



DL-CS ANCHOR

5-1/2"

Manual No:
DL-322-5500-1146

Revision: **B**

Revision Date:
11/26/2018

Authored by: J.Anderson

Approved by: C.Colvin

A) DESCRIPTION

The DL-CS Anchor is used to anchor downhole equipment from rotating and/or moving up the hole. The anchor is designed to resist up to 11,000 Ft-lbs of torque with a unique cone and slip design while preventing movement up or down hole. It can be set in casing or open hole.

B) SPECIFICATION GUIDE

CASING			TOOL OD (INCHES)	THREAD CONNECTION BOX UP / PIN DOWN	PART NUMBER
SIZE (INCHES)	WEIGHT (LBS/FT)	RECOMMENDED HOLE SIZE (INCHES)			
5-1/2	13.0 – 23.0	4.670 – 5.044	4.375	2-7/8 IF TOOL JOINT / 2-3/8 IF TOOL JOINT	32255

TORQUE THRU TOOL (MAX)
11,000 FT-LBS

C) PRE-INSTALLATION INSPECTION PROCEDURES

CAUTION: 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.

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.

D & L OIL TOOLS
P.O. BOX 52220 TULSA, OK 74152
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C) PRE-INSTALLATION INSPECTION PROCEDURES (cont'd)

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) 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 DL-CS Anchor requires a bottom restriction to set compressive force against in the form of a permanent or retrievable bridge plug, bottom of the drilled hole, top of cement, etc.

To set the anchor, run the tool to the restriction and set weight down to initiate the setting procedure. Apply enough weight (approximately 40,000 lbs) at the anchor to shear the upper row of shear screws (5,000 lbs/screw) and the shear screws in the slip body (1,200 lbs/screw). The DL-CS Anchor is now set and locked in place with the internal ratcheting mechanism. The shear values can be reduced by removing shear screws, but caution must be taken not to shear prematurely.

E) RELEASING PROCEDURES

Apply straight, upward pull with enough tension to shear releasing shear screws (5,000 lbs/screw). The cones will move away allowing the slips to retract back into the anchor. The tool is now free to be retrieved. The shear values can be reduced by removing shear screws, but caution must be taken not to shear prematurely.

F) 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.

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
- STRAP WRENCH
- 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 upper connector (4) in vise.

H-1.1) From lower end of tool, unscrew and remove set screws (22) from bottom sub (3).

H-1.2) Unscrew and remove bottom sub (3) from mandrel (2).

H-1.3) Unscrew and remove shear screws (15) from shear cap (8).

H-1.4) Remove shear cap (8) from mandrel (2).

H-1.5) Remove disk springs (3) from mandrel (2).

H-1.6) Unscrew lower cone cap (9) from lower cone (6) and remove from mandrel (2).

H-1.7) Unscrew and remove cap screws (20) from upper cone (5).



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H) DISASSEMBLY (cont'd)

H-1.8) Wedge slips outwards. Remove slip body assembly and disassemble:

H-1.8.1) Unscrew and remove shear screws (21) from slip body (7).

H-1.8.2) Remove wedges. Remove slips (13, 14) from slip body (7).

H-1.8.2.1) Unscrew and remove button head cap screws (16) from slips (3) and remove slip springs (17).

H-1.8.3) Remove lower cone (6) from slip body (7).

H-1.9) From upper end of tool, unscrew and remove set screws (18) from top sub (1).

H-1.10) Unscrew and remove top sub (1) from upper connector (4).

H-1.11) Remove pin (11) from upper connector (4).

H-1.12) Unscrew and remove set screws (19) from upper connector (4).

H-1.13) Remove mandrel assembly from upper connector (4) and disassemble:

H-1.13.1) Unscrew and remove shear screws (15) from upper cone (5).

H-1.13.2) Unscrew and/or remove mandrel (2) from lock ring (16) (**NOTE**₁: Left-hand threads).

H-1.13.3) Unscrew and remove lock ring (16) from upper cone (5).

H-2) Unclamp and remove upper connector (4) from vise.

I) ASSEMBLY

NOTE₂: Clean and inspect all parts. Replace all worn and damaged parts. Install parts in proper order, and orientation and tighten/torque all connections properly.

I-1) Clamp upper connector (4) in vise.

I-1.1) Assemble mandrel assembly and install:

I-1.1.1) From upper end of mandrel (2), install lock ring (10) onto shoulder of mandrel (2) above ratchet threads.

NOTE₃: Threads on lock ring (10) are directional—it **MUST** be installed in correct direction for tool to work properly.

CAUTION₃: Do not engage lock ring (10) onto ratchet threads.

I-1.1.2) From lower end of mandrel (2), install upper cone (5) onto mandrel (2). Carefully thread upper cone (5) onto lock ring (10).

CAUTION₃: Do not engage lock ring (10) onto ratchet threads.

I-1.1.3) Align threaded holes in upper cone (5) with shear screw groove in mandrel (2).

I-1.1.4) Screw shear screws (15) into upper cone (5). Tighten until shear screws (15) contact mandrel (2). Back shear screws (15) out 1/4 turn.

I-1.1.5) Install mandrel assembly into upper connector (4) and screw upper cone (5) into upper connector (4).

I-1.1.6) Screw set screws (19) into upper connector (4).

I-1.2) Rotate mandrel (2) as necessary to align pin slot in mandrel (2) with pin holes in upper connector (4). Install pin (11) into upper connector and through mandrel (2). Ensure pin (11) is evenly flush with OD of upper connector (4).

