



# HYDROSET II PACKER

## w/FLAT TOP

### 7" X 2-7/8" X 1.900"

Manual No:  
**DL-905-7000-222**

Revision: **A**

Revision Date:  
**10/29/2009**

Written by: Bruce Mathis

Approved by: Brian Oligschlaeger

## A) DESCRIPTION

The D&L Hydroset II is a hydraulic set, mechanically held dual string production packer, normally run above a single string hydraulic set or wireline set seal bore packer. The short length of the Hydroset II makes it ideally suited for deviated wells or doglegs. Since there is no tubing manipulation required to set the packer, the well head can be installed and flanged up before setting the packer. The Hydroset II is available with short or long string setting capabilities and a variety of tubing connections. The packer is also adaptable for submersible pump applications. The Hydroset II has a sequential upper slip releasing system that is designed so that each slip is released individually to reduce the pull required to release the packer. The angles on the upper slips and upper slip cage result in the slips releasing smoothly from the casing.

## B) PRESSURE RATING

	DIFFERENTIAL PRESSURE RATING		LONG STRING INTERNAL PRESSURE DO NOT EXCEED
	STANDARD	WITH P-110 SETTING CHAMBER	
17 - 26#	5,500 PSI	7,000 PSI	5,000 PSI
26 - 32#	5,500 PSI	7,000 PSI	5,000 PSI

## C) SPECIFICATION GUIDE

CASING		RECOMMENDED HOLE SIZE	TOOL OD (INCHES)	THREAD CONNECTION BOX UP / PIN DOWN		PART NUMBER
SIZE (INCHES)	WEIGHT (LBS/FT)			LONG STRING	SHORT STRING	
7	17 – 26	6.276 – 6.538	6.062	2-7/8 EUE	1.900 NUE	90572-BAC-BBA
7	26 – 32	6.094 – 6.276	5.938	2-7/8 EUE	1.900 NUE	90570-BAC-BAA
7	26 - 32	6.094 – 6.276	5.938	2-7/8 NUE / 2-7/8 EUE	1.900 NUE / 1.900 EUE	90570-BAC-BBA

## D) OPERATION

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 chamber, shearing the setting shear screws. The setting chamber is forced down, which shears the lower slip cage shear screws and sets the lower slips. The setting mandrel is forced up, which shears the upper slip cage shear screws, and sets the upper slips and packs off the elements. Any relative motion between the setting chamber 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.

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



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## D-1) SETTING PROCEDURES

Run the packer in the well slowly (*60 Ft. stand in 30 seconds is recommended*). 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 1,500 PSI differential in the tubing at the packer and hold it for 10 minutes. (**CAUTION: Do NOT exceed 5,000 PSI**). The packer should now be fully set and can be pressure tested if desired.

## D-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 5,000 lbs to 40,000 lbs (in 5,000 lb increments - see illustration).

## E) DISASSEMBLY

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

E-1.1) Unscrew and remove pup joint (24) from flat top (1).

E-1.1.1) Unscrew and remove coupling (25) from pup joint (24).

E-1.2) Unscrew and remove pup joint (9) from lower slip body cap (19).

E-1.2.1) If applicable - unscrew and remove crossover (33) from pup joint (9)

E-1.3) Unscrew and remove changeover (23) from long string mandrel (2).

E-1.4) Unscrew and remove shear screws (22) from shear pin retainer (20).

E-1.5) Unscrew and remove shear pin retainer (20) from lower slip body cap (19).

E-1.6) Unscrew and remove socket cap (torque) screws (7) and shear screws (6) from lower slip cage (15).

E-1.7) Slide lower slip cage assembly off of lower cone (16), long string mandrel (2) and short string mandrel (3).

E-1.8) Disassemble lower slip cage assembly:

E-1.8.1) Unscrew and remove lower slip body cap (19) from lower slip cage (15).

E-1.8.2) Remove alignment mandrel (26) from lower slip body cap (19).

E-1.8.2.1) Remove o-ring (32) from lower slip body cap (19).

E-1.8.3) Remove lower slips (21) from lower slip cage (15).

E-1.8.3.1) Unscrew and remove button head screws (29) to remove slip springs (28) from lower slips (21).

E-1.9) Remove pick up ring (18) from long string mandrel (2)

E-1.10) Unscrew and remove long string mandrel (2) from flat top (1). Pull long string mandrel (2) out through lower cone (16).

**NOTE:** Do NOT wrench or clamp on seal surface.

E-1.11) Remove setting mandrel assembly from short string mandrel (3) and disassemble:

E-1.11.1) Unscrew and remove lower cone (16) from setting chamber (14).

