



DLESP PACKER, 5-1/2" X 2-7/8" W/ (1X) 1/4" FEED THROUGH

Manual No:
DL-948-5500-1734

Revision: **A**

Revision Date:
01/10/2024

Authored by: *J.Anderson*

Approved by: *E.Visaez*

A) DESCRIPTION

The DLESP Packer is a hydraulic set, mechanically held dual string production packer normally run above a single string hydraulic set or wireline set seal bore packer. Because no tubing manipulation is required to set this packer, the well head can be installed and flanged up before setting.

This packer is available with short string or long string setting capabilities and a variety of tubing connections. This packer is also adaptable for electrical submersible pump applications. This packer features a sequential upper slip release system designed to release each slip individually to reduce the pull required to release the packer. The angles on the upper slips and upper slip body result in the slips releasing smoothly from the casing.

B) SPECIFICATION GUIDE

CASING		
SIZE (INCHES)	WEIGHT (LBS/FT)	RECOMMENDED HOLE SIZE (INCHES)
5-1/2	20.0 – 23.0	4.670 – 4.778

TOOL			PART NUMBER
OD (INCHES)	LONG STRING ID (INCHES)	FEED THRU HOLE ID (INCHES)	
4.530	2.38	0.37	94857-BAC-1 94857H-BAC-1 ¹ 94857V-BAC-1 ² 94857C-BAC-1 ³ 94857HC-BAC-1 ⁴ 94857VC-BAC-1 ⁵

Tool Options: ¹HSN, ²Viton, ³Nitrile, Carbide, ⁴HSN, Carbide, ⁵Viton, Carbide

THREAD CONNECTION BOX UP / PIN DOWN	
LONG STRING	FEED THRU HOLES
2-7/8 EUE	1/4 NPT

DIFFERENTIAL PRESSURE (MAX)	TENSILE LOAD THRU TOOL (MAX)
5,000 PSI	58,000 LBS*

*with 40,000 lbs releasing shear segment

SETTING			
SETTING AREA (SQ INCHES)	INITIATION PRESSURE (PSI)	MINIMUM SETTING PRESSURE (PSI)	RECOMMENDED SETTING PRESSURE (PSI)
5.70	1,755	3,860	4,000

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



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C) 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.

NOTE₁: Do not tighten the long string mandrel (2) into the flat top (1) with more than 400 ft-lbs torque.

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

D) OPERATION

CAUTION₂: Do not run the tool without properly tightening connections. Running the tool with loose connections may damage the tool and cause malfunction.

When tubing pressure is applied to the packer, the inlet port allows pressure differential to be present in the setting chamber. This differential forces the setting mandrel to separate from the setting cylinder, shearing the setting shear segment. The setting cylinder is forced down, which shears the lower slip body shear screws and sets the lower slips. The setting mandrel is forced up, which shears the upper slip body shear screws, and sets the upper slips and packs off the elements. Any relative motion between the setting cylinder and the setting mandrel is held in place by the lock ring, which will ratchet in only one direction. With a pressure differential from above, the force is transferred through the outer components of the packer and is supported by the lower slips. With the pressure differential from below, the force transfers through the outer components of the packer and is supported by the upper slips.



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D) OPERATION (cont'd)

D-1) SETTING PROCEDURES

Running speed is critical, especially in heavy or viscous fluid where excess speed can result in swabbing off the packing element or in creating pressure waves which could lead to creating a preset condition. As a guide it is recommended that running speed should not be more than 30 seconds per joint (range II or 30 feet). **Do not exceed this speed**, particularly when running the packer in the heaviest weight casing for the range for which the packer is dressed.

A run in the well with a junk basket and suitable sized gauge ring or a bit and scraper is strongly recommended prior to running. The location of any tight spots should be noted and the running speed for the packer through these spots should be reduced.

