



ASI-X PACKER

2-7/8" X 1.050"

Manual No:
DL-603-2875-709

Revision: **D**

Revision Date:
02/10/2021

Authored by: D.Barlow

Approved by: J.McArthur

A) DESCRIPTION

The ASI-X 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.

B) RELATED TOOLS (sold separately)

B-1) 2-7/8" DT-2 On/Off Tool and Stinger (P/N varies)—refer to applicable technical manual.

B-2) 1.050" 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)		
2-7/8	6.4 – 6.5	2.375 – 2.441	2.250 2.263*	0.63	1.050 EUE	60325-3E 60325H-3E ¹ 60325V-3E ² 60325C-3E ³ 60325HC-3E ⁴ 60325VC-3E ⁵

*Maximum OD across retracted drag blocks.

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

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	18,000 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.

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

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D) PRE-INSTALLATION INSPECTION PROCEDURES (cont'd)

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 (minimum 6,000 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-2) TENSION SET

Run to setting depth, pick up on the work string and rotate 1/4 right-hand turn 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 (minimum 6,000 lbs over string weight). 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 ASI-X Packer may cause the upper slips to wedge in tighter, requiring an extra amount of tension to release the upper slips.



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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

PACKER SIZE (INCHES)	TUBING SIZE (INCHES)	PRESSURE AFFECTED AREA (SQ. INCHES)	
		ABOVE	BELOW
2-7/8	1.050	0.020 (DOWN)	-0.353 (UP)
	1.315	-0.472 (UP)	-0.022 (UP)
	1.660	-1.278 (UP)	0.610 (DOWN)
	1.900	-1.949 (UP)	1.150 (DOWN)

Example: Consider a 2-7/8" X 1.050 ASI-X Packer set on 1.660" 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 2-7/8" X 1.050" ASI-X Packer run on 1.660" 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 -1.278 in². Multiplying the differential pressure (3,000 PSI) by the pressure affected area (-1.278 in²) results in a force of -3,834 lbs. The piston effect on the packer mandrel is an upward force of 3,834 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



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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	AT045110

K) DISASSEMBLY

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

K-1.1) Unscrew and remove J-pin bottom sub (23) from inner mandrel (2).

NOTE3: Drag block body assembly must be free to rotate.

K-1.1.1) Remove o-ring (28) from J-pin bottom sub (23).

K-1.2) Unscrew and remove set screws (27) from drag block body (18).

K-1.3) Unscrew and remove J-body (20) from drag block body (18) (**NOTE4:** Right-hand threads)

K-1.4) Unscrew and remove set screws (27) from lower slip body (26).

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

K-1.6) Unscrew lower slip body (26) from drag block body (18) and slide lower slip body (26) toward lower cone (16).

K-1.7) Release drag blocks (22). Remove drag blocks (22) and drag block springs (3) from drag block body (18). Remove drag block assembly tool (T1).

K-1.8) Unscrew and remove rubber mandrel cap (19) from rubber mandrel (11).

NOTE7: For added leverage, insert a rod through rubber retainer (15) and rubber mandrel (11) as needed.

K-1.9) Remove drag block retainer (21) and drag block body (18) from inner mandrel (11).

K-1.10) Wedge lower slips (17) outwards (if needed). Remove lower slip body assembly from rubber mandrel (11) and disassemble:

K-1.10.1) Remove wedges (if needed). Remove lower slips (17) and lower slip springs (25) from lower slip body (26).

K-1.11) Unscrew and remove lower cone (16) from rubber retainer (15).

K-1.12) Unscrew rubber mandrel (11) from center coupling (10).

NOTE5: For added leverage, insert a rod thru rubber retainer (15) and rubber mandrel (11) as needed.

K-1.13) Remove rubber mandrel assembly from inner mandrel (2).

K-1.13.1) Remove elements (13, 14), rubber spacers (12), and rubber retainer (15) from rubber mandrel (11).

K-1.14) Unscrew and remove center coupling (10) from upper cone (9).

K-1.14.1) Remove o-ring (29) from center coupling (10).

K-1.15) Remove upper cone (9) from inner mandrel (2).

K-1.15.1) Remove valve (24) and o-rings (30, 31) from upper cone (9).



