A) DESCRIPTION

The Hydroset II-A 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)	**SHORT STRING ID** (INCHES)	**J-LATCH SEAL BORE** (INCHES)	
4.625	1.56	1.25	1.969	94655H-BAA 94655HC-BAA[1]

[1]Carbide option

THREAD CONNECTION	
LONG STRING BOX UP / PIN DOWN	**SHORT STRING** BOX DOWN
1.900" EUE	1.660" NUE

DIFFERENTIAL PRESSURE (MAX)	**TENSILE LOAD THRU TOOL** (MAX)
5,000 PSI	5,000 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)
8.98	134	1,070	2,451	3,676

RELEASING
Shear release is adjustable from 15,000 to 30,000 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

C) PRE-INSTALLATION INSPECTION PROCEDURES

CAUTION$_1$: 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.

NOTE$_5$: Do not tighten long string mandrel (2) into J-latch top (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.

D) OPERATION

CAUTION$_3$: 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 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.

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.

D-1) SETTING PROCEDURES (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.

Allow at least 30 minutes for the packer to equalize thermally before setting. Temporarily plug the long string below the packer and apply a minimum of 2,451 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 Hydroset II-A Packer is released by a straight pick up on the long string.

The long string mandrel can carry a maximum of 35,000 lbs below the packer. If the amount of tension required to shear the releasing shear screws plus the weight below the tool exceeds 35,000 lbs, a Telescoping Union should be run directly below the packer. The shear release value is adjustable from 15,000 to 30,000 lbs (5,000 lbs increments). A minimum of 3 shear screws are required.

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

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 J-latch top (1) in vise.
- H-1.1) From upper end of tool, unscrew and remove coupling (10) from pup joint (20).
- H-1.2) Unscrew and remove pup joint (20) from J-latch top (1).
- H-1.3) Unscrew and remove cap screws (21) from J-latch top (1).
- H-1.4) Remove scoop head (4) from J-latch top (1).
- H-1.5) Moving to lower end of tool, unscrew and remove crossover (5) from long string mandrel (2).
- H-1.6) Unscrew and remove shear screws (25) from shear sleeve (24).
- H-1.7) Unscrew and remove shear sleeve (24) from lower slip body cap (19).
- H-1.8) Unscrew and remove cap screws (23) from lower cone (16).
- H-1.9) Unscrew and remove shear screws (26) from lower slip body (18).
- H-1.10) Wedge lower slips (17) outwards. Remove lower slip body assembly and disassemble:
  - H-1.10.1) Remove wedges. Remove lower slips (17) from lower slip body (18).
    - H-1.10.1.1) Unscrew and remove button head cap screws (28) from lower slips (17).
    - H-1.10.1.2) Remove slip springs (27) from lower slips (17).
  - H-1.10.2) Unscrew and remove lower slip body (18) from lower slip body cap (19).
  - H-1.10.3) Remove o-ring (29) 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 (29, 30, 31) from lower cone (16).
  - H-1.12.2) Unscrew and remove lock ring (7) from lower end of setting mandrel (22).
  - H-1.12.3) Unscrew and remove shear screws (26) from setting chamber (15).
  - H-1.12.4) Remove setting mandrel (22) from setting chamber (15).
    - H-1.12.4.1) Remove o-rings (29, 30) from setting mandrel (22).
    - H-1.12.4.2) Remove o-rings (32) from setting chamber (15).
- H-1.13) Remove elements (13, 14) and rubber spacers (12) from long string mandrel (2) and short string mandrel (3).
- H-1.14) Unscrew and remove short string mandrel (3) and long string mandrel (2) from J-latch top (1).

  CAUTION3: Do NOT wrench or clamp on seal surfaces.
- H-1.15) Unscrew and remove cap screws (23) from upper cone (9).
- H-1.16) Unscrew and remove shear screws (26) from upper slip body (6).
- H-1.17) Wedge upper slips (8) outwards. Remove upper cone (9) from upper slip body (6).
  - H-1.17.1) Remove o-rings (29, 30) from upper cone (9).
  - H-1.17.2) Remove wedges. Remove upper slips (8) from upper slip body (6).
    - H-1.17.2.1) Unscrew and remove button head cap screws (28) from upper slips (6).
    - H-1.17.2.2) Remove slip springs (27) from upper slips (8).
- H-1.18) Unscrew and remove upper slip body (6) from J-latch top (1)

H-2) Unclamp and remove J-latch top (1) from vise.
- H-2.1) Remove o-rings (29, 30) from J-latch top (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.

