



HYDROSET II-A PACKER
W/ 2.688" SNAP LATCH, CARBIDE, SHORT STRING
SET, SUPER 13 CHROME FLOW WET
7" X 2-3/8" EUE X 2-3/8" EUE

Manual No:
DL-947-7000-1449

Revision: **A**

Revision Date:
04/20/2021

Authored by: J.Anderson

Approved by: D.McKeon

A) DESCRIPTION

The Hydroset II 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) RELATED TOOLS (sold separately)

B-1) Snap Latch for 2.688" Seal Bore Hydroset II-A, Super 13 Chrome (P/N 94126-F).

C) SPECIFICATION GUIDE

CASING			TOOL			PART NUMBER
SIZE (INCHES)	WEIGHT (LBS/FT)	RECOMMENDED HOLE SIZE (INCHES)	OD (INCHES)	LONG STRING ID (INCHES)	SHORT STRING ID (INCHES)	
7	17.0 – 26.0	6.276 – 6.538	6.062	1.94	1.94	94772C-9-FBAB 94772HC-9-FBAB ¹ 94772VC-9-FBAB ²

Elastomer Trim Options: ¹HSN, ²Viton

THREAD CONNECTION BOX UP / PIN DOWN	
LONG STRING	SHORT STRING
2-3/8 EUE	2-3/8 EUE

DIFFERENTIAL PRESSURE (MAX)	TENSILE LOAD THRU TOOL (MAX)
4,500 PSI	18,500 LBS*

* Using all eight (8 qty) releasing shear screws

SETTING				
SETTING AREA (SQ INCHES)	SHEAR VALUE (PSI/SCREW)	INITIATION PRESSURE (PSI)	MINIMUM SETTING PRESSURE (PSI)	RECOMMENDED SETTING PRESSURE (PSI)
14.12	168	1,350	1,990	2,980

RELEASING
Shear release is adjustable from 15,000 to 40,000 lbs (5,000 lbs increments). Minimum of 3 shear screws required.

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



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D) 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.

NOTES: Do not tighten long string mandrel (2) into top connection (1) with more than 200 ft-lbs of 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.

E) 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 screws. 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 locking nut, 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.

E-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.



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E) OPERATION (cont'd)

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.

If both strings are run simultaneously, allow at least 30 minutes for the packer to equalize thermally before setting. Run the secondary string, if it was not run with the primary string, and latch into the packer seal bore. Temporarily plug the long string below the packer and apply a minimum of 1,990 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.

CAUTION: Do **NOT** exceed 4,500 psi during setting.

E-2) RELEASING PROCEDURES

The Hydroset II packer is released by a straight pick up on the long string. The shear release value is adjustable from 15,000 lbs to 40,000 lbs (in 5,000 lbs. increments—see technical illustration).

The standard mandrel can carry a maximum of 58,500 lbs below the packer. If the combined force from the releasing shear screws plus the weight below the tool exceeds 58,500 lbs, a telescoping union should be run directly below the packer.

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

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
- BOLTS, 1/4-20 X 1-1/4” LONG (4EA)
- 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 top connection (1) in vise.
- H-1.1) Unscrew and remove coupling (4) from pup joint (20).
- H-1.2) Unscrew pup joint (20) from top connection (1) and remove from scoop head (31).
- H-1.3) Moving to lower end of tool, unscrew and remove changeover (5) from long string mandrel (2).
- H-1.4) Unscrew and remove changeover (5) from pup joint (21).
- H-1.5) Unscrew and remove pup joint (21) from lower slip body cap (19).
- H-1.6) Unscrew and remove shear screws (26) from shear sleeve (10).
- H-1.7) Unscrew and remove shear sleeve (10) from lower slip body cap (19).