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K) DISASSEMBLY (cont'd)

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

CAUTION4: Do NOT wrench or clamp on seal surface.

K-2.1) Unscrew and remove spring cage (5) from upper slip body (6).

CAUTION5: Compression spring (4) is compressed with spring tension against upper slip body assembly.

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

K-2.3) Remove compression spring (4) from inner mandrel (2).

K-2.4) Wedge releasing slip (7) and upper slips (8) outwards (if needed). Remove upper slip body assembly from inner mandrel (2) and disassemble:

K-2.4.1) Remove wedges (if needed). Remove releasing slip (7), upper slips (8) and upper slip springs (25) from upper slip body (6).

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

L) ASSEMBLY

NOTE4: Clean and inspect all parts. Replace all worn and damaged parts. Install parts in proper order, and orientation and tighten/torque all connections properly.

CAUTION6: To ensure tool operates properly, install o-rings in o-ring grooves NOT thread reliefs (Fig. 2).

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

CAUTION4: Do NOT wrench or clamp on seal surface.

L-1.1) Assemble upper slip body assembly and install:

L-1.1.1) Install upper slips (8), releasing slip (7) and upper slip springs (25) into upper slip body (6).

NOTE5: Install one (1ea) spring per slip (Fig. 3).

L-1.1.2) Wedge releasing slip (7) and upper slips (8) outwards. Install upper slip body assembly onto inner mandrel (2).

L-1.2) Install compression spring (4) onto inner mandrel (2).

L-1.3) Screw top sub (1) onto inner mandrel (2).

L-1.4) Screw spring cage (5) onto upper slip body (6).

CAUTION5: Compression spring (4) is compressed with spring tension against upper slip body assembly.

L-2) Remove inner mandrel (2) from vise and clamp top sub (1) in vise.

L-2.1) Install o-rings (30, 31) in groove in upper cone (9).

L-2.2) Install valve (24) into upper cone (9).

CAUTION7: Do not rip or tear o-ring during installation.

L-2.3) Install upper cone (9) onto inner mandrel (2).

L-2.4) Install o-ring (29) into center coupling (10).

L-2.5) Screw center coupling (10) into upper cone (9).

L-2.6) Assemble rubber mandrel assembly and install:

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

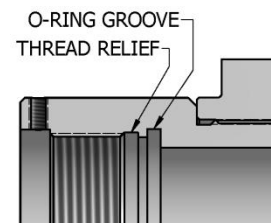


Fig. 2

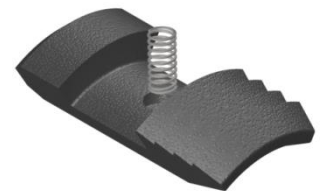


Fig. 3

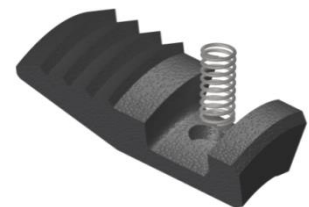


Fig. 4



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L) ASSEMBLY (cont'd)

L-2.6.2) Install rubber mandrel assembly onto inner mandrel (2). Screw rubber mandrel (11) into center coupling (10).

CAUTION7: 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 lower slip body (26)

NOTE6: Install one (1ea) spring per slip (Fig. 4).

L-2.8.2) Wedge lower slips (17) outwards. Install lower slip body assembly onto rubber mandrel (11) and remove wedges (if needed).

L-2.8.3) Install drag blocks (22) and drag block springs (3) into drag block body (18).

NOTE7: Install two (2ea) springs per drag block (Fig. 5).

L-2.8.4) Compress drag blocks (22) with drag block assembly tool (T1).

L-2.8.5) Install drag block retainer (21) onto drag block body (18) to capture ends of drag blocks (22).

L-2.8.6) Install drag block body assembly onto rubber mandrel (11). Screw drag block body (18) into lower slip body (26).

L-2.8.7) Screw set screws (27) into lower slip body (26). Release drag blocks.

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

L-2.10) Screw J-body (20) into drag block body (18): (**NOTE6:** Right-hand threads)

L-2.11) Screw set screws (27) into drag block body (18).

L-2.12) Install o-ring (28) in groove in J-pin bottom sub (23).

L-2.13) Screw J-pin bottom sub (23) onto inner mandrel (2).

