



VSI-X HT PACKER

with DOUBLE HOOK J-SLOT

5-1/2" X 2-7/8"

Manual No:
DL-601-5500-745

Revision: **A**

Revision Date:
08/29/2014

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) 5-1/2 X 2-7/8" Wireline Adapter Kit (WLAK) (PN 97156)—refer to technical manual *DL-971-5500-440*.

B-2) 2-7/8" DT-2 On/Off Tool and Stinger—refer to technical manual *DL-512-2875-146*.

C) SPECIFICATION GUIDE

CASING			TOOL			THREAD CONNECTION BOX UP / PIN DOWN	PART NUMBER
SIZE (INCHES)	WEIGHT (LBS/FT)	RECOMMENDED HOLE SIZE (INCHES)	OD (INCHES)	NOMINAL ID (INCHES)	DRIFT ID (INCHES)		
5-1/2	14.0 - 20.0	4.778 - 5.012	4.625	2.38	2.347	2-7/8 EUE	60156HT5 60156HT5H ¹ 60156HT5V ²
	20.0 - 23.0	4.670 - 4.778	4.500	2.37	2.347	2-7/8 EUE	60159HT5 60159HT5H ¹ 60159HT5V ²

¹HSN Option

²Viton Option

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

DIFFERENTIAL PRESSURE (MAX)	TENSILE LOAD THRU TOOL (MAX)
10,000 PSI	88,915 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

5-1/2" X 2-7/8"

Manual No:
DL-601-5500-745

Revision: **A**

Revision Date:
08/29/2014

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.

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) 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 PROCEDURES

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

5-1/2" X 2-7/8"

Manual No:
DL-601-5500-745

Revision: **A**

Revision Date:
08/29/2014

Authored by : J.Anderson

Approved by: K.Riggs

G) PRESSURE AFFECTED AREA GUIDE

PACKER SIZE (INCHES)	TUBING SIZE (INCHES)	PRESSURE (SQ. INCHES)	
		ABOVE	BELOW
5-1/2" X 2-7/8"	2.375	2.06 DOWN	3.37 UP
	2.875	0.00	1.81 UP

Example: Consider a 5-1/2" X 2-7/8" VSI-X HT Packer set on 2.375" tubing with a differential pressure of 3,000 PSI in the annulus around the tubing above the packer. How much force is 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 5-1/2" X 2-7/8" VSI-X HT Packer set on 2.375" tubing. In this example, the differential pressure from above the packer acts down on the seal area of the mandrel area across a pressure affected area of 206 in². Multiplying the differential pressure (3,000 PSI) by the pressure affected area (2.06 in²) results in a downward force of 6,180 lbs. 6,180 lbs is the force which needs to be overcome when releasing the packer.

H) 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

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 5-1/2" X 2-7/8"

Manual No:
DL-601-5500-745

Revision: **A**

Revision Date:
08/29/2014

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 (28) 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 (33) from J-pin bottom sub (23).

J-1.5) Unscrew and remove set screws (31) 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) Remove drag block retainer (21) from drag block body (18).

J-1.8) 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-1.9) Wedge lower slips (17) outwards (if needed). Remove drag block body assembly and disassemble:

J-1.9.1) Remove wedges (if needed). Remove lower slips (17) and lower slip springs (25) from drag block body (18).

J-1.10) Unscrew and remove lower cone (16) from rubber retainer (15).

J-1.11) Unscrew rubber mandrel (11) from center coupling (10).

J-1.12) Remove rubber mandrel assembly and disassemble:

J-1.12.1) Remove gage ring (29), elements (13, 14), rubber spacers (12), and rubber retainer (15) from rubber mandrel (11).

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

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

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

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

J-1.15) Wedge slips outwards (if needed). Unscrew and remove inner mandrel (2) from top sub (1).

J-1.16) Remove wedges (if needed). Remove releasing slip (7), upper slips (8) and upper slip springs (26) from spring cage (5).

