A) DESCRIPTION

The Model "H" Hydraulic Setting Assembly (HST) is a hydraulic setting tool designed for setting packers and plugs without pipe manipulations in deep, high-temperature wells. It is used to set packers and plugs that are normally set with a Model "E-4" Wireline Pressure Setting Assembly (or similar wireline setting equipment). The same adapter kit that is used on wireline can be used with the Model "H" HST.

The Model "H" HST and packer (or plug) is run in on the tubing to the desired setting depth and a ball is dropped to the HST. Pressure is applied to close the fill ports, which also opens the setting pistons to pressure. As pressure is applied, force is transmitted to the packer (or plug) to set. Tubing tension can also be applied to supplement the setting force generated by the pressure applied.

The standard setting tool comes with three pistons, but additional pistons can be added to reduce setting pressure.

Features include:

- The primary feature of the D&L Model "H" Hydraulic Setting Assembly is that it permits setting on tubing equipment, which could previously be set only with wireline setting tools. This is particularly advantageous in high angle or deviated wells where wireline setting is extremely difficult.
- Premature setting is prevented by means of a shear screw in the cross link sleeve.
- The tubing fills automatically as it is run in the hole through a ported top sub in the setting assembly. These ports also permit circulation through the setting assembly at any time.

B) SPECIFICATION GUIDE

SIZE (INCHES)	TOOL PRESSURE (MAX PSI)	PULL (MAX LBS)	TOOL OD (INCHES)	EFFECTIVE PISTON AREA (IN^2)	CONNECTION TOP BOTTOM (BAKER E-4)	PART NUMBER
#05	11,000	30,829	1.718	2.54	1.315 EUE / SIZE 05	39105 39105H[1] 39105V[2]
						39105-1 39105H-1[1] 39105V-1[2]

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

NOTE1: Replace temporary steel set screw used for shipping with brass shear screw before running.

C) 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.

C) 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 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 o-rings, shear screws, etc. Contact D&L sales for redress kit and/or other replacement part information.

D) OPERATION PROCEDURES

The Model "H" Hydraulic Setting Assembly uses the same wireline adapter kit (WLAK) used with the Baker wireline pressure setting assembly. To set packer or plug with the hydraulic setting tool, make up the hydraulic setting tool to the WLAK and the packer or plug. Run the pressure setting assembly downhole on tubing to the desired setting depth.

With the pressure setting assembly at the desired setting depth, pump the setting ball down the tubing to its seat in the support sleeve of the hydraulic setting tool. Apply a minimum of 1,165 psi per screw to shear the shear screws in the support sleeve and close off the top sub ports.

Continue to hold a minimum of 800 psi to force the pistons and cross link sleeve downward. The setting mandrel remains stationary while the cross link sleeve forces the WLAK and the packer or plug body downward. The resulting squeeze action applied to the packer or plug forces the slips to set and the elements to pack off. Apply tension and/or pump pressure to complete setting of the packer or plug and releasing of the pressure setting assembly.

Pick up on the work string to remove the hydraulic setting assembly from the well. As the pistons move downwards, cylinder ports open to allow the fluid in the tubing to unload.

E) APPLIED FORCE WITH PRESSURE

PRESSURE (PSI)	**FORCE (LBS) w/2 PISTONS** (Total Area = 2.54 in^2)
1,000	2,540
2,000	5,080
3,000	7,620
4,000	10,160
5,000	12,700
6,000	15,240

CAUTION[2]: Some packers may not be energized by mechanical pull after slips are set. It is your responsibility to identify these packers and set with pressure only.

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. 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) ELASTOMER TRIM TEMPERATURE GUIDE

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

H) 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
- STRAP WRENCH
- 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

I) DISASSEMBLY

I-1) Clamp cross link sleeve (6) in vise.

I-1.1) Unscrew and remove top sub assembly from top upper cylinder (4) and disassemble;

I-1.1.1) Remove ball (12) from top sub (1).

I-1.1.2) Remove o-ring (20) from top sub (1).

I-1.1.3) Unscrew and remove stop (3) from top sub (1).

I-1.1.4) Unscrew and remove shear screws (16) from top sub (1).

I-1.1.5) Remove support sleeve (2) from top sub (1).

I-1.1.5.1) Remove o-rings (17, 18) from support sleeve (2).

I-1.2) Unscrew and remove top upper cylinder assembly from cylinder connector (14) and disassemble:

I-1.2.1) Remove upper piston (13) from upper cylinder (4).

I-1.2.1.1) Remove o-ring (21) from upper piston (13).

I-1.3) Unscrew and remove cylinder connector (14) from lower upper cylinder (4).

I-1.3.1) Remove o-rings (19, 20) from cylinder connector (14).

I-1.4) Unscrew and remove lower upper cylinder (4) from cylinder head (5).

I-1.4.1) Remove lower piston (7) from lower upper cylinder (4).

