



HYDROSET II-A PACKER W/ 2.688" SNAP LATCH 8-5/8" X 2-7/8" X 2-7/8"

Manual No:
DL-947-8625-767

Revision: **A**

Revision Date:
11/10/2014

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) RELATED TOOLS (sold separately)

B-1) Snap Latch for 2.688" Seal Bore Hydroset II-A (P/N 94126)—refer to technical manual *DL-941-2688-768*.

C) SPECIFICATION GUIDE

CASING		
SIZE (INCHES)	WEIGHT (LBS/FT)	RECOMMENDED HOLE SIZE (INCHES)
8-5/8	24.0 – 32.0	7.921 – 8.097

TOOL					PART NUMBER
OD (INCHES)	LONG STRING ID		SHORT STRING ID		
	NOMINAL (INCHES)	DRIFT (INCHES)	NOMINAL (INCHES)	DRIFT (INCHES)	
7.688	2.39	2.347	2.39	2.347	94785-BAC

THREAD CONNECTION BOX UP / PIN DOWN	
LONG STRING	SHORT STRING
2-7/8 EUE	2.688" SEAL BORE / 2-7/8 NUE

DIFFERENTIAL PRESSURE (MAX)	TENSILE LOAD THRU TOOL (MAX)
7,000 PSI	61,000 LBS

* Using all eight (8 qty) releasing shear screws

SETTING				
SETTING AREA (SQ INCHES)	SHEAR VALUE (PSI/SCREW)	INITIATION PRESSURE (PSI)	RECOMMENDED SETTING PRESSURE (PSI)	MAXIMUM SETTING PRESSURE (PSI)
26.89		1,060	1,280	1,925

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.

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.

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 1,200 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.

CAUTION₃: Do **NOT** exceed 5,000 psi during setting.



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E) OPERATION (cont'd)

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 79,000 lbs below the packer. If the combined force from the releasing shear screws plus the weight below the tool exceeds 70,000 lbs, a telescoping union should be run directly below the packer.

F) 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

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 body (1) in vise.

H-1.1) Unscrew and remove coupling (22) from handling pup (23).

H-1.2) Unscrew and remove handling pup (23) from scoop head (9).

H-1.3) Moving to lower end of tool, unscrew and remove changeover (24) from long string mandrel (2).

H-1.4) Unscrew and remove shear screws (25) from shear pin retainer (19).

H-1.5) Unscrew and remove shear pin retainer (19) from lower slip body cap (18).

H-1.6) Unscrew and remove cap screws (8) from lower cone (15).

H-1.7) Unscrew and remove shear screws (26) from lower slip body (16).

H-1.8) Wedge lower slips (17) outwards (if needed). Remove lower slip body assembly and disassemble:

H-1.8.1) Remove lower slips (17) and slip springs (7) from lower slip body (16).

H-1.8.2) Unscrew and separate lower slip body (16) from lower slip body cap (18).

H-1.8.3) Remove o-ring (28) from lower slip body cap (18).

H-1.9) Remove pick up ring (20) from long string mandrel (2)



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H) DISASSEMBLY (cont'd)

H-1.10) Remove setting mandrel assembly and disassemble:

H-1.10.1) Unscrew and remove lower cone (15) from setting chamber (14).

H-1.10.1.1) Remove o-rings (28, 29) from lower cone (15).

H-1.10.2) Unscrew and remove lock ring (27) from lower end of setting chamber (14) and setting mandrel (13).

H-1.10.3) Unscrew and remove shear screws (26) from setting chamber (14).

H-1.10.4) Remove setting mandrel (13) from setting chamber (14).

H-1.10.4.1) Remove o-rings (28) from setting mandrel (13).

H-1.10.4.2) Remove o-rings (30) from setting chamber (14).

H-1.11) Remove elements (10, 12) and rubber spacers (11) from short and long string mandrels (2, 4).

H-1.12) Unscrew and remove long string mandrel (2) and short string mandrel (4) from top connection body (1).

CAUTION₄: Do NOT wrench or clamp on seal surfaces.

H-1.13) Unscrew and remove cap screws (8) from upper cone (5).

H-1.14) Unscrew and remove shear screws (26) from upper slip body (3).

H-1.15) Wedge upper slips (6) outwards (if needed). Remove upper cone (5) from upper slip body (3).