I-1.3) Screw top sub (1) onto upper connector (4).

I-1.4) Screw set screws (18) into top sub (1).



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I) ASSEMBLY (cont'd)

I-1.5) Assemble slip body assembly and install:

I-1.5.1) Install lower cone (6) into slip body (7). Align shear screw groove in lower cone (6) with threaded holes in slip body (7).

I-1.5.2) Screw shear screws (21) into slip body (7). Tighten until shear screws (21) contact lower cone (6). Back shear screws (21) out 1/4 turn.

I-1.5.3) Install springs (17) in slips (13, 14). Secure springs (17) in place with button head cap screws (16).
NOTE4: Install three (3 ea) springs per slip.

I-1.5.4) Install slips (13, 14) into slip body (7) and wedge slips in place. Install anti-rotation slips (14) 180° apart.

I-1.5.5) Install slip body assembly onto mandrel (2) and onto upper cone (5). Remove wedges from slips (13, 14).

I-1.6) Align cap screw slot in slip body (7) with threaded holes in upper cone (5). Screw cap screws (20) into upper cone (5).

I-1.7) Install lower cone cap (9) onto mandrel (2) and screw onto lower cone (6).

I-1.8) Install disk springs (12) onto mandrel (2) against lower cone cap (9).

I-1.9) Install shear cap (8) onto mandrel (2). Align threaded holes in shear cap (8) with shear screw groove in mandrel (2).

I-1.10) Screw shear screws (15) into shear cap (8). Tighten until shear screws (15) contact mandrel (2). Back shear screws (15) out 1/4 turn.

I-1.11) Screw bottom sub (3) onto mandrel (2).

I-1.12) Screw set screws (22) into bottom sub (3).

I-2) Unclamp upper connector (4) from vise and remove assembled tool.

J) PARTS LIST

ITEM	QTY	DESCRIPTION	MATERIAL	PART NUMBER
1	1	TOP SUB	P-110	32255610
2	1	MANDREL	P-110	32255210
3	1	BOTTOM SUB	P-110	32255630
4	1	UPPER CONNECTOR	P-110	32255310
5	1	UPPER CONE	P-110	32255410
6	1	LOWER CONE	P-110	32255420
7	1	SLIP BODY	P-110	32255320
8	1	SHEAR CAP	P-110	32255710
9	1	LOWER CONE CAP	P-110	32255715
10	1	LOCK RING	L-80	32255011



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J) PARTS LIST (cont'd)

ITEM	QTY	DESCRIPTION	MATERIAL	PART NUMBER
11	1	PIN	P-110	32255990
12	3	DISK SPRING	P-110	32255920
13	2	SLIP	1026	32255110
14	2	SLIP	1026	32255110NT
15	16	SHEAR SCREW	Brass	32045910
16	4	BUTTON HEAD CAP SCREW #8-32 UNC X 3/8	STEEL	BHSC832C037
17	12	SLIP SPRING	-	32055950
18	4	SET SCREW 5/16-18 UNC X 3/8	STEEL	SSS031C037
19	4	SET SCREW 5/16-18 UNC X 5/16	STEEL	SSS031C031
20	4	CAP SCREW 3/8-16 UNC X 3/8	STEEL	SCS037C037
21	4	SHEAR SCREW (1200#) 1/4-20 UNC X 3/8	DLM360BRS	BSSSLT025C037
22	4	SET SCREW 5/16-18 UNC X 1/2	STEEL	SSS031C050

ASSEMBLED WEIGHT		136 LBS
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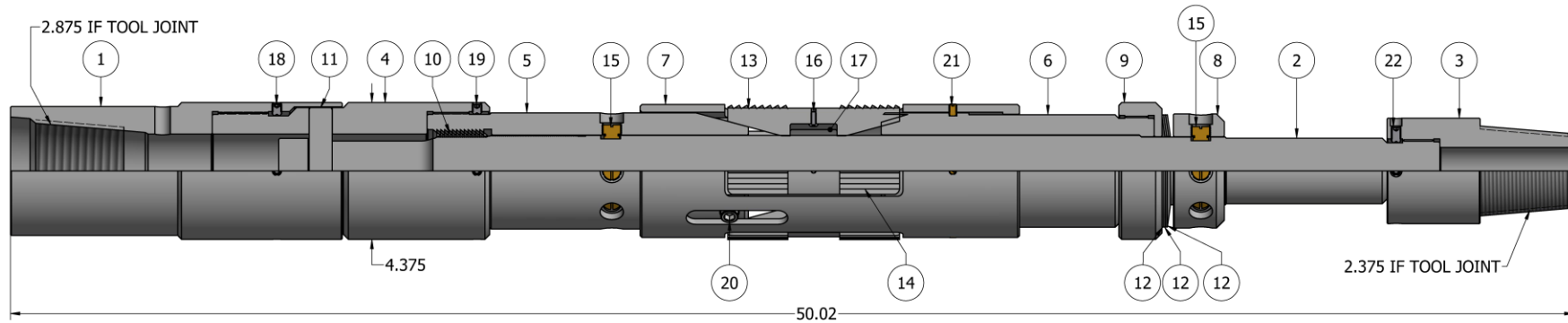
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K) TECHNICAL ILLUSTRATION



L) REVISION HISTORY

DATE	REVISION	DESCRIPTION OF CHANGES	REVISED BY	APPROVED BY
11/26/2018	B	Removed RDK; Revised max. torque thru tool	J.Anderson	D.Hushbeck
06/22/2018	A	Created new manual.	-	-