A) DESCRIPTION

The ASI-X HT Single String Double-Grip Production Packer is the most versatile of the mechanically set retrievable packers and may be used in any production application. This packer is suited for treating, testing, or injection applications, in pumping or flowing wells, either deep or shallow. This packer can be left in tension or compression depending on well conditions and the required application.

A large internal by-pass reduces swabbing when running and retrieving. The by-pass closes when the packer is set and opens prior to releasing the upper slips when retrieving to allow pressure equalization. The J-slot design allows easy setting and releasing; 1/4 turn right-hand set, 1/4 turn right-hand release.

The ASI-X HT Packer is designed for differential pressures up to 10,000 PSI (unless noted otherwise). The HT version allows this packer to be utilized in completions where high pressure treating operations are performed and it is desirable to leave the tool in the well for production.

B) RELATED TOOLS (sold separately)

B-1) 2-7/8” DT-2 On/Off Tool (P/N varies)—refer to technical manual *DL-512-2875-146*.

B-2) 2-7/8” Stinger—actual P/N varies depending on customer requirements.

C) SPECIFICATION GUIDE

CASING			TOOL		THREAD CONNECTION BOX UP / PIN DOWN	PART NUMBER
SIZE (INCHES)	**WEIGHT** (LBS/FT)	**RECOMMENDED HOLE SIZE** (INCHES)	**GAGE OD** (INCHES)	**NOMINAL ID** (INCHES)		
7	17.0 – 26.0	6.276 – 6.538	6.000 6.062*	2.50	2-7/8 EUE	60372HT 60372HTH[1] 60372HTV[2] 60372HTC[3] 60372HTHC[4] 60372HTCV[5]
	26.0 – 32.0	6.094 – 6.276	5.875	2.50	2-7/8 EUE	60370HT 60370HTH[1] 60370HTV[2] 60370HTC[3] 60370HTHC[4] 60370HTVC[5]
	29.0 – 35.0	6.004 – 6.184	5.812	2.50	2-7/8 EUE	60371HT 60371HTH[1] 60371HTV[2] 60371HTC[3] 60371HTHC[4] 60371HTVC[5]

Tool Options: [1]HSN, [2]Viton, [3]Nitrile, Carbide, [4]HSN, Carbide, [5]Viton, Carbide

*Max OD measured across retracted drag blocks.

C) SPECIFICATION GUIDE (cont’d)

NOTE1: Tools listed are right-hand set / right-hand release.

NOTE2: Use of a Double Hook J-slot Packer is recommended when running with a pumpjack to help prevent the packer from unsetting during well production.

DIFFERENTIAL PRESSURE (MAX)	TENSILE LOAD THRU TOOL (MAX)
10,000 PSI	137,000 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.

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 tools 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 part information.

E) SETTING PROCEDURES

CAUTION2: Do not run the tool without properly tightening connections. Running the tool with loose connections may damage the tool and cause malfunction.

E-1) COMPRESSION SET

Run the packer to setting depth. Pick up the work string to allow for setting stroke (12-13”) plus desired work string load. Rotate the work string 1/4 right-hand turn at the packer, and then lower the work string while releasing torque. Slack off on the work string sufficient weight to set the packer (15,000 lbs). Pull tension to assure that the upper slips are set. The work string can then be left in tension, compression or neutral. If insufficient weight is available to set the packer with compression, tension can be applied after slack-off to pack off the elements.

E) SETTING PROCEDURES(cont’d)

E-2) TENSION SET

Run to setting depth, pick up on the work string and rotate 1/4 turn to the right at the packer then lower the work string slacking off available weight to set the packer lower slips. Pull tension to set upper slips and pack off elements (15,000 lbs). After setting the packer, the work string can be left in compression, tension or neutral.

F) RELEASING PROCEDURES

The releasing procedures are the same whether the packer has been tension or compression set. Set down weight on the packer to unseat the J-pin from the tension shoulder of the J-slot. Refer to the Pressure Affected Area Guide to determine necessary set down weight on the packer. Rotate the work string 1/4 right-hand turn at the packer and pick up while holding right-hand torque. Weight in addition to pipe weight may be required to pick up on packer—refer to Pressure Affected Area Guide. The internal by-pass will open, allowing pressure to equalize. After pressure is equalized, continue to pick up to release the upper slips, relax the elements and release the lower slips thus allowing the packer to be re-set or removed from the well.

