

***HASKEL***

***TECHNICAL***

***DSF***

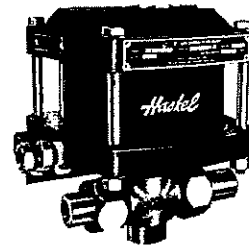
***PARTS LIST***

# Haskel

## Technical Specifications & Performance Data

# 1.5, 2 & 2.2 HP LIQUID PUMPS

## A, H & XH SERIES



### INTRODUCTION

This brochure should be read in conjunction with Catalog MLP-46 and the assembly drawings when supplied as part of the O/M manual with a pump.

### INSTALLATION

The Haskel pump can be mounted in any position and should be secured to a firm base using the mounting bracket(s), alternatively a bottom entry hydraulic inlet can be directly mounted to a tank top. All models however, where the series code starts with a "D", (denoting distance piece, e.g. DF-35, DXHF-903) should be mounted horizontally whenever possible so that any leakage from the hydraulic section will not migrate to the air section. Do not pipe vent port back to fluid source.

### AIR DRIVE SYSTEM

Other gases such as Nitrogen, CO<sub>2</sub>, Natural Gas - even Sour Gas can be used as alternatives to compressed air when properly modified.

The air drive requires a minimum pressure of 25 psi (1.72 bar) to actuate the air cycling valve spool. The maximum air drive pressure is 150 psi\* (10 bar). It is not necessary or desirable to use an air line lubricator. The air drive section of all Haskel liquid pumps are prelubricated at the time of assembly with Haskel lubricant 28442. The air drive requires no other means of lubrication. Install an air line filter and pressure regulator with a minimum of 1/2" npt port size. Also review air system upstream and eliminate any restrictions to provide 1/2" minimum inside diameter. Install a shut-off/speed control valve 1/2" npt at pump inlet port. Install one 1/2" npt exhaust muffler, p/n 21701, to the exhaust port in the bottom cap to suppress the noise and prevent entry of contamination into the air valve assembly. See bottom of page 10 "Air Controls" in MLP-46 Catalog for typical layout. The A, H and XH series includes pumps with double and triple air heads as well as the standard single air head. Extra air heads are used to increase the intensification ratio without any loss of flow rate. A double air head is identified by a 2 as the last digit in the ratio number and a triple air head by a 3, e.g. HF-202, DSXHF-903.

\* 100 psi max. on -1.5, -683, -903 and -1373 models.

### HYDRAULIC SYSTEM

See pages 2 & 7 of this data catalog for fluid inlet/outlet port sizes.

**Note:** Inlet fluid supply piping should not be less and ideally greater than 1/2" npt for -4, -25, -35, -60, -100, -150, -52, -72, -122, 151, -225, -300, -450, -202, -302, -452, -602, -683, -903, -1373, and 1" npt for -1.5, -10, -15, -22, -32.

**CAUTION: HIGH PRESSURE LIQUID CAN BE DANGEROUS IF IMPROPERLY HANDLED.**

Restricting the fluid supply will result in lower outlet flow rates and can cause pump to cavitate.

Larger internal diameter piping should be used with heavy fluids or if suction head is over 2 feet. The piping may be somewhat smaller if the inlet is supercharged.

**Caution:** Do not loosen liquid inlet or outlet fittings of pump to facilitate make up of connections. These fittings must be tight to avoid leakage or damage. A suction filter must be installed in the liquid inlet line. 100 x 100 mesh is normally ample to protect the pump seals and check valves.

### PRIMING

Install a valve of suitable working pressure at the pump outlet or locate a high pressure fitting that is capable of being used as an air bleed at start up. Open air control valve slowly. Allow pump to cycle for approximately 15 seconds, pumping fluid out the valve or loosened fitting. When adequately primed close the valve or fitting. The pump will cycle slower and then stall due to increase in output resistance. If the pump does not stall, repeat procedure.

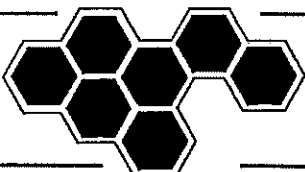
Reliability of the XH models (-452 thru -1373) will be improved with an air driven supercharge pump, not only to simplify priming but to reduce fatigue stresses. The higher the supercharge, the better the results. Also install a relief valve to protect the lower pressure pump from potential back pressure. Supercharging of the -1373 model is recommended for all applications.