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H) DISASSEMBLY (cont'd)

- H-1.8) Unscrew and remove cap screws (24) from lower cone (16).
- H-1.9) Unscrew and remove shear screws (23) from lower slip body (18).
- H-1.10) Wedge lower slips (17) outwards (if needed). Remove lower slip body assembly and disassemble:
 - H-1.10.1) Remove lower slips (17) lower slip body (18).
 - H-1.10.2) Unscrew and remove button head cap screws (27) from lower slips (17) and remove slip springs (25).
 - H-1.10.3) Unscrew and separate lower slip body (18) from lower slip body cap (19).
 - H-1.10.4) Remove o-ring (28) from lower slip body cap (19).
- H-1.11) Remove pick-up ring (11) from long string mandrel (2)
- H-1.12) Remove setting mandrel assembly and disassemble:
 - H-1.12.1) Unscrew and remove lower cone (16) from setting chamber (15).
 - H-1.12.1.1) Remove o-rings (28, 29) from lower cone (16).
 - H-1.12.2) Unscrew and remove lock ring (7) from lower end of setting chamber (15) and setting mandrel (22).
 - H-1.12.3) Unscrew and remove shear screws (23) from setting chamber (15).
 - H-1.12.4) Remove setting mandrel (22) from setting chamber (15).
 - H-1.12.4.1) Remove o-rings (28) from setting mandrel (22).
 - H-1.12.4.2) Remove o-rings (30) from setting chamber (15).
- H-1.13) Remove elements (13, 14) and rubber spacers (12) from short and long string mandrels (2, 3).
- H-1.14) Unscrew and remove cap screws (24) from upper cone (9).
- H-1.15) Unscrew and remove shear screws (23) from upper slip body (6).
- H-1.16) Wedge upper slips (8) outwards (if needed). Remove upper cone (9) from upper slip body (6).
 - H-1.16.1) Remove o-rings (28) from upper cone (9).
- H-1.17) Unscrew upper slip body (6) from top connection (1). Remove slip body assembly and disassemble:
 - H-1.17.1) Remove wedges (if needed). Remove upper slips (8) from upper slip body (6).
 - H-1.17.2) Unscrew and remove button head cap screws (27) from upper slips (8) and remove slip springs (25).
- H-1.18) Unscrew and remove long string mandrel (2) and short string mandrel (3) from top connection (1). Flats are provided on mandrels (2, 3) for wrenching.

CAUTION: Do NOT wrench or clamp on seal surfaces.
- H-1.19) Unscrew and remove cap screws (32) from top connection (1).
- H-1.20) Remove scoop head (31) from top connection (1).
- H-2) Unclamp and remove top connection (1) from vise.
 - H-2.1) Remove o-rings (28) from top connection (1).



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I) ASSEMBLY

NOTE₁: Clean and inspect all parts. Replace all worn and damaged parts. Install parts in proper order, and orientation and tighten/torque all connections properly.

CAUTION₅: To ensure tool operates properly, install o-rings in o-ring grooves **NOT** thread reliefs unless stated otherwise (Fig. 2).

I-1) Install o-rings (28) in o-ring grooves in top connection (1).

I-2) Clamp top connection (1) in vise.

I-2.1) Install scoop head (31) onto top connection (1). Align holes in scoop head (31) with threaded holes in top connection (1).

I-2.2) Screw cap screws (32) into top connection (1).

I-2.3) Screw short string mandrel (3) and long string mandrel (2) into top connection (1). Flats are provided on mandrels (2, 3) for wrenching.

I-2.4) Assemble upper slip body assembly and install:

I-2.4.1) Install slip springs (25) onto upper slips (8) and secure with button head cap screws (27).

I-2.4.2) Install upper slips (8) into upper slip body (6). Wedge slips outwards.

I-2.4.3) Install upper slip body assembly and screw upper slip body (6) onto top connection (1). Remove wedges.

I-2.5) Install o-rings (28) in o-ring grooves in upper cone (9).

I-2.6) Install upper cone (9) into upper slip body. Align threaded holes in upper cone (9) with holes and slots in upper slip body (6).

CAUTION₆: Do NOT rip or tear o-rings while installing.

I-2.7) Screw cap screws (24) into upper cone (9).

I-2.8) Screw shear screws (23) into upper slip body (6). Tighten until shear screws (23) contact upper cone (9). Back shear screws (23) out 1/4 turn.

I-2.9) Install elements (13, 14) and rubber spacers (12) onto short and long string mandrels (2, 3).