CAUTION3: High differential pressure below the packer may cause the upper slips to wedge in tighter, requiring an extra amount of tension to release the upper slips.

F-1) EMERGENCY RELEASE

As a last resort, if the packer will not release in the normal manner, a minimum straight pull of 90,000 lbs (may have to pull as high as 125,000 lbs) over work string weight can be applied – this will shear the J-pins on the J-pin bottom sub allowing the packer to be pulled. Tensile strength of tubing and connections should be considered. When released in this manner, the packer will reset when moved down the hole.

G) 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.

H) PRESSURE AFFECTED AREA GUIDE

When set downhole, the packer mandrel is subjected to a force created by differential pressure above or below the packer that acts on the pressure affected area (i.e., the piston effect). Depending on the tubing size and weight and the seal area of the packer the force created by differential pressure acts upwards or downwards on the packer mandrel. An upward force, designated as a negative (-) value, acts to push the packer mandrel up hole and must be accounted for to ensure that the packer remains set. A downward force, designated as a positive value, acts to push the packer mandrel down hole and must be accounted for when releasing the packer. Other factors (e.g., tubing movement due to temperature change) must be considered separately to determine all the forces acting on the packer.

PACKER SIZE (INCHES)	**TUBING SIZE** (INCHES)	**PRESSURE AFFECTED AREA** (SQ. INCHES)	
		ABOVE	**BELOW**
7	2.375	3.87 (DOWN)	-5.17 (UP)
	2.875	1.80 (DOWN)	-3.62 (UP)
	3.500	-1.33 (UP)	-1.26 (UP)

Example: Consider a 7” ASI-X Packer set on 2.875” tubing with a differential pressure of 3,000 psi in the annulus around the tubing above the packer. What is the force acting on the seal area of the mandrel?

To calculate the force (lbs) acting on the seal area of the mandrel, refer to the Pressure Affected Area Guide. In this example, the differential pressure from above the packer acts on the seal area of the packer mandrel across a pressure affected area of 1.80 in^2. Multiplying the differential pressure (3,000 psi) by the pressure affected area (1.80 in^2) results in a force of 5,400 lbs. The piston effect on the packer mandrel is a downward force of 5,400 lbs.

I) ELASTOMER TRIM TEMPERATURE GUIDE

NITRILE (STD)			
TEMPERATURE RANGE (F°)	**DUROMETER**		
	END	**MIDDLE**	**END**
40° - 125°	80	70	80
125° - 250°	90	70	90
150° - 250°	90	80	90
250° +	Contact D&L Sales		

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

J) RECOMMENDED TOOLS

J-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

J-2) SPECIAL TOOLS

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

K) DISASSEMBLY

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

K-1.1) Unscrew and remove bottom nipple (32) from J-pin bottom sub (23).

K-1.2) Unscrew and remove set screws (35) from J-pin bottom sub (23). Move J-body (20) as needed access screws.

K-1.3) Unscrew and remove J-pin bottom sub (23) from inner mandrel (2).

NOTE$_{10}$: Drag block body assembly must be free to rotate.

K-1.3.1) Remove o-ring (41) from J-pin bottom sub (23).

K-1.4) Compress drag blocks (22) with drag block assembly tool (T1).

K-1.5) Unscrew and remove set screws (36) from drag block body (18). Rotate drag block retainer (21) as needed to access screws.

K-1.6) Unscrew and remove J-body (20) from drag block body (18) (**NOTE$_3$**: Left-hand threads).

K-1.7) Remove retaining ring (31) from J-body (20).

K-1.8) Remove drag block retainer (21) from drag block body (18).

K-1.9) Release drag blocks (22). Remove drag blocks (22) and drag block springs (3) from drag block body (18).

K-1.10) Unscrew and remove rubber mandrel cap (19) from rubber mandrel (11).

NOTE$_4$: For added leverage, insert a rod thru rubber retainer (15) and rubber mandrel (11) as needed.

K-1.11) Wedge lower slips (17) outward (if needed). Remove drag block body assembly from rubber mandrel (11) and disassemble:

K-1.11.1) Remove wedges (if needed). Remove lower slips (17) and lower slip springs (25) from drag block body (18).

K-1.12) Unscrew and remove lower cone (16) from rubber retainer (15).

