A) DESCRIPTION

The HD Abandonment Packer is a heavy duty service packer ideally suited for all types of squeeze cementing, formation fracturing, high pressure acidizing, etc. This packer is a large opening compression set packer with hydraulic button-type hold down. This packer withstands high pressure from above or below and uses a 3-element packing system, J-slot, and a drag block mechanism for easy setting. This packer has a built-in unloader which circulates across the hold down buttons to improve retrievability and run in performance.

B) SPECIFICATION GUIDE

CASING			TOOL		THREAD CONNECTIONS BOX UP / PIN DOWN	PART NUMBER
SIZE (INCHES)	**WEIGHT** (LBS/FT)	**RECOMMENDED HOLE SIZE** (INCHES)	**GAGE OD** (INCHES)	**NOMINAL ID** (INCHES)		
10-3/4	32.75 – 45.5	9.950 – 10.192	9.700	3.50	4-1/2 IF TOOL JOINT	61501-XBEE 61501H-XBEE[1] 61501V-XBEE[2]
	51.0 – 65.7	9.560 – 9.850	9.312 9.374*	3.50	4-1/2 IF TOOL JOINT	61510-XBEE 61510H-XBEE[1] 61510V-XBEE[2]
	65.7 – 91.2	9.032 – 9.560	8.813	3.50	4-1/2 IF TOOL JOINT	61599-XBEE 61599H-XBEE[1] 61599V-XBEE[2]

Elastomer Trim Options: [1]HSN, [2]Viton

* Max OD measured across retracted drag blocks.

NOTE$_1$: Tools listed are right-hand auto set / straight pick-up.

DIFFERENTIAL PRESSURE (MAX)	TENSILE LOAD THRU UNSET TOOL (MAX)	HANGING WEIGHT ON SET TOOL (MAX)*	TORQUE THRU TOOL (MAX)
8,000 PSI	500,000 LBS	250,000 LBS*	2,000 FT-LBS

*Casing must be cemented for this load rating.

CAUTION$_1$: Before running the tool, check the pressure affected areas chart, and consider other effects to be certain that the unloader will remain closed during operation.

CAUTION$_2$: If the HD Packer is run with a Retrievable Bridge Plug, make sure the Retrievable Bridge Plug J-slot is compatible with the J-slot on the packer. Whichever direction you set the Retrievable Bridge Plug, the packer should set in the **opposite** direction.

C) PRE-INSTALLATION INSPECTION PROCEDURES

CAUTION3: D&L ships tool connections made-up hand-tight—labeled with hand-tight tape on the tool—unless stated otherwise. Properly tighten connections before operating tool (Fig. 1).

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.

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

CAUTION4: Do not run the tool without properly tightening connections. Running the tool with loose connections may damage the tool and cause malfunction.

Run to setting depth. The unloader remains open while running in. Pick up the tubing and rotate 1/4 turn at the packer. Slack off weight and set down on the packer to set the slips, close the unloader and compress the packing elements. A minimum weight of 25,000 lbs at the packer is required to pack off the elements.

CAUTION5: Run the tool slowly, as with any hold down type packer, to help prevent dulling of the hydraulic buttons.

E) RELEASING PROCEDURES

Pick up on the tubing to open the unloader, allowing time for the tubing and casing pressure to equalize. Refer to Pressure Affected Area Guide to determine weight in addition to pipe weight required to pick up on packer. Continued upward movement of the tubing unsets the slips, relaxes the packing elements and re-jays the packer. The tool may now be moved and reset, or pulled from the well.

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. Elastomers 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).