### OPERATION

The pump model number indicates the ratio between the area of air piston and the liquid piston. See page 3 "Principle of Operation" in the MLP-46 catalog.

The liquid outlet pressure can be controlled quite accurately by regulating the air drive pressure. The pump will cycle rapidly initially and as it approaches an output pressure equal to the ratio times the air drive pressure, it will gradually slow down and finally "stall".

Where it is necessary to obtain maximum outlet flow rates up to a predetermined pressure, a Haskel Air Pilot Switch should be installed at the pump outlet to automatically stop the pump at the required pressure. The airline regulator should be set at 150 psi (10 bar) for all models except for ratios -15, -683, -903 and -1373, which should be set at 100 psi (7 bar). A Haskel relief valve to prevent over pressurization should also be fitted as a safety precaution. See top of page 17 "Air Pilot Switch" and "Regulating Relief Valves" of MLP-46 catalog.



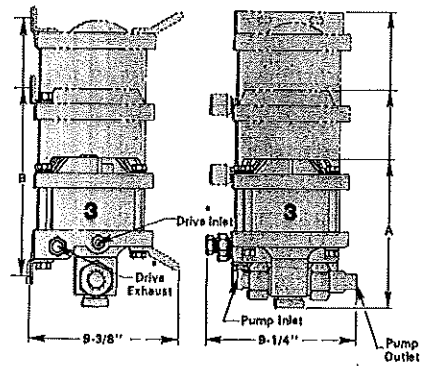
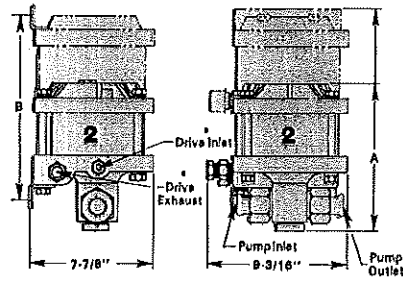
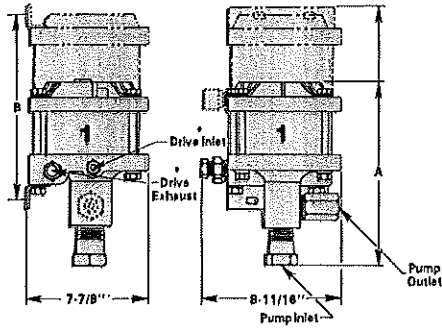
*Our products are backed by outstanding technical support, an excellent reputation for reliability, and world-wide distribution.*

# DIMENSIONAL ILLUSTRATIONS

## 1.5 & 2 HP LOW RATIO PUMPS

## 1.5 & 2 HP MEDIUM RATIO PUMPS

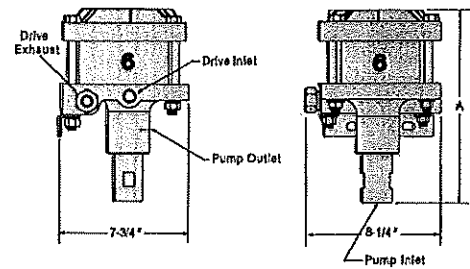
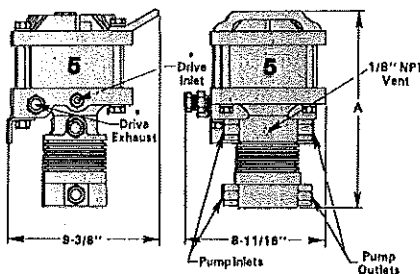
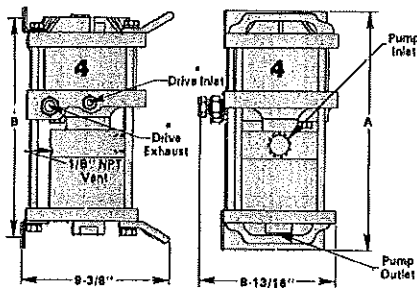
## 1.5 & 2 HP HIGH RATIO PUMPS