K-1.13) Unscrew rubber mandrel (11) from center coupling (10).

K-1.14) Remove rubber mandrel assembly from inner mandrel (2) and disassemble:

K-1.14.1) Remove gage ring (29), elements (13, 14), rubber spacers (12), and rubber retainer (15) from rubber mandrel (11).

K-1.15) Unscrew and remove center coupling (10) from collet cone (9).

K-1.15.1) Remove bonded seal (24) and o-ring (42) from center coupling (10).

K-1.15.1.1) Remove o-ring (40) from bonded seal (24).

K-1.16) Remove bearing bushing (30) and collet cone (9) from inner mandrel (2).

K-2) Unclamp and remove top sub (1) from vise. Clamp inner mandrel (2) in vise.

NOTE$_5$: Do NOT wrench or clamp on seal surface.

K-2.1) Unscrew and remove spring cage cap (27) from spring cage (5).

CAUTION$_4$: Compression spring (4) is compressed and has spring tension against upper slip body assembly.

K-2.2) Unscrew and remove top sub (1) from inner mandrel (2).

K-2.3) Unscrew and remove spring cage (5) from upper slip body (6).

K-2.4) Remove compression spring (4) from cover sleeve (33).

K-2.5) Unscrew and remove set screws (37) from cover sleeve (33).

K-2.6) Remove cover sleeve (33) from inner mandrel (2).

K-2.7) Remove snap ring (39) from inner mandrel (2).

K-2.8) Wedge releasing slip (7) and upper slips (8) outwards (if needed). Remove upper slip body assembly from swivel sleeve (38) and disassemble.

K) DISASSEMBLY (cont’d)

K-2.8.1) Remove wedges (if needed). Remove spring retaining ring (34), releasing slip (7), upper slips (8) and upper slip springs (26) from upper slip body (6).

K-2.9) Remove swivel sleeve (38) and bearing ring (28) from inner mandrel (2).

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

L) ASSEMBLY

NOTE6: Clean and inspect all parts. Replace all worn and damaged parts. Install parts in proper order, and orientation and tighten/torque all connections properly.

CAUTION5: To ensure tool operates properly, install o-rings in o-ring grooves **NOT** thread relief (Fig. 2).

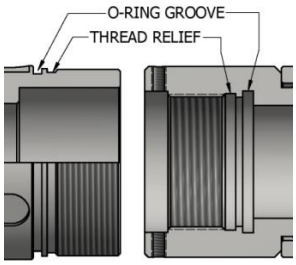


Fig. 2

L-1) Clamp inner mandrel (2) in vise.

NOTE5: Do NOT wrench or clamp on seal surface.

L-1.1) Install bearing ring (28) and swivel sleeve (38) onto inner mandrel (2).

L-1.2) Assemble upper slip body assembly and install:

L-1.2.1) Install spring retaining ring (34) into upper slip body (6).

L-1.2.2) Install upper slips (8), releasing slip (7), and upper slip springs (26) into upper slip body (6). Wedge slips outwards.

NOTE7: Install two (2ea) springs per slip (Fig. 3).

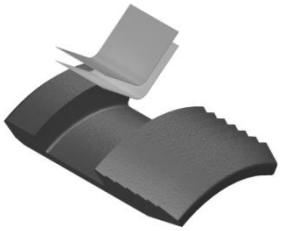


Fig. 3

L-1.2.3) Install upper slip body assembly onto swivel sleeve (38). Remove wedges.

L-1.3) Install snap ring (39) into groove on inner mandrel (2).

L-1.4) Install cover sleeve (33) onto inner mandrel (2).

L-1.5) Align threaded holes in cover sleeve (33) with pocket holes in inner mandrel (2). Screw set screws (37) into cover sleeve (33).

L-1.6) Install compression spring (4) onto cover sleeve (33).

L-1.7) Screw spring cage (5) into upper slip body (6).

L-1.8) Screw top sub (1) onto inner mandrel (2).

L-1.9) Screw spring cage cap (27) onto spring cage (5).

CAUTION4: Compression spring (4) will be compressed with spring tension against upper slip body assembly.

L-2) Unclamp and remove inner mandrel (2) from vise. Clamp top sub (1) in vise.

L-2.1) Install collet cone (9) and bearing bushing (30) onto inner mandrel (2).