Being a hydraulically set packer, it can be subject to preset conditions by pressure waves through the fluid. A slow steady running speed should be used and sudden stops and starts, such as when setting or pulling slips, should be avoided. Make up the packer to the tubing string in the desired position and to the required torque.

Allow at least 30 minutes for the packer to thermally equalize before setting. Temporarily plug the long string below the packer and apply a minimum of 3,860 psi differential in the tubing at the packer and hold it for 30 minutes. The packer should now be fully set and can be pressure tested if desired.

D-2) RELEASING PROCEDURES

The packer is released by a straight pick up on the long string.

E) 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.

F) ELASTOMER TRIM TEMPERATURE GUIDE

TEMPERATURE RANGE (F°)			
TEMPERATURE RANGE (F°)	DUROMETER		
	END	MIDDLE	END
40° - 125°	60	60	60
125° - 300°	80	70	80
300° +	Contact D&L Sales		

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



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G) RECOMMENDED 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) DISASSEMBLY

H-1) Clamp flat top (1) in vise.

H-1.1) From upper end of tool, unscrew and remove top sub (10) from pup joint (20).

H-1.2) Remove o-rings (34) from top sub (10).

H-1.3) Unscrew and remove pup joint (20) from flat top (1).

H-1.4) Moving to lower end of tool, unscrew and remove crossover (5) from long string mandrel (2).

H-1.5) Remove o-rings (33) from crossover (5).

H-1.6) Unscrew and remove set screws (30) from collector sub (23)

H-1.7) Remove collector sub (23) from long string mandrel (2) and feed throughs (3).

H-1.8) Remove o-rings (31) from collector sub (23).

H-1.9) Remove pick-up ring (26) from long string mandrel (2).

H-1.10) Unscrew and remove shear cap (21) from lower slip body (18).

H-1.11) Remove shear plates (28) and shear ring (27) from long string mandrel (2).

H-1.12) Unscrew and remove cap screws (24) from lower cone (16).

H-1.13) Unscrew and remove shear screws (4) from lower slip body (18).

H-1.14) Wedge lower slips (17) outwards. Remove lower slip body assembly and disassemble:

H-1.14.1) Remove wedges (if needed). Remove lower slips (17) from lower slip body (18).

H-1.14.1.1) Unscrew and remove button head cap screws (22) from lower slips (17) and remove slip springs (15).

H-1.15) Remove pick-up ring (26) from long string mandrel (2).

H-1.16) Remove setting mandrel assembly and disassemble:

H-1.16.1) Unscrew and remove lower cone (16) from setting chamber (25).

H-1.16.1.1) Remove o-rings (32, 34, 35) from lower cone (16).

H-1.16.2) Unscrew and remove lock ring (7) from lower end of setting mandrel (11) and setting chamber (25).

H-1.16.3) Unscrew shear ring cap (19) from setting chamber (25) and move upward to expose shear ring (29).

H-1.16.4) Remove shear ring (29) from setting chamber (25).

H-1.16.5) Remove setting mandrel (11) from setting chamber (25).

H-1.16.5.1) Remove o-rings (32, 34) from setting mandrel (11).

H-1.16.5.2) Remove shear ring cap (19) from setting mandrel (11).

H-1.16.6) Remove o-rings (35) from setting chamber (25).

H-1.17) Remove elements (13, 14) and rubber spacers (12) from long string mandrel (2) and feed through tube (3).



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H) DISASSEMBLY (cont'd)

- H-1.18) Unscrew and remove cap screws (24) from upper cone (9).
- H-1.19) Unscrew and remove shear screws (4) from upper slip body (6).
- H-1.20) Wedge upper slips (8) outwards (if needed). Remove upper cone (9) from upper slip body (6).
 - H-1.20.1) Remove o-rings (32, 34) from upper cone (9).
- H-1.21) Unscrew and remove upper slip body (6) from flat top (1).
 - H-1.21.1) Remove wedges (if needed). Remove upper slips (8) from upper slip body (6).
 - H-1.21.1.1) Unscrew and remove button head cap screws (22) from upper slips (8) and remove slip springs (15).
- H-1.22) Unscrew and remove long string mandrel (2) and feed through tube (3) from flat top (1).
 - CAUTION:** Do NOT wrench or clamp on seal surfaces.
- H-2) Unclamp and remove flat top (1) from vise.
 - H-2.1) Remove o-rings (31, 33, 34) from flat top (1).