G) PRESSURE AFFECTED AREAS 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 (IN)	**DRILL PIPE TO PACKER**			**PRESSURE AFFECTED AREA** (IN^2)			
	SIZE (IN)	**WEIGHT** (LBS/FT)	**ID** (IN)	**ABOVE**		**BELOW**	
10-3/4	ABANDONED	N/A	PLUGGED	15.584	(DOWN)	0.210	(DOWN)
	2.375*	4.85	1.995	11.154	(DOWN)	3.335	(DOWN)
		6.65	1.815	11.154	(DOWN)	2.797	(DOWN)
	2.875*	6.85	2.441	9.093	(DOWN)	4.889	(DOWN)
		10.40	2.151	9.093	(DOWN)	3.843	(DOWN)
	3.500	8.50	3.063	5.963	(DOWN)	7.578	(DOWN)
		13.30	2.764	5.963	(DOWN)	6.210	(DOWN)
		15.50	2.602	5.963	(DOWN)	5.527	(DOWN)
	4.000	11.85	3.476	3.018	(DOWN)	9.699	(DOWN)
		14.00	3.340	3.018	(DOWN)	8.971	(DOWN)
		15.70	3.240	3.018	(DOWN)	8.454	(DOWN)
	4.500	13.75	3.958	-0.320	(UP)	12.513	(DOWN)
		16.60	3.826	-0.320	(UP)	11.706	(DOWN)
		20.00	3.640	-0.320	(UP)	10.616	(DOWN)
		22.82	3.500	-0.320	(UP)	9.831	(DOWN)
	5.000	16.25	4.408	-4.051	(UP)	15.470	(DOWN)
		19.50	4.276	-4.051	(UP)	14.570	(DOWN)
		25.60	4.000	-4.051	(UP)	12.776	(DOWN)
	5.500	19.20	4.892	-8.174	(UP)	19.005	(DOWN)
		21.90	4.778	-8.174	(UP)	18.140	(DOWN)
		24.70	4.670	-8.174	(UP)	17.338	(DOWN)

*Drill pipe sizes not recommended.

G) PRESSURE AFFECTED AREAS GUIDE (cont'd)

PACKER SIZE (IN)	DRILL PIPE TO PACKER			PRESSURE AFFECTED AREA (IN^2)			
	SIZE (IN)	WEIGHT (LBS/FT)	ID (IN)	ABOVE		BELOW	
10-3/4	5.875	23.40	5.153	-11.524	(UP)	21.065	(DOWN)
		24.17	5.045	-11.524	(UP)	20.199	(DOWN)
	6.625	25.20	5.965	-18.887	(UP)	28.155	(DOWN)
		27.70	5.901	-18.887	(UP)	27.559	(DOWN)

*Drill pipe sizes not recommended.

Example: Consider a 10-3/4" X 4-1/2" HD Abandonment Packer set on 4.500" (20.00 lbs/ft) 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 for a 10-3/4" X 4-1/2" HD Abandonment Packer run on 4.500" (20.00 lbs/ft) tubing. 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 -0.320 in^2. Multiplying the differential pressure (3,000 PSI) by the pressure affected area (-0.320 in^2) results in a force of -960 lbs. The piston effect on the packer mandrel is an upward force of 960 lbs.

H) 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 (F°)
NITRILE	40° - 250°F
HSN (HNBR)	70° - 300°F
VITON	100° - 350°F

I) RECOMMENDED TOOLS

I-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
- JACK STANDS

I-2) SPECIAL TOOLS

ITEM	QTY	DESCRIPTION	PART NUMBER
T1	1	DRAG BLOCK ASSEMBLY TOOL	AT010110
T2	1	BUTTON REMOVAL TOOL	AT-BRT000
T3	1 GAL	KOPR-KOTE® ANTI-SEIZE LUBRICANT	DL-KOPR-KOTE-1G

J) DISASSEMBLY

NOTE2: Ensure vise is capable of handling weight of tool.

NOTE3: Support tool during disassembly and assembly with jack stands as necessary.

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

J-1.1) Unscrew and remove set screws (39) from J-pin sub (23).

J-1.2) Unscrew and remove bottom sub (28) from J-pin sub (23).

J-1.3) Unscrew and remove set screws (40) from J-pin sub (23). Move J-body (20) as needed to access screws.

J-1.4) Unscrew and remove J-pin sub (23) from inner mandrel (2).

NOTE4: Drag block body must be free to rotate.

J-1.4.1) Remove o-rings (47, 48) from J-pin sub (23).

J-1.5) Compress drag blocks (22) with drag block assembly tool (T1).

