



VSI-X HT PACKER with DOUBLE HOOK J-SLOT 4-1/2" X 2-3/8"

Manual No:
DL-601-4500-747

Revision: **B**

Revision Date:
04/26/2019

Authored by : J.Anderson

Approved by: K.Riggs

A) DESCRIPTION

The VSI-X Single String Double-Grip Production Packer is one of the most versatile packers on the market. This packer is a modification of the ASI-X Packer with the 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 this packer. This packer can then be lubricated in the hole and set under pressure. Once set, casing pressure can be bled off, and the tubing with an On-Off Tool Overshot can be run and latched onto the packer. The Wireline Plug can then be removed.

This packer easily converts to a mechanically set ASI-X Packer – just remove the shear screws and install drag blocks and drag block springs. The ASI-X Packer sets with 1/4 right-hand rotation and releases with 1/4 right-hand rotation. The ASI-X Packer can be left in tension, compression or neutral.

This packer features a double hook J-slot to prevent the packer from unsetting when manipulating the work string above the packer in tension.

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.

CAUTION₁: Do not run the tool without properly tightening connections. Running the tool with loose connections may damage the tool and cause malfunction.

B) RELATED TOOLS (sold separately)

B-1) 4-1/2 X 2-3/8" Wireline Adapter Kit (WLAK) (PN 97145)—refer to technical manual *DL-971-4500-542*.

B-2) 2-3/8" DT-2 On/Off Tool and Stinger—refer to technical manual *DL-512-2375-360*.

C) SPECIFICATION GUIDE

CASING			TOOL		THREAD CONNECTION BOX UP / PIN DOWN	PART NUMBER
SIZE (INCHES)	WEIGHT (LBS/FT)	RECOMMENDED HOLE SIZE (INCHES)	OD (INCHES)	ID (INCHES)		
4-1/2	9.5 – 13.5	3.920 – 4.090	3.750	1.94	2-3/8 EUE	60145HTDJ 60156HTDJH ¹ 60156HTDJV ²

Elastomer Trim Options: ¹HSN, ²Viton

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

DIFFERENTIAL PRESSURE (MAX)	TENSILE LOAD THRU TOOL (MAX)
10,000 PSI	55,000 LBS

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



VSI-X HT PACKER with DOUBLE HOOK J-SLOT 4-1/2" X 2-3/8"

Manual No:
DL-601-4500-747

Revision: **B**

Revision Date:
04/26/2019

Authored by : J.Anderson

Approved by: K.Riggs

D) PRE-INSTALLATION INSPECTION PROCEDURES

CAUTION₂: 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) 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. 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.

CAUTION₃: High differential pressure below the VSI-X HT Packer may cause the upper slips to wedge in tighter, requiring an extra amount of tension to release the upper slips.

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. 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.



VSI-X HT PACKER with DOUBLE HOOK J-SLOT 4-1/2" X 2-3/8"

Manual No:
DL-601-4500-747

Revision: **B**

Revision Date:
04/26/2019

Authored by : J.Anderson

Approved by: K.Riggs

G) PRESSURE AFFECTED AREA GUIDE

PACKER SIZE (INCHES)	TUBING SIZE (INCHES)	PRESSURE AFFECTED AREA (SQ. INCHES)	
		ABOVE	BELOW
4-1/2	1.900	1.48 (DOWN)	-2.28 (UP)
	2.063	0.97 DOWN	-1.91 (UP)
	2.375	-0.11 (UP)	-1.19 (UP)

Example: Consider a 4-1/2" X 2-3/8" VSI-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 4-1/2" X 2-3/8" VSI-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 -0.11 in². Multiplying the differential pressure (3,000 PSI) by the pressure affected area (-0.11 in²) results in a force of -330 lbs. The piston effect on the packer mandrel is an upward force of 330 lbs.