I) ASSEMBLY

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

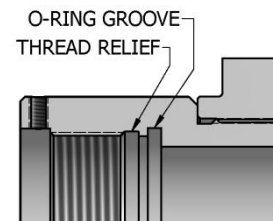


Fig. 2

- I-1) Clamp flat top (1) in vise
 - I-1.1) Install o-rings (31, 33, 34) in o-ring grooves in flat top (1).
 - I-1.2) Screw pup joint (20) into flat top (1).
 - CAUTION:** Do NOT rip or tear o-rings while installing.
 - I-1.3) Install o-rings (34) in o-ring grooves in top sub (10).
 - I-1.4) Screw top sub (10) onto pup joint (20).
 - CAUTION:** Do NOT rip or tear o-rings while installing.
 - I-1.5) Install feed through tube (3) and screw long string mandrel (2) into flat top (1).
 - CAUTION:** Do NOT wrench or clamp on seal surfaces.
 - CAUTION:** Do NOT rip or tear o-rings while installing.
 - I-1.6) Assemble upper slip body assembly and install:
 - I-1.6.1) Place slip springs (15) onto upper slips (8) and screw button head cap screws (22) into upper slips (8) to secure slip springs (15).
 - NOTE:** Install two (2 ea) springs per slip (Fig. 3).
 - I-1.6.2) Install upper slip assemblies into upper slip body (6). Wedge slips outwards.
 - I-1.6.3) Install upper slip body assembly onto long string mandrel (2) and feed through tube (3). Screw upper slip body (6) onto flat top (1).
 - CAUTION:** Do NOT rip or tear o-rings while installing.
 - I-1.7) Install o-rings (32, 34) in o-ring grooves in upper cone (9).
 - I-1.8) Install upper cone (9) onto inner mandrel (2) and feed through tube (3) and into upper slip body (6). Align threaded holes in upper cone (9) with slots in upper slip body (6).
 - I-1.9) Screw cap screws (24) into upper cone (9). Remove wedges from slips.
 - I-1.10) Screw shear screws (4) into upper slip body (6). Tighten until shear screws (4) contact upper cone (9). Back shear screws (4) out 1/4 turn.

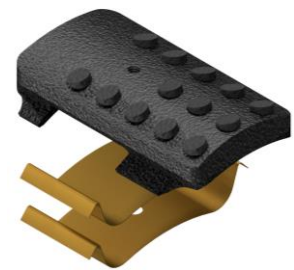


Fig. 3



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I) ASSEMBLY (cont'd)