I-2.10) Assemble setting mandrel assembly and install:

I-2.10.1) Install o-rings (28) in o-ring grooves in setting mandrel (22).

I-2.10.2) Install o-rings (30) in o-ring groove in setting chamber (15).

I-2.10.3) Gently tap setting mandrel (22) into setting chamber (15). Align shear screw groove in setting mandrel (22) with threaded holes in setting chamber (15).

CAUTION₆: Do NOT rip or tear o-ring while installing.

I-2.10.4) Temporarily screw one shear screw (23) into setting chamber (15) to hold parts together.

I-2.10.5) Install lock ring (7) into bottom end of setting chamber (15) and screw onto setting mandrel (22).

I-2.10.6) Install o-rings (28, 29) in o-ring grooves in lower cone (16).

I-2.10.7) **CAREFULLY** screw lower cone (16) into setting chamber (15) until they shoulder.

CAUTION₆: Do NOT rip or tear o-rings while installing.

I-2.10.8) Unscrew and remove shear screw (23) from setting chamber (15). Rotate setting chamber (15) and lower cone (16) in right-hand motion to align holes for long and short string mandrels (2, 3).

I-2.10.9) Continue rotating setting chamber and lower cone (in unison) further to align threaded holes in setting chamber (15) with pocket holes in setting mandrel (22).

NOTE₂: This should NOT take more than 1/8 rotation (45°).

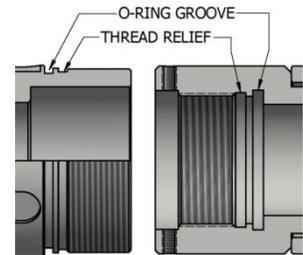


Fig. 2



HYDROSET II-A PACKER
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I) ASSEMBLY (cont'd)

I-2.10.10) Screw shear screws (23) into setting chamber (15). Tighten until shear screws (23) contact setting mandrel (22). Back shear screws (23) out 1/4 turn.

I-2.10.11) While backing up with a wrench on setting chamber (15), back off lower cone (16) just enough to allow holes for short and long string mandrels to align again.

I-2.10.12) Install setting mandrel assembly onto short and long string mandrels.

CAUTION₆: Do NOT rip or tear o-rings while installing.

I-2.11) Install pick-up ring (11) in pick-up ring groove in long string mandrel (2).

I-2.12) Assemble lower slip body assembly and install:

I-2.12.1) Install o-ring (28) in o-ring groove in lower slip body cap (19).

I-2.12.2) Screw lower slip body (18) onto lower slip body cap (19).

I-2.12.3) Install lower slip springs (25) onto lower slips (17) and secure with button head cap screws (27).

I-2.12.4) Install lower slips (17) into lower slip body (18). Wedge slips outwards.

I-2.12.5) Install lower slip body assembly onto short and long string mandrels and onto lower cone (16). Align threaded holes in lower cone (16) with holes and slots in lower slip body (18). Remove wedges from lower slips (17).

NOTE₃: Back off lower slip body cap (19) as needed to align short and long string mandrels.

CAUTION₆: Do NOT rip or tear o-rings while installing.

I-2.13) Screw cap screws (24) into lower cone (16).

I-2.14) Screw shear screws (23) into lower slip body (18). Tighten until shear screws (23) contact lower cone (16). Back shear screws (23) out 1/4 turn.

I-2.15) Screw shear sleeve (10) into lower slip body cap (19) until shouldered. Back off shear sleeve (10) as needed to align threaded holes in shear sleeve (10) with shear screw groove in long string mandrel (2).

I-2.16) Screw shear screws (26) into shear sleeve (10). Tighten until shear screws (26) contact long string mandrel (2). Back shear screws (26) out 1/4 turn.

NOTE₄: Install a minimum of three (3 qty) shear screws (26). Install additional shear screws (26) as needed to achieve desired shear value.

I-2.17) Screw changeover (5) onto long string mandrel (2).

I-2.18) Screw pup joint (21) into lower slip body cap (19).

I-2.19) Screw changeover (5) onto pup joint (21).