**DSTV-1.5 PUMP**  
SINGLE ACTING—HIGH OUTPUT

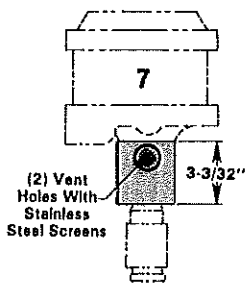
**ATV-4 PUMP**  
DOUBLE ACTING—HIGH OUTPUT

**AFD or ASFD - B60 PUMP**  
DOUBLE ACTING—HIGH OUTPUT



For interconnecting inlet and outlet port tubing, see 27964 modification page 11 — MLP-46.

## DISTANCE PIECE (SEPARATION)



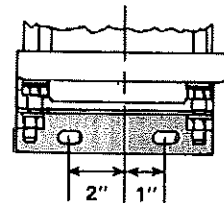
Pumps with prefix "D" in the model number have aluminum Distance Piece between the air drive and the pump section (except DSTV-1.5).

Vent holes can be threaded 1/2" NPT female at extra cost. Specify modification number 28000.

Horizontal mounting is recommended for non exchange of contaminants.

## MOUNTING BRACKETS

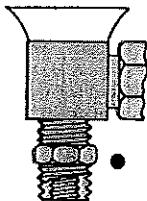
ALL SERIES



All mounting brackets have 7/16" holes (slots) for 3/8" bolts. Upper mounting bracket not furnished as standard on single air head non-distance piece units. See page 15 - MLP-46 catalog

## OPTIONAL PUMP INLETS FOR TANK MOUNTING

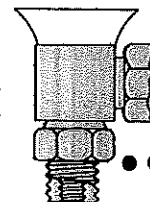
**RATIO SERIES**  
-B10, B-15  
-B22, -B32



Inlet externally threaded 1-1/4" NPT male, internally threaded 1" NPT female. To specify add "R" between "B" and the ratio number.

e.g. AW-BR10

**RATIO SERIES**  
-25 thru -903



Inlet on the bottom and externally threaded 1" NPT male, internally threaded 1/2" NPT female. To specify add "B" before the ratio number.

e.g. AW-B150 e.g. DXHW-B683

\*Drive Inlet and exhaust are 1/2 NPT female. Drive Inlet also includes a 1/2 NPT male x 1/2 NPSM female (straight pipe thread) swivel adapter. (Connecting male nipple should include 30° inside bevel for proper fit).

# DIMENSIONAL SPECIFICATIONS

ILLUSTR.	RATIO SERIES	PUMP INLET	OPTIONAL PUMP INLET	PUMP OUTLET	AIR HEAD(S)	DIMENSIONS		TARE WEIGHT APPROX.
						A	B	
1	-B10, -B15	Bottom 1" NPT	●	1/2" NPT	Single	12-3/8"	N/A	24 lbs.
	-B22, -B32	Bottom 1" NPT	●	1/2" NPT	Double	16-5/8"	11-1/4"	27 lbs.
2	-25, -35, -60, -100, -150	Side 1/2" NPT	● ●	1/2" NPT	Single	9-1/8"	N/A	25 lbs.
	-52, -72, -122	Side 1/2" NPT	● ●	1/2" NPT	Double	13-7/8"	11-1/4"	30 lbs.
3	-151, -225, -300, -450	Side 1/2" NPT	● ●	1/4" Superpressure	Single	9-1/8"	N/A	24 lbs.
	-202, -302, -452, -602	Side 1/2" NPT	● ●	1/4" Superpressure	Double	13-7/8"	11-1/4"	29 lbs.
	-683, 903	Side 1/2" NPT	● ●	1/4" Superpressure	Triple	*21-3/4"	15-1/4"	34 lbs.
	-1373	Side 1/2" NPT	N/A	**1/4" Superpressure	Triple	*21-3/4"	15-1/4"	34 lbs.
4	DSTV-1.5	Side 1" NPT	N/A	3/4" NPT	Single	14-5/8"	13-9/16"	30 lbs.
5	ATV-4	Side 1/2" NPT (2 ea.)	N/A	1/2" NPT (2 ea.)	Single	12-1/8"	N/A	25 lbs.
6	-D-B60	Bottom 1/2" NPT	N/A	3/8" NPT	Single	11-1/2"	N/A	20 lbs.

