



HYDROSET II PACKER W/ FEEDTHROUGH

5-1/2" X 2-3/8" X (4) 1/4"

Manual No:
DL-908-5500-677

Revision: **C**

Revision Date:
05/02/2016

Authored by: *J.Anderson*

Approved by: *F.Johnson*

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) SPECIFICATION GUIDE

CASING		
SIZE (INCHES)	WEIGHT (LBS/FT)	RECOMMENDED HOLE SIZE (INCHES)
5-1/2	14.0 – 20.0	4.778 – 5.012

TOOL			PART NUMBER
OD (INCHES)	LONG STRING ID (INCHES)	FEED THRU HOLES ID (INCHES)	
4.625	1.95	0.37	90855-BAB-4

THREAD CONNECTION BOX UP / PIN DOWN	
LONG STRING	FEED THRU HOLES
2-3/8 EUE	1/4 NPT

DIFFERENTIAL PRESSURE (MAX)	TENSILE LOAD THRU TOOL (MAX)
5,000 PSI	15,500 LBS*

*Using all (8 qty) releasing shear screws

SETTING			
SETTING AREA (SQ INCHES)	INITIATION PRESSURE (PSI)	MINIMUM SETTING PRESSURE (PSI)	RECOMMENDED SETTING PRESSURE (PSI)
9.12	1,056	2,412	3,618

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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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.

NOTE₃: 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

CAUTION₃: 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.

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.



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D) 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.

D-2) RELEASING PROCEDURES

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

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

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) 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

G) DISASSEMBLY

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

G-1.1) From upper end of tool, unscrew and remove coupling (19) from pup joint (18).

G-1.2) Unscrew and remove pup joint (18) from flat top (1).

G-1.3) Moving to lower end of tool, unscrew and remove hex nipples (32) from lower slip body cap (13).

G-1.4) Unscrew and remove crossover (20) from long string mandrel (2).

G-1.5) Unscrew and remove shear screws (23) from shear sleeve (14).

G-1.6) Unscrew and remove shear sleeve (14) from lower slip body cap (13).

G-1.7) Unscrew and remove cap screws (16) from lower cone (11).

G-1.8) Unscrew and remove shear screws (17) from lower slip body (12).

G-1.9) Wedge lower slips (22) outwards. Remove lower slip body assembly and disassemble:

G-1.9.1) Remove lower slips (22) from lower slip body (12).

G-1.9.1.1) Unscrew and remove button head cap screws (31) from lower slips (22) and remove slip springs (30).

G-1.9.2) Unscrew and remove lower slip body (12) from lower slip body cap (13).

G-1.9.3) Remove o-ring (29) from lower slip body cap (13).



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G) DISASSEMBLY (cont'd)

- G-1.10) Remove pick-up ring (24) from long string mandrel (2).
- G-1.11) Remove setting mandrel assembly and disassemble:
 - G-1.11.1) Unscrew and remove lower cone (11) from setting chamber (10).
 - G-1.11.1.1) Remove o-rings (26, 28, 29) from lower cone (11).
 - G-1.11.2) Unscrew and remove lock ring (9) from lower end of setting mandrel (8).
 - G-1.11.3) Unscrew and remove shear screws (17) from setting chamber (10).
 - G-1.11.4) Remove setting mandrel (8) from setting chamber (10).
 - G-1.11.4.1) Remove o-rings (26, 29) from setting mandrel (8).
 - G-1.11.4.2) Remove o-rings (27) from setting chamber (10).
- G-1.12) Remove elements (5, 6) and rubber spacers (7) from long string mandrel (2) and feed through tubes (15).
- G-1.13) Unscrew and remove feed through tubes (15), and long string mandrel (2) from flat top (1).

NOTE₂: Do NOT wrench or clamp on seal surfaces.
- G-1.14) Unscrew and remove cap screws (16) from upper cone (4).
- G-1.15) Unscrew and remove shear screws (17) from upper slip body (3).
- G-1.16) Wedge upper slips (21) outwards (if needed). Remove upper cone (4) from upper slip body (3).
 - G-1.16.1) Remove o-rings (26, 29) from upper cone (4).
 - G-1.16.2) Remove wedges. Remove upper slips (21) from upper slip body (3).
 - G-1.16.2.1) Unscrew and remove button head cap screws (31) from upper slips (21) and remove slip springs (30).
- G-1.17) Unscrew and remove upper slip body (3) from flat top (1)
- G-1.18) Remove o-rings (25, 26) from flat top (1).
- G-2) Unclamp and remove flat top (1) from vise.