E-1.11.1.1) Remove o-rings (27, 30, 32) from lower cone (16).

E-1.11.2) Unscrew and remove shear screws (6) from setting chamber (14).

E-1.11.3) Rotate setting mandrel (13) to remove it from locking ring (17) and out of setting chamber (14).

E-1.11.3.1) Remove o-rings (27, 32) from setting mandrel (13).

E-1.11.4) Unscrew and remove locking ring (17) from setting chamber (14).

E-1.11.4.1) Remove o-ring (31) from setting chamber (14).



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## E) DISASSEMBLY

E-1.12) Remove elements (10, 11) and rubber spacers (12) from short string mandrel (3).

E-1.13) Unscrew and remove short string mandrel (3) from flat top (1).

**NOTE:** Do NOT wrench or clamp on seal surface.

E-1.14) Unscrew and remove upper slip cage assembly from flat top (1) and disassemble:

E-1.14.1) Unscrew and remove shear screws (6) and socket cap (torque) screws (7) from upper slip cage (4).

E-1.14.2) Slide upper cone (5) out of upper slip cage (4).

E-1.14.2.1) Remove o-rings (27, 32) from upper cone (5).

E-1.14.3) Remove upper slips (8) from upper slip cage (4).

E-1.14.3.1) Unscrew and remove button head screws (29) to remove slip springs (28) from upper slips (8).

E-2) Unclamp and remove flat top (1) from vise.



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## F) ASSEMBLY

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

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

F-1.1) Assemble upper slip cage assembly:

F-1.1.1) Set slip springs (28) in place on upper slips (8) and screw in button head screws (29).

F-1.1.2) Install upper slips (8) into upper slip cage (4).

F-1.1.3) Install o-rings (27, 32) into grooves in upper cone (5), then slide upper cone (5) into upper slip cage (4) far enough to hold slips in place.

F-1.1.4) Screw shear screws (6) and socket cap (torque) screws (7) to secure upper cone (5) to upper slip cage (4).

F-1.1.5) Screw upper slip cage assembly onto from flat top (1).

F-1.2) Screw short string mandrel (3) into flat top (1).

**NOTE:** Do NOT wrench or clamp on seal surface.

F-1.3) Slide elements (10, 11) and rubber spacers (12) onto short string mandrel (3).

F-1.4) Assemble setting mandrel assembly:

F-1.4.1) Install o-rings (27, 32) into grooves in setting piston (13).

F-1.4.2) Install o-ring (31) into grooves in setting chamber (14).

F-1.4.3) With setting piston (13) on bench with thread facing up, CAREFULLY slide setting chamber (14) onto setting piston (13).

F-1.4.4) With holes aligned, screw a shear screw (6) through setting chamber (14) and into setting piston (13).

**NOTE:** Install one shear screw to hold parts together temporarily.

F-1.4.5) Insert lock nut (17) into setting chamber (14) and screw it onto setting piston (13) until lock nut (17) is flush with lower end of setting piston (13).

F-1.4.6) Install o-rings (27, 30, 32) in grooves in lower cone (16).

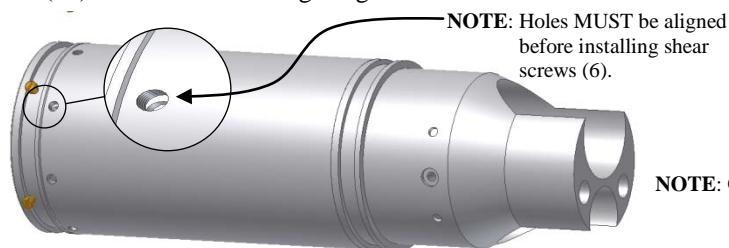
F-1.4.7) CAREFULLY start the lower cone (16) into the setting chamber (14).

**CAUTION:** Do NOT rip or tear the o-rings on the threads while installing into the setting chamber.

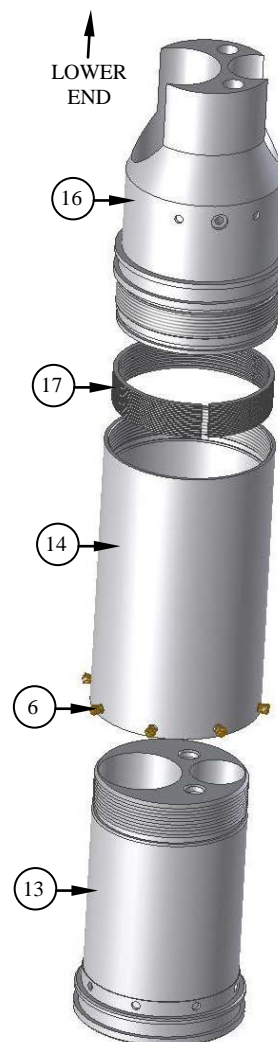
F-1.4.8) Screw lower cone (16) into setting chamber (14) until they shoulder.