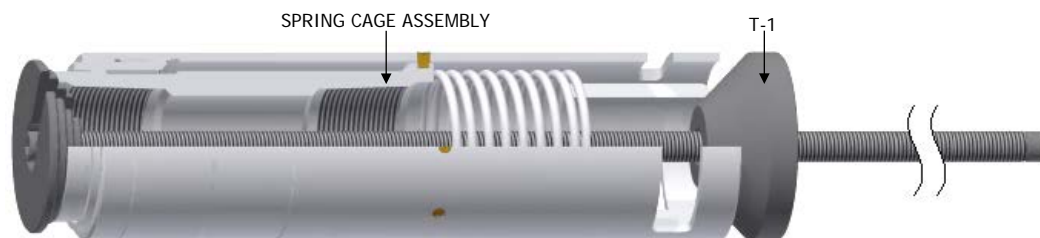


Fig. 2

J-1.17) Disassemble spring cage assembly:

J-1.17.1) Position assembly tool (T-1) hand-tight against top sub (1) and spring cage (5) of spring cage assembly (Fig. 2).

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

J-1.17.2) Unscrew and remove shear screws (3 or 6) from spring cage (5).



VSI-X HT PACKER with DOUBLE HOOK J-SLOT 5-1/2" X 2-7/8"

Manual No:
DL-601-5500-745

Revision: **A**

Revision Date:
08/29/2014

Authored by : J.Anderson

Approved by: K.Riggs

J) DISASSEMBLY (cont'd)

J-1.17.3) 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 (27) for spring cage cap (27) to be unscrewed from spring cage (5).

J-1.17.4) Unscrew spring cage cap (27) from spring cage (5).

J-1.17.5) Release remaining compression spring (4) tension by loosening assembly tool (T-1). Remove tool from assembly.

J-1.17.6) Remove spring cage cap (27), 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 (27) into spring cage (5).

NOTE₉: Press down top sub (1) to compress compression spring (4) as necessary.

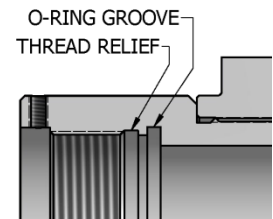


Fig. 3

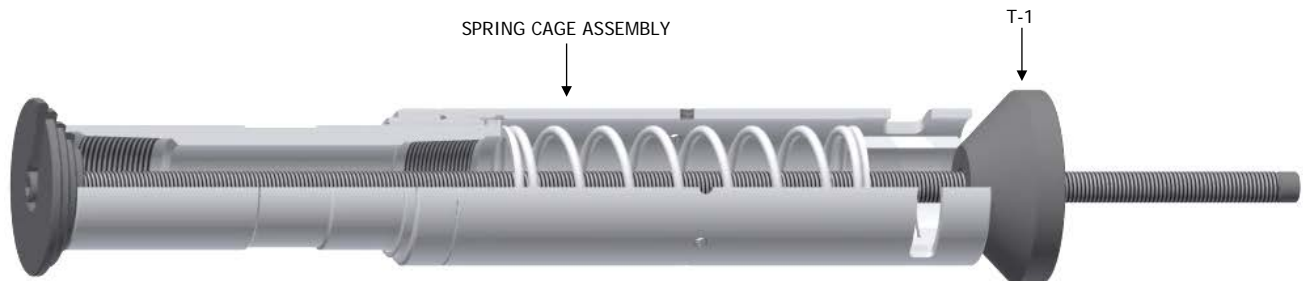


Fig. 4

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 or 6) into spring cage (5). Tighten until shear screws (3 or 6) make contact with top sub (1). Back shear screws (3 or 6) 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.

NOTE₈: Install two (2ea) springs per slip (Fig. 5).

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

K-1.3) Install upper cone (9) and bearing bushing (30) onto inner mandrel (2).

K-1.4) Install o-ring (32) into groove in bonded seal (24).