CAUTION4: To ensure tool operates properly, install o-rings in o-ring grooves **NOT** thread reliefs (Fig. 2).

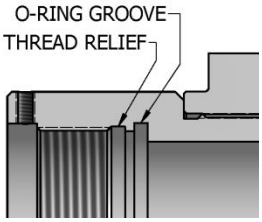


Fig. 2

I-1) Install o-rings (29, 30) in o-ring grooves in J-latch top (1).

I-2) Clamp J-latch top (1) in vise

I-2.1) Screw upper slip body (6) onto J-latch top (1).

I-2.2) Place slip springs (27) onto upper slips (8).

NOTE2: Install two (2ea) springs per slip (Fig. 3).

I-2.3) Screw button head cap screws (28) into upper slips (8) to secure slip springs (27) (Fig. 3).

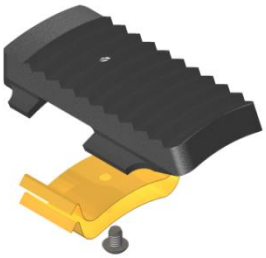


Fig. 3

I-2.4) Install upper slips into upper slip body (6). Wedge slips outwards.

I-2.5) Install o-rings (29, 30) in o-ring grooves in upper cone (9).

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

I-2.7) Screw cap screws (23) into upper cone (9).

I-2.8) Screw shear screws (26) into upper slip body (6). Tighten until shear screws (26) make contact with upper cone (9). Back shear screws (26) out 1/4 turn.

I-2.9) Screw short string mandrel (3) and long string mandrel (2) into J-latch top (1). Remove wedges.

CAUTION3: Do NOT wrench or clamp on seal surfaces.

CAUTION5: Do NOT rip or tear o-rings while installing.

I-2.10) Install elements (13, 14) and rubber spacers (12) onto short string mandrel (3) and long string mandrel (2).

I-2.11) Assemble setting mandrel assembly and install:

I-2.11.1) Install o-rings (29, 30) in o-ring grooves in setting mandrel (22).

I-2.11.2) Install o-rings (31) in o-ring grooves in setting chamber (15).

I-2.11.3) Gently tap setting mandrel (22) into setting chamber (15). Align threaded holes in setting chamber (15) with shear screw groove in setting mandrel (22).

CAUTION5: Do NOT rip or tear o-rings while installing.

I-2.11.4) Temporarily screw one (1 qty) shear screw (26) into setting chamber (15) to hold parts together.

I-2.11.5) Install lock ring (7) into bottom end of setting chamber (15) and screw onto setting mandrel (22). Keep lock ring (7) in smooth part of setting chamber (15) to avoid premature setting.

I-2.11.6) Install o-rings (29, 30) in o-ring grooves in lower cone (16).

I-2.11.7) CAREFULLY screw lower cone (16) into setting chamber (15) until they shoulder.

CAUTION5: Do NOT rip or tear o-rings while installing.

I-2.11.8) Rotate setting chamber (15) and lower cone (16) in right-hand motion to align holes for long string mandrel (2) and short string mandrel (3).

I-2.11.9) Screw shear screws (26) into setting chamber (15). Tighten until shear screws (26) make contact with setting mandrel (22). Back shear screws (26) out 1/4 turn.

I) ASSEMBLY (cont'd)

I-2.11.10) Install setting mandrel assembly onto long string mandrel (2) and short string mandrel (3).

CAUTION$_5$: Do NOT rip or tear o-rings while installing.

I-2.12) Install pick-up ring (11) in groove in long string mandrel (2).

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

I-2.13.1) Install o-rings (29) in o-ring grooves in lower slip body cap (19).

I-2.13.2) Screw lower slip body (18) onto lower slip body cap (19).

I-2.13.3) Assemble lower slip assemblies and install:

I-2.13.3.1) Place slip springs (27) onto lower slips (17).

NOTE$_2$: Install two (2 ea) springs per slip (Fig. 4).

Fig. 4

I-2.13.3.2) Screw button head cap screws (28) into lower slips (17) to secure slip springs (27) (Fig. 4).

I-2.13.3.3) Install lower slips onto lower slip body (18). Wedge slips outwards.