J-1.6) Unscrew and remove set screws (41) from drag block body (18). Rotate drag block retaining ring (21) as necessary to access screws.

J-1.7) Unscrew and remove J-body (20) from drag block body (18) (**NOTE5**: Left-hand threads).

J-1.7.1) Remove retaining ring (31) from J-body (20).

J-1.8) Remove drag block retaining ring (21) from drag block body (18).

J-1.9) Remove drag block assembly tool (T1). Remove drag blocks (22) and drag block springs (3) from drag block body (18).

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

NOTE6: For added leverage, insert a rod through lower cone (16) and rubber mandrel (11) as needed.

J-1.11) Remove drag block body assembly and disassemble:

J-1.11.1) Unscrew and remove cap screw (38) from drag block body (18).

J-1.11.2) Wedge lower slips (17) outward (if needed). Remove lower slip support (32) from drag block body (18).

J-1.11.3) Remove wedges (if needed). Remove lower slips (17) and lower slip springs (25) from drag block body (18).

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

NOTE7: For added leverage, insert a rod through central body (10) as needed.

J-1.13) Unscrew rubber mandrel (11) from valve body (34).

J-1.14) Remove rubber mandrel assembly and disassemble:

J-1.14.1) Remove elements (13, 14), rubber spacers (12) and rubber retainer (15) from secondary rubber mandrel (35).

J-1.14.2) Remove secondary rubber mandrel (35) from rubber mandrel (11).

J-1.14.2.1) Remove o-ring (44) from rubber mandrel (11).

J-1.15) Unscrew and remove gage ring (29) from valve body (34).

J-1.16) Unscrew and remove valve body (34) from central body (10).

NOTE7: For added leverage, insert a rod through central body (10) as needed.

J-1.16.1) Remove o-ring (42) from valve body (34).

J-1.17) Unscrew and remove central body (10) from hold down body (6).

J-2) Remove top sub (1) from vise and clamp lower end of inner mandrel (2) in vise.

CAUTION6: Do NOT wrench or clamp on seal surface.

J-2.1) Unscrew and remove set screws (41) from top sub (1).

J) DISASSEMBLY (cont'd)

J-2.2) Unscrew and remove top sub (1) from inner mandrel (2).
J-2.2.1) Remove o-ring (47) from top sub (1).
J-2.3) Unscrew and remove hold down cap (4) from hold down body (6).
J-2.4) If applicable - move strap retainer (36) downwards out-of-the-way temporarily.
J-2.5) Remove hold down buttons from hold down body:
J-2.5.1) Unscrew and remove flat head cap screws (37) from hold down body (6).
J-2.5.2) Remove hold down straps (7) from hold down body (6).
J-2.5.3) Remove hold down button springs (26) from hold down buttons (30).
J-2.5.4) Remove hold down buttons (30) from hold down body (6) with button removal tool (T2).
J-2.5.4.1) Remove o-rings (46) from hold down buttons (30).
J-2.6) Unscrew and remove hold down extension (33) from hold down body (6).
J-2.6.1) Remove o-ring (49) from hold down extension (33).
J-2.7) Remove hold down body (6) from inner mandrel (2).
J-2.7.1) Remove o-rings (50, 51) from hold down body (6).
J-2.8) If applicable - remove strap retainer (36) from inner mandrel (2).
J-2.9) Remove compensating piston (9) from compensating mandrel (8).
J-2.9.1) Remove o-rings (50, 51) from compensating piston (9).
J-2.10) Unscrew and remove compensating mandrel (8) from seal receptacle (5).
CAUTION6: Do NOT wrench or clamp on seal surface.
J-3) Unclamp and remove inner mandrel (2) from vise.
J-4) Remove seal receptacle (5) from inner mandrel (2).
J-4.1) Unscrew and remove seal retainer (27) from seal receptacle (5).
J-4.2) Remove quad seal (24) and o-rings (43, 45) from seal receptacle (5).

K) ASSEMBLY

NOTE8: Clean and inspect all parts. Replace all worn and damaged parts. Install parts in proper order, and orientation and tighten/torque all connections properly.

CAUTION7: To ensure tool operates properly, install o-rings in o-ring grooves **NOT** thread reliefs (Fig. 2).