F-1.4.9) Remove shear screw (6) from setting chamber (14).

F-1.4.10) Rotate setting chamber (14) and lower cone (16) in unison about setting mandrel (13) until holes for strings align.



**NOTE:** O-rings not shown.



F-1.4.11) Align set screw holes in setting chamber (14) with setting piston (13). Looking from lower end of lower cone (16), rotate setting chamber (14) and lower cone (16) clockwise until shear screw holes align with pockets in setting piston (13).

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



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## H) ASSEMBLY (cont'd)

F-1.4.12) Install shear screws (6). Tighten and back out 1/4 turn.

F-1.4.13) Backing up on setting chamber (14) with a wrench, back off lower cone (16) just enough to allow holes for short & long strings (2, 3) to align again.

F-1.4.14) Slide the setting piston assembly onto the short string mandrel (3).

**CAUTION:** Do NOT rip or tear the o-rings on the threads while installing.

F-1.5) Screw long string mandrel (2) into flat top (1).

F-1.6) Install pick up ring (18) into groove in long string mandrel (2).

F-1.7) Assemble lower slip cage assembly:

F-1.7.1) Set slip springs (28) in place on lower slips (21) and screw in button head screws (29).

F-1.7.2) Install lower slips (21) into lower slip cage (15).

F-1.7.3) Install o-ring (32) into groove in lower slip body cap (19).

F-1.7.4) Screw alignment mandrel (26) into lower slip body cap (19).

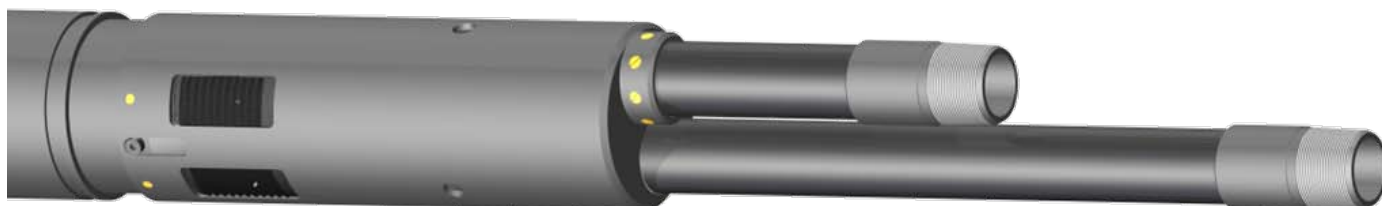
F-1.7.5) Screw lower slip cage (15) onto lower slip cage cap (19).

F-1.7.6) Slide lower slip cage assembly onto lower cone (16). Install shear screws (6) and socket cap (torque) screws (7). Tighten shear screws and back off 1/4 turn.

**NOTE:** Back off lower slip cage cap (19) as needed to align short and long string mandrels (2, 3).

F-1.8) Screw shear pin retainer (20) into lower slip cage cap (19) until shouldered.

F-1.9) Back off shear pin retainer (20) as need to align threaded holes with pockets in long string mandrel (2).



F-1.10) Screw shear screws (22) into shear pin retainer (20). Tighten and back out 1/4 turn.

**NOTE:** Install quantity of shear screws (22) needed to achieve desired shear value.

F-1.11) Screw pup joint (9) into lower slip cage cap (19).

F-1.12) Screw changeover (23) onto long string mandrel (2).

F-1.13) If applicable - screw crossover (33) onto pup joint (9).

F-1.14) Screw pup joint (24) into flat top (1).

F-1.15) Screw coupling (25) onto pup joint (24).

F-2) Unclamp flat top (1) from vise and remove tool assembly.