\*Illustration 7 — Distance piece is standard accessory for triple air head models. Therefore, dimension A includes distance piece. Also, carrying handles and upper mounting bracket are standard for triple air head models.

\*\*Adapters included for 3/8" and 5/16" Superpressure tubing.

## MAINTENANCE

Disconnect pump from system and remove to a clean, well lit work bench with access to vice, tools, seal kits and spares. All parts removed for inspection should be washed in a suitable de-greasing agent such as Stoddard solvent or equivalent. Inspect all moving parts for wear or scratches. Damaged parts should be replaced. It is recommended that all seals and 'O' rings are replaced. Specially packed seal kits are available for:

Air Drive	p/n 16772 (single air head)
Air Drive	p/n 28611 (double air head)
Air Drive	p/n 28612 (triple air head)
Air Cycling Valve	p/n 16771
Distance Piece	p/n 17327

See separate parts list drawings for individual hydraulic seal kit part numbers.

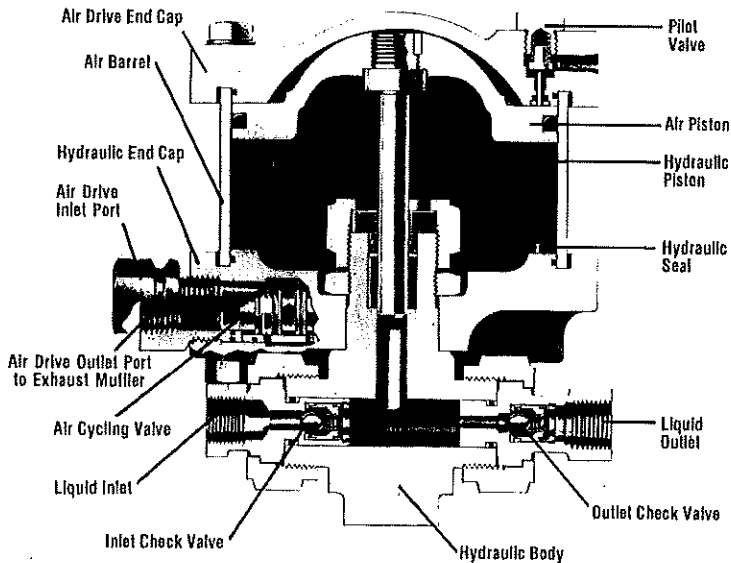


FIGURE 1 CROSS SECTION OF 1.5 hp AW PUMP

## TROUBLE SHOOTING GUIDE AIR DRIVE SECTION

1. Pump will not cycle and air exhausts continuously from muffler (see fig. 4 page 8).

- Remove air exhaust muffler and fitting located in the end cap. Pull out spool. Change all 'O' rings. Re-lubricate sleeve, spool and 'O' rings with Haskel Silicone Grease p/n 28442 and re-assemble. Retest before further disassembly.
- If 'O' rings swollen—(probably due to Phosphate Ester in air compressor lubricant) replace with 568017-7 'O' rings.
- Increase pipeline size so that pump sees required air pressure and flow.

2. Pump will not cycle and air exhausts continuously from pilot vent.

- Check air cycling valve as in paragraph 1 and replace the pilot stem(s) and seals as detailed below.

3. False cycling — If pump will not cycle properly, the following test procedure will determine which of the two pilot valves is faulty.

- Install a 160 psi pressure gauge to show pilot pressure at the 1/8" npt port in upper cap (plug 17568-2) or the 1/2" npt port in lower cap (plug 17568-5).
- Apply air pressure to the air drive inlet to cycle pump against a load. Gauge will read zero pressure if lower pilot valve has not been actuated. Gauge will read full drive pressure after lower valve is actuated and before upper pilot valve has been actuated. (drive is on pull stroke). Therefore, correct pilot valve action will cause gauge to sharply rise and fall from zero to drive pressure as pump cycles. During the "push" stroke, slow increase in gauge reading indicates leakage past lower pilot valve seat. On the "pull" stroke, slow decrease in pressure indicates upper valve seat or pilot tube end seals are faulty and repair is necessary. Check also for external air leaks at plugs.