H) 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

I) RECOMMENDED TOOLS

I-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

I-2) SPECIAL TOOLS

ITEM	QTY	DESCRIPTION	PART NUMBER
T-1	1	ASSEMBLY TOOL 4-1/2" - 7-5/8" VSI-XW	AT100



VSI-X HT PACKER with DOUBLE HOOK J-SLOT 4-1/2" X 2-3/8"

Manual No:
DL-601-4500-747

Revision: **B**

Revision Date:
04/26/2019

Authored by: J.Anderson

Approved by: K.Riggs

J) DISASSEMBLY

J-1) Clamp spring cage (5) in vise.

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

J-1.2) Unscrew and remove bottom nipple (22) from J-pin bottom sub (23).

J-1.3) Unscrew and remove set screws (21) from J-pin bottom sub (23). Move J-body (20) as needed to access set screws (28).

J-1.4) Unscrew and remove J-pin bottom sub (23) from inner mandrel (2).

NOTE4: Drag block body assembly must be free to rotate.

J-1.4.1) Remove o-ring (28) from J-pin bottom sub (23).

J-1.5) Unscrew and remove set screws (21) from J-body (20).

J-1.6) Unscrew and remove J-body (20) from drag block body (18) (**NOTE5:** Left-hand threads).

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

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

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

J-1.8.1) Remove wedges (if needed). Remove lower slips (17) and lower slip springs (25) from drag block body (18).

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

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

J-1.11) Remove rubber mandrel assembly and disassemble:

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

J-1.12) Unscrew and remove center coupling (10) from upper cone (9).

J-1.12.1) Remove bonded seal (24) and o-ring (29) from center coupling (10).

J-1.12.1.1) Remove o-ring (27) from bonded seal (24).

J-1.13) Remove upper cone (9) from inner mandrel (2).

J-1.14) Wedge slips outwards (if needed). Unscrew and remove inner mandrel (2) from top sub (1).

J-1.15) Remove wedges (if needed). Remove releasing slip (7), upper slips (8) and upper slip springs (26) from spring cage (5).

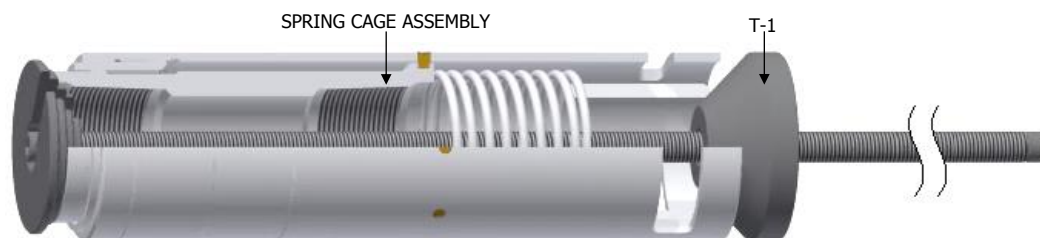


Fig. 2

J-1.16) Disassemble spring cage assembly:

J-1.16.1) Position assembly tool (T-1) hand-tight against top sub (1) and spring cage (5) of spring cage assembly (Fig. 2).

CAUTIONs: Compression spring (4) is compressed with tension against spring cage assembly.

J-1.16.2) Unscrew and remove shear screws (3) from spring cage (5).



VSI-X HT PACKER with DOUBLE HOOK J-SLOT 4-1/2" X 2-3/8"

Manual No:
DL-601-4500-747

Revision: **B**

Revision Date:
04/26/2019

Authored by : J.Anderson

Approved by: K.Riggs

J) DISASSEMBLY (cont'd)

J-1.16.3) Release compression spring (4) tension by loosening assembly tool (T-1) until enough space exists between stepped cone of assembly tool (5) and spring cage cap (6) for spring cage cap (6) to be unscrewed from spring cage (5).

J-1.16.4) Unscrew spring cage cap (6) from spring cage (5).

J-1.16.5) Release remaining compression spring tension by loosening assembly tool (T-1). Remove tool from assembly.

J-1.16.6) Remove spring cage cap (6), top sub (1), and compression spring (4) from spring cage (5).

J-2) Unclamp and remove spring cage (5) from vise.

K) 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.

CAUTION4: To ensure tool operates properly, install o-rings in o-ring grooves **NOT** thread reliefs (Fig. 3).