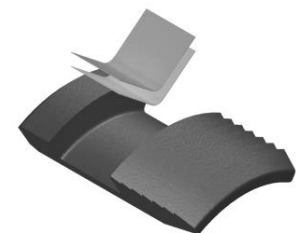


Fig. 5



VSI-X HT PACKER with DOUBLE HOOK J-SLOT 5-1/2" X 2-7/8"

Manual No:
DL-601-5500-745

Revision: **A**

Revision Date:
08/29/2014

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 (34) 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), rubber spacers (12), and gage ring (29) 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.

NOTE₈: Install two (2ea) springs per slip (Fig. 6).

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) Install drag block retainer (21) onto drag block body (18).

K-1.13) Screw J-body (20) onto drag block body (18) (**NOTE₅**: Left-hand threads).

K-1.14) Screw set screws (31) into J-body (20).

K-1.15) Install o-ring (33) into groove in J-pin bottom sub (23).

K-1.16) 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.

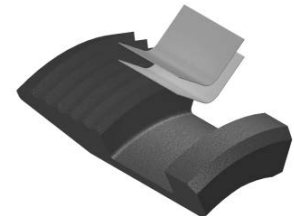
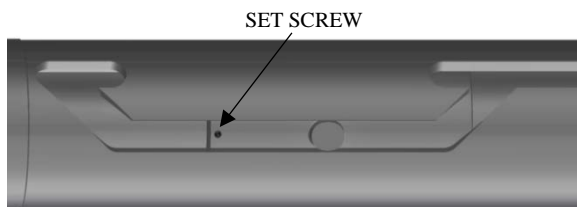


Fig. 6



SET SCREW

Fig. 7



J-PIN

Fig. 8

K-1.17) Rotate J-body (20) as needed to position J-pin of J-pin bottom sub (23) along J-slot to access threaded holes (Fig. 7). Screw set screws (28) into J-pin bottom sub (23).

K-1.18) Screw bottom nipple (22) into J-pin bottom sub (23).

K-1.19) Position J-pin of J-pin bottom sub (23) in set position in J-slot of J-body (20) (Fig. 8).

K-1.20) 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

5-1/2" X 2-7/8"

Manual No:
DL-601-5500-745

Revision: **A**

Revision Date:
08/29/2014

Authored by : J.Anderson

Approved by: K.Riggs

L) PARTS LIST

ITEM	QTY	DESCRIPTION	MATERIAL	P/N 60156HT5 (14.0 – 20.0#)	P/N 60159HT5 (20.0 – 23.0#)
1	1	TOP SUB	P-110	60156610HT	
2	1	INNER MANDREL	P-110	60356210HT	60359210HT
3	-	SHEAR SCREW (2375#)	BRASS	60100990 (16 QTY)	60100990 (8 QTY)
4	1	COMPRESSION SPRING	CHROME VANADIUM	60356920	
5	1	SPRING CAGE	P-110/1026	60156325HT	60159325HT
6	8	SHEAR SCREW (2375#)	BRASS	-	90555990
7	1	RELEASING SLIP	P-110	60056125	
8	2	UPPER SLIP	1026	60056115	
9	1	UPPER CONE	P-110	60356410HT	
10	1	CENTER COUPLING	1026	60056620	
11	1	RUBBER MANDREL	P-110	60056220HT	60059220HT
12	2	RUBBER SPACER	1026	60256840	60259840
13	1	ELEMENT	80 DURO NITRILE	60256512	60259512
14	2	ELEMENT	90 DURO NITRILE	60256513	60259513
15	1	RUBBER RETAINER	1026	60256850	60259850
16	1	LOWER CONE	P-110	60056420HT	60059420HT
17	4	LOWER SLIP	1026	60056135	
18	1	DRAG BLOCK BODY	1026	60056335	60059335
19	1	RUBBER MANDREL CAP	1026	60156230	
20	1	J-BODY	1026	60156345	
21	1	DRAG BLOCK RETAINER	1026	60056910	60059910
22	1	NIPPLE	L-80	60370636	
23	1	J-PIN SUB	P-110	60356634HT	
24	1	BONDED SEAL	90 DURO NITRILE	60056520	
25	8	LOWER SLIP SPRING	ELGILOY	7155901	
26	6	UPPER SLIP SPRING		7155902	
27	1	SPRING CAGE CAP	1026	60156810	60159810
28	2	SET SCREW 1/4-20 UNC	STEEL	SSS025C037 (3/8" LONG)	SSS025C050 (1/2" LONG)
29	1	GAGE RING	1026	60256830	60259830
30	1	BEARING BUSHING	1026	60056224	
31	3	SET SCREW 5/16-18 UNC	STEEL	SSS031C037 (3/8" LONG)	SSS031C031 (5/16" LONG)



