



HYDRAULIC TUBING ANCHOR

4-1/2" X 2-3/8"

Manual No:
DL-324-4500-118

Revision: **C**

Revision Date:
09/15/2017

Authored by: *B.Mathis*

Approved by: *D.Hushbeck*

A) DESCRIPTION

The Hydraulic Tubing Anchor is a hydraulically-activated retrievable anchor designed to hold the tubing string in tension or compression. The Hydraulic Tubing Anchor catcher prevents movement of the tubing during pumping strokes and holds it stationary if it should part. The use of a tubing anchor increases pump efficiency, reduces rod and tubing wear, and keeps tubing and rods from falling into the well in case of a part.

The Hydraulic Tubing Anchor is operated by applying pressure to the tubing. This pressure shears screws that hold the anchor unset. A setting piston drives the slips set while locking the setting force in place. The Hydraulic Tubing Anchor utilizes special designed slips - heat-treated steel alloy double-acting slips for maximum holding power in tension or compression. Slips are fully enclosed for extra breakage resistance and will be retained if slips break. The Hydraulic Tubing Anchor is retrieved by shearing screws with tension. Shear pins are added in 5,000 lb increments to achieve the desired shear value necessary to release.

B) RELATED TOOLS (sold separately)

B-1) Pump-Out Plug (P/N varies)—refer to technical manual *DL-597-0000-431*.

C) SPECIFICATION GUIDE

CASING			TOOL OD (INCHES)	TOOL ID (INCHES)	THREAD CONNECTION BOX UP / PIN DOWN	PART NUMBER
SIZE (INCHES)	WEIGHT (LBS/FT)	RECOMMENDED HOLE SIZE (INCHES)				
4-1/2	9.5 - 13.5	3.920 – 4.090	3.750	1.94	2-3/8 EUE	32445 32445H ¹ 32445V ²

Elastomer Trim Options: ¹HSN, ²Viton

DIFFERENTIAL PRESSURE (MAX)	TENSILE LOAD THRU TOOL (MAX)	TORQUE THRU TOOL (MAX)
7,000 PSI	41,000 LBS	2,000 FT-LBS

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.

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 (cont'd)

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, o-rings, shear screws, etc. Contact D&L sales for redress kit and/or other replacement part information.

E) SETTING PROCEDURES

CAUTION: Do not run the tool without properly tightening connections. Running the tool with loose connections may damage the tool and cause malfunction.

The Hydraulic Tubing Anchor is operated by applying pressure to the tubing. The applied pressure shears the setting shear screws which set the anchor. The setting piston sets the slips set while locking the setting force in place.

A tubing plug (ball seat, pump-out plug, etc.) must be run below the anchor so pressure can be applied to the tubing. The initial setting pressure is controlled by shear screws in the setting piston. The shear screws are rated to 615 psi per screw and the pressure to initiate setting will be determined by the quantity of shear screws.

F) RELEASING PROCEDURES

A straight pull shears the releasing shear screws with tension and the anchor can be retrieved. The anchor must be re-dressed before it can be reset. Shear screws are added in 5,000 lb increments to achieve the desired shear value necessary to release the anchor.

G) ELASTOMER TRIM TEMPERATURE GUIDE

RUBBER TYPE	TEMPERATURE RANGE
NITRILE	40° - 250°F
HSN (HNBR)	70° - 300°F
VITON	100° - 350°F

H) 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.

Store the tool, if possible, in an enclosed, temperature and humidity controlled environment. Avoid excessively high temperatures over long periods of time. 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.



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I) 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

J) DISASSEMBLY

J-1) Clamp coupling (1) in vise.

J-1.1) Unscrew and remove crossover (12) from inner mandrel (2).

J-1.2) Unscrew and remove shear screws (15) from shear ring (11).

J-1.3) Remove shear ring (11) from inner mandrel (2).

J-1.4) Unscrew and remove set screws (14) from upper cone (7).

J-1.5) Wedge slips (9) outward (if needed). Remove slip body assembly from inner mandrel (2) and disassemble:

J-1.5.1) Remove wedges (if needed). Remove slip assemblies from slip body (8) and disassemble:

J-1.5.1.1) Unscrew and remove button head screws (17) from slips (9).

J-1.5.1.2) Remove slip springs (13) from slips (9).

J-1.5.2) Remove lower cone (10) from slip body (8).

J-2) Remove coupling (1) from vice and clamp on lower end of inner mandrel (2).

J-2.1) Unscrew and remove coupling (1) from inner mandrel (2).

J-2.2) Unscrew and remove shear screws (16) from setting piston (5).