H-1.15.1) Remove o-rings (28) from upper cone (5).

H-1.16) Remove wedges (if needed). Remove upper slips (6) and slip springs (7) from upper slip body (3).

H-1.17) Unscrew and remove upper slip body (3) from top connection body (1).

H-1.18) Unscrew and remove cap screws (21) from top connection body (1).

H-1.19) Remove scoop head (9) from top connection body (1).

H-2) Unclamp and remove top connection body (1) from vise.

H-2.1) Remove o-rings (28) from top connection body (1).

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 body (1).

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

I-2.1) Install scoop head (9) onto top connection body (1). Align holes in scoop head (9) with threaded holes in top connection body (1).

I-2.2) Screw cap screws (21) into top connection body (1).

I-2.3) Screw upper slip body (3) onto top connection body (1).

I-2.4) Install slip springs (7) and upper slips (6) into upper slip body (3). Wedge slips outwards.

I-2.5) Install o-rings (28) in grooves in upper cone (5).

I-2.6) Install upper cone (5) into upper slip body. Align threaded holes in upper cone (5) with holes and slots in upper slip body (3).

I-2.7) Screw cap screws (8) into upper cone (5).

I-2.8) Screw shear screws (26) into upper slip body (3). Tighten until shear screws (26) make contact with upper cone (5). Back shear screws (26) out 1/4 turn.

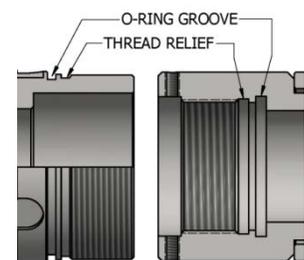


Fig. 2



HYDROSET II-A PACKER W/ 2.688" SNAP LATCH 8-5/8" X 2-7/8" X 2-7/8"

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I) ASSEMBLY (cont'd)

I-2.9) Screw short string mandrel (4) and long string mandrel (2) into top connection body (1). Remove wedges from upper slips (6).

CAUTION₄: Do NOT wrench or clamp on seal surfaces.

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

I-2.10) Install elements (10, 12) and rubber spacers (11) onto short and long string mandrels (2, 4).

I-2.11) Assemble setting mandrel assembly and install (Figs. 3, 4):

I-2.11.1) Install o-rings (28) in o-ring grooves in setting mandrel (13).

I-2.11.2) Install o-rings (30) in o-ring groove in setting chamber (14).

I-2.11.3) Gently tap setting mandrel (13) into setting chamber (14). Align shear screw groove in setting mandrel (13) with threaded holes in setting chamber (14).

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

I-2.11.4) Temporarily screw one shear screw (26) into setting chamber (14) to hold parts together.

I-2.11.5) Install lock ring (27) into bottom end of setting chamber (14) and screw onto setting mandrel (13).

I-2.11.6) Install o-rings (28, 29) in o-ring grooves in lower cone (15).

I-2.11.7) CAREFULLY screw lower cone (15) into setting chamber (14) until they shoulder.

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

I-2.11.8) Unscrew and remove shear screw (26) from setting chamber (14). Rotate setting chamber (14) and lower cone (15) in right-hand motion to align holes for long and short string mandrels (Fig. 4).

I-2.11.9) Continue rotating setting chamber and lower cone (in unison) further to align threaded holes in setting chamber (14) with pocket holes in setting mandrel (13).

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

I-2.11.10) Screw shear screws (26) into setting chamber (14) (Fig. 3). Tighten until shear screws (26) make contact with setting mandrel (13). Back shear screws (26) out 1/4 turn.

I-2.11.11) While backing up with a wrench on setting chamber (14), back off lower cone (15) just enough to allow holes for short and long string mandrels to align again (Fig. 4).

I-2.11.12) Install setting mandrel assembly onto short and long string mandrels.

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

I-2.12) Install pick up ring (20) in pick-up ring groove in long string mandrel (2).

I-2.13) Assemble lower slip body assembly and install:

I-2.13.1) Install o-ring (28) in o-ring groove in lower slip body cap (18).

I-2.13.2) Screw lower slip body (16) onto lower slip body cap (18).

I-2.13.3) Install lower slip springs (7) and lower slips (17) into lower slip body (16). Wedge slips outwards.

