIP BODY	1026	60073320	
7	1	RELEASE SLIP	P-110	60073125	
8	2	UPPER SLIP	1026	60073115	
9	1	UPPER CONE	1026	60373410	
10	1	CENTER COUPLING	1026	60273620	
11	1	RUBBER MANDREL	1026	60073220	
12	2	RUBBER SPACER	1026	60273840	60274840
13	1	ELEMENT	70 DURO	60273511	60274511
14	2	ELEMENT	90 DURO	60273513	60274513
15	1	RUBBER RETAINER	1026	60273850	
16	1	LOWER CONE	1026	60073420	
17	4	LOWER SLIP	1026	60073135	
18	1	DRAG BLOCK BODY	1026	60073335	
19	1	RUBBER MANDREL CAP	1026	60173230	
20	1	J-BODY	1026	60173340	
21	1	DRAG BLOCK RETAINER	1026	60073910	
22	1	SPRING RETAINER RING	1026	60073820	
23	1	J-PIN BOTTOM SUB	P-110/1026	60373650	
24	1	SEAL	NITRILE	60073520	
25	8	LOWER SLIP SPRING		7170901	
26	6	UPPER SLIP SPRING		7170902	
27	1	SPRING CAGE CAP	1026	60174810	
28	2	SET SCREW 1/4-20 UNC X 7/16	STEEL	SSS025C043 7/16"	SSS025C037 3/8"
29	2	GAGE RING	1026	60273830	60274830



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H) PARTS LIST (cont'd)

ITEM	QTY	DESCRIPTION	MATERIAL	P/N 60173 (26.0 – 32.0#)	P/N 60174 (17.0 – 26.0#)
30	1	BEARING BUSHING	1026	60373224	
31	3	SET SCREW 3/8-16 UNC X 3/8	STEEL	SSS037C037	
32	1	155-90 O-RING	NITRILE	90155	
33	1	237-90 O-RING	NITRILE	90237	
34	1	243-90 O-RING	NITRILE	90243	

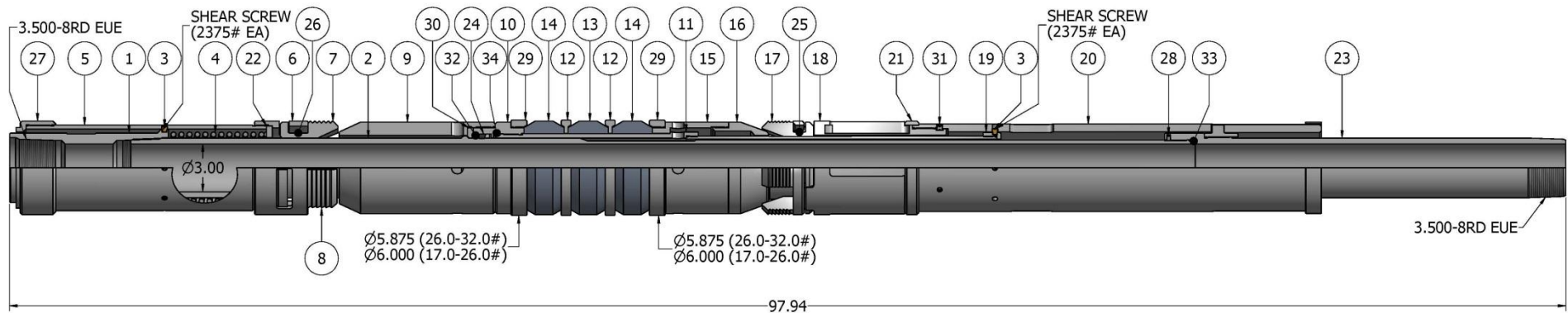
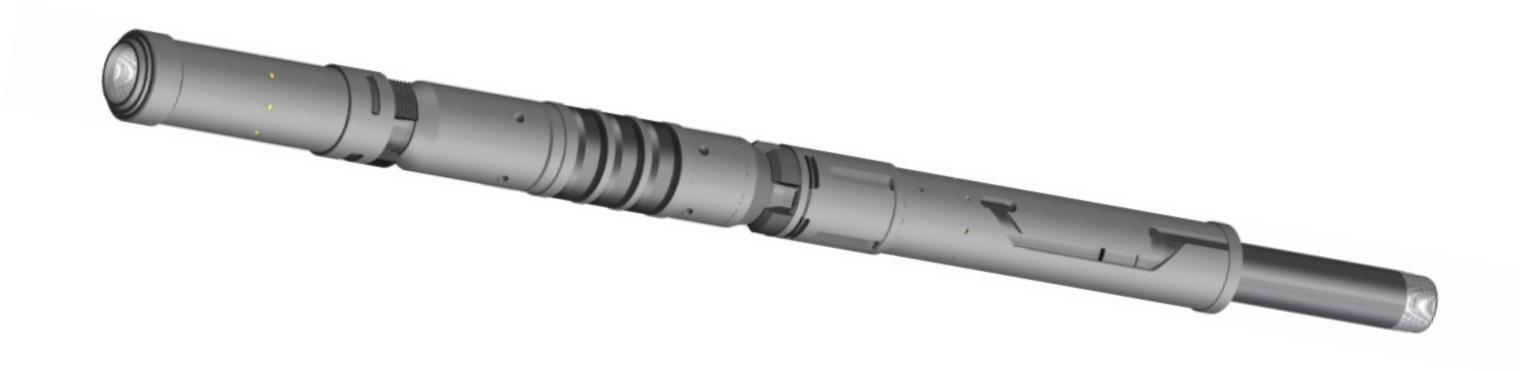
REDRESS KIT		60173050	60174050
ASSEMBLED WEIGHT		311 LBS	312 LBS

NOTE₁₀: OPTIONAL PER CUSTOMER REQUIREMENTS FOR STINGER

8	1/2-13 UNC X 7/16 SHEAR SCREW (5500# EA)	BRASS	BSSSLT050C043
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I) TECHNICAL ILLUSTRATION



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