



# TRILOBITE QUARTER TURN ANCHOR, CARBIDE 7" X 2-7/8"

Manual No:  
**DL-317-7000-1136**

Revision: **C**

Revision Date:  
**04/06/2020**

Authored by: J.Anderson

Approved by: H.Bringham

## A) DESCRIPTION

The Trilobite Quarter Turn Anchor is a mechanically set retrievable anchor designed to hold the tubing string in tension or compression. The Trilobite Quarter Turn 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 Trilobite Quarter Turn Anchor is operated by a J-slot design that allows easy setting and releasing with a 1/4 turn right-hand set and release. The Trilobite Quarter Turn 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 Trilobite Quarter Turn Anchor can also be retrieved by shearing the J-pins with tension. Standard J-pins are rated to 18,000 lbs each (3 qty) for a total shear force of 54,000 lbs. Lower rated J-pins are available upon request.

The Trilobite Quarter Turn Anchor features a bypass area around the slips. The bypass allows gas and debris to pass the anchor as well as electrical and injection lines to be run alongside the anchor. The reduced O.D. is equivalent to a 2-7/8" EUE coupling.

**NOTE<sub>1</sub>:** When banding lines to the anchor, band only to the top sub. Banding to any other part will restrict movement and cause the tool to malfunction.

## B) SPECIFICATION GUIDE

| CASING        |                 |                                | TOOL            |                     |             | THREAD CONNECTION<br>BOX UP / PIN DOWN | PART NUMBER |
|---------------|-----------------|--------------------------------|-----------------|---------------------|-------------|--|-------------|
| SIZE (INCHES) | WEIGHT (LBS/FT) | RECOMMENDED HOLE SIZE (INCHES) | MAX OD (INCHES) | REDUCED OD (INCHES) | ID (INCHES) |  |             |
| 7             | 26.0 – 32.0     | 6.094 – 6.276                  | 5.875           | 3.67                | 2.44        | 2-7/8 EUE                              | 31770C      |

| DIFFERENTIAL PRESSURE (MAX) | TENSILE LOAD THRU TOOL (MAX) | TORQUE THRU TOOL (MAX) |
|-----------------------------|------------------------------|------------------------|
| 7,000 PSI                   | 70,000 LBS                   | 2,000 FT-LBS           |

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



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## C) PRE-INSTALLATION INSPECTION PROCEDURES

**CAUTION<sub>1</sub>:** 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 /<br>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<br>(INCHES)               | #6    | #8      | #10     | 1/4     | 5/16    | 3/8      | 7/16      | 1/2       | 5/8 and<br>larger |
| TORQUE RANGE<br>(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.

## D) SETTING PROCEDURES

**CAUTION<sub>2</sub>:** Do not run the tool without properly tightening connections. Running the tool with loose connections may damage the tool and cause malfunction.

### D-1) COMPRESSION SET

Run the anchor to setting depth. Pick up the work string to allow for setting stroke (5-6") plus desired work string load. Rotate the work string 1/4 right-hand turn at the anchor, and then lower the work string while releasing torque. Slack off on the work string sufficient weight to set the anchor (8,000 lbs). Pull tension (8,000 lbs) to assure that the upper slips are set. The work string can then be left in tension or compression.

### D-2) TENSION SET

Run to setting depth, pick up on the work string and rotate 1/4 turn to the right at the anchor then lower the work string slacking off available weight to set the anchor slips. Pull tension to set upper slips (8,000 lbs). After setting the anchor, the work string can be left in compression or tension.



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## E) RELEASING PROCEDURES

The releasing procedures are the same whether the anchor has been tension or compression set. Set down weight on the anchor to unseat the J-pin from the tension shoulder of the J-slot. Rotate the work string 1/4 right-hand turn at the anchor and pick up while holding right-hand torque. Weight in addition to pipe weight may be required to pick up on anchor. Continue to pick up to release the slips thus allowing the anchor to be re-set or removed from the well.

### E-1) EMERGENCY RELEASE

In the event the anchor will not release in the normal manner, the anchor is equipped with an emergency shear release. The J-pins can be sheared with straight pickup above tubing weight. The shear release value is 54,000 lbs (18,000 lbs/pin). When released in this manner, the anchor will reset automatically when moved down the hole.