NOTE3: Drag block body assembly must be free to rotate.

CAUTION7: Do not rip or tear o-ring during installation.



Fig. 5

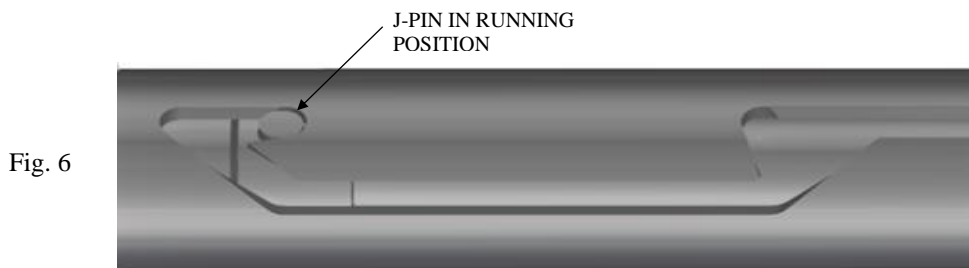


Fig. 6

L-2.14) Position J-pin of J-pin bottom sub (23) in running position in J-slot of J-body (20) (Fig. 6).

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



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M) PARTS LIST

ITEM	QTY	DESCRIPTION	MATERIAL	P/N 60325-3E
1	1	TOP SUB	DLMS80	60125610
2	1	INNER MANDREL	DLMS110	60325210DB
3	8	DRAG BLOCK SPRING	OIL TEMPERED STEEL	60335990
4	1	COMPRESSION SPRING	DLMCRSP	60325920
5	1	SPRING CAGE	DLMS60	60125310
6	1	UPPER SLIP BODY	DLMS60	60325320
7	1	RELEASING SLIP	DLMS110	60325125
8	2	UPPER SLIP	DLMS60	60325115
9	1	UPPER CONE	DLMS60	60325410
10	1	CENTER COUPLING	DLMS60	60325620-3E
11	1	RUBBER MANDREL	DLMS80	60325220DB
12	2	RUBBER SPACER	DLMS80	60225840-3E
13	1	ELEMENT	70 DURO NITRILE	60225511-3E
14	2	ELEMENT	90 DURO NITRILE	60225513-3E
15	1	RUBBER RETAINER	DLMS60	60225850-3E
16	1	LOWER CONE	DLMS60	60325420
17	4	LOWER SLIP	DLMS60	60325135
18	1	DRAG BLOCK BODY	DLMS60	60325335
19	1	RUBBER MANDREL CAP	DLMS60	60125230
20	1	J-BODY	DLMS110	60125340
21	1	DRAG BLOCK RETAINER	DLMS60	60325910
22	4	DRAG BLOCK	DLMSDB8	9028900
23	1	J-PIN BOTTOM SUB	DLMS110	60325630
24	1	VALVE (MOLDED RUBBER TYPE)	90 DURO NITRILE	60325520M
25	7	SLIP SPRING	DLMCRSP	41225920
26	1	LOWER SLIP BODY	DLMS110	60325351
27	5	SOCKET SET SCREW 1/4-20 UNC X 1/4	STEEL	SSS025C025
28	1	120 O-RING	90 DURO NITRILE	90120
29	1	123 O-RING	90 DURO NITRILE	90123
30	1	223 O-RING	90 DURO NITRILE	90223
31	1	129 O-RING	90 DURO NITRILE	90129

REDRESS KIT (RDK)	60325050-3E
ASSEMBLED WEIGHT	32 LBS



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M) PARTS LIST (cont'd)

M-1) ELASTOMER TRIM OPTIONS

NOTE₂: For temperature range, refer to Elastomer Trim Temperature Guide.