- I-1.11) Install elements (13, 14) and rubber spacers (12) onto feed through tube (3) and long string mandrel (2).
- I-1.12) Assemble setting mandrel assembly and install:
- I-1.12.1) Install o-rings (32, 34) in o-ring grooves in setting mandrel (11).
 - I-1.12.2) Install o-rings (35) in o-ring grooves in setting chamber (25).
 - I-1.12.3) Install o-rings (32, 34, 35) in o-ring grooves in lower cone (16).
 - I-1.12.4) Install shear ring cap (19) onto setting mandrel (11).
 - I-1.12.5) Install setting shear ring (29) into shear ring groove in setting mandrel (11).
 - I-1.12.6) Install setting chamber (25) onto setting mandrel (11). Gently tap setting chamber (25) as necessary. Setting chamber (25) should contact shear ring (29).
CAUTIONs: Do NOT rip or tear o-rings while installing.
 - I-1.12.7) Screw shear ring cap (19) onto setting chamber (25).
 - I-1.12.8) Install lock ring (7) into bottom end of setting chamber (25) and screw onto setting mandrel (11). Keep lock ring (7) in smooth part of setting chamber (25) to avoid premature setting.
NOTE4: Spread lock ring (7) as necessary to install.
 - I-1.12.9) Screw lower cone (16) into setting chamber (25) until they shoulder.
CAUTIONs: Do NOT rip or tear o-rings while installing.
 - I-1.12.10) Align holes in setting mandrel (11) and lower cone (16) for long string mandrel (2) and feed through tube (3).
 - I-1.12.11) Install setting mandrel assembly onto long string mandrel (2) and feed through tube (3).
CAUTIONs: Do NOT rip or tear o-rings while installing.
- I-1.13) Install pick-up ring (26) in groove just above releasing shear ring groove in long string mandrel (2).
- I-1.14) Assemble lower slip body assembly and install:
- I-1.14.1) Place slip springs (15) onto lower slips (17) and screw button head cap screws (22) into lower slips (17) to secure slip springs (15).
NOTE3: Install two (2 ea) springs per slip (Fig. 4).
 - I-1.14.2) Install lower assembled slips into lower slip body (18). Wedge slips outwards.
 - I-1.14.3) Install lower slip body assembly onto long string mandrel (2) and feed through tube (3) and onto lower cone (16).
- I-1.15) Align threaded holes in lower cone (16) with slots in lower slip body (18). Screw cap screws (24) into lower cone (16).
- I-1.16) Screw shear screws (4) into lower slip body (18). Tighten until shear screws (4) contact lower cone (16). Back shear screws (4) out 1/4 turn. Remove wedges.
- I-1.17) Install one (1 qty) shear plate (28), releasing shear ring (27) and one (1 qty) shear plate (28) onto long string mandrel (2) and feed through (3). Ensure shear ring (28) is properly engaged with shear ring groove in mandrel (2).
- I-1.18) Install shear cap (21) onto long string mandrel (2) and screw onto lower slip body (18).
- I-1.19) Install pick-up ring (26) in pick-up groove in inner mandrel (2).
- I-1.20) Install o-rings (31) in o-ring grooves in collector sub (23).
- I-1.21) Install collector sub (23) onto mandrel (2) and feed throughs (3). Collector sub (23) should shoulder pick-up ring (26).
CAUTIONs: Do NOT rip or tear o-rings while installing.

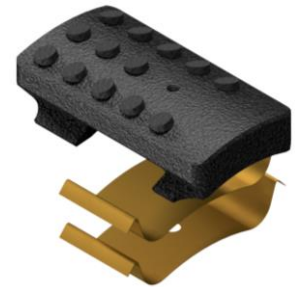


Fig. 4



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I) ASSEMBLY (cont'd)

- I-1.22) Install set screws (30) into collector sub (23).
- I-1.23) Install o-rings (33) in o-ring grooves in crossover (5).
- I-1.24) Install crossover (5) onto collector sub (23).

CAUTIONS: Do NOT rip or tear o-rings while installing.

- I-2) Unclamp flat top (1) from vise and remove assembled tool.

NOTES: If pressure testing of the packer is desired, refer to technical manual *DL-945-5500-1192*. Pressure testing of the packer is not mandatory.