K-1) Clamp spring cage (5) in vise.

K-1.1) Assemble spring cage assembly:

K-1.1.1) Install compression spring (4) and top sub (1) into spring cage (5).

K-1.1.2) Screw spring cage cap (6) into spring cage (5).

NOTE8: Press down top sub (1) to compress compression spring (4) as necessary.

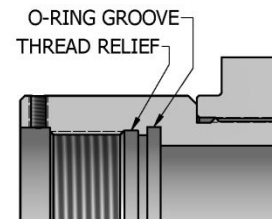


Fig. 3

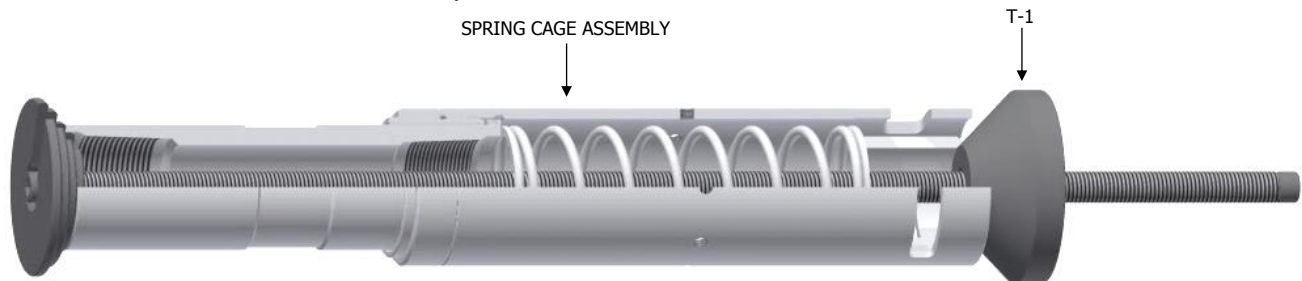


Fig. 4

K-1.1.3) Compress compression spring (4) with assembly tool (T-1) (Fig. 4).

K-1.1.4) Align threaded holes in spring cage (5) with recessed holes in top sub (1). Screw shear screws (3) into spring cage (5). Tighten until shear screws (3) make contact with top sub (1). Back shear screws (3) out 1/4 turn.

K-1.1.5) Remove assembly tool (T-1) from spring cage assembly.

CAUTION5: Compression spring (4) is compressed with tension against spring cage assembly.

K-1.1.6) Install upper slips (8), releasing slip (7) and upper slip springs (26) into spring cage (5). Wedge releasing slip (7) and upper slips (8) outwards.

K-1.2) Screw inner mandrel (2) into top sub (1). Remove wedges.

K-1.3) Install upper cone (9) onto inner mandrel (2).

K-1.4) Install o-ring (27) into groove in bonded seal (24).



VSI-X HT PACKER with DOUBLE HOOK J-SLOT 4-1/2" X 2-3/8"

Manual No:
DL-601-4500-747

Revision: **B**

Revision Date:
04/26/2019

Authored by : J.Anderson

Approved by: K.Riggs

K) ASSEMBLY (cont'd)

K-1.5) Install bonded seal (24) into center coupling (10).

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

K-1.6) Install o-ring (29) in groove in center coupling (10).

K-1.7) Screw center coupling (10) onto upper cone (9).

K-1.8) Assemble rubber mandrel assembly and install:

K-1.8.1) Install rubber retainer (15), elements (13, 14), and rubber spacers (12) onto rubber mandrel (11).

K-1.8.2) Install rubber mandrel assembly onto inner mandrel (2) and screw rubber mandrel (11) into center coupling (10).

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

K-1.9) Screw lower cone (16) into rubber retainer (15).

K-1.10) Assemble drag block body assembly and install:

K-1.10.1) Install lower slips (17) and lower slip springs (25) into drag block body (18). Wedge lower slips (17) outwards.

K-1.10.2) Install drag block body assembly onto rubber mandrel (11). Remove wedges.