M-1.1) HSN

ITEM	QTY	DESCRIPTION	MATERIAL	P/N 60325H-3E
13	1	ELEMENT	70 DURO HSN	60225511H-3E
14	2	ELEMENT	90 DURO HSN	60225513H-3E
24	1	VALVE (MOLDED RUBBER TYPE)	90 DURO HSN	60325520MH
28	1	120 O-RING	90 DURO HSN	90120H
29	1	123 O-RING	90 DURO HSN	90123H
30	1	223 O-RING	90 DURO HSN	90223H
31	1	129 O-RING	90 DURO HSN	90129H

REDRESS KIT (RDK)		60325050H-3E
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M-1.2) VITON

ITEM	QTY	DESCRIPTION	MATERIAL	P/N 60325V-3E
13	1	ELEMENT	70 DURO VITON	60225511V-3E
14	2	ELEMENT	90 DURO VITON	60225513V-3E
24	1	VALVE (MOLDED RUBBER TYPE)	90 DURO VITON	60325520MV
28	1	120 O-RING	90 DURO VITON	90120V
29	1	123 O-RING	90 DURO VITON	90123V
30	1	223 O-RING	90 DURO VITON	90223V
31	1	129 O-RING	90 DURO VITON	90129V

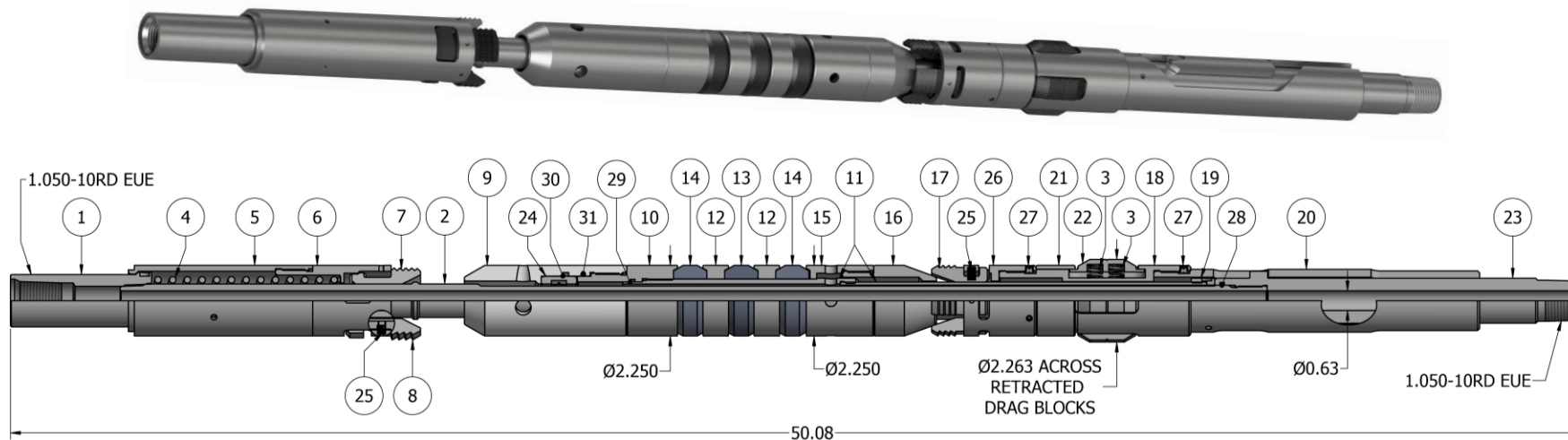
REDRESS KIT (RDK)		60325050V-3E
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M-2) CARBIDE OPTIONS

ITEM	QTY	DESCRIPTION	MATERIAL	P/N 60325C-3E
8	2	CARBIDE UPPER SLIP	DLMS60	60325115C
17	4	CARBIDE LOWER SLIP	DLMS60	60325135C
22	4	CARBIDE DRAG BLOCK	DLMSDB8	9028900C

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N) TECHNICAL ILLUSTRATION



O) REVISION HISTORY

DATE	REVISION	DESCRIPTION OF CHANGES	REVISED BY	APPROVED BY
02/10/2021	D	Revised 60125610 was 60325610, 60125310 was 60325310, 60125230 was 60325230, 60125340 was 60325340DB	J.Anderson	E.Visaez
02/06/2020	C	Revise Elastomer Trim Temp. Guide nitrile, Assembly and Disassembly, Technical Illustration; Added P/N 90129	J.Anderson	N.Banker
06/14/2016	B	Added Related Tools, General Screw Torque Recommendations; Revised Elastomer Trim Temperature Guide HSN and Nitrile temperature ranges, Pressure Affected Area Guide example, P/N 60335990 was 9102900	J.Anderson	C.Colvin
09/23/14	A	Created a new tech manual.	-	-