I-2.13.3.4) Install lower slip body (18) onto short string mandrel (3) and long string mandrel (2) and onto lower cone (16). Align threaded holes in lower cone (16) with slots in lower slip body (18).

NOTE$_3$: Back off lower slip body cap (19) as needed to align short string mandrel (3) and long string mandrel (2).

CAUTION$_5$: Do NOT rip or tear o-rings while installing.

I-2.13.3.5) Screw cap screws (23) into lower cone (16).

I-2.14) Screw shear screws (26) into lower slip body (18). Tighten until shear screws (26) make contact with lower cone (16). Back shear screws (26) out 1/4 turn. Remove wedges.

I-2.15) Screw shear sleeve (24) into lower slip body cap (19) until shouldered.

I-2.16) Screw shear screws (25) into shear sleeve (24). Tighten until shear screws (25) make contact with long string mandrel (2). Back shear screws (25) out 1/4 turn.

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

I-2.18) Moving to upper end of tool, install scoop head (4) onto J-latch top (1). Align counterbored holes in scoop head with threaded holes in top connection.

I-2.19) Screw cap screws (21) into J-latch top (1).

I-2.20) Screw pup joint (20) into J-latch top (1).

CAUTION$_5$: Do NOT rip or tear o-rings while installing.

I-2.21) Screw coupling (10) onto pup joint (20).

CAUTION$_5$: Do NOT rip or tear o-rings while installing.

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

NOTE$_4$: 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 94655H-BAA
1	1	J-LATCH TOP	DLMS110 / DLMS80	94655600
2	1	LONG STRING MANDREL	DLMS110	94519200-55
3	1	SHORT STRING MANDREL	DLMS80	94516210-55
4	1	SCOOP HEAD	DLMS80	94755615
5	1	CROSSOVER	DLMS80	CH-BBA-BAA-B-1
6	1	UPPER SLIP BODY	DLMS80	90455320
7	1	LOCK RING	DLMS80	94555721
8	4	UPPER SLIP	DLMS60	90855115-4
9	1	UPPER CONE	DLMS80	94555400
10	1	COUPLING	DLMS80	CP-BAA-BBA-B-1
11	1	PICK-UP RING	DLMS80	94519915
12	2	RUBBER SPACER	DLMS80	94555840
13	1	ELEMENT	70 DURO HSN	94555511H
14	2	ELEMENT	80 DURO HSN	94555512H
15	1	SETTING CHAMBER	DLMS110	90455755
16	1	LOWER CONE	DLMS80	94555420
17	4	LOWER SLIP	DLMS60	90855135-4
18	1	LOWER SLIP BODY	DLMS80	90455315
19	1	LOWER SLIP BODY CAP	DLMS80	94555336
20	1	PUP JOINT	DLMS80	PJ-BBA-36-B
21	2	CAP SCREW 3/8-16 UNC X 1-1/2	STEEL	SCS037C150
22	1	SETTING MANDREL	DLMS80	94555751
23	4	CAP SCREW 5/16-18 UNC X 5/16	STEEL	SCS031C031
24	1	SHEAR SLEEVE	DLMS80	94555740
25	6	SHEAR SCREW (5000#) 1/2-13 W/ .418 DOG POINT	DLM360BRS	65050902
26	16	SHEAR SCREW (1200#) 1/4-20 UNC X 1/4	DLM360BRS	BSSSLT025C025

J) PARTS LIST (cont’d)