## 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 TOOLS

### G-1) 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

### G-2) SPECIAL TOOLS

| ITEM | QTY | DESCRIPTION              | PART NUMBER |
|------|-----|--------------------------|-------------|
| T1   | 1   | DRAG BLOCK ASSEMBLY TOOL | AT070110    |

## H) DISASSEMBLY

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

H-1.1) From upper end of tool, unscrew and remove top sub (1) from inner mandrel (2).

H-1.2) Remove compression spring (13) from inner mandrel (2).

H-1.3) Unscrew and remove set screws (14) from pusher sleeve cap (3).

H-1.4) Unscrew pusher sleeve cap (3) from pusher sleeve (4) and remove from inner mandrel (2).

H-1.5) Remove pick-up ring (12) from inner mandrel (2).

H-1.6) Unscrew and remove flat head cap screws (21) from both ends of slip body (7).

H-1.7) Remove slip body extension (20) from slip body (7).

H-1.8) Unscrew and remove button head cap screws (10) from pusher sleeve (4) and support sleeve (6) to free cone blocks (5).

H-1.9) Lift cone blocks (5) and slips (8) outward. Align threaded holes in cone blocks (5) with holes in slip body (7).



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## H) DISASSEMBLY (cont'd)

- H-1.10) Temporarily screw cap screws (19) into cone blocks (5) to hold slips (8) outward during disassembly.
- H-1.11) Remove pusher sleeve (4) from inner mandrel (2).
- H-1.12) Remove slip body assembly from mandrel (2) and disassemble:
  - H-1.12.1) Unscrew and remove temporary cap screws (19) from cone blocks (5).
  - H-1.12.2) Remove cone blocks (5) and slips (8) from slip body (7).
  - H-1.12.3) Unscrew and remove button head cap screws (9) from slips (8) and remove slip springs (11).
- H-1.13) Compress drag blocks (15) with drag block assembly tool (T1).
- H-1.14) Unscrew and remove J-pins (16) from support sleeve (6).
- H-1.15) Remove support sleeve assembly from mandrel (2) and disassemble:
  - H-1.15.1) Remove drag block retainers (17) from support sleeve (6).
  - H-1.15.2) Remove drag block assembly tool (T1). Remove drag blocks (15) and drag block springs (18) from support sleeve (6).
- H-2) Unclamp and remove mandrel (2) from vise.

## I) ASSEMBLY

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

### I-1) Clamp lower end of mandrel (2) in vise.

#### I-1.1) Assemble support sleeve assembly and install:

- I-1.1.1) Install drag block springs (18) and drag blocks (15) in support sleeve (6). Compress drag blocks (15) with drag block assembly tool (T1).

**NOTE:** Uses four (4 ea) springs per drag block (Fig. 2).

- I-1.1.2) Install drag block retainers (17) into support sleeve (6).

- I-1.1.3) Install support sleeve assembly onto mandrel (2). Position support sleeve (8) with threaded holes aligned with running position in J-slot in inner mandrel (2).

- I-1.1.4) Screw J-pins (16) into support sleeve (6).

- I-1.1.5) Remove drag block assembly tool (T1).

#### I-1.2) Assemble slip body assembly and install:

- I-1.2.1) Position slip springs (11) on slips (8).

**NOTE:** Uses three (3 ea) springs per slip (Fig. 3).

- I-1.2.2) Secure slip springs (11) by screwing button head screws (14) into slips (9) (Fig. 3).

I-1.2.3)



Fig. 2

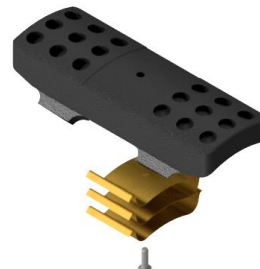


Fig. 3



# TRILOBITE QUARTER TURN ANCHOR, CARBIDE 7" X 2-7/8"

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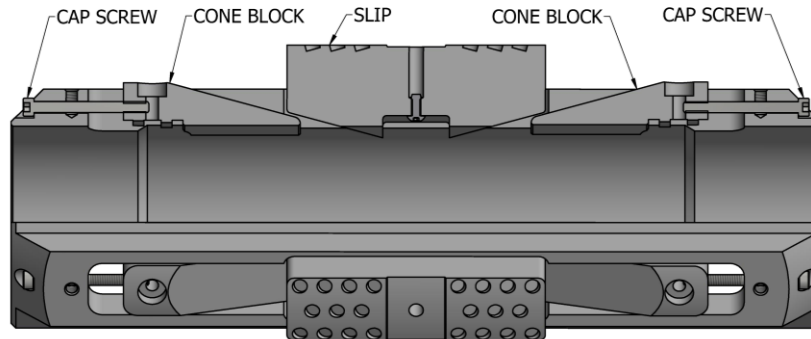
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## I) ASSEMBLY (cont'd)

Fig. 4,  
for illustration only. Not  
representative of actual tool.