J-2.3) Separate shear cap (3) from setting piston (5), and remove shear cap (3) from inner mandrel (2).

J-2.3.1) Remove o-rings (18, 20) from shear cap (3).

J-2.4) Remove snap ring (4) from inner mandrel (2).

J-2.5) Unscrew and remove setting piston (5) from upper cone (7).

J-2.5.1) Remove o-ring (19) from setting piston (5).

J-2.6) Unscrew and remove upper cone (7) downward from lock ring (6).

J-2.7) Unscrew and/or slide lock ring (6) from inner mandrel (2) (**NOTE₂**: Left-hand threads).

NOTE₃: Using snap ring spreader pliers, the lock ring (6) may be spread slightly to be removed from inner mandrel (2).

J-2.8) Remove upper cone (7) from upper end of inner mandrel (2).

J-3) Unclamp and remove inner mandrel (2) from vise.



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K) ASSEMBLY

NOTE₄: Clean and inspect all parts. Replace all worn and damaged parts. Install parts in proper order and orientation.

K-1) Clamp lower end of inner mandrel (2) in vise.

K-1.1) Install upper cone (7) onto inner mandrel (2).

K-1.2) Screw and/or slide lock ring (6) onto inner mandrel (2) (**NOTE₂:** Left-hand threads).

NOTE₅: Threads on lock ring (6) are directional – it **MUST** be installed in correct direction for tool to work properly.

K-1.3) Carefully screw upper cone (7) onto lock ring (6).

K-1.4) Install o-ring (19) in o-ring groove in setting piston (5).

K-1.5) Screw setting piston (5) onto upper cone (7). Back up on upper cone (7) as necessary to ensure lock ring (6) stays in place.

CAUTION₁: Do not rip or tear o-ring during installation.

K-1.6) Install snap ring (4) in groove in inner mandrel (2).

K-1.7) Install o-rings (18, 20) in o-ring grooves in shear cap (3).

K-1.8) Install shear cap (3) into setting piston (5). Align pocket holes in shear cap (3) with threaded holes in setting piston (5).

CAUTION₁: Do not rip or tear o-rings during installation.

K-1.9) Screw shear screws (16) into setting piston (5). Tighten until shear screws (16) make contact with shear cap (3). Back shear screws (16) out 1/4 turn.

K-1.10) Screw coupling (1) onto upper mandrel (2).

K-2) Remove inner mandrel (2) from vise and clamp coupling (1) in vise.

K-2.1) Assemble slip body assembly and install:

K-2.1.1) Install lower cone (10) into slip body (8).

K-2.1.2) Assemble slip assemblies and install into slip body (8):

K-2.1.2.1) Install slip springs (13) in place on slips (9).

NOTE₈: Install three (3 ea) springs per slip (Fig. 2).

K-2.1.2.2) Screw button head screws (17) into slips (9).

K-2.1.2.3) Install slip assemblies into slip body (8).

K-2.1.3) Wedge slips (9) outward. Install slip body assembly onto inner mandrel (2).

K-2.2) Align slots in slip body (8) with threaded holes in upper cone (7). Screw set screws (14) into upper cone (7). Remove wedges.

NOTE₆: Top of set screws (17) should be just below or flush with slip body (8) OD.

K-2.3) Install shear ring (11) onto inner mandrel (2). Align threaded holes of shear ring (11) with pocket holes in inner mandrel (2).

K-2.4) Screw shear screws (15) into shear ring (11). Tighten until shear screws (15) make contact with inner mandrel (2). Back shear screws (15) out 1/4 turn.

K-2.5) Screw crossover (12) onto inner mandrel (2).

K-3) Unclamp coupling (1) from vise and remove assembled tool.