J) PARTS LIST

ITEM	QTY	DESCRIPTION	MATERIAL	P/N 94857-BAC-1
1	1	FLAT TOP	DLMS110	94857610C1
2	1	LONG STRING MANDREL	DLMS110	94857210C3
3	1	FEED THROUGH MANDREL	DLMS80	94855250C
4	8	1/4-20 UNC X 1/4 SLOTTED SHEAR SCREW (1200#)	DLM360BRS	BSSSLT025C025
5	1	CROSSOVER	DLMS110	CH-281SA-BAC
6	1	UPPER SLIP BODY	DLMS110	94857320C3
7	1	LOCK RING	DLMS41X80	94557721
8	4	UPPER SLIP	DLMS35	948571152
9	1	UPPER CONE	DLMS110	94857410C1
10	1	TOP SUB	DLMS80	90427610
11	1	SETTING MANDREL	DLMS110	94857751C1
12	2	RUBBER SPACER	DLMS80	94857840C1
13	1	ELEMENT	70 DURO NITRILE	94857511C1
14	2	ELEMENT	80 DURO NITRILE	94857512C1
15	16	SLIP SPRING	DLMINC625	32045950
16	1	LOWER CONE	DLMS110	94857420C1
17	4	LOWER SLIP	DLMS35	94857135
18	1	LOWER SLIP BODY	DLMS80	94857315C3
19	1	SETTING SHEAR RING CAP	DLMS110	94857981
20	1	PUP JOINT	DLMS110	PJ-2812SA-36
21	1	SHEAR CAP	DLMS110	94857965C3
22	8	BUTTON HEAD CAP SCREW #8-32 X .19	STEEL	BHSC08F019
23	1	COLLECTOR SUB	DLMS80	94857935C1
24	4	5/16-18 UNC X 5/16 SOCKET CAP SCREW	STEEL	SCS031C031
25	1	SETTING CHAMBER	DLMS110	94857755C1
26	2	PICK UP RING	DLMS110	94527915
27	1	RELEASING SHEAR RING	DLM360BRS	94855965C-4



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J) PARTS LIST (cont'd)

ITEM	QTY	DESCRIPTION	MATERIAL	P/N 94857-BAC-1
28	2	SHEAR PLATE	DLMS80	94857890C
29	1	SETTING SHEAR RING	DLM360BRS	94857960C
30	2	3/8-16 UNC X 1/2 SOCKET SET SCREW	STEEL	SSS037C050
31	4	114 O-RING	90 DURO NITRILE	90114
32	5	115 O-RING	90 DURO NITRILE	90115
33	4	147 O-RING	90 DURO NITRILE	90147
34	9	150 O-RING	90 DURO NITRILE	90150
35	4	155 O-RING	90 DURO NITRILE	90155

REDRESS KIT (RDK)	94857-C-1-050
ASSEMBLED WEIGHT	155 LBS

J-1) ELASTOMER TRIM OPTIONS

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

J-1.1) HSN

ITEM	QTY	DESCRIPTION	MATERIAL	P/N 94857H-BAC-1
13	1	ELEMENT	70 DURO HSN	94857511C1H
14	2	ELEMENT	80 DURO HSN	94857512C1H
31	4	114 O-RING	90 DURO HSN	90114H
32	5	115 O-RING	90 DURO HSN	90115H
33	4	147 O-RING	90 DURO HSN	90147H
34	9	150 O-RING	90 DURO HSN	90150H
35	4	155 O-RING	90 DURO HSN	90155H

REDRESS KIT (RDK)	94857-C-1-050H
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J-1.2) VITON

ITEM	QTY	DESCRIPTION	MATERIAL	P/N 94857V-BAC-1
13	1	ELEMENT	70 DURO VITON	94857511C1V
14	2	ELEMENT	80 DURO VITON	94857512C1V
31	4	114 O-RING	90 DURO VITON	90114V
32	5	115 O-RING	90 DURO VITON	90115V
33	4	147 O-RING	90 DURO VITON	90147V
34	9	150 O-RING	90 DURO VITON	90150V
35	4	155 O-RING	90 DURO VITON	90155V

REDRESS KIT (RDK)	94857-C-1-050V
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J) PARTS LIST (cont'd)

J-2) CARBIDE OPTION

ITEM	QTY	DESCRIPTION	MATERIAL	P/N 94857C-BAC-1
8	4	CARBIDE UPPER SLIP	DLMS110	94857115C2
17	4	CARBIDE LOWER SLIP	DLMS110	94857135C



