



# LC HYDRAULIC SETTING TOOL SIZE #15

Manual No:  
**DL-394-15-511**

Revision: **A**

Revision Date:  
**06/03/2013**

Authored by: *B.Mathis*

Approved by: *D.Hushbeck*

## A) DESCRIPTION

The D&L LC Hydraulic Setting Tool and LC Hydraulic Set Adapter Kit are used to set any wireline set packer. This allows setting in high-angle or deviated wells where it is often difficult to use wireline equipment.

The LC Hydraulic Set Adapter Kit will need to be purchased for each packer style. Contact D&L Oil Tools for availability.

**NOTE<sub>1</sub>:** The Setting Kit with tripping ball is sold separately. Contact D&L with your requirements.

## B) SPECIFICATION GUIDE

SIZE	TOOL OD (INCHES)	TOOL ID (INCHES)	THREAD CONNECTION BOX UP	PART NUMBER
#15	3.718	1.50	2-7/8 EUE	39415

DIFFERENTIAL PRESSURE (MAX)	TENSILE LOAD THRU TOOL (MAX)
10,000 PSI	110,000 LBS

## C) 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

D & L OIL TOOLS  
P.O. BOX 52220 TULSA, OK 74152  
PHONE: (800) 441-3504 [www.dlmfg.com](http://www.dlmfg.com)



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### D) SETTING PROCEDURES

- D-1) Run the packer on tubing at a uniform rate. Slowly stop tubing with brake without jerking, and drop slips in place. If using a solid setting nut, **DO NOT ROTATE THE TUBING TO THE RIGHT.**
- D-2) To remove the tubing slips: slowly pick up - without jerking – the desired amount.
- D-3) When the desired depth is reached, drop the tripping ball into the running-in string. Allow approximately 5 minutes per 1,000 ft for the ball to gravitate to the ball seat in water.  
**NOTE<sub>2</sub>:** The ball size varies depending on the setting equipment used.
- D-4) Determine the setting force requirement for the packer by referring to the tech manual for the specific packer being run.
- D-5) Calculate the required setting pressure required to obtain the recommended packer setting force (see Force Table).
- D-6) Once the full setting force has been applied, bleed off the tubing pressure and set down as much weight as possible without damaging the running-in string, but **DO NOT EXCEED THE SETTING FORCE REQUIREMENTS.**
- D-7) Pressure test the annulus while monitoring tubing. If the well has not been perforated below the packer, or a solid setting nut is used, pressure testing can be accomplished by pressuring tubing and monitoring the annulus.
- D-8) If using a solid setting nut, the tool may now be rotated out of the packer with right-hand rotation.

### E) FORCE TABLE

PRESSURE (PSI)	FORCE APPLIED TO PACKER (LBS - BASED ON 3 CYLINDERS)
1,000	14,094
1,500	21,141
2,000	28,186
2,500	35,235
3,000	42,282
3,500	49,325
4,000	56,376
4,500	63,423
5,000	70,470

### F) DISASSEMBLY

- F-1) Clamp top sub (1) in vise.
  - F-1.1) Unscrew and remove set screws (16) from adapter sub (5).
  - F-1.2) Unscrew and remove adapter sub (5) from lower sleeve (6).
  - F-1.3) Disassemble lower sleeve assembly and remove:
    - F-1.3.1) Unscrew and remove set screws (16) from lower sleeve (6).
    - F-1.3.2) Unscrew and remove lower sleeve (6) from center sleeve (6).
      - F-1.3.2.1) Remove o-ring (12) from lower sleeve (6).
      - F-1.3.2.2) Remove o-ring (14) and backup rings (15) from lower sleeve (6).
    - F-1.3.3) Unscrew and remove set screws (3) from lower body extension (4).



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### F) DISASSEMBLY (cont'd)