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## G) PARTS LIST

ITEM	QTY	DESCRIPTION	MATERIAL	90572-BAC-BBA (17 - 26#)	90570-BAC-BAA (26 - 32#)	90570-BAC-BBA (26 - 32#)
1	1	FLAT TOP	L-80		90570612	
2	1	LONG STRING MANDREL	L-80		90570214	
3	1	SHORT STRING MANDREL	L-80		90570222	
4	1	UPPER SLIP CAGE	L-80		90570322	
5	1	UPPER CONE	L-80	90572412	90570412	
6	16	SHEAR SCREW (2375#)	BRASS		60100990	
7	4	SOCKET CAP SCREW 3/8-16 X 3/8			SCS037C037	
8	4	UPPER SLIP	1018		90570111	
9	1	PUP JOINT - 24"	L-80		PJ1900N-24	
10	2	ELEMENT (OUTER)	80 DURO NITRILE	90572514		90570514
11	1	ELEMENT (CENTER)	70 DURO NITRILE	90572515		90570515
12	2	RUBBER SPACER	L-80	90572842		90570842
13	1	SETTING MANDREL	L-80	90572751		90570751
14	1	SETTING CHAMBER (NOTE: 7K APPLICATIONS AVAILABLE)	L-80	90572755		90570755
15	1	LOWER SLIP CAGE	L-80		90570317	
16	1	LOWER CONE	L-80	90572422		90570422
17	1	LOCKING RING	L-80		90570720	
18	1	PICK UP RING	1018		90570761	
19	1	LOWER SLIP BODY CAP	L-80		90570336	
20	1	SHEAR PIN RETAINER	P-110		90570741	
21	4	LOWER SLIP	1018		90570131	
22	8	SHEAR SCREW (5000#) 1/2-13 W/.418 DOG POINT	BRASS		65050902	
23	1	CHANGEOVER	L-80		CH2875N2875E-SC	
24	1	PUP JOINT - 24"	L-80	PJ2875N-24-L80		PJ2875N-72-L80
25	1	COUPLING - SPECIAL CLEARANCE	1018		CP2875E2875N-SC	
26	1	ALIGNMENT MANDREL	L-80		90570216	
27	3	233-90 O-RING			90233	
28	8	SLIP SPRING			72470950	
29	8	BUTTON HEAD SCREW #10-24 X 1/4			BHSC010C025	
30	1	252-90 O-RING			90252	
31	1	254-90 O-RING			90254	
32	4	226-90 O-RING			90226	
33	1	CROSSOVER - SPECIAL CLEARANCE		N/A		CH1900N1900E-SC

REDRESS KIT		90572-C-A-050	90570-C-A-050	
ASSEMBLED WEIGHT		280 LBS	303 LBS	303 LBS

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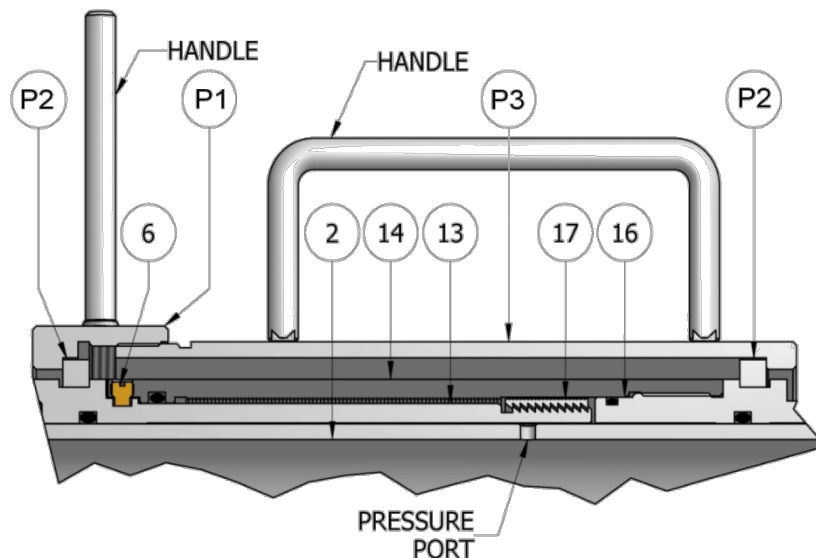
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## H) PRESSURE TEST

### H-1) ASSEMBLY

**NOTE:** Prior to testing, all o-rings must be properly installed and in good condition (no rips, tears, cuts, etc).



H-1.1) Remove all but one of setting shear screws (6) from setting chamber (14).

H-1.2) Slide sleeve cap (P1) onto lower end of packer with threads facing toward lower end.

H-1.3) Install split ring (P2) into pressure test groove on lower cone (16).

H-1.4) Slide test sleeve (P3) onto lower end of packer (with threads facing upper end) over split ring (P2).

H-1.5) Install split ring (P2) into pressure test groove on setting mandrel (13).

H-1.6) Screw sleeve cap (P1) onto test sleeve (P3).

H-1.7) Tighten sleeve cap (P1).

H-1.8) Plug off top and bottom of long string mandrel.

H-1.9) Fill mandrel with hydraulic oil or inhibited water.