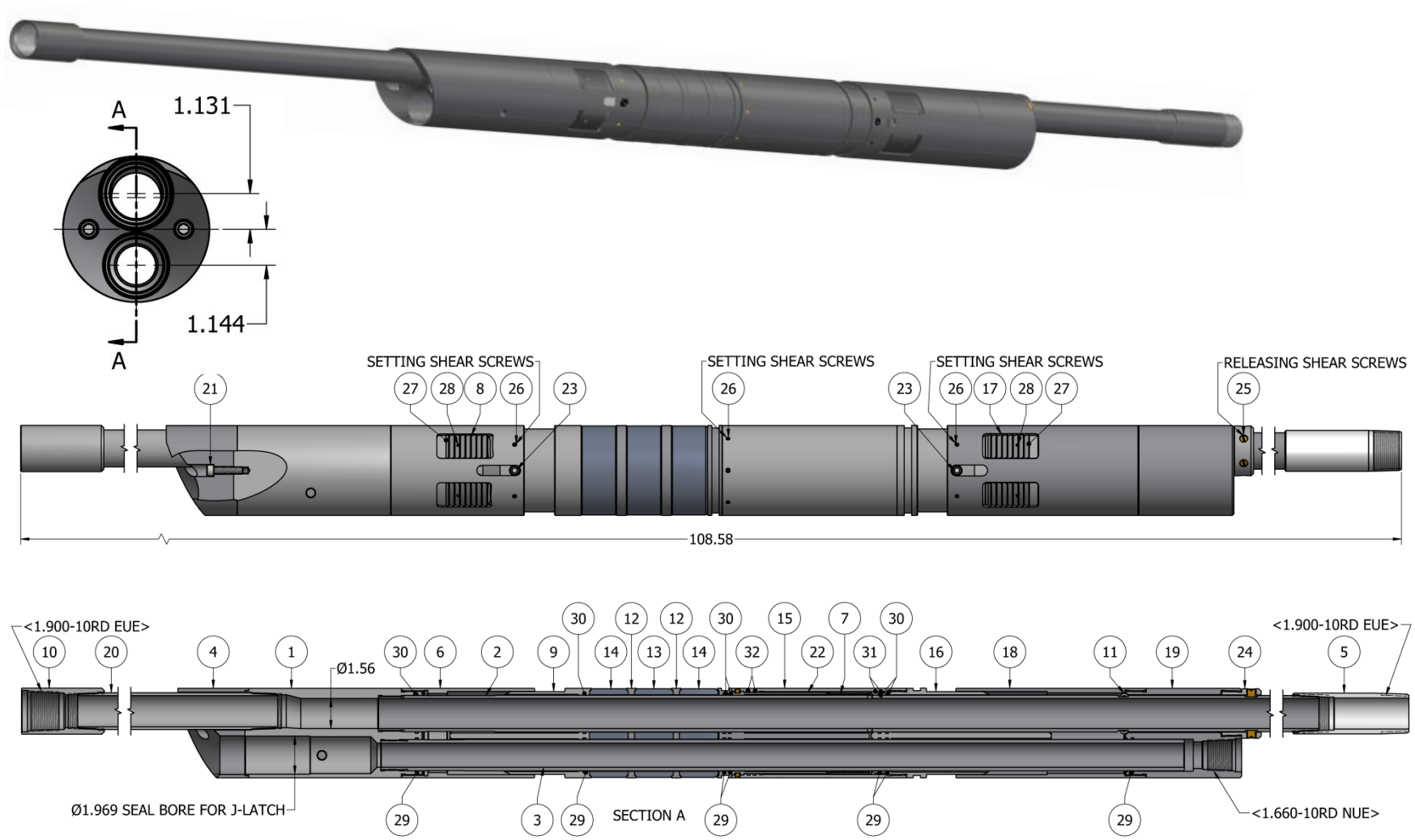
ITEM	QTY	DESCRIPTION	MATERIAL	P/N 94655H-BAA
27	16	SLIP SPRING	INCONEL 625	32045950
28	8	BUTTON HEAD CAP SCREW #8-32 UNC X 1/4	STEEL	BHSC832C025
29	7	130 O-RING	90 DURO HSN	90130H
30	6	134 O-RING	90 DURO HSN	90134H
31	2	155 O-RING	90 DURO HSN	90155H
32	2	156 O-RING	90 DURO HSN	90156H

REDRESS KIT (RDK)		94555-H-050
ASSEMBLED WEIGHT		178 LBS

J-1) CARBIDE OPTIONS

ITEM	QTY	DESCRIPTION	MATERIAL	P/N 94655HC-BAA
8	4	CARBIDE UPPER SLIP	DLMS110	90555115C
17	4	CARBIDE LOWER SLIP	DLMS110	90555131C

K) TECHNICAL ILLUSTRATION



L) REVISION HISTORY

DATE	REVISION	DESCRIPTION OF CHANGES	REVISED BY	APPROVED BY
11/17/2022	D	Revised BHSC832C025 was BHSC832C031; Added P/N 94655HC-BAA	J.Anderson	E.Visaez
06/19/2019	C	Added Note$_5$, Note$_4$; Revised Setting table, recommended weight range; Removed Pressure Test	J.Anderson	Z.Speer
10/26/2017	B	90855115-4 was 90555115, 90855135-4 was 90555131	J.Anderson	K.Plunkett
07/24/2017	A	Created new manual	-	-