Remove faulty pilot stem for inspection and replacement of any damaged component as follows:

- Remove plugs p/n 16510 (one in each end cap).
- Remove springs and 27375 pilot stems (figure 2).
- Inspect valve stem and seat. Replace if bent or damaged.

Note: To replace the stem 'O' ring seals requires access from inside the air section. If replacement is required, care must be taken in installing the Tru-Arc retainer for the seal and back-up concentrically. As shown in figure 3, use the 27375 pilot stem valve as seating tool. Place the rubber valve face against the retainer and tap the top of the valve lightly to evenly bend the legs of the retainer.

Note: DO NOT re-use retainer p/n 5005-31H.

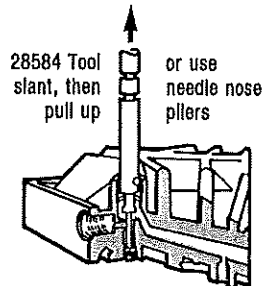
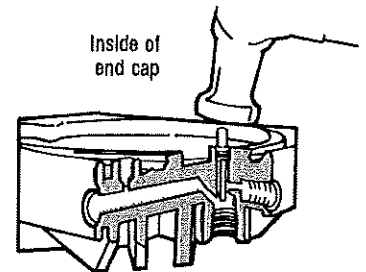


FIGURE 2



Seating the retainer FIGURE 3

### Spool Extractor, Air Cycling Valve Assembly, P/N 28584:

A pin is located on one end of the tool for hooking the spool or sleeve and extracting them from the air valve housing. If the sleeve is stuck, grooves in the center of the tool are provided as leverage points for prying. At other end, bumper hook is used by inserting into center of bumper to pull it straight out of housing.