- F-1.3.4) Unscrew and remove lower body extension (4) from center body extension (4).
  - F-1.3.4.1) Remove o-ring (12) and backup rings (13) from lower body extension (4).
  - F-1.3.4.2) Remove o-ring (10) and backup rings (11) from lower body extension (4).
- F-1.4) Disassemble center sleeve assembly and remove:
  - F-1.4.1) Unscrew and remove set screws (16) from center sleeve (6).
  - F-1.4.2) Unscrew and remove center sleeve (6) from upper sleeve (6).
    - F-1.4.2.1) Remove o-ring (12) from center sleeve (6).
    - F-1.4.2.2) Remove o-ring (14) and backup rings (15) from center sleeve (6).
  - F-1.4.3) Unscrew and remove set screws (3) from center body extension (4).
  - F-1.4.4) Unscrew and remove center body extension (4) from mandrel (2).
    - F-1.4.4.1) Remove o-ring (12) and backup rings (13) from center body extension (4).
    - F-1.4.4.2) Remove o-ring (10) and backup rings (11) from center body extension (4).
- F-1.5) Disassemble upper sleeve assembly and remove:
  - F-1.5.1) Unscrew and remove shear screws (8) from upper sleeve (6).
  - F-1.5.2) Unscrew and remove upper sleeve (6) from adjusting head (7).
    - F-1.5.2.1) Remove o-ring (12) from upper sleeve (6).
    - F-1.5.2.2) Remove o-ring (14) and backup rings (15) from upper sleeve (6).
- F-1.6) Unscrew and remove set screws (9) from adjusting head (7).
- F-1.7) Unscrew and remove set screws (3) from top sub (1).
- F-1.8) Unscrew and remove mandrel (2) from top sub (1).
  - F-1.8.1) Unscrew and remove adjusting head (7) from mandrel (2).
  - F-1.8.2) Remove o-ring (12) and backup rings (13) from inner mandrel (2).
- F-1.9) Remove o-ring (10) and backup rings (11) from top sub (1).
- F-2) Remove top sub (1) from vise.

### G) ASSEMBLY

**NOTE<sub>2</sub>:** Clean and inspect all parts. Replace all worn and damaged parts. Install parts in proper order and orientation.

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

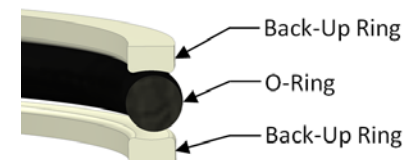
- G-1.1) Install o-ring (10) and backup rings (11) in groove in top sub (1).
- G-1.2) Remove o-ring (12) and backup rings (13) in groove in inner mandrel (2).
- G-1.3) Screw adjusting head (7) onto mandrel (2).
- G-1.4) Screw mandrel (2) into top sub (1).

**CAUTION<sub>3</sub>:** Do not rip or tear o-ring or backup rings during installation.

- G-1.5) Screw set screws (3) into top sub (1).
- G-1.6) Screw set screws (9) into adjusting head (7).
- G-1.7) Assemble upper sleeve assembly and install:

- G-1.7.1) Install o-ring (14) and backup rings (15) in groove in upper sleeve (6).
- G-1.7.2) Install o-ring (12) in groove in upper sleeve (6).
- G-1.7.3) Screw upper sleeve (6) onto adjusting head (7).

**CAUTION<sub>3</sub>:** Do not rip or tear o-ring or backup rings during installation.



DETAIL (TYP.)

NOTE: CURVED FACES OF BACK-UP RINGS FACE O-RING.



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### G) DISASSEMBLY (cont'd)

G-1.7.4) Screw shear screws (8) into upper sleeve (6). Tighten until shear screws (8) make contact with adjusting head (7). Back shear screws (8) out 1/4 turn.

G-1.8) Assemble center sleeve assembly and install:

G-1.8.1) Install o-ring (10) and backup rings (11) in groove in center body extension (4).

G-1.8.2) Install o-ring (12) and backup rings (13) in groove in center body extension (4).

G-1.8.3) Screw center body extension (4) onto mandrel (2).

**CAUTION<sub>3</sub>**: Do not rip or tear o-ring or backup rings during installation.

G-1.8.4) Screw set screws (3) into center body extension (4).

G-1.8.5) Install o-ring (14) and backup rings (15) in groove in center sleeve (6).

G-1.8.6) Install o-ring (12) in groove in center sleeve (6).

G-1.8.7) Screw center sleeve (6) onto upper sleeve (6).

**CAUTION<sub>3</sub>**: Do not rip or tear o-ring or backup rings during installation.

G-1.8.8) Screw set screws (16) into center sleeve (6).

G-1.9) Assemble lower sleeve assembly and install:

G-1.9.1) Install o-ring (10) and backup rings (11) in groove in lower body extension (4).

G-1.9.2) Install o-ring (12) and backup rings (13) in groove in lower body extension (4).

G-1.9.3) Screw lower body extension (4) onto center upper body extension (4).

**CAUTION<sub>3</sub>**: Do not rip or tear o-ring or backup rings during installation.

G-1.9.4) Screw set screws (3) into lower body extension (4).

G-1.9.5) Install o-ring (14) and backup rings (15) in groove in lower sleeve (6).