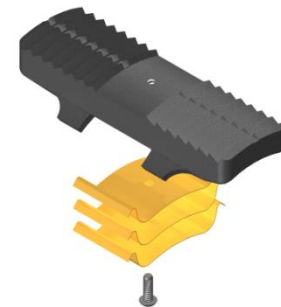


Fig. 2



HYDRAULIC TUBING ANCHOR

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L) PARTS LIST

ITEM	QTY	DESCRIPTION	MATERIAL	P/N 32445
1	1	COUPLING	DLMS80	CP-BAB-BBB-B
2	1	INNER MANDREL	DLMS80	32445210
3	1	SHEAR CAP	DLMS80	32445740
4	1	SNAP RING	DLMS110	32445980
5	1	SETTING PISTON	DLMS80	32445750
6	1	LOCK RING	DLMS80	32445011
7	1	UPPER CONE	DLMS110	32445410
8	1	SLIP BODY	DLMS80	32545320
9	3	SLIP	1026	32045110
10	1	LOWER CONE	DLMS80	32545420
11	1	SHEAR RING	DLMS80	32545930
12	1	CROSSOVER	DLMS60	CH2375N2375E
13	9	SLIP SPRING	INCONEL	32045950
14	3	SET SCREW 1/2-20 UNF X 1/2	STEEL	SSS050F050
15	8	SHEAR SCREW (5000#) .625-18 UNF X .45	DLM360BRS	32045910
16	8	SHEAR SCREW (615 PSI)	DLM360BRS	60100990
17	3	BUTTON HEAD SCREW #8-32 UNC X 5/16	STEEL	BHSC832C031
18	1	229 O-RING	90 DURO NITRILE	90229
19	1	332 O-RING	90 DURO NITRILE	90332
20	1	335 O-RING	90 DURO NITRILE	90335

REDRESS KIT (RDK)		32445050
ASSEMBLED WEIGHT		53 LBS



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L) PARTS LIST (cont'd)

L-1) ELASTOMER TRIM OPTIONS

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

L-1.1) HSN

ITEM	QTY	DESCRIPTION	MATERIAL	P/N 32445H
18	1	229 O-RING	90 DURO HSN	90229H
19	1	332 O-RING	90 DURO HSN	90332H
20	1	335 O-RING	90 DURO HSN	90335H

REDRESS KIT (RDK)		32445050H
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L-1.2) VITON

ITEM	QTY	DESCRIPTION	MATERIAL	P/N 32445V
18	1	229 O-RING	90 DURO VITON	90229V
19	1	332 O-RING	90 DURO VITON	90332V
20	1	335 O-RING	90 DURO VITON	90335V

REDRESS KIT (RDK)		32445050V
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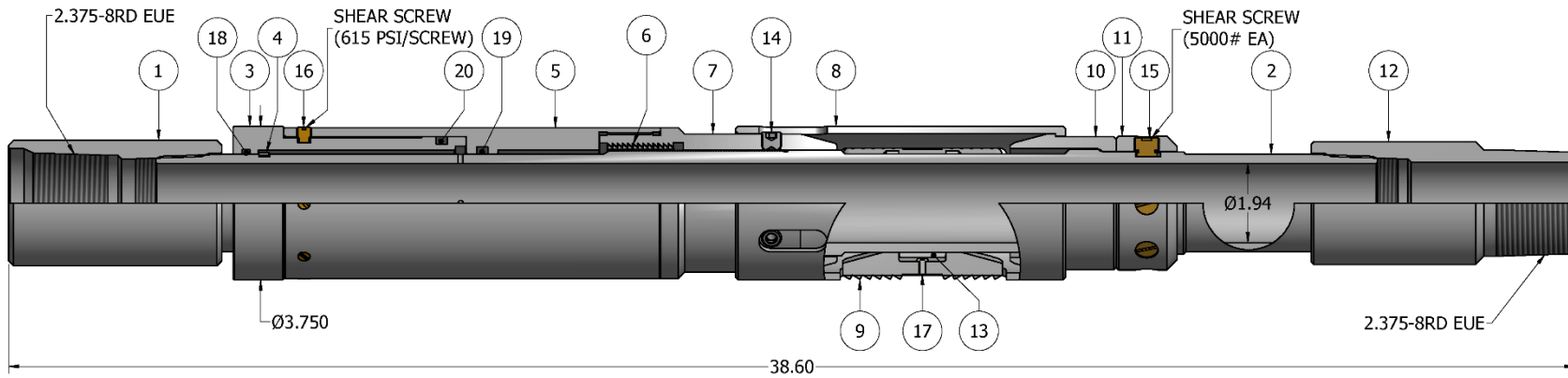
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M) TECHNICAL ILLUSTRATION



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N) REVISION HISTORY

DATE	REVISION	DESCRIPTION OF CHANGES	REVISED BY	APPROVED BY
09/15/2017	C	Added Related Tools, Elastomer Trim Options, max. differential pressure, tensile load, torque thru tool, Pre-Installation Inspection Procedures, Elastomer Trim Temperature Guide, Storage Recommendations; Revised P/N SSS050F050 was SSS050C043; Removed Setting Force Guide	J.Anderson	C.Colvin
11/26/13	B	Revised Recommended Setting Force was 8,000 lbs and 2,100 PSI, P/N CP-BAB-BBB-B was CP2375E2375N, P/N 32045950 was 32045900, P/N BHSC832C031 was BHSC1024C031; Added Recommended Hand Tools, Assembly Instructions, Redress Kit P/N 32445050, Assembled Weight 53 LBS, Revision History.	S. McEntire	K. Riggs