H) ASSEMBLY

NOTE₃: Clean and inspect all parts. Replace all worn and damaged parts. Install parts in proper order and orientation. Refer to technical illustration for placement of o-rings.

- H-1) Clamp flat top (1) in vise
 - H-1.1) Install o-rings (25, 26) in grooves in flat top (1).
 - H-1.2) Screw pup joint (18) into flat top (1).
 - H-1.3) Screw coupling (19) onto pup joint (18).
 - H-1.4) Screw upper slip body (3) onto flat top (1).

CAUTION₂: Do NOT rip or tear o-ring while installing.
 - H-1.5) Assemble upper slip assemblies and install:
 - H-1.5.1) Place slip springs (30) onto upper slips (21) and screw button head cap screws (31) into upper slips (21) to secure slip springs (30).

NOTE₄: Install two (2ea) springs per slip (Fig. 2).

- H-1.5.2) Install upper slip assemblies into upper slip body (3). Wedge slips outwards.
 - H-1.6) Install o-rings (26, 29) in grooves in upper cone (4).
 - H-1.7) Install upper cone (4) into upper slip body (3).
 - H-1.8) Align threaded holes in upper cone (4) with slots in upper slip body (3). Screw cap screws (16) into upper cone (4).



Fig. 2



HYDROSET II PACKER W/ FEEDTHROUGH 5-1/2" X 2-3/8" X (4) 1/4"

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H) ASSEMBLY (cont'd)

H-1.9) Screw shear screws (17) into upper slip body (3). Tighten until shear screws (17) make contact with upper cone (4). Back shear screws (17) out 1/4 turn.

H-1.10) Screw feed through tubes (15), and long string mandrel (2) into flat top (1). Remove wedges.

NOTE₂: Do NOT wrench or clamp on seal surfaces.

CAUTION₂: Do NOT rip or tear o-rings while installing.

H-1.11) Install elements (5, 6) and rubber spacers (7) onto feed through tubes (15), long string mandrel (2).

H-1.12) Assemble setting mandrel assembly and install:

H-1.12.1) Install o-rings (26, 29) in grooves in setting mandrel (8).

H-1.12.2) Install o-rings (27) in grooves in setting chamber (10).

H-1.12.3) Gently tap setting mandrel (8) into setting chamber (10).

CAUTION₂: Do NOT rip or tear o-rings while installing.

H-1.12.4) Align threaded holes in setting chamber (10) with pocket holes in setting mandrel (8). Screw one shear screw (17) into setting chamber (10) to hold parts together temporarily.

H-1.12.5) Insert lock ring (9) into bottom end of setting chamber (10).

H-1.12.6) Screw lock ring (9) onto setting mandrel (8). Keep it in smooth part of setting chamber (10) to avoid premature setting.

H-1.12.7) Install o-rings (26, 28, 29) in grooves in lower cone (11).

H-1.12.8) CAREFULLY screw lower cone (11) into setting chamber (10) until they shoulder.

CAUTION₂: Do NOT rip or tear o-rings while installing.

H-1.12.9) Remove shear screw (17) from setting chamber (10). Rotate setting chamber (10) and lower cone (11) in right-hand motion to align holes for long string mandrel (2) and feed through tubes (15).

H-1.12.10) Continue to rotate setting chamber (10) and lower cone (11) in unison; align threaded holes in setting chamber (10) with pocket holes in setting mandrel (8).

NOTE₅: This should NOT take more than 1/8 rotation (45°).

H-1.12.11) Screw shear screws (17) into setting chamber (10). Tighten until shear screws (17) make contact with setting mandrel (8). Back shear screws (17) out 1/4 turn.

H-1.12.12) Back up on setting chamber (10) with a wrench. Back off lower cone (11) enough to re-align holes for long string mandrel (2) and feed through tubes (15).

H-1.12.13) Install setting mandrel assembly onto long string mandrel (2) and feed through tubes (15).

CAUTION₂: Do NOT rip or tear o-rings while installing.

H-1.13) Install pick up ring (24) in groove in long string mandrel (2).

H-1.14) Assemble lower slip body assembly and install:

H-1.14.1) Install o-ring (29) in grooves in lower slip body cap (13).