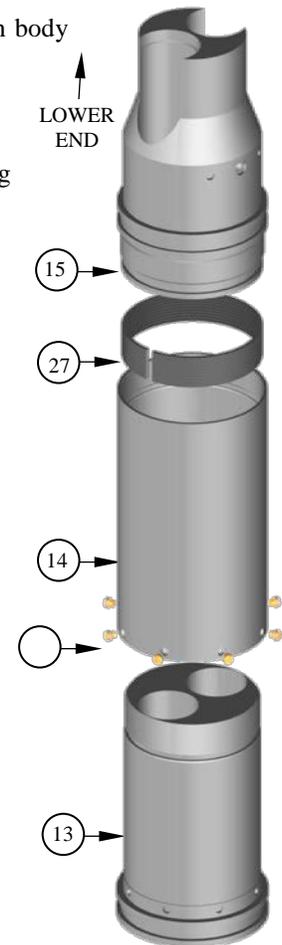


Fig. 3

NOTE₆: O-rings not shown.



Fig. 4

NOTE₇: Holes MUST be aligned before installing shear screws (26).



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I) ASSEMBLY (cont'd)

I-2.13.4) Install lower slip body assembly onto short and long string mandrels and onto lower cone (15). Align threaded holes in lower cone (15) with holes and slots in lower slip body (16). Remove wedges from lower slips (17).

NOTE₃: Back off lower slip body cap (18) as needed to align short and long string mandrels.

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

I-2.14) Screw cap screws (8) into lower cone (15).

I-2.15) Screw shear screws (26) into lower slip body (16). Tighten until shear screws (26) make contact with lower cone (15). Back shear screws (26) out 1/4 turn.

I-2.16) Screw shear pin retainer (19) into lower slip body cap (18) until shouldered. Back off shear pin retainer (19) as needed to align threaded holes in shear pin retainer (19) with shear screw groove in long string mandrel (2).

I-2.17) Screw shear screws (25) into shear pin retainer (19). Tighten until shear screws (25) make contact with long string mandrel (2). Back shear screws (25) out 1/4 turn.

NOTE₄: Install a minimum of three (3qty) shear screws (25). Install additional shear screws (25) as needed to achieve desired shear value.

I-2.18) Screw changeover (24) onto long string mandrel (2).

I-2.19) Moving to upper end of tool, screw handling pup (23) into top connection body (1).

I-2.20) Screw coupling (22) onto handling pup (23).

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



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J) PRESSURE TEST

J-1) ASSEMBLY

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

- J-1.1) Remove all but one of setting shear screws (26) from setting chamber (14).
- J-1.2) Install two halves of pressure test ring (P1) into groove in lower cone (15).
- J-1.3) Screw cap screws (P3) into pressure test ring (P1)
- J-1.4) Install two halves of pressure test ring (P1) into groove in setting mandrel (13).
- J-1.5) Screw cap screws (P3) into pressure test ring (P1)
- J-1.6) Install threaded rods (P2) through holes in pressure test rings (P1).
- J-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.
- J-1.8) Fill the setting port with hydraulic oil or inhibited water.
- J-1.9) Apply pressure to the setting port. Hold and observe for leaks.

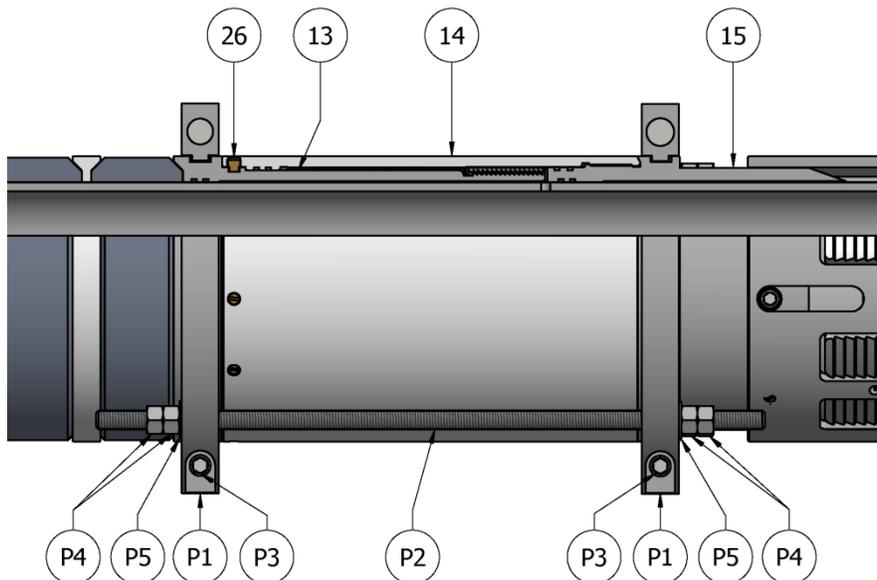
WARNING: Do NOT exceed 1,000 PSI. To test over 1,000 PSI contact D&L sales.