L-2.2) Install o-ring (40) in o-ring groove in bonded seal (24).

L-2.3) Install bonded seal (24) into center coupling (10).

CAUTION6: Do not rip or tear o-ring during installation.

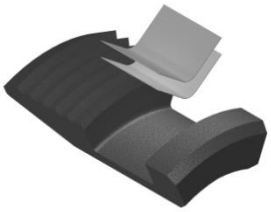


Fig. 4

L-2.4) Install o-ring (42) in o-ring groove in center coupling (10).

L-2.5) Screw center coupling (10) onto collet cone (9).

L-2.6) Assemble and install rubber mandrel assembly:

L-2.6.1) Install rubber retainer (15), elements (13, 14), rubber spacers (12), and gage ring (29) onto rubber mandrel (11).

L-2.6.2) Install rubber mandrel assembly onto inner mandrel (2).

L) ASSEMBLY (cont’d)

L-2.6.3) Screw rubber mandrel (11) into center coupling (10).

CAUTION$_6$: Do not rip or tear o-ring during installation.

L-2.7) Screw lower cone (16) into rubber retainer (15).

L-2.8) Assemble drag block body assembly and install:

L-2.8.1) Install lower slips (17) and lower slip springs (25) into drag block body (18).Wedge slips outward.

NOTE$_7$: Install two (2ea) springs per slip (Fig. 4).

L-2.8.2) Install drag block body assembly onto rubber mandrel (11). Remove wedges.

L-2.9) Screw rubber mandrel cap (19) onto rubber mandrel (11).

NOTE$_4$: For added leverage, insert a rod thru rubber retainer (15) and rubber mandrel (11) as needed.

L-2.10) Install drag blocks (22) and drag block springs (3) into drag block body (18). Compress drag blocks (22) using drag block body assembly tool (T1).

NOTE$_8$: Install six (6ea) springs per drag block (Fig. 5).

Fig. 5

L-2.11) Install drag block retainer (21) onto drag block body (18) capturing ends of drag blocks (22). Align holes in drag block retainer (21) to access threaded holes in drag block body (18).

L-2.12) Install retaining ring (31) onto J-body (20).

L-2.13) Screw J-body (20) into drag block body (18) (**NOTE$_3$**: Left-hand threads.)

L-2.14) Screw set screws (36) into drag block body (18).

L-2.15) Release drag blocks (22).

L-2.16) Install o-ring (41) in o-ring groove in J-pin bottom sub (23).

L-2.17) Screw J-pin bottom sub (23) onto inner mandrel (2).

NOTE$_{10}$: Drag block body assembly must be free to rotate.

CAUTION$_6$: Do not rip or tear o-ring during installation.

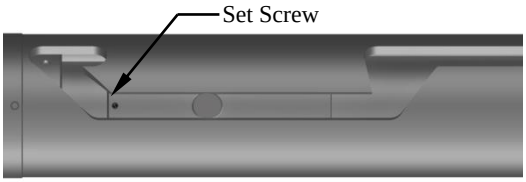


Fig. 6

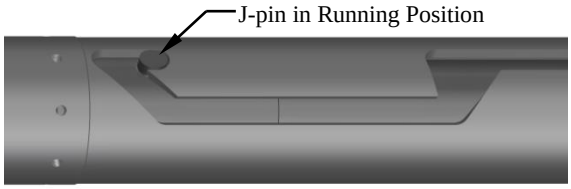


Fig. 7

L-2.18) Screw set screws (35) into J-pin bottom sub (23). Move J-body (20) as needed (Fig. 6).

L-2.19) Screw bottom nipple (28) into J-pin bottom sub (23).

L-2.20) Position J-pin in running position in J-slot of J-body (20) (Fig. 7).

L-2.21) Screw bottom nipple (32) into J-pin bottom sub (23).

L-3) Unclamp top sub (1) from vise and remove assembled tool.