H-1.14.2) Screw lower slip body (12) onto lower slip body cap (13).

H-1.14.3) Assemble lower slip assemblies and install:

H-1.14.3.1) Place slip springs (30) onto lower slips (22) and screw button head cap screws (31) into lower slips (22) to secure slip springs (30).

NOTE₄: Install two (2ea) springs per slip (Fig. 3).

H-1.14.3.2) Install lower slip assemblies into lower slip body (12). Wedge slips outwards.



Fig. 3



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H) ASSEMBLY (cont'd)

H-1.14.4) Install lower slip body assembly onto feed through tubes (15), and long string mandrel (2) and onto lower cone (11).

NOTE₆: Back off lower slip body cap (13) as needed to align feed through tubes (15), and long string mandrel (2).

CAUTION₂: Do NOT rip or tear o-rings while installing.

H-1.15) Align threaded holes in lower cone (11) with slots in lower slip body (12). Screw cap screws (16) into lower cone (11).

H-1.16) Screw shear screws (17) into lower slip body (12). Tighten until shear screws (17) make contact with lower cone (11). Back shear screws (17) out 1/4 turn. Remove wedges.

H-1.17) Screw shear sleeve (14) into lower slip body cap (13) until shouldered. Back off shear sleeve (14) as needed to align threaded holes in shear sleeve (14) with groove in long string mandrel (2).

H-1.18) Screw shear screws (23) into shear sleeve (14). Tighten until shear screws (23) make contact with long string mandrel (2). Back shear screws (23) out 1/4 turn ().

NOTE₇: Install a minimum of six (6) shear screws (23). Install additional shear screws (23) as needed to achieve desired shear value.

H-1.19) Screw crossover (20) onto long string mandrel (2).

H-1.20) Screw hex nipples (32) into lower slip body cap (13).

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

I) O-RING PRESSURE TEST

I-1) ASSEMBLY

NOTE₈: Prior to testing, all o-rings must be properly installed and in good condition (no rips, tears, cuts, etc.).

I-1.1) Remove all but one of setting shear screws (17) from setting chamber (10).

I-1.2) Install two halves of pressure test ring (P1) into groove in lower cone (11).

I-1.3) Screw socket cap screws (P3) into pressure test ring (P1)

I-1.4) Install two halves of pressure test ring (P1) into groove in setting mandrel (8).

I-1.5) Screw socket cap screws (P3) into pressure test ring (P1)

I-1.6) Install threaded rods (P2) through holes in pressure test rings (P1).

I-1.7) For each end of threaded rods (4 total), install one (1ea) flat washer (P5) and two (2ea) hex nuts (P4). Thread hex nuts (P4) onto threaded rods (P2) until washers and nuts are snug against rings.

I-1.8) Fill the setting port with hydraulic oil or inhibited water.

I-1.9) Apply pressure to the setting port. Hold and observe for leaks.

WARNING: Do NOT exceed 1,500 PSI.

I-1.10) Release pressure, remove pressure test kit, and re-install setting shear screws (17) in setting chamber (10).



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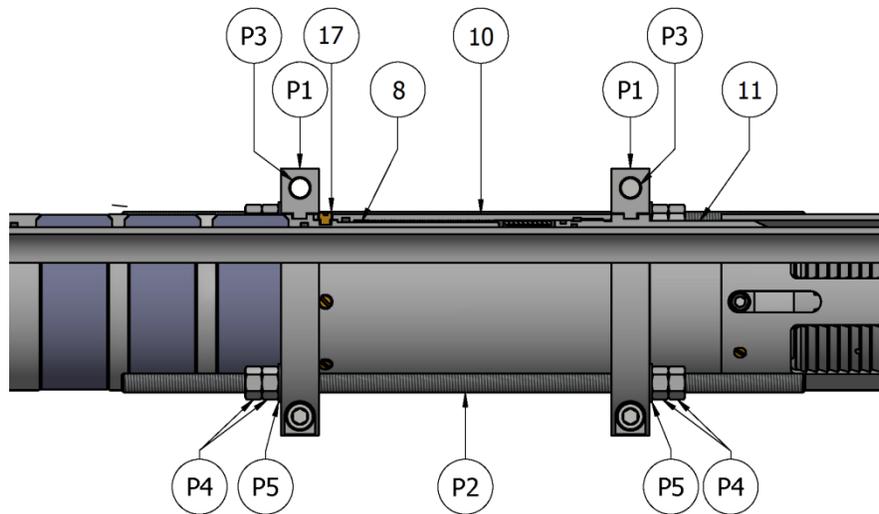
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I) O-RING PRESSURE TEST (cont'd)