- J-1.10) Release pressure, remove pressure test kit, and re-install setting shear screws (26) in setting chamber (14).

J-2) PARTS LIST

ITEM	QTY	DESCRIPTION	MATERIAL	P/N TE-905-85
P1	2	PRESSURE TEST RING	P-110	TE-905-85-24-32
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

J-3) TECHNICAL ILLUSTRATION





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K) PARTS LIST

ITEM	QTY	DESCRIPTION	MATERIAL	PART NUMBER
1	1	TOP CONNECTION BODY	P-110	94785600CC
2	1	LONG STRING MANDREL	P-110	90427200
3	1	UPPER SLIP BODY	L-80	94585310
4	1	SHORT STRING MANDREL	L-80	90427210
5	1	UPPER CONE	L-80	94585400CC
6	4	UPPER SLIP	1026	94585115
7	24	SLIP SPRING	X-750 INCONEL	DL94829
8	4	CAP SCREW 3/8-16 UNC X 3/8	STEEL	SCS037C037
9	1	SCOOP HEAD	L-80	90685615
10	2	ELEMENT	80 DURO NITRILE	90585512
11	2	RUBBER SPACER	1018	90585840
12	1	ELEMENT	70 DURO NITRILE	90585511
13	1	SETTING MANDREL	L-80	94585751CC
14	1	SETTING CHAMBER	P-110	94585755
15	1	LOWER CONE	L-80	94585420CC
16	1	LOWER SLIP BODY	L-80	94585315
17	4	LOWER SLIP	1026	94585130
18	1	LOWER SLIP BODY CAP	L-80	94585336CC
19	1	SHEAR PIN RETAINER	P-110	90570741
20	1	PICK UP RING	1026	90570761
21	2	CAP SCREW 1/2-13 UNC X 2-1/2	STEEL	SCS050C250
22	1	COUPLING - SPECIAL CLEARANCE	1026	CP2875E2875N-SC
23	1	HANDLING PUP	L-80	PJ-BBC-72-B
24	1	CHANGEOVER	L-80	CH2875N2875E-SC
25	8	SHEAR SCREW (5000#) 1/2-13 W/ .418 DOG POINT	BRASS	65050902
26	20	SHEAR SCREW (2375#)	BRASS	60100990
27	1	LOCK RING	L-80	94585720
28	15	150 O-RING	90 DURO NITRILE	90150
29	2	166 O-RING	90 DURO NITRILE	90166
30	2	167 O-RING	90 DURO NITRILE	90167