I-1.4.1.1) Remove o-ring (21) from lower piston (7).

I) DISASSEMBLY (cont'd)

I-1.5) Unscrew and remove cylinder head (5) from setting mandrel (9).

I-1.6) Unscrew and remove cap screw (15) from cross link sleeve (6).

I-1.7) Remove cross ring (11) from cross link sleeve (6).

I-1.8) Remove cross link (10) from slots in cross link sleeve (6), piston rod (8), and setting mandrel (9).

I-1.9) Remove piston rod (8) from setting mandrel (9).

I-1.10) Unscrew and remove shear screws (16) from cross link sleeve (6).

I-1.11) Remove setting mandrel (9) from cross link sleeve (6).

I-2) Unclamp and remove cross link sleeve (6) from vise.

J) ASSEMBLY

NOTE3: Clean and inspect all parts. Replace all worn and damaged parts. Install parts in proper order, and orientation and tighten/torque all connections properly.

CAUTION3: To ensure tool operates properly, install o-rings in o-ring grooves **NOT** thread reliefs (Fig. 2).

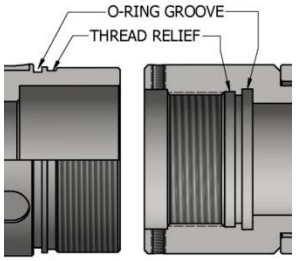


Fig. 2

J-1) Clamp cross link sleeve (6) in vise.

J-1.1) Install setting mandrel (9) into cross link sleeve (6). Align pocket holes in setting mandrel with lower set of threaded holes in cross link sleeve.

J-1.2) TEMPORARILY screw a long 1/4-20 UNC steel bolt into cross link sleeve (6) allowing further assembly without damaging shear screw.

J-1.3) Install piston rod (8) into setting mandrel (9). Align slot in piston rod with slots in setting mandrel (9) and cross link sleeve (6).

J-1.4) Install cross link (10) through aligned slots linking cross link sleeve (6), piston rod (8), and setting mandrel (9) together.

J-1.5) Install cross ring (11) onto cross link sleeve (6). Align holes in cross ring with threaded holes in cross link sleeve.

J-1.6) Screw cap screw (15) into cross link sleeve (6).

J-1.7) Screw cylinder head (5) onto setting mandrel (9).

J-1.8) Install o-ring (21) in o-ring groove in lower piston (7).

J-1.9) Install lower piston (7) onto piston rod (8).

J-1.10) Install lower upper cylinder (4) onto piston rod (8) and screw onto cylinder head (5).

CAUTION4: Do not rip or tear o-ring during installation.

J-1.11) Install o-rings (19, 20) in o-ring grooves in cylinder connector (14).

J-1.12) Screw cylinder connector (14) into upper cylinder (4).

CAUTION4: Do not rip or tear o-ring during installation.

J-1.13) Install o-ring (21) in o-ring groove in upper piston (13).

J-1.14) Install upper piston (13) into cylinder connector (14) and into lower piston (7).

CAUTION4: Do not rip or tear o-ring during installation.

J-1.15) Install upper cylinder (4) onto upper piston (13) and screw onto cylinder connector (14).

CAUTION4: Do not rip or tear o-ring during installation.

J) ASSEMBLY (cont'd)

J-1.16) Assemble top sub assembly and install:

J-1.16.1) Install o-ring (20) in o-ring groove in top sub (1).

J-1.16.2) Install o-rings (17, 18) in o-ring grooves in support sleeve (2).

J-1.16.3) Install support sleeve (2) into top sub (1). Align groove at upper end of support sleeve (2) aligns with threaded hole in top sub (1).

J-1.16.4) Screw shear screws (16) into top sub (1). Tighten until shear screws make contact with mandrel support sleeve (2). Back shear screws out 1/4 turn.

J-1.16.5) Screw stop (3) into lower end of top sub (1).

J-1.16.6) Screw top sub (1) into upper cylinder (4.)

CAUTION$_4$: Do not rip or tear o-ring during installation.

J-1.17) Unscrew and remove temporary long 1/4-20 UNC steel bolt from cross link sleeve (6).

CAUTION$_5$: Failing to remove temporary long 1/4-20 UNC steel bolt will cause the tool to malfunction.

J-1.18) Screw shear screws (16) into cross link sleeve (6). Tighten until shear screws make contact with setting mandrel (9). Back shear screws out 1/4 turn.

J-2) Unclamp cross link sleeve (6) from vise and remove assembled tool.

J-3) The tool is ready to take to location. Remember to take the correct size setting ball.