I-2) PARTS LIST

ITEM	QTY	DESCRIPTION	MATERIAL	P/N TE-905-55
P1	2	PRESSURE TEST RING	P-110	TE-905-55-14-20
P2	4	THREADED ROD 1/2-13 UNC	STEEL	TE-905-55-1
P3	4	CAP SCREW 1/2-13 UNC X 1"	STEEL	SCS050C100
P4	16	STEEL HEX NUT .500-13 UNC	STEEL	SHN050C
P5	8	FLAT WASHER 1/2	STEEL	FW050

I-3) TECHNICAL ILLUSTRATION



J) PARTS LIST

ITEM	QTY	DESCRIPTION	MATERIAL	PART NUMBER
1	1	FLAT TOP	DLMS80	90855610-4
2	1	LONG STRING MANDREL	DLM13CR110	94520200-55-F
3	1	UPPER SLIP BODY	DLMS80	90455320
4	1	UPPER CONE	DLMS80	90855410-4
5	2	ELEMENT	80 DURO NITRILE	90855512-4
6	1	ELEMENT	70 DURO NITRILE	90855511-4
7	2	RUBBER SPACER	DLMS80	90855840-4
8	1	SETTING MANDREL	DLMS80	90855850-4



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J) PARTS LIST (cont'd)

ITEM	QTY	DESCRIPTION	MATERIAL	PART NUMBER
9	1	LOCK RING	DLMS80	90555720
10	1	SETTING CHAMBER	DLMS110	90455755
11	1	LOWER CONE	DLMS80	90855420-4
12	1	LOWER SLIP BODY	DLMS80	90455315
13	1	LOWER SLIP BODY CAP	DLMS80	90855335-4
14	1	SHEAR SLEEVE	DLMS60	94555741
15	4	FEED THROUGH TUBE 1/4	DLMS60	90425210-55
16	4	CAP SCREW 5/16-18 UNC X 3/8	STEEL	SCS031C037
17	16	SHEAR SCREW (1200#) 1/4-20 UNC X 1/4	DLM360BRS	BSSSLT025C025
18	1	PUP JOINT	DLMS80	PJ-BBB-36-B
19	1	COUPLING	DLMS80	CP-BAB-BBB-B-1
20	1	CROSSOVER	DLMS80	CH-BBB-BAB-B-1
21	4	UPPER SLIP	DLMS60	90855115-4
22	4	LOWER SLIP	DLMS60	90855135-4
23	6	SHEAR SCREW (5000#) 1/2-13 W/ .418 DOG POINT	DLM360BRS	65050902
24	1	PICK-UP RING	DLMS80	94570760
25	4	115 O-RING	NITRILE	90115
26	6	142 O-RING	NITRILE	90142
27	2	156 O-RING	NITRILE	90156
28	2	155 O-RING	NITRILE	90155
29	24	112 O-RING	NITRILE	90113
30	16	SLIP SPRING	-	32045950
31	8	BUTTON HEAD CAP SCREW	STEEL	BHSC832C025
32	4	CHANGEOVER	DLMS60	CH-50NPT-25NPT