## EXPLODED VIEW OF AIR CYCLING VALVE MECHANISM

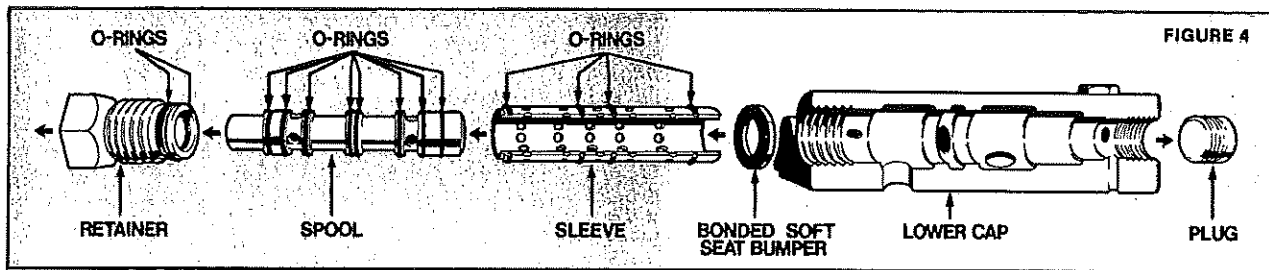


FIGURE 4

### TROUBLE SHOOTING GUIDE (continued from page 7) HYDRAULIC SECTION

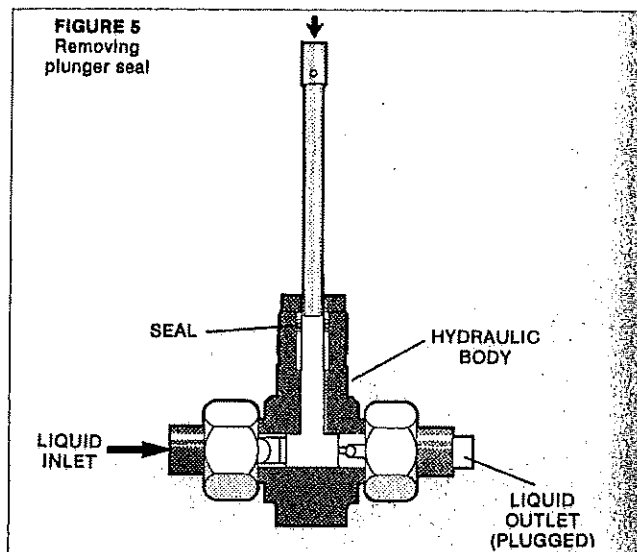
1. Pump cycles but will not pump.
  - See page 1 section on priming.
  - Inspect inlet check valve parts for contamination or damage.
2. Pump will not stall.
  - Inspect inlet check valve parts. Repair as required per instructions below.
- \*3. Outlet pressure drops during suction stroke.
  - Inspect outlet check valve parts. Repair as follows: Haskel check valves use either an internal snap ring to secure the retainer or stepped bore construction. With either of these. All parts may be disassembled for individual replacement as necessary. Metal seat models may be re-worked (if damage is not severe) with lapping tool rotated on the seat using a fine grade of lapping compound. After replacement of soft seat type checks, pump should be pressurized to approximately 2,000 psi (140 bar) to seat the check valves.  
**Note:** Repair of the check valves can be simplified by using the special tool for P/N 29370 for 1/2" Semi Soft Seat Ball Check Valves. This rod sleeve assembly can be used to assemble or disassemble these check valves. To disassemble, depress the retaining ring in the check with the inner rod or tool. Then slide the sleeve down to force the retaining ring out of the fitting body groove and into the recess of the tool. Extract the tool, and other components of the check valve are free for removal. To assemble, follow the procedure in reverse.



- \*4. Pumped fluid appears at muffler (or distance piece vent).  
 Replace high pressure seals as follows:  
 (a) Hydraulic pressure within the pump body is the most convenient method to remove a small plunger seal. (However, if large enough, simply remove by inserting finger into I.D. of parts after withdrawing plunger). Hydraulic pressure may be generated mechanically by tapping top end of plunger (or air piston assembly on non-distance piece models) with soft mallet, after removing gland nut or distance piece and filling pump body with light fluid and plugging outlet port. (See figure 5).

(b) To install new gland parts, lightly coat with lubricant (if compatible with fluid) and insert in cavity in order detailed on parts/assembly drawing. Leave gland nut loose.  
 (c) Carefully insert plunger through gland parts before tightening gland nut or tie rods (depending on model).  
 (d) Reassemble pump body and air drive as shown on parts/assembly drawing.

When reassembling single and double air head pumps torque tie bolt nuts evenly to 16—18 ft. lbs. Triple air head pumps should be torqued to 25 ft. lbs.  
**Note:** Some models have components wired together with .032" stainless steel wire. Replace with new wire when reassembling.  
 When ordering spare parts advise pump serial number, model, spare part number and description.



\*This data applies specifically to single acting models -10 thru -903. For high output, double acting or model -1373, see details on individual assembly drawings furnished with pump.

### LIMITED WARRANTY

Haskel manufactured products are warranted free of original defects in material and workmanship for a period of one year from date of shipment to first user. This warranty does not include packing, seals, nor failures caused by lack of proper maintenance, incompatible fluids, foreign materials in the driving media, in the pumped media, or application of pressures beyond catalog ratings. Products believed to be originally defective may be returned, freight prepaid, for repair and/or replacement to the distributor, authorized service representative, or to the factory. If upon inspection by the factory or authorized service representative, the problem is found to be originally defective material or workmanship, repair or replacement will be made at no charge for labor or materials, F.O.B. the point of repair or replacement. Permission to return under warranty should be requested before shipment and include the following: the original purchase date, purchase order number, serial number, model number, or other pertinent data to establish warranty claim, and to expedite the return or replacement to the owner.

If pump has been disassembled and reassembled in a facility other than Haskel, warranty is void if it has been improperly reassembled or substitute parts have been used in place of factory manufactured parts.

Any modification to any Haskel product which you have made or may make in the future has been and will be at your sole risk and responsibility, and without Haskel's approval or consent. Haskel disclaims any and all liability, obligation, or responsibility for the modified product; and for any claims, demands, or causes of action for damage or personal injuries resulting from the modification and/or use of such a modified Haskel product.