K) PARTS LIST

ITEM	QTY	DESCRIPTION	MATERIAL	P/N 39105	P/N 39105-1
1	1	TOP SUB	DLMS110	39105101	
2	1	SUPPORT SLEEVE	DLMS110	39105103	39105103-375
3	1	STOP	DLMS110	39105102	
4	2	UPPER CYLINDER	DLMS110	39105104	
5	1	CYLINDER HEAD	DLMS110	39105106	
6	1	CROSS LINK SLEEVE	DLMS110	39105108	
7	1	LOWER PISTON	DLMS110	39105113	
8	1	PISTON ROD	DLMS110	39105112	
9	1	SETTING MANDREL	DLMS110	39105109	
10	1	CROSS LINK	DLMS110	39105111	
11	1	CROSS RING	DLMS110	39105110	
12	1	STEEL BALL	STEEL	SB0750 (3/4")	SB0375 (3/8")
13	1	UPPER PISTON	DLMS110	39105105	
14	1	CYLINDER CONNECTOR	DLMS110	39105107	
15	1	LOW HEAD CAP SCREW #10-24 UNC X 3/16	STEEL	LHSC1024C018	
16	3	SHEAR SCREW (700#) #10-24 UNC X 3/8	DLM360BRS	BSSSLT1024C037	
17	1	114 O-RING	90 DURO NITRILE	90114	

K) PARTS LIST (cont'd)

ITEM	QTY	DESCRIPTION	MATERIAL	P/N 39105	P/N 39105-1
18	2	115 O-RING	90 DURO NITRILE	90115	
19	1	116 O-RING	90 DURO NITRILE	90116	
20	2	123 O-RING	90 DURO NITRILE	90123	
21	2	216 O-RING	90 DURO NITRILE	90216	

REDRESS KIT (RDK)		39105050	39105050-1
ASSEMBLED WEIGHT		19 LBS	19 LBS

K-1) ELASTOMER TRIM OPTIONS

NOTE5: For temperature range, refer to Elastomer Trim Temperature Guide.

K-1.1) HSN

ITEM	QTY	DESCRIPTION	MATERIAL	P/N 39105H	P/N 39105H-1
17	1	114 O-RING	90 DURO HSN	90114H	
18	2	115 O-RING	90 DURO HSN	90115H	
19	1	116 O-RING	90 DURO HSN	90116H	
20	2	123 O-RING	90 DURO HSN	90123H	
21	2	216 O-RING	90 DURO HSN	90216H	

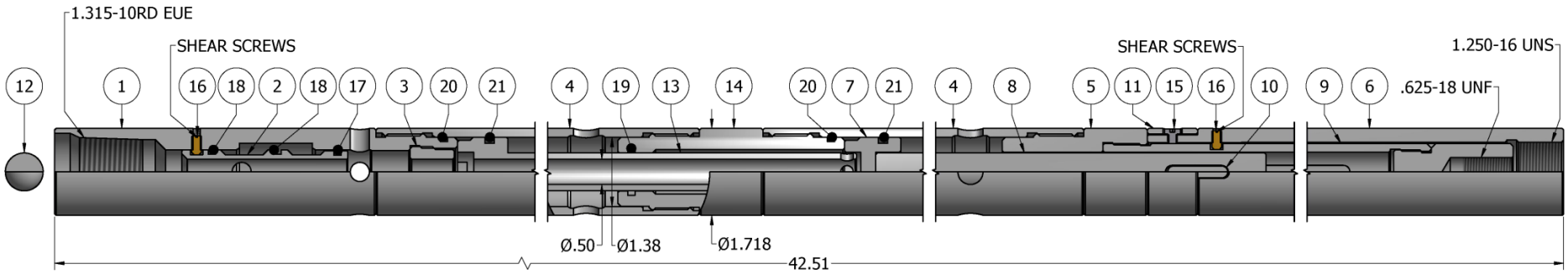
REDRESS KIT (RDK)		39105050H	39105050H-1

K-1.2) VITON

ITEM	QTY	DESCRIPTION	MATERIAL	P/N 39105V	P/N 39105V-1
17	1	114 O-RING	90 DURO VITON	90114V	
18	2	115 O-RING	90 DURO VITON	90115V	
19	1	116 O-RING	90 DURO VITON	90116V	
20	2	123 O-RING	90 DURO VITON	90123V	
21	2	216 O-RING	90 DURO VITON	90216V	

REDRESS KIT (RDK)		39105050V	39105050V-1

L) TECHNICAL ILLUSTRATION



M) REVISION HISTORY

DATE	REVISION	DESCRIPTION OF CHANGES	REVISED BY	APPROVED BY
08/15/2022	D	Revised P/N SB0750 was SB075	J.Anderson	D.McKeon
05/14/2020	C	Revised Nitrile temp. rating, P/N BSSSLT1024C037 shear rating 700 was 7,000	J.Anderson	E.Visaez
05/18/2016	B	Revised Operating Procedures, Elastomer Trim Temperature Guide Nitrile was 70-300°F and HSN was 70-325°F; Added General Screw Torque Recommendations	J.Anderson	C.Colvin
06/23/2015	A	Created new manual	-	-