NOTE9: Apply KOPR-KOTE® anti-seize lubricant (T3) on STUB ACME and drill pipe connections when making up connections.

NOTE2: Ensure vise is capable of handling weight of tool.

NOTE3: Support tool during disassembly and assembly with jack stands as necessary.

K-1) Install o-rings (43, 45) in o-ring grooves in seal receptacle (5).
K-2) Install quad seal (24) onto seal receptacle (5).
K-3) Screw seal retainer (27) onto seal receptacle (5).

CAUTION8: Do not rip or tear quad seal during installation.

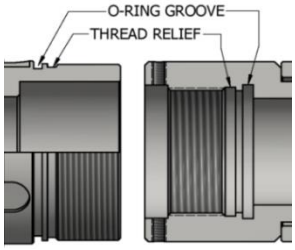


Fig. 2

K) ASSEMBLY (cont'd)

K-4) Install seal receptacle (5) onto lower end of inner mandrel (2). Slide seal receptacle (5) upwards into place.

K-5) Clamp lower part of inner mandrel (2) in vise.

CAUTION6: Do NOT wrench or clamp on seal surface.

K-5.1) Screw compensating mandrel (8) into seal receptacle (5).

CAUTION9: Do not rip or tear o-ring during installation.

K-5.2) Install o-rings (50, 51) in o-ring grooves in compensating piston (9).

K-5.3) Install compensating piston (9) onto compensating mandrel (8).

NOTE10: Ensure compensating piston (9) is installed in correct direction (Fig. 3).

CAUTION9: Do not rip or tear o-ring during installation.

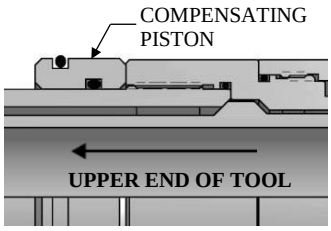


Fig. 3

K-5.4) If applicable - install strap retainer (36) onto inner mandrel (2).

K-5.5) Assemble hold down body assembly and install:

K-5.5.1) Install o-rings (50, 51) in o-ring grooves in hold down body (6).

K-5.5.2) Install o-ring (49) in o-ring groove in hold down extension (33).

K-5.5.3) Screw hold down extension (33) into hold down body (6).

CAUTION9: Do not rip or tear o-ring during installation.

K-5.5.4) Install hold down body assembly onto inner mandrel (2).

CAUTION9: Do not rip or tear o-ring during installation.

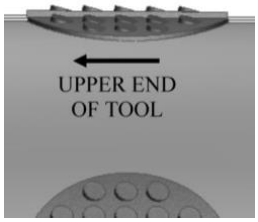


Fig. 4

K-5.6) Assemble hold down buttons and install:

K-5.6.1) Install o-rings (46) in o-ring grooves in hold down buttons (30).

K-5.6.2) Install hold down buttons (30) into hold down body (6) (Fig. 4).

CAUTION9: Do not rip or tear o-ring during installation.

K-5.6.3) Install hold down button springs (26) into hold down buttons (30).

NOTE11: Install two (2ea) springs per hold down button (Fig. 5).

K-5.6.4) Align slot in hold down buttons (30) with slot in hold down body (6). Set hold down straps (7) in slots in hold down buttons (30) and hold down body (6) (Fig. 5).


Fig. 5

K-5.6.5) Screw flat head cap screws (37) into hold down body (6).

K-5.7) If applicable - slide strap retainer (36) onto hold down body (6) capturing lower ends of hold down straps (7).

K-5.8) Screw hold down cap (4) onto hold down body (6) capturing upper ends of hold down straps (7).

K-5.9) Install o-ring (47) in o-ring groove in top sub (1).

K-5.10) Screw top sub (1) onto inner mandrel (2).

CAUTION9: Do not rip or tear o-ring during installation.

K-5.11) Screw set screws (41) into top sub (1).

K-6) Remove inner mandrel (2) from vise. Clamp top sub (1) in vise.

K-6.1) Screw central body (10) onto hold down body (6).