VSI-X HT PACKER

with DOUBLE HOOK J-SLOT

5-1/2" X 2-7/8"

Manual No:
DL-601-5500-745

Revision: **A**

Revision Date:
08/29/2014

Authored by : J.Anderson

Approved by: K.Riggs

L) PARTS LIST (cont'd)

ITEM	QTY	DESCRIPTION	MATERIAL	P/N 60156HT5 (14.0 – 20.0#)	P/N 60159HT5 (20.0 – 23.0#)
32	1	151 O-RING	90 DURO NITRILE		90151
33	1	231 O-RING	90 DURO NITRILE		90231
34	1	235 O-RING	90 DURO NITRILE		90235
35	8	SHEAR SCREW (5500#) 1/2-13 UNC X 7/16	BRASS		BSSSLT050C043*

*Refer to WLAK tech manual for placement.

REDRESS KIT (RDK)		60156050HT	60159050HT
ASSEMBLED WEIGHT		184 LBS	172 LBS

M) OPTIONS PARTS LIST

M-1) HSN

NOTE₁₀: For temperature range, refer to Element Selection Guide.

ITEM	QTY	DESCRIPTION	MATERIAL	P/N 60156HT5H (14.0 – 20.0#)	P/N 60159HT5H (20.0 – 23.0#)
13	1	ELEMENT	80 DURO HSN	60256512H	60259512H
14	2	ELEMENT	90 DURO HSN	60256513H	60259513H
24	1	BONDED SEAL	90 DURO HSN	60056520H	
32	1	151 O-RING	90 DURO HSN	90151H	
33	1	231 O-RING	90 DURO HSN	90231H	
34	1	235 O-RING	90 DURO HSN	90235H	

REDRESS KIT (RDK)		60156050HTH	60156050HTH
-------------------	--	-------------	-------------

M-2) VITON

NOTE₁₀: For temperature range, refer to Element Selection Guide.

ITEM	QTY	DESCRIPTION	MATERIAL	P/N 60156HT5V (14.0 – 20.0#)	P/N 60159HT5V (20.0 – 23.0#)
13	1	ELEMENT	80 DURO VITON	60256512V	60259512V
14	2	ELEMENT	90 DURO VITON	60256513V	60259513V
24	1	BONDED SEAL	90 DURO VITON	60056520V	
32	1	151 O-RING	90 DURO VITON	90151V	
33	1	231 O-RING	90 DURO VITON	90231V	
34	1	235 O-RING	90 DURO VITON	90235V	

REDRESS KIT (RDK)		60156050HTV	60159050HTV
-------------------	--	-------------	-------------



VSI-X HT PACKER with DOUBLE HOOK J-SLOT 5-1/2" X 2-7/8"