- I-1.2.4) Install lower cone blocks (5) into slip body (7). Align threaded holes in cone blocks (5) with holes in slip body (7) (Fig. 4).
- I-1.2.5) Screw temporary cap screws (19) into lower cone blocks (5) (Fig. 4).
- I-1.2.6) Install slips (8) and upper cone blocks (5) into slip body (7) one at a time (Fig. 4).
- I-1.2.7) For each slip (8), press slip (8) and upper cone block (7) outwards to align threaded hole in cone block (7) with hole in slip body (7). Screw temporary cap screws (19) into cone blocks (7) one at a time.
- I-1.2.8) Install slip body assembly onto mandrel (2). Align lower cone blocks (5) with flats on upper end of support sleeve (6). Align holes in cone blocks (5) with threaded holes in support sleeve (6).
- I-1.2.9) Unscrew and remove temporary cap screws (29) from lower cone blocks (5). Ensure lower cone blocks (5) are mated with grooves in support sleeve (6). Screw button head cap screws (10) into support sleeve (6).
- I-1.3) Install pusher sleeve (4) onto inner mandrel (2). Align flats in lower end of pusher sleeve (4) with upper cone blocks (5). Align threaded holes in pusher sleeve (4) with holes in cone blocks (5).
- I-1.4) Unscrew and remove temporary cap screws (29) from cone blocks (5). Ensure cone blocks (5) are mated with grooves in pusher sleeve (4). Screw flat head cap screws (15) into pusher sleeve (4).
- I-1.5) Install slip body extension (20) onto slip body (7). Align slip body extension (20) with slips (8) and threaded holes in slip body (7).
- I-1.6) Screw flat head cap screws (21) into slip body (7).
- I-1.7) Install pick-up ring (12) in groove in upper end of inner mandrel (2).
- I-1.8) Install pusher sleeve cap (3) onto inner mandrel (2) and screw onto pusher sleeve (4)
- I-1.9) Screw set screws (14) into pusher sleeve cap (3).
- I-1.10) Install compression spring (13) onto inner mandrel (2).
- I-1.11) Screw top sub (1) onto inner mandrel (2).
- I-2) Unclamp inner mandrel (2) from vise and remove assembled tool.



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## J) PARTS LIST

| ITEM | QTY | DESCRIPTION                            | MATERIAL  | P/N 31770C   |
|------|-----|--|-----------|--------------|
| 1    | 1   | TOP SUB                                | DLMS80    | 31956610     |
| 2    | 1   | INNER MANDREL                          | DLMS110   | 31756210     |
| 3    | 1   | PUSHER SLEEVE CAP                      | DLMS80    | 31756750     |
| 4    | 1   | PUSHER SLEEVE                          | DLMS110   | 31756741     |
| 5    | 6   | CONE BLOCK                             | DLMS110   | 31956411     |
| 6    | 1   | SUPPORT SLEEVE                         | DLMS110   | 31770931     |
| 7    | 1   | SLIP BODY                              | DLMS110   | 31770320     |
| 8    | 3   | SLIP W/CARBIDE                         | DLMS110   | 31970110C    |
| 9    | 3   | BUTTON HEAD CAP SCREW #8-32 UNC X 3/8  | STEEL     | BHSC832C037  |
| 10   | 6   | BUTTON HEAD CAP SCREW #10-32 UNF X 1/2 | STEEL     | BHSC1032F050 |
| 11   | 9   | SLIP SPRING                            | DLMINC625 | 32045950     |
| 12   | 1   | PICK-UP RING                           | DLMS110   | 94527915     |
| 13   | 1   | COMPRESSION SPRING                     | DLMCRSP   | 26670920     |
| 14   | 3   | SET SCREW 1/4-20 UNC X 3/16            | STEEL     | SSS025C018   |
| 15   | 3   | DRAG BLOCK W/ CARBIDE                  | DLMSDB4   | 9057900C     |
| 16   | 3   | J-PIN                                  | DLMS80    | 31770870     |
| 17   | 3   | DRAG BLOCK RETAINER                    | DLMSDB4   | 31756910     |
| 18   | 12  | DRAG BLOCK SPRING                      | -         | 9100900      |
| 19   | 6   | CAP SCREW #10-24 UNC X 2"              | STEEL     | SCS1024C200* |
| 20   | 3   | SLIP BODY EXTENSION                    | DLMSFB4   | 31770325     |
| 21   | 6   | FLAT HEAD CAP SCREW 1/4-20 UNC X 1/2   | STEEL     | FHSC025C050  |