CAUTION9: Do not rip or tear o-ring during installation.

K-6.2) Install o-ring (42) in o-ring groove in valve body (34).

K-6.3) Screw valve body (34) into central body (10).

NOTE5: For added leverage, insert a rod through central body (10) as needed.

K-6.4) Screw gage ring (29) onto valve body (34).

K) ASSEMBLY (cont'd)

K-6.5) Assemble rubber mandrel assembly and install:

K-6.5.1) Install o-ring (44) in o-ring groove in rubber mandrel (11).

K-6.5.2) Install secondary rubber mandrel (35) onto rubber mandrel (11).

CAUTION$_9$: Do not rip or tear o-ring during installation.

K-6.5.3) Install rubber retainer (15), elements (13, 14), and rubber spacers (12) onto secondary rubber mandrel (35).

K-6.6) Screw rubber mandrel (11) into valve body (34).

CAUTION$_9$: Do not rip or tear o-ring during installation

K-6.7) Screw lower cone (16) into rubber retainer (15).

NOTE$_5$: For added leverage, insert a rod through central body (10) as needed.

K-6.8) Assemble drag block body assembly and install:

K-6.8.1) Install lower slips (17) and lower slip springs (25) into drag block body (18). Wedge lower slips (17) outward.

NOTE$_{10}$: Install two (2ea) slip springs per slip (Fig. 6).

Fig. 6

K-6.8.2) Install lower slip support (32) into drag block body (18).

K-6.8.3) Align hole(s) in lower slip support (32) with threaded hole(s) in drag block body (18). Screw socket cap screws (38) into drag block body (18). Remove wedges.

K-6.8.4) Install drag block body assembly onto rubber mandrel (11)

K-6.9) Screw rubber mandrel cap (19) onto rubber mandrel (11).

K-6.10) 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$_{11}$: Install six (6ea) drag block springs per drag block (Fig. 7).

K-6.11) Install drag block retainer (21) onto drag block body (18) capturing ends of drag blocks (22). Align holes in drag block retaining ring (21) with threaded holes in drag block body (18).

K-6.12) Install retaining ring (31) onto J-body (20).

K-6.13) Screw J-body (20) into drag block body (22) (**NOTE$_5$**: Left-hand threads).

K-6.14) Screw set screws (41) into drag block body (18). Release drag blocks (22).

K-6.15) Install o-rings (47, 48) in o-ring grooves in J-pin sub (23).

K-6.16) Screw J-pin sub (23) onto inner mandrel (2).

NOTE$_4$: Drag block body must be free to rotate.

CAUTION$_9$: Do not rip or tear o-ring during installation.

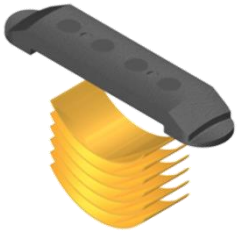


Fig. 7

K-6.17) Screw set screws (40) into J-pin sub (23). Move J-body (20) as needed to access threaded holes in J-pin sub (23).

K-6.18) Screw bottom sub (28) into J-pin sub (23).

CAUTION$_9$: Do not rip or tear o-ring during installation.

K-6.19) Screw set screws (39) into J-pin sub (23).

K-7) Unclamp top sub (1) from vise and remove assembled tool.