H-1.10) Apply pressure. Hold and observe for leaks.

**WARNING:** Do NOT exceed 1,500 PSI.

H-1.11) Release pressure, remove test fixtures and plugs, and re-install setting shear screws (6) in setting chamber (14).

### H-2) PARTS LIST

ITEM	QTY	DESCRIPTION	MATERIAL	P/N 90570PTF
P1	1	CAP WELDMENT	WELDED STEEL MILD	90570PTF006
P2	2	SPLIT RING	P-110	90570PTF008
P3	1	SLEEVE WELDMENT	WELDED STEEL MILD	90570PTF007





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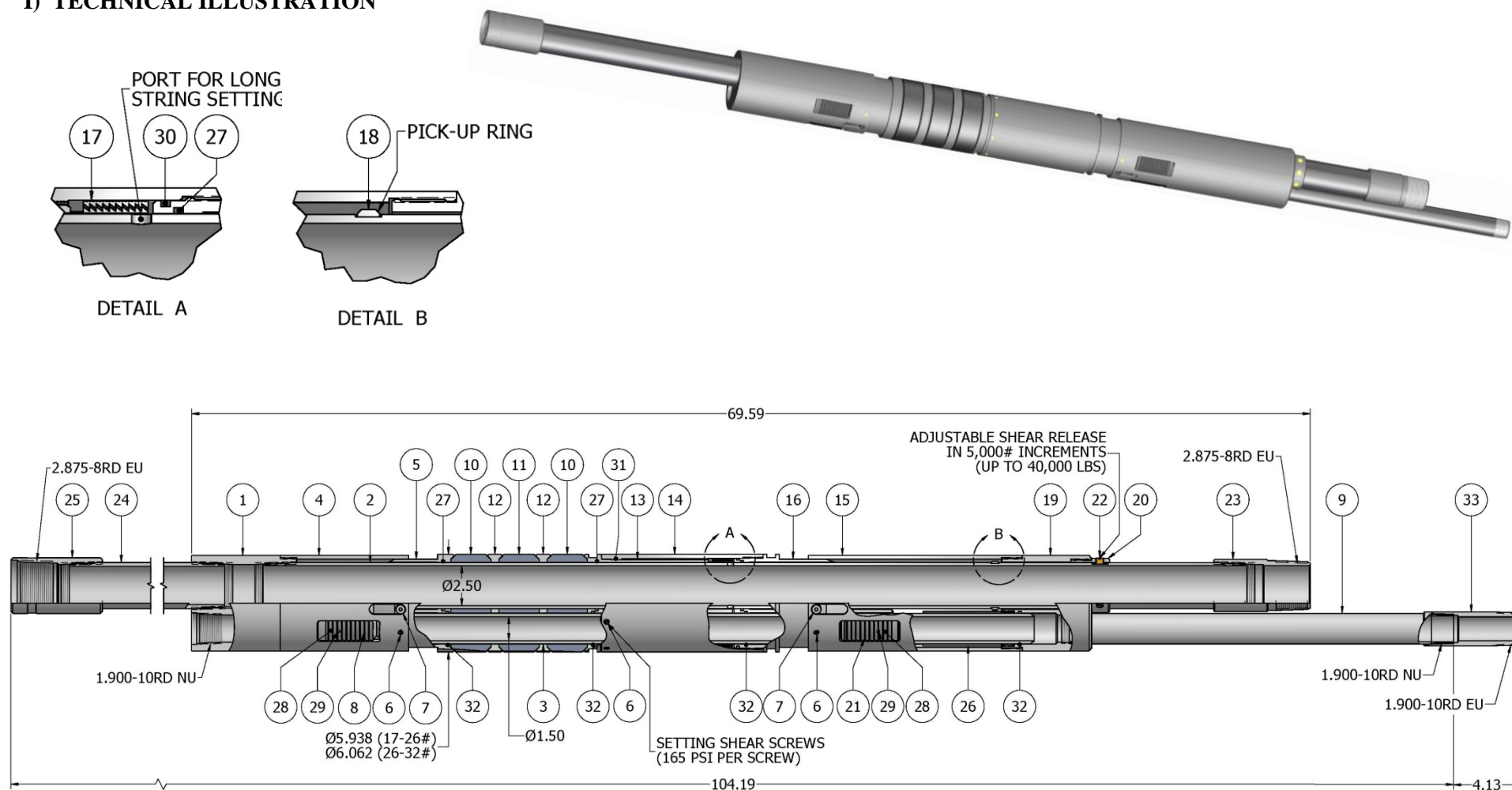
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## I) TECHNICAL ILLUSTRATION



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