M) PARTS LIST

ITEM	QTY	DESCRIPTION	MATERIAL	P/N 60370HT	P/N 60371HT	P/N 60372HT
1	1	TOP SUB	DLMS110	60170610HT (60370610HT*)		
2	1	INNER MANDREL	DLMS110	60370211HT		
3	24	DRAG BLOCK SPRING	-	9101900		
4	1	COMPRESSION SPRING	CHROME VANADIUM	60373920		
5	1	SPRING CAGE	DLMS60	60173310 (60373310*)		
6	1	UPPER SLIP BODY	DLMS110 / DLMS60	60073320HT	60071320HT	60073320HT
7	1	RELEASING SLIP	DLMS110	60073125	60067125	60073125
8	2	UPPER SLIP	DLMS35	60073115	60067115	60073115
9	1	COLLET CONE	DLMS110	60370411HT		
10	1	CENTER COUPLING	DLMS35	60370620		
11	1	RUBBER MANDREL	DLMS60	60370220	60371220	60370220
12	2	RUBBER SPACER	DLMS35	60270840	60271840	60272840
13	1	ELEMENT	80 DURO NITRILE	60270512		60272512
14	2	ELEMENT	90 DURO NITRILE	60270513		60272513
15	1	RUBBER RETAINER	-	60370850	60271850	60372850
16	1	LOWER CONE	DLMS110	60070420HT		
17	4	LOWER SLIP	DLMS35	60070135		
18	1	DRAG BLOCK BODY	DLMS60 / DLMS35	60070335		
19	1	RUBBER MANDREL CAP	DLMS60	60170230 (60070230*)		
20	1	J-BODY	DLMS60	60170340HT (60370340HT*)		
21	1	DRAG BLOCK RETAINER	DLMS60	60070910	60071910	60070910
22	4	DRAG BLOCK	DLMSDB8	9070900	9060900	9080900

*P/N may be substituted

M) PARTS LIST (cont’d)

ITEM	QTY	DESCRIPTION	MATERIAL	P/N 60370HT	P/N 60371HT	P/N 60372HT
23	1	J-PIN BOTTOM SUB	DLMS110	60370634HT		
24	1	BONDED SEAL	90 DURO NITRILE	60070520		
25	8	LOWER SLIP SPRING	-	7170901		
26	6	UPPER SLIP SPRING	-	7170902		
27	1	SPRING CAGE CAP	-	60173810 (60073810*)	60171810HT (60071810HT*)	60173810 (60073810*)
28	2	BEARING RING	DLMS110	60370103		
29	1	GAGE RING	-	60270830	60271830	60272830
30	1	BEARING BUSHING	DLMS60	60170224	60370224	60170224
31	1	RETAINING RING	DLMS60	60070911		
32	1	BOTTOM NIPPLE	DLMS80	60370636		
33	1	COVER SLEEVE	DLMS60	60370106		
34	1	SPRING RETAINING RING	DLMS35	60073820		
35	2	SET SCREW 1/4-20 UNC X 3/8	STEEL	SSS025C037		
36	3	SET SCREW 5/16-18 UNC X 1/2	STEEL	SSS031C050		
37	3	SET SCREW 5/16-18 UNC X 5/16	STEEL	SSS031C031		
38	1	SWIVEL SLEEVE	DLMS110	60370100		
39	1	SNAP RING	DLMS110	60370102		
40	1	153 O-RING	90 DURO NITRILE	90153		
41	1	233 O-RING	90 DURO NITRILE	90233		
42	1	242 O-RING	90 DURO NITRILE	90242		

*P/N may be substituted

REDRESS KIT (RDK)		60370050HT	60371050HT	60372050HT
ASSEMBLED WEIGHT		300 LBS	296 LBS	303 LBS

M) PARTS LIST (cont’d)

M-1) ELASTOMER TRIM OPTIONS

NOTE9: For temperature range, refer to Elastomer Trim Temperature Guide.

M-1.1) HSN

ITEM	QTY	DESCRIPTION	MATERIAL	60370HTH	60371HTH	60372HTH
13	1	ELEMENT	80 DURO HSN	60270512H		60272512H
14	2	ELEMENT	90 DURO HSN	60270513H		60272513H
24	1	BONDED SEAL	90 DURO HSN	60070520H		
40	1	153 O-RING	90 DURO HSN	90153H		
41	1	233 O-RING	90 DURO HSN	90233H		
42	1	242 O-RING	90 DURO HSN	90242H		

REDRESS KIT (RDK)		60370050HTH	60371050HTH	60372050HTH

M-1.2) VITON

ITEM	QTY	DESCRIPTION	MATERIAL	60370HTV	60371HTV	60372HTV
13	1	ELEMENT	80 DURO VITON	60270512V		60272512V
14	2	ELEMENT	90 DURO VITON	60270513V		60272513V
24	1	BONDED SEAL	90 DURO VITON	60070520V		
40	1	153 O-RING	90 DURO VITON	90153V		
41	1	233 O-RING	90 DURO VITON	90233V		
42	1	242 O-RING	90 DURO VITON	90242V		