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## Jim Wright

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**From:** Neil Tate [neilt@pneumaticandhydraulic.com]  
**Sent:** Tuesday, June 03, 2008 9:45 AM  
**To:** jbw@hyd.com  
**Subject:** FW: O/M for DSF-150  
**Attachments:** MLP-25\_46 BROCHURE.pdf; AD-1DMHb.pdf; CV-Ma.pdf; PS-DSF date rev.pdf

*Neil Tate*

Office Manager  
Pneumatic and Hydraulic Co.  
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"Service Beyond Expectations"

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**From:** Speed, Ken HS [mailto:KSpeed@haskel.com]  
**Sent:** Monday, June 02, 2008 10:17 AM  
**To:** Neil Tate  
**Subject:** O/M for DSF-150

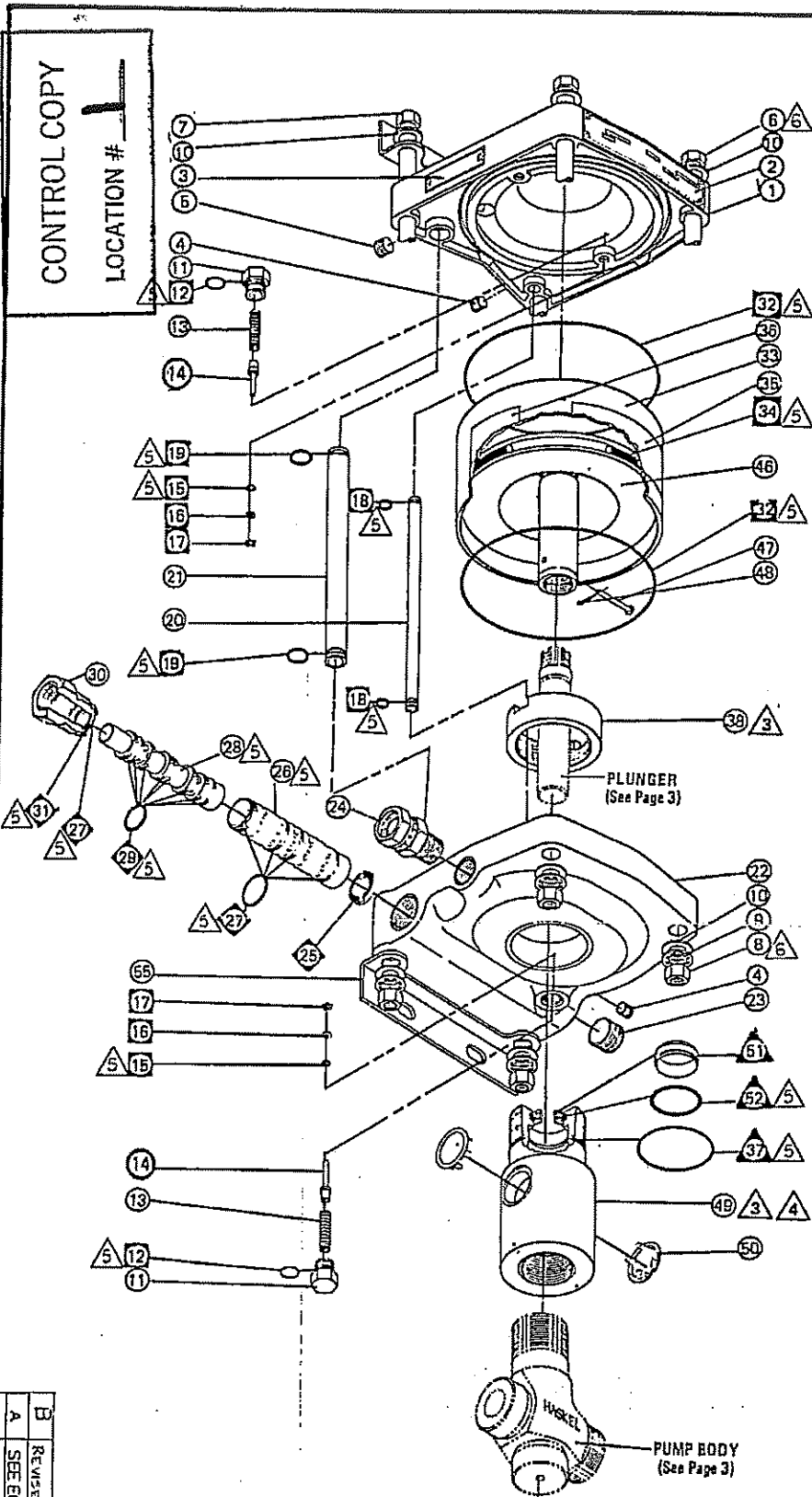
<<MLP-25\_46 BROCHURE.pdf>> <<AD-1DMHb.pdf>> <<CV-Ma.pdf>> <<PS-DSF date rev.pdf>>  
Here's the OM as requested. Sorry for the delay. Found my note.