L) PARTS LIST

ITEM	QTY	DESCRIPTION	MATERIAL	32.75 – 45.5# P/N 61501-XBEE	51.0 - 65.7# P/N 61510-XBEE	65.7 – 91.2# P/N 61599-XBEE
1	1	TOP SUB	DLMS110	61595612-YBEE		
2	1	INNER MANDREL	DLMS110	61595215		
3	36	DRAG BLOCK SPRING	-	9101900		
4	1	HOLD DOWN CAP	DLMS110	61301370	61310370	61399370
5	1	SEAL RECEPTACLE	DLMS110	61395730		
6	1	HOLD DOWN BODY	DLMS110	61310320		61395320
7	4	HOLD DOWN STRAP	DLMSFB4	61395360		61395361
8	1	COMPENSATING MANDREL	DLMS110	61395240		
9	1	COMPENSATING PISTON	DLMS110	61395715		
10	1	CENTRAL BODY	DLMS110	61395385		
11	1	RUBBER MANDREL	DLMS110	60313220HT		
12	2	RUBBER SPACER	DLMS35	61301840	61310840	60299840S
13	1	ELEMENT	80 DURO NITRILE	61301512 (80 DURO)	61310511 (70 DURO)	60299512S (80 DURO)
14	2	ELEMENT	90 DURO NITRILE	61301513	61310513	60299513S
15	1	RUBBER RETAINER	DLMS110	61301850	61310850	60299850SHT
16	1	LOWER CONE	DLMS110	60310420		60399420SHT
17	-	LOWER SLIP W/ CARBIDE	DLMS110	60010135C (6 EA)		60099135C (5 EA)
18	1	DRAG BLOCK BODY	DLMS35 / DLMS110	60310335HT		61599335
19	1	RUBBER MANDREL CAP	DLMS80	60095230		

L) PARTS LIST (cont'd)

ITEM	QTY	DESCRIPTION	MATERIAL	32.75 – 45.5# P/N 61501-XBEE	51.0 - 65.7# P/N 61510-XBEE	65.7 – 91.2# P/N 61599-XBEE
20	1	J-BODY	DLMS110	61395340		
21	1	DRAG BLOCK RETAINER	DLMS60	60310910		60399910
22	6	DRAG BLOCK W/ CARBIDE	DLMSDB4	9080900C	9070900C	9080900C
23	1	J-PIN SUB	DLMS110	61595620		
24	1	QUAD SEAL	90 DURO NITRILE	61395520		
25	12	SLIP SPRING	-	7170901 (12 EA)	(12 EA)	(10 EA)
26	16	HOLD DOWN BUTTON SPRING	-	9101900		
27	1	SEAL RETAINER	DLMS110	61395530		
28	1	BOTTOM SUB	DLMS110	61762620		
29	1	GAGE RING	DLMS110	61301830	61310830	60299830HT
30	8	HYDRAULIC HOLD DOWN BUTTON W/ CARBIDE	STRESSPROOF	61310974		61399974
31	1	RETAINING RING	-	60095911HT (DLMS110)		60099911 (DLMS35)
32	1	LOWER SLIP SUPPORT	DLMS60	60310912		60399912HT
33	1	HOLD DOWN EXTENSION	DLMS110	61395310	61310310	61395310
34	1	VALVE BODY	DLMS110	61395350		
35	1	SECONDARY RUBBER MANDREL	DLMS110	61310221		60095221HT
36	1	STRAP RETAINER	-	61301650 (DLMS80)	61310650 (DLMS110)	N/A
37	-	FLAT HEAD SOCKET CAP SCREW 5/16-18 UNC X 5/8	STEEL	FHSC031C062 (4 EA)		FHSC037C062 (12 EA)

L) PARTS LIST (cont'd)

ITEM	QTY	DESCRIPTION	MATERIAL	32.75 – 45.5# P/N 61501-XBEE	51.0 - 65.7# P/N 61510-XBEE	65.7 – 91.2# P/N 61599-XBEE
38	-	SOCKET CAP SCREW 1/2-13 UNC X 3/4	STEEL	SCS050C075 (2 EA)		SCS050C100 (1 EA)
39	4	SET SCREW1/4-20 UNC	STEEL	SSS025C050 (1/2" LONG)	SSS025C037 (3/8" LONG)	SSS025C062 (5/8" LONG)
40	2	SET SCREW 3/8-16 UNC X 3/8	STEEL	SSS037C037		
41	6	SET SCREW 3/8-16 UNC X 1/2	STEEL	SSS037C050		
42	1	160 O-RING	90 DURO NITRILE	90160		
43	1	253 O-RING	90 DURO NITRILE	90253		
44	1	254 O-RING	90 DURO NITRILE	90254		
45	1	256 O-RING	90 DURO NITRILE	90256		
46	8	338 O-RING	90 DURO NITRILE	90338		
47	2	346 O-RING	90 DURO NITRILE	90346		
48	1	348 O-RING	90 DURO NITRILE	90348		
49	1	351 O-RING	90 DURO NITRILE	90351		
50	2	356 O-RING	90 DURO NITRILE	90356		
51	2	363 O-RING	90 DURO NITRILE	90363		

REDRESS KIT (RDK)		61501050	61510050	61599050
ASSEMBLED WEIGHT		882 LBS	871 LBS	789 LBS

L) PARTS LIST (cont'd)

L-1) ELASTOMER TRIM OPTIONS

NOTE13: For temperature range, refer to Elastomer Trim Temperature Guide.