REDRESS KIT (RDK)	90855-B-4-050
ASSEMBLED WEIGHT	161 LBS



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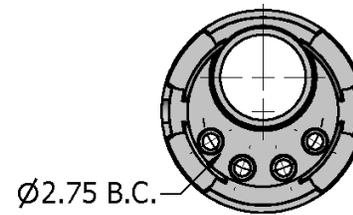
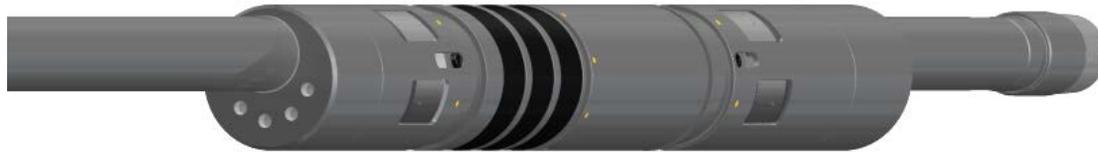
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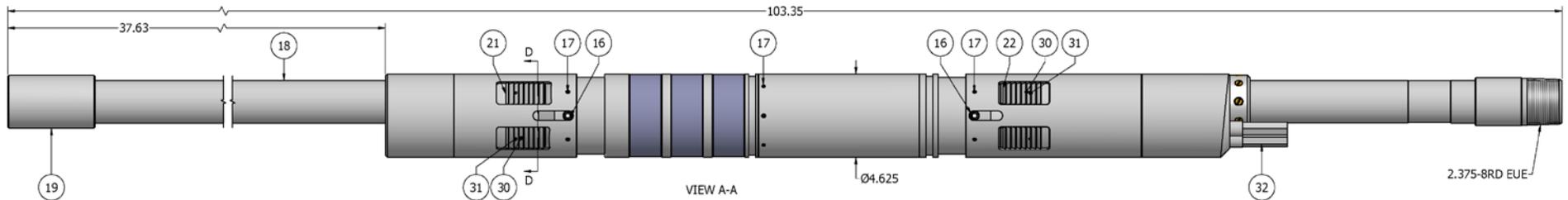
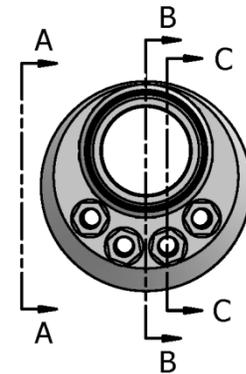
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K) TECHNICAL ILLUSTRATION



SECTION D-D





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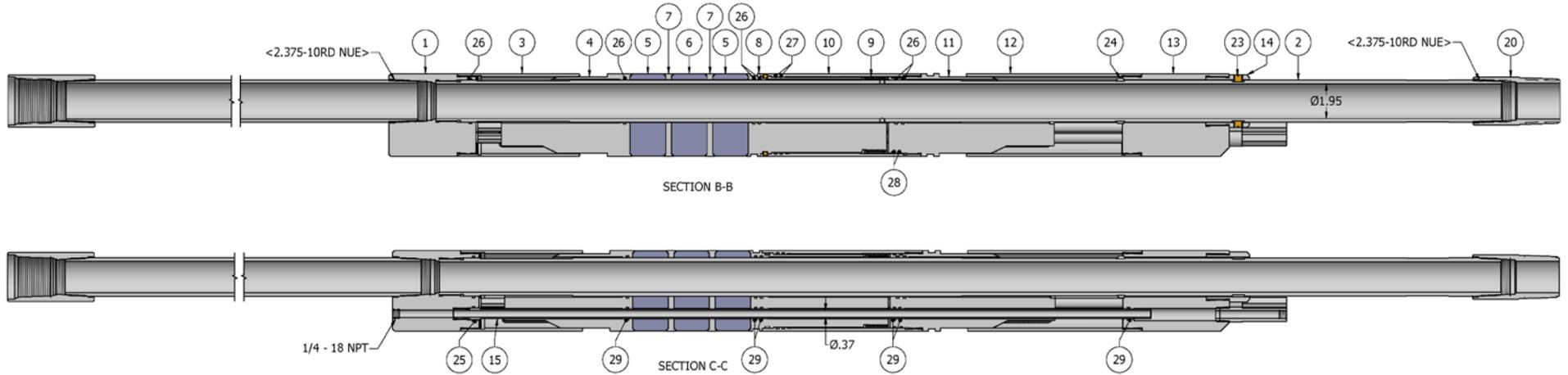
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K) TECHNICAL ILLUSTRATION (cont'd)



L) REVISION HISTORY

DATE	REVISION	DESCRIPTION OF CHANGES	REVISED BY	APPROVED BY
04/25/14	A	Created new manual	-	-
05/30/14	B	Revised PN 72455950 qty was 8, technical illustrations; Added PN CH-50NPT-25NPT	J.Anderson	D.Hushbeck
05/02/2016	C	Removed tool drift ID; Added setting and releasing to Specification Guide; Revised P/N 94520200-55-F was 90420200-55, 94555741 was 90570740, CP-BAB-BBB-B-1 was CP2375N2375E-SC, CH-BBB-BAB-B-1 was CH2375N2375ESC, 94570760 was 90570760, 32045950 was 72455950, BHSC832C025 was BHSC832C037, P/N 65050902 qty 6 was 8, assembled weight 161 was 156 lbs	J.Anderson	K.Plunkett