\*Cap screws used for assembly purposes only.

|                  |        |
|------------------|--------|
| ASSEMBLED WEIGHT | 78 LBS |
|------------------|--------|



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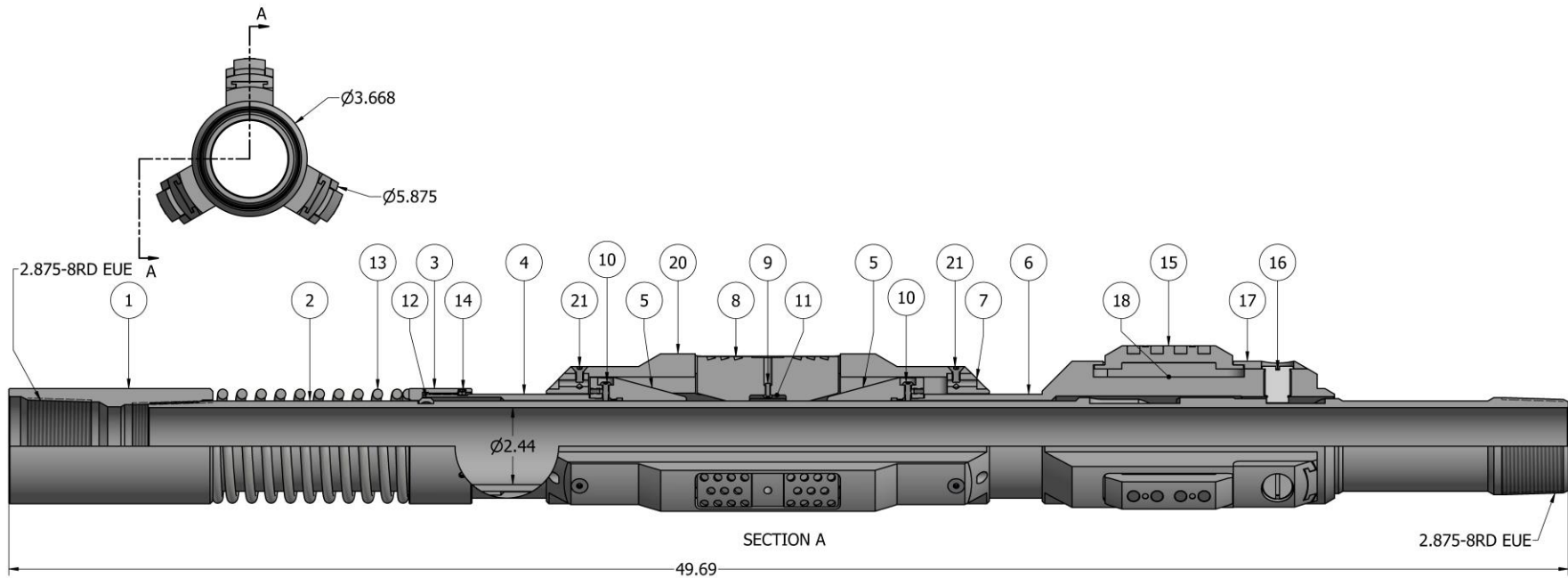
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## K) TECHNICAL ILLUSTRATION



|  |  |                                       |
|--|--|---------------------------------------|
|  | <b>TRILOBITE QUARTER TURN<br/>ANCHOR, CARBIDE</b><br>7" X 2-7/8" | Manual No:<br><b>DL-317-7000-1136</b> |
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**L) REVISION HISTORY**

| DATE       | REVISION | DESCRIPTION OF CHANGES  | REVISED BY | APPROVED BY |
|------------|----------|---|------------|-------------|
| 04/06/2020 | C        | Revised 31756741 was 31756740, 31956411 was 31956410, 31770931 was 31770930 | J.Anderson | H.Bringham  |
| 04/24/2019 | B        | Revised BHSC1032F050 was FHSC1032F050                                       | J.Anderson | J.Johnson   |
| 06/11/2018 | A        | Created new manual  | -          | -           |