Manual No:
DL-601-5500-745

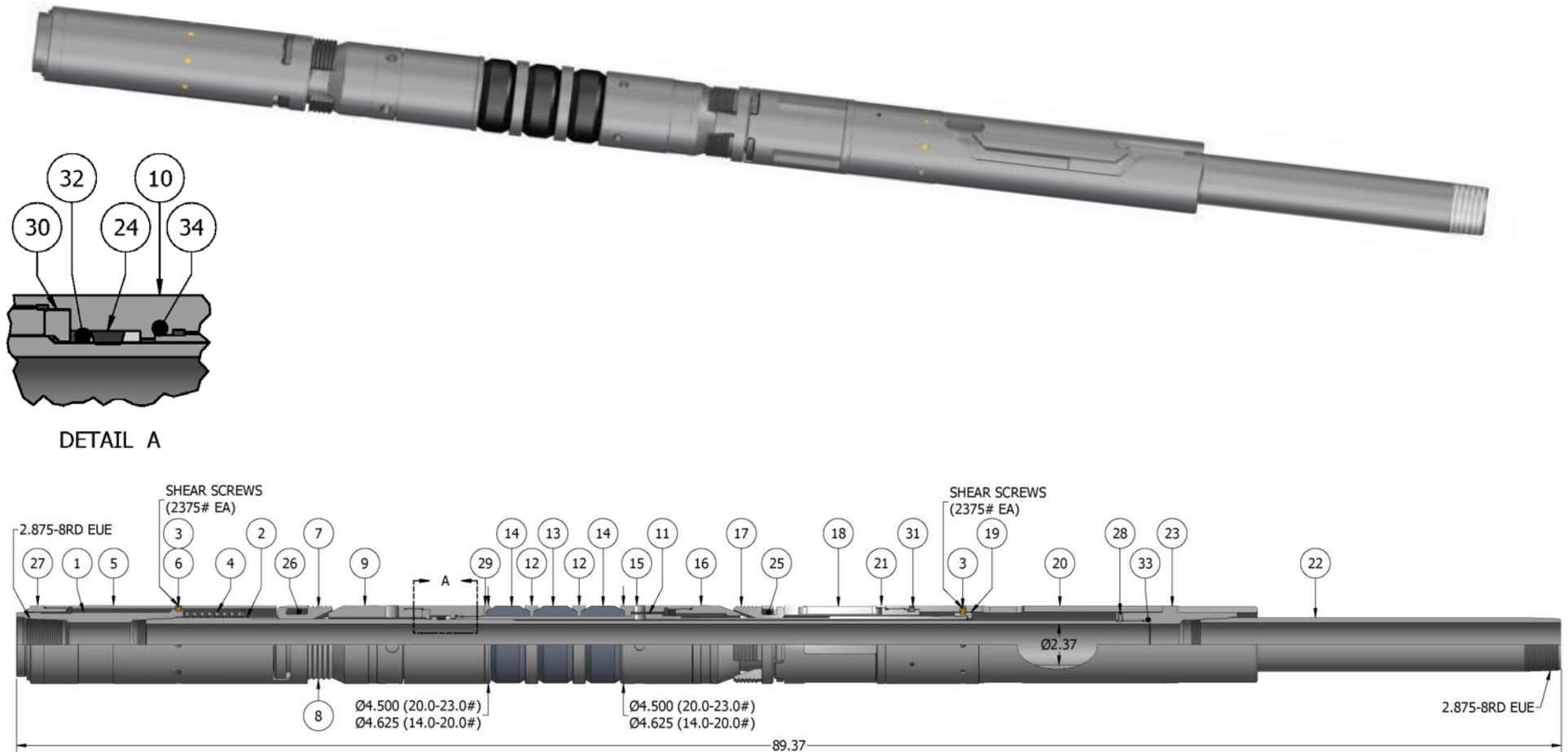
Revision: **A**


Revision Date:
08/29/2014

Authored by : J.Anderson

Approved by: K.Riggs

N) TECHNICAL ILLUSTRATION



	VSI-X HT PACKER with DOUBLE HOOK J-SLOT 5-1/2" X 2-7/8"	Manual No: DL-601-5500-745
		Revision: A
		Revision Date: 08/29/2014
<i>Authored by : J.Anderson</i>		<i>Approved by: K.Riggs</i>

O) REVISION HISTORY

DATE	REVISION	DESCRIPTION OF CHANGES	REVISED BY	APPROVED BY
08/29/14	A	Created new manual	-	-