K-1.11) Screw rubber mandrel cap (19) onto rubber mandrel (11).

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

K-1.12) Screw J-body (20) onto drag block body (18) (**NOTE₅**: Left-hand threads).

K-1.13) Screw set screws (21) into J-body (20).

K-1.14) Install o-ring (28) into groove in J-pin bottom sub (23).

K-1.15) Screw J-pin bottom sub (23) onto inner mandrel (2).

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

NOTE₄: Drag block body assembly must be free to rotate.

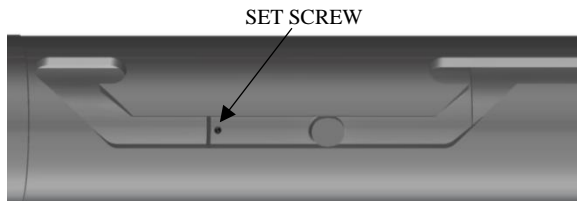


Fig. 5



Fig. 6

K-1.16) Rotate J-body (20) as needed to position J-pin of J-pin bottom sub (23) along J-slot to access threaded holes (Fig. 5). Screw set screws (21) into J-pin bottom sub (23).

K-1.17) Screw bottom nipple (22) into J-pin bottom sub (23).

K-1.18) Position J-pin of J-pin bottom sub (23) in set position in J-slot of J-body (20) (Fig. 6).

K-1.19) Align threaded holes in J-body (20) with pocket holes in rubber mandrel cap (19). Screw shear screws (3) into J-body (20). Tighten until shear screws (3) make contact with rubber mandrel cap (19). Back shear screws (3) out 1/4 turn.

K-2) Unclamp spring cage (5) from vise and remove assembled tool.



VSI-X HT PACKER with DOUBLE HOOK J-SLOT 4-1/2" X 2-3/8"

Manual No:
DL-601-4500-747

Revision: **B**

Revision Date:
04/26/2019

Authored by : J.Anderson

Approved by: K.Riggs

L) PARTS LIST

ITEM	QTY	DESCRIPTION	MATERIAL	P/N 60145HTDJ
1	1	TOP SUB	DLMS110	60145610HT
2	1	INNER MANDREL	DLMS110	60045210HT
3	16	SHEAR SCREW (2375#)	DLM360BRS	60100990
4	1	COMPRESSION SPRING	DLMCRSP	60345920
5	1	SPRING CAGE ASSEMBLY	DLMS110 / DLMS60	60145325HT
6	1	SPRING CAGE CAP	DLMS60	60145810
7	1	RELEASING SLIP	DLMS110	60045125
8	2	UPPER SLIP	DLMS35	60045115
9	1	UPPER CONE	DLMS110	60045410HT
10	1	CENTER COUPLING	DLMS60	60245620
11	1	RUBBER MANDREL	DLMS110	60045220
12	2	RUBBER SPACER	DLMS60	60245840
13	1	ELEMENT	80 DURO NITRILE	60245512
14	2	ELEMENT	90 DURO NITRILE	60245513
15	1	RUBBER RETAINER	DLMS60	60245850
16	1	LOWER CONE	DLMS110	60045420HT
17	4	LOWER SLIP	DLMS60	60045135
18	1	DRAG BLOCK BODY	DLMS60	60045335
19	1	RUBBER MANDREL CAP	DLMS60	60145230
20	1	J-BODY - DOUBLE HOOK	P-110	60145345HT
21	6	SET SCREW 1/4-20 UNC X 3/8	DLMS80	SSS025C037
22	1	BOTTOM NIPPLE	STEEL	60355636
23	1	J-PIN BOTTOM SUB	DLMS110	60045634HT
24	1	BONDED SEAL	NITRILE	60045520
25	4	LOWER SLIP SPRING	ELGILOY	7145901
26	3	UPPER SLIP SPRING	ELGILOY	7145902
27	1	145 O-RING	90 DURO NITRILE	90145
28	1	228 O-RING	90 DURO NITRILE	90228
29	1	232 O-RING	90 DURO NITRILE	90232
30	8	SHEAR SCREW (5000#) 7/16-20 UNF X 7/16	DLM360BRS	BSSSLT043F043*

*Refer to WLAK tech manual for placement.