I-2.20) Moving to upper end of tool, install pup joint (20) into scoop head (31) and screw into top connection (1).

I-2.21) Screw coupling (4) onto pup joint (20).

I-3) Unclamp top connection (1) from vise and remove assembled tool.

NOTE₆: If pressure testing of the packer is desired, refer to technical manual *DL-945-7000-1173*. Pressure testing of the packer is not mandatory.



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J) PARTS LIST

ITEM	QTY	DESCRIPTION	MATERIAL	P/N 94772C-9-FBAB
1	1	TOP CONNECTION, SUPER 13 CHROME	DLM13CR110	94770611BB-F
2	1	LONG STRING MANDREL	DLM13CR110	94520209-F
3	1	SHORT STRING MANDREL	DLM13CR110	94520219-F
4	1	COUPLING	DLM13CR110	CP-BAB-BBB-F-1
5	2	CHANGEOVER	DLM13CR110	CH-BBB-BAB-F-1
6	1	UPPER SLIP BODY	DLMS110	94570320
7	1	LOCK RING	DLMS80	94570725
8	4	CARBIDE UPPER SLIP	DLMS110	90570111C-1
9	1	UPPER CONE	DLMS80	94572400BB
10	1	SHEAR SLEEVE	DLMS60	94570740
11	1	PICK UP RING	DLMS80	94570760
12	2	RUBBER SPACER	DLMS80	94572840BB
13	1	ELEMENT	70 DURO NITRILE	94572511BB
14	2	ELEMENT	80 DURO NITRILE	94572512BB
15	1	SETTING CHAMBER	DLMS110	94570780
16	1	LOWER CONE	DLMS80	94570420BB
17	4	CARBIDE LOWER SLIP	DLMS110	90570131C-1
18	1	LOWER SLIP BODY	DLMS80	94570315
19	1	LOWER SLIP BODY CAP	DLM13CR110	94570336BB-F
20	1	PUP JOINT	DLM13CR110	PJ-BBB-48-F
21	1	PUP JOINT	DLM13CR110	PJ-BBB-36-F
22	1	SETTING MANDREL	DLMS80	94572751BB
23	16	SHEAR SCREW (2375#)	DLM360BRS	60100990
24	4	3/8-16 UNC X 3/8 LOW HEAD SOCKET CAP SCREW	STEEL	LHSC037C037
25	16	SLIP SPRING	-	72455950
26	8	SHEAR SCREW (5000#)	DLM464BRS	65050902
27	8	BUTTON HEAD CAP SCREW #10-24 X 1/4	STEEL	BHSC1024C025
28	15	142 O-RING	90 DURO NITRILE	90142
29	2	160 O-RING	90 DURO NITRILE	90160
30	2	161 O-RING	90 DURO NITRILE	90161
31	1	SCOOP HEAD	DLMS110	94770612BB
32	2	1/2-13 UNC X 1-1/2 SOCKET CAP SCREW	STEEL	SCS050C150

REDRESS KIT (RDK)	94772-B-B-050
ASSEMBLED WEIGHT	351 LBS



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J) PARTS LIST (cont'd)

J-1) ELASTOMER TRIM OPTIONS

NOTE₇: For temperature range, refer to Elastomer Trim Temperature Guide.

J-1.1) HSN

ITEM	QTY	DESCRIPTION	MATERIAL	P/N 94772HC-9-FBAB
13	1	ELEMENT	70 DURO HSN	94572511BBH
14	2	ELEMENT	80 DURO HSN	94572512BBH
28	15	142 O-RING	90 DURO HSN	90142H
29	2	160 O-RING	90 DURO HSN	90160H
30	2	161 O-RING	90 DURO HSN	90161H

REDRESS KIT (RDK)	94772H-B-B-050
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J-1.2) VITON

ITEM	QTY	DESCRIPTION	MATERIAL	P/N 94772VC-9-FBAB
13	1	ELEMENT	70 DURO VITON	94572511BBV
14	2	ELEMENT	80 DURO VITON	94572512BBV
28	15	142 O-RING	90 DURO VITON	90142V
29	2	160 O-RING	90 DURO VITON	90160V
30	2	161 O-RING	90 DURO VITON	90161V