L-1.1) HSN

ITEM	QTY	DESCRIPTION	MATERIAL	32.75 – 45.5# P/N 61501H-XBEE	51.0 - 65.7# P/N 61510H-XBEE	65.7 – 91.2# P/N 61599H-XBEE
13	1	ELEMENT	HSN	61301512H (80 DURO)	61310511H (70 DURO)	60299512SH (80 DURO)
14	2	ELEMENT	90 DURO HSN	61301513H	61310513H	60299513SH
24	1	QUAD SEAL	90 DURO HSN	61395520H		
43	1	253 O-RING	90 DURO HSN	90253H		
44	1	254 O-RING	90 DURO HSN	90254H		
45	1	256 O-RING	90 DURO HSN	90256H		
46	8	338 O-RING	90 DURO HSN	90338H		
47	2	346 O-RING	90 DURO HSN	90346H		
48	1	348 O-RING	90 DURO HSN	90348H		
49	1	351 O-RING	90 DURO HSN	90351H		
50	2	356 O-RING	90 DURO HSN	90356H		
51	2	363 O-RING	90 DURO HSN	90363H		

REDRESS KIT (RDK)		61501050H	61510050H	61599050H

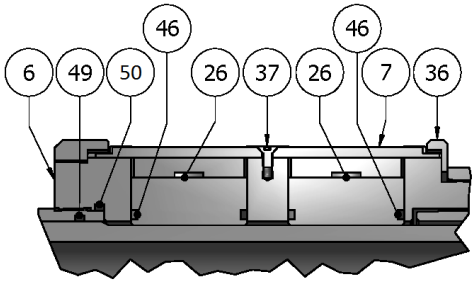
L) PARTS LIST (cont’d)

L-1.2) VITON

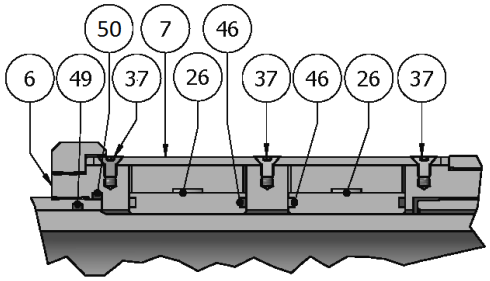
ITEM	QTY	DESCRIPTION	MATERIAL	32.75 – 45.5# P/N 61501V-XBEE	51.0 - 65.7# P/N 61510V-XBEE	65.7 – 91.2# P/N 61599V-XBEE
13	1	ELEMENT	VITON	61301512V (80 DURO)	61310511V (70 DURO)	60299512SV (80 DURO)
14	2	ELEMENT	90 DURO VITON	61301513V	61310513V	60299513SV
24	1	QUAD SEAL	90 DURO VITON	61395520V		
43	1	253 O-RING	90 DURO VITON	90253V		
44	1	254 O-RING	90 DURO VITON	90254V		
45	1	256 O-RING	90 DURO VITON	90256V		
46	8	338 O-RING	90 DURO VITON	90338V		
47	2	346 O-RING	90 DURO VITON	90346V		
48	1	348 O-RING	90 DURO VITON	90348V		
49	1	351 O-RING	90 DURO VITON	90351V		
50	2	356 O-RING	90 DURO VITON	90356V		
51	2	363 O-RING	90 DURO VITON	90363V		