REDRESS KIT (RDK)		60145050HT
ASSEMBLED WEIGHT		114 LBS



VSI-X HT PACKER
with DOUBLE HOOK J-SLOT
4-1/2" X 2-3/8"

Manual No:
DL-601-4500-747

Revision: **B**

Revision Date:
04/26/2019

Authored by : J.Anderson

Approved by: K.Riggs

L) PARTS LIST (cont'd)

L-1) ELASTOMER TRIM OPTIONS

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

L-1.1) HSN

ITEM	QTY	DESCRIPTION	MATERIAL	P/N 60145HTDJH
13	1	ELEMENT	80 DURO HSN	60245512H
14	2	ELEMENT	90 DURO HSN	60245513H
24	1	BONDED SEAL	HSN	60045520H
27	1	145 O-RING	90 DURO HSN	90145H
28	1	228 O-RING	90 DURO HSN	90228H
29	1	232 O-RING	90 DURO HSN	90232H

REDRESS KIT (RDK)		60145050HTH
-------------------	--	-------------

L-1.2) VITON

ITEM	QTY	DESCRIPTION	MATERIAL	P/N 60145HTDJV
13	1	ELEMENT	80 DURO VITON	60245512V
14	2	ELEMENT	90 DURO VITON	60245513V
24	1	BONDED SEAL	VITON	60045520V
27	1	145 O-RING	90 DURO VITON	90145V
28	1	228 O-RING	90 DURO VITON	90228V
29	1	232 O-RING	90 DURO VITON	90232V

REDRESS KIT (RDK)		60145050HTV
-------------------	--	-------------



VSI-X HT PACKER with DOUBLE HOOK J-SLOT 4-1/2" X 2-3/8"

Manual No:
DL-601-4500-747

Revision: **B**

Revision Date:
04/26/2019

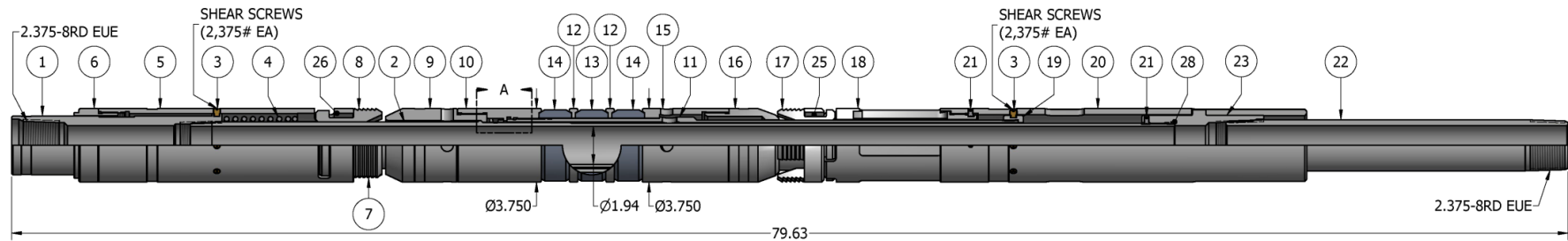
Authored by : J.Anderson


Approved by: K.Riggs

M) TECHNICAL ILLUSTRATION



DETAIL A



	VSI-X HT PACKER with DOUBLE HOOK J-SLOT 4-1/2" X 2-3/8"	Manual No: DL-601-4500-747
		Revision: B
		Revision Date: 04/26/2019
<i>Authored by : J.Anderson</i>		<i>Approved by: K.Riggs</i>

N) REVISION HISTORY

DATE	REVISION	DESCRIPTION OF CHANGES	REVISED BY	APPROVED BY
04/26/2019	B	Removed tool drift ID; Added General Screw Torque Recommendations; Revised Elastomer Trim Temp. Guide temp ratings, P/N BSSSLT043F043 was 4,300 lbs	J.Anderson	J.Johnson
08/29/14	A	Created new manual	-	-