Regards,

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Senior Applications Engineer  
Haskel International  
100 E. Graham Pl.  
Burbank, CA 91502  
Phone # 818-556-2552  
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CONTROL COPY

LOCATION # 1



ITEM NO.	PART DESCRIPTION	PART NO.	QTY./ ASSY.
* 1	UPPER CAP	28752	1
2	NAME PLATE	16574	1
* 3	NAME PLATE	28607	1
* 4	PLUG	17568-2	2
* 5	PLUG	17568-3	1
6	BOLT	17562-2	2
7	BOLT	17562-5	2
8	NUT	17995	4
9	LOCKWASHER	1724	4
10	WASHER	AN960-816	8
* 11	PLUG	16510	2
* 12	O-RING	568006-9	2
* 13	SPRING	16513	2
* 14	PILOT STEM	27376-3	2
* 15	O-RING	568006-2	2
* 16	SPACER	16517	2
* 17	RETAINER	5005-31H	2
18	O-RING	568010-2	2
19	O-RING	568014-2	2
20	PILOT TUBE	27077-2	1
21	FLOW TUBE	27078-2	1
** 22	LOWER CAP	16501-3	1
** 23	PLUG	17568-5	1
** 24	FITTING	61019-8S	1
** 25	SPACER	17524	1
** 26	SLEEVE	16548	1
** 27	O-RING	568020-2	5
** 28	SPOOL	16578	1
** 29	O-RING	568017-21	8
** 30	RETAINER	16649	1
** 31	O-RING	568015-21	1
32	O-RING	568050-2	2
33	BARREL	17339	1
34	O-RING	27272	1
35	DECAL, LUBE	17830	1
36	DECAL, PATENT	26817	1
37	O-RING	568035-2	1
38	EXTERNAL NUT	16615	1
46	PISTON ASSY.	17396	1
47	PIN	MS20392-1C37	1
48	COTTER PIN	MS24565-1012	1
49	DISTANCE PIECE	17386	1
50	VENT SCREEN	17849	2
51	BEARING SEAL	17209-18	1
52	O-RING	568218-2	1
55	MTG. BRACKET	17666	2

\* 16552, UPPER CAP ASSEM.  
 \*\* 16551-3, LOWER CAP ASSEM.

- ◇ 16771, SEALS KIT
- 16772, SEALS KIT
- △ 17327, SEALS KIT

- △ TORQUE TO 16-18 FT. LBS.
- △ RELUBE W/HASKEL LUBE P/N 28442
- △ THIS ITEM LOCKWIRED TO NUTS ON CHECK VALVE ASSEMBLY WITH .032 DIAMETER ST. STL. WIRE.
- △ THESE ITEMS ARE PERMANENTLY LOCITTED TOGETHER AT ASSEMBLY.
- 2. SEE PAGE 2 FOR PARTS INCLUDED IN INLET AND OUTLET CHECK VALVES.
- 1. SEE PAGE 3 FOR PACKING PUMP BODY AND PLUNGER.

NOTE:

		<b>HASKEL, INC.</b> 100 E. GRAHAM PLACE BURBANK, CALIFORNIA 91502 · U.S.A.	
		TITLE AIR DRIVE SECTION MEDIUM AND HIGH RATIOS W/DISTANCE PIECE	NO. AD-10MH
REV.	B	PAGE	1

# - PARTS LIST - AIR DRIVE