REDRESS KIT (RDK)	94772V-B-B-050
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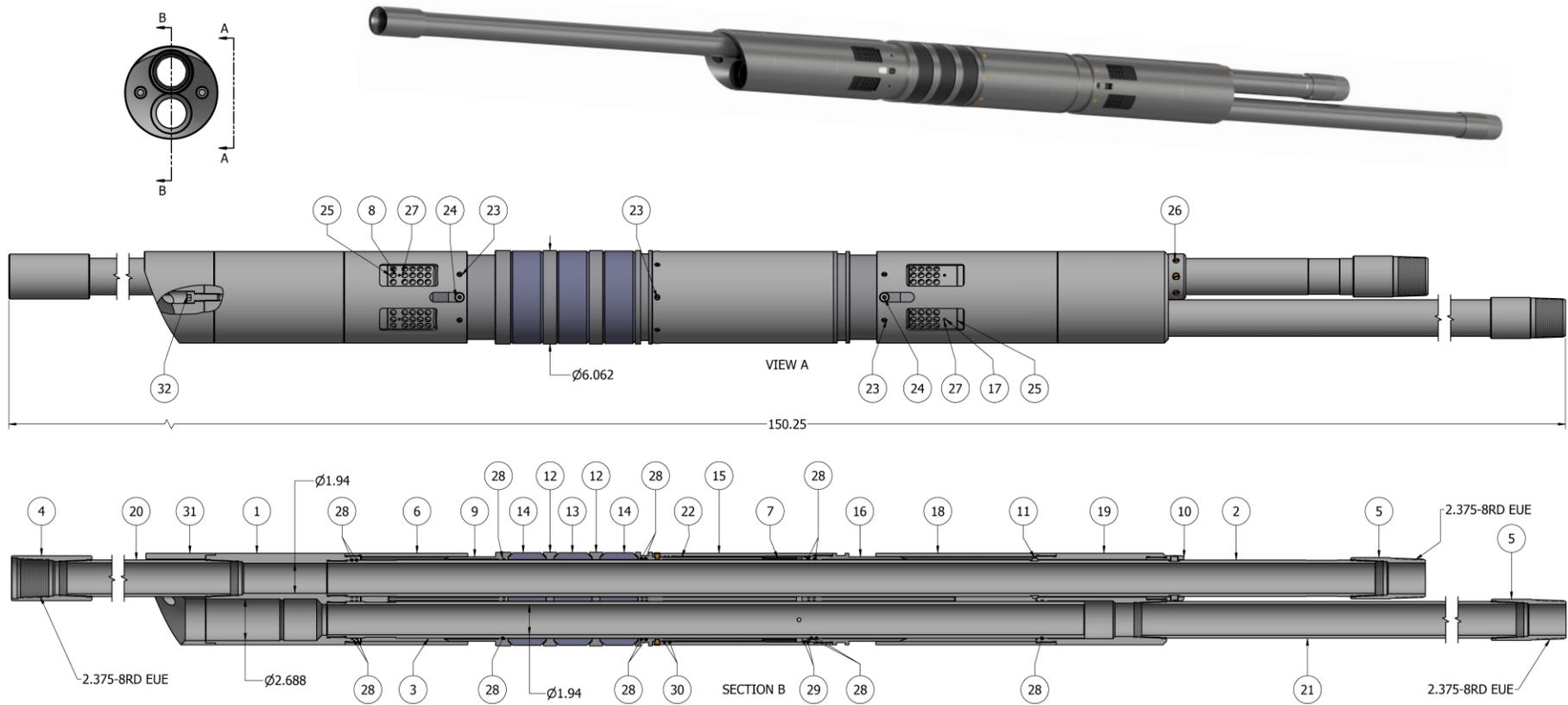
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K) TECHNICAL ILLUSTRATION



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L) REVISION HISTORY

DATE	REVISION	DESCRIPTION OF CHANGES	REVISED BY	APPROVED BY
04/20/2021	A	Created new manual	-	-