REDRESS KIT (RDK)	94785050
ASSEMBLED WEIGHT	612 LBS



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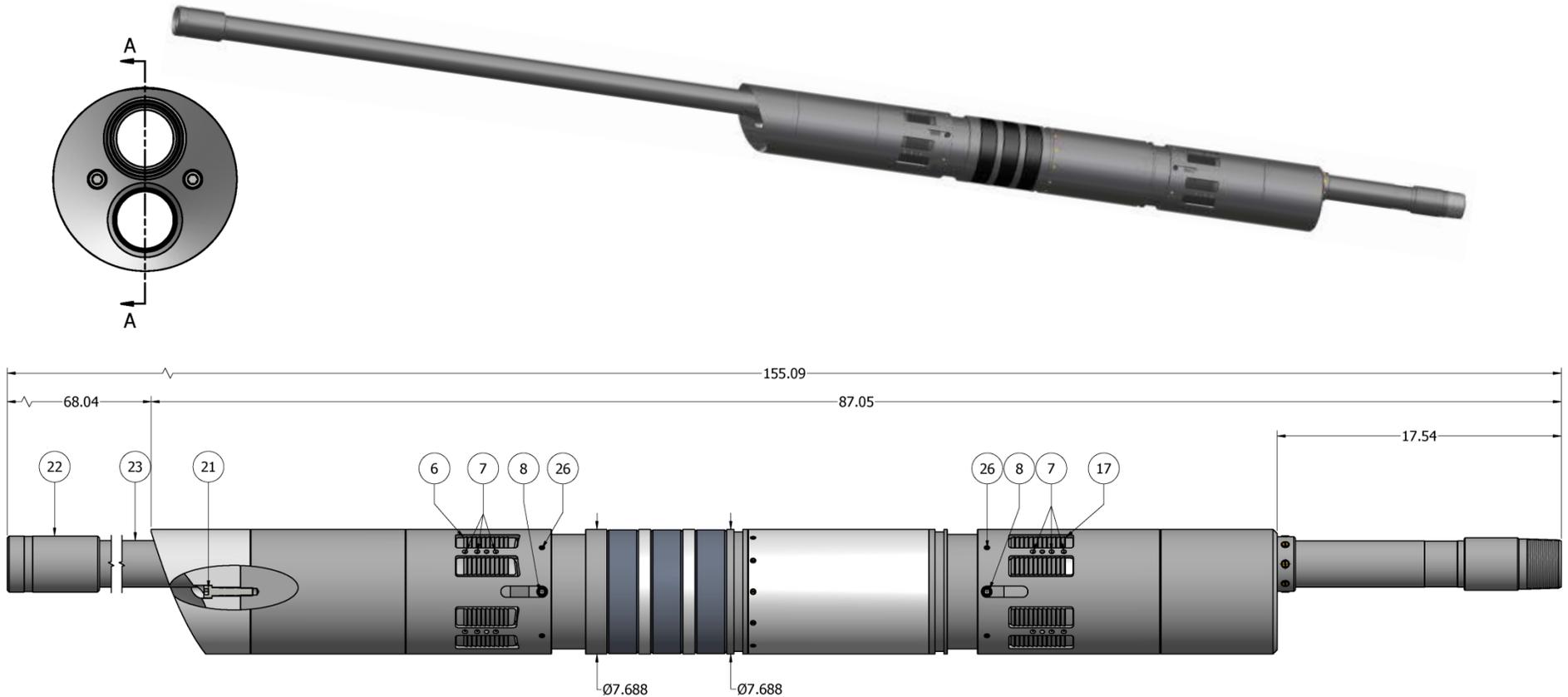
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L) TECHNICAL ILLUSTRATION





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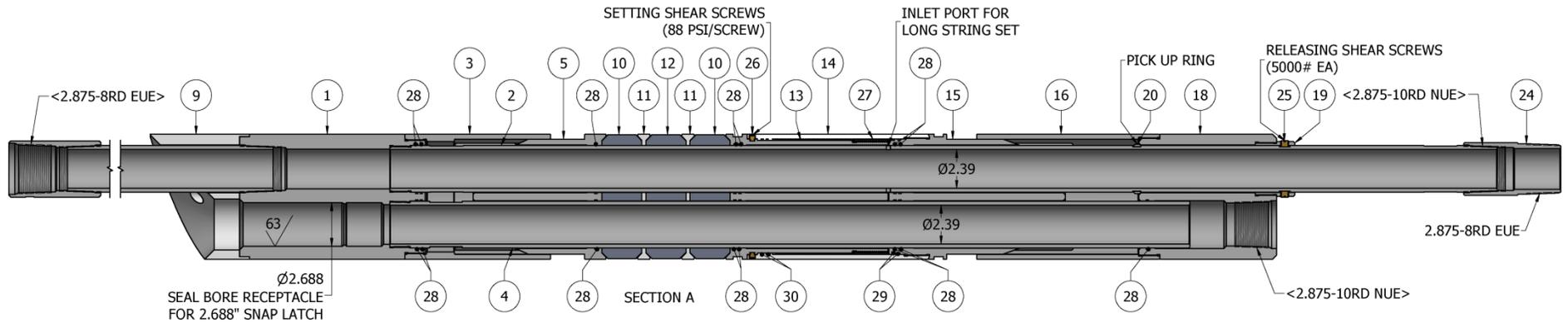
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L) TECHNICAL ILLUSTRATION (cont'd)



M) REVISION HISTORY

DATE	REVISION	DESCRIPTION OF CHANGES	REVISED BY	APPROVED BY
11/10/14	A	Created new manual	-	-