REDRESS KIT (RDK)		61501050V	61510050V	61599050V

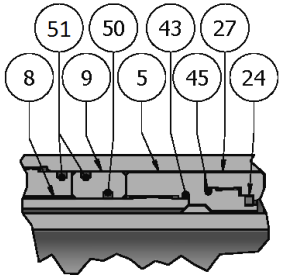
M) TECHNICAL ILLUSTRATION



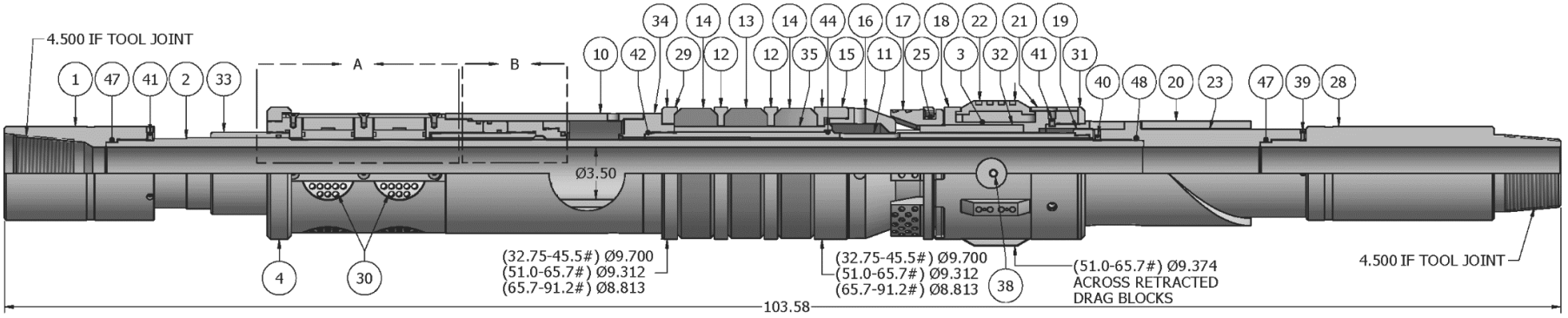
DETAIL A
FOR (32.75-45.5#), (51.0-65.7#)



DETAIL A
FOR (65.7-91.2#)



DETAIL B



N) REVISION HISTORY

DATE	REVISION	DESCRIPTION OF CHANGES	REVISED BY	APPROVED BY
04/30/2020	J	Added General Screw Torque Recommendations; Revised Elastomer Trim Temp. Guide, P/N 90356 qty 2 was 1, Removed P/N 90357	J.Anderson	Z.Speer
12/14/2015	H	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;	B.Mathis	B.Oligschlaeger
11/17/2015	G	Added: Elastomer Options, Max OD over drag blocks & note, Note1, TORQUE THRU TOOL, HAND TOOLS – Jack Stands, SPECIAL TOOLS – T3, Note2, Note3, Note8, Fig. 2, Fig. 3, Fig. 5, PARTS LIST – P/N 61599-XBEE and parts, PARTS LIST - ELASTOMER TRIM OPTIONS; Revised: PRE-INSTALLATION INSPECTION PROCEDURES, RELEASING PROCEDURES, PRESSURE AFFECTED AREA GUIDE, ELASTOMER TRIM TEMPERATURE GUIDE was ELEMENT SELECTION GUIDE, DISASSEMBLY instructions, ASSEMBLY instructions, PARTS LIST – MATERIAL was P-110 (P/N's 61395730, 61395240, 61395715, 61395385, 60313220HT, 60010135C, 61395530, 61395310, 61395350), DLMS35 was 1018 (P/N 61301840), DLMS110 / DLMS35 was P-110 / 1026 (P/N 60310420, DLMS60 was 1026 (P/N's 60095230, 60310910, 60310912), 70 DURO & 80 DURO was NITRILE (P/N's 61301512, 61310511, 60299512S), L-80 was '–' (P/N 61301650), P-110 was '–' (P/N 61310650), TECH ILLUSTRATIONS; Removed: Drift ID;	B.Mathis	K.Riggs
09/04/14	F	Added: P/N 61510-XBEE; Revised: entire manual;	J.Anderson	B.Oligschlaeger
08/29/14	E	Added: Pressure Affected Area Guide calculations;	J.Anderson	B.Oligschlaeger