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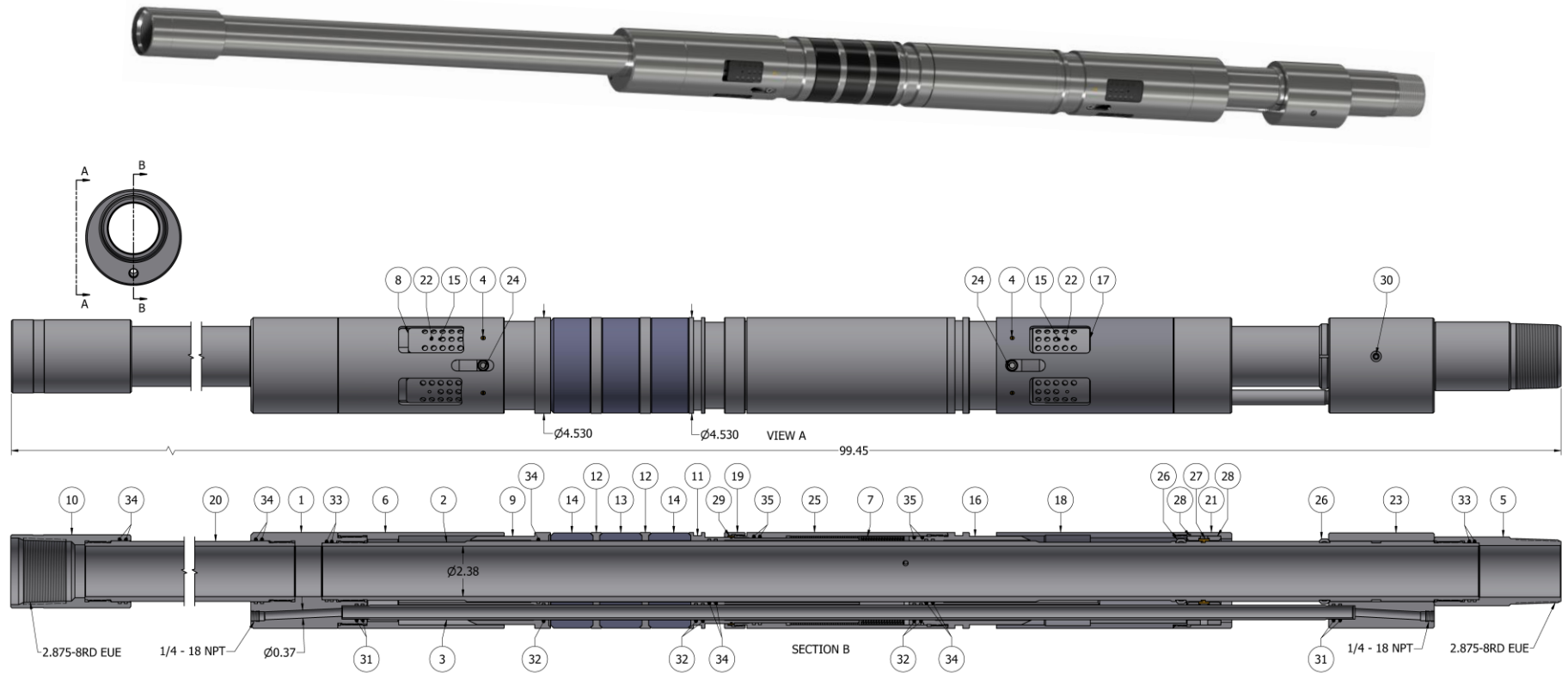
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K) TECHNICAL ILLUSTRATION





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L) REVISION HISTORY

DATE	REVISION	DESCRIPTION OF CHANGES	REVISED BY	APPROVED BY
01/10/2024	A	Created manual	-	-