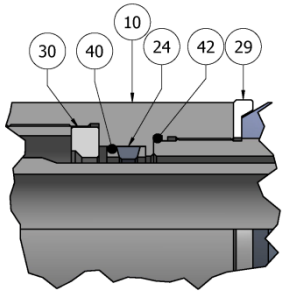
REDRESS KIT (RDK)		60370050HTV	60371050HTV	60372050HTV

M) PARTS LIST (cont’d)

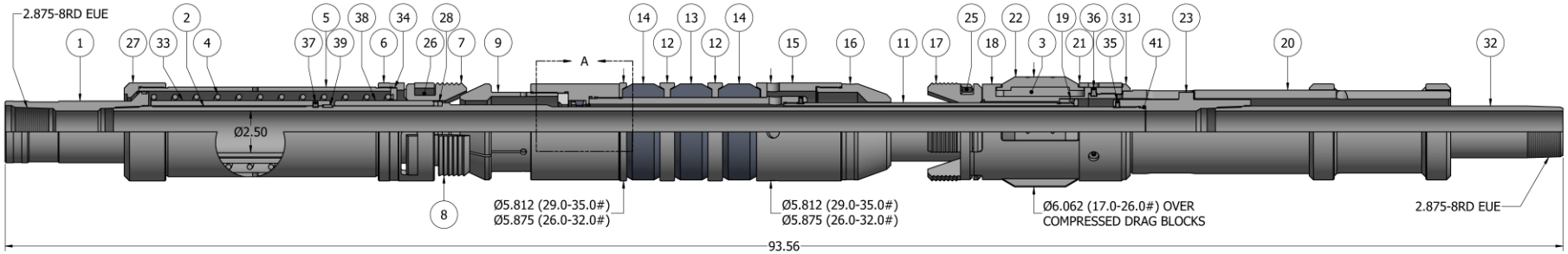
M-2) CARBIDE OPTION

ITEM	QTY	DESCRIPTION	MATERIAL	P/N 60370HTC	P/N 60371HTC	P/N 60372HTC
8	2	CARBIDE UPPER SLIP	DLMS35	60073115C	60067115C	60073115C
17	4	CARBIDE LOWER SLIP	DLMS35	60070135C		
22	4	CARBIDE DRAG BLOCK	DLMSDB8	9070900C	9060900C	9080900C

N) TECHNICAL ILLUSTRATION



DETAIL A



O) REVISION HISTORY

DATE	REVISION	DESCRIPTION OF CHANGES	REVISED BY	APPROVED BY
11/06/2020	H	Added carbide options	J.Anderson	D.Hushbeck
05/22/2018	G	Revised Elastomer Trim Temp. Guide Nitrile rating was 70-250; Updated tech. illustration	J.Anderson	C.Colvin
04/19/2016	F	Removed tool drift ID; Revised Elastomer Durometer Temperatures – Nitrile (90/80/90 Duro) was 250° - 300°F, Nitrile (Contact D&L Sales) was 300°F +, Rubber Type Temperature Ranges – Nitrile was 70° - 300°F, HSN was 70° - 325°F	J.Anderson	C.Colvin
05/08/15	E	Added Related Tools, tool drift ID, Pre-Installation Inspection and Storage Procedures, Emergency Release; Revised Pressure Affected Area Guide, P/N AT070110 was DBAT70	J.Anderson	K.Plunkett
07/30/13	D	Revised Pressure Affected Area Guide Example, Assembly Tool P/N DBAT70 was AT070110, P/N 60170610HT was 60370610HT, 60173310 was 60373310, 60170230 was 60070230, 60170340HT was 60370340HT, 60173810 was 60073810, 60171810HT was 60071810HT; Added HSN and Viton options (P/N 60370HTH, 60371HTH, 60372HTH, 60370HTV, 60371HTV, 60372HTV), max tensile load; Recommended Hand Tools, Note for substitute parts; Options Parts List, Revision History; Removed Aflas from Element Selection Guide, Item T2 from Special Tools.	S. McEntire	D. Hushbeck