G-1.9.6) Install o-ring (12) in groove in lower sleeve (6).

G-1.9.7) Screw lower sleeve (6) onto center sleeve (6).

**CAUTION<sub>3</sub>**: Do not rip or tear o-ring or backup rings during installation.

G-1.9.8) Screw set screws (16) into lower sleeve (6).

G-1.10) Screw adapter sub (5) onto lower sleeve (6).

**CAUTION<sub>3</sub>**: Do not rip or tear o-ring or backup rings during installation.

G-1.11) Screw set screws (16) into adapter sub (5).

G-2) Unclamp top sub (1) and removed assembled tool from vise.



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### H) PARTS LIST

ITEM	QTY	DESCRIPTION	MATERIAL	P/N 39415
1	1	TOP SUB	P-110	NCB215HST-001
2	1	MANDREL	P-110	NCB215HST-002
3	6	SET SCREW 1/4-20 UNC X 1/4	STEEL	SSS025C025
4	2	BODY EXTENSION	P-110	NCB215HST-003
5	1	ADAPTER SUB	P-110	NCB215HST-006
6	3	SLEEVE	P-110	NCB215HST-004
7	1	ADJUSTING HEAD	P-110	NCB215HST-005
8	12	SHEAR SCREW (142 PSI PER SCREW) 5/16-18 UNC X 5/16	BRASS	BSSSLT031C031
9	2	SET SCREW 5/16-18 UNC X 5/8	STEEL	SSS031C062
10	3	226-90 O-RING	NITRILE	90226
11	6	PARKER PARBAK BACKUP FOR 226 O-RING	TEFLON	04500226
12	6	234-90 O-RING	NITRILE	90234
13	6	PARKER PARBAK BACKUP FOR 234 O-RING	TEFLON	04500234
14	3	227-90 O-RING	NITRILE	90227
15	6	PARKER PARBAK BACKUP FOR 227 O-RING	TEFLON	04500227
16	11	SET SCREW 5/16-18 UNC X 5/16	STEEL	SSS031C031

REDRESS KIT (RDK)	39415050
ASSEMBLED WEIGHT	111 LBS



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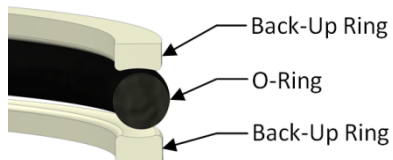
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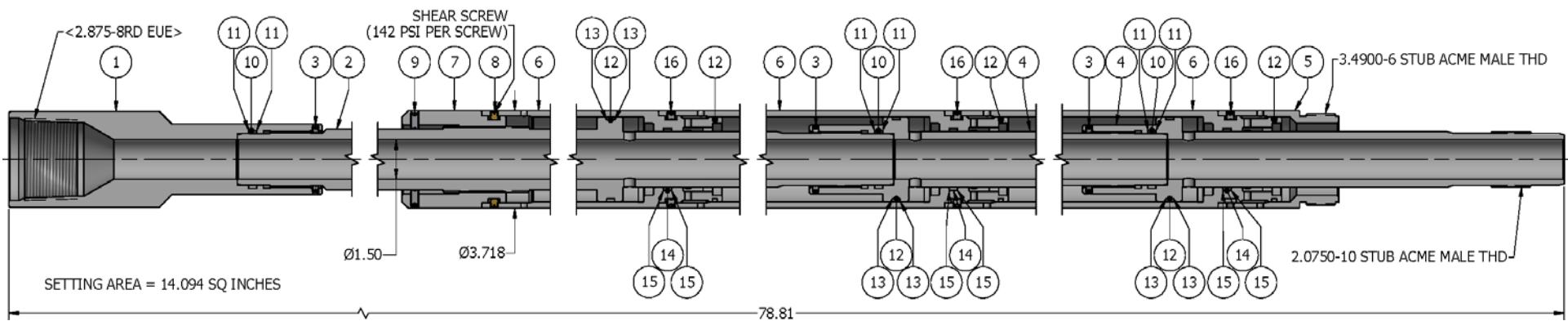
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## I) TECHNICAL ILLUSTRATION



DETAIL (TYP.)  
NOTE: CURVED FACES OF BACK-UP  
RINGS FACE O-RING.



## J) REVISION HISTORY

DATE	REVISION	DESCRIPTION OF CHANGES	REVISED BY	APPROVED BY
06/03/13	A	Created new tech manual;	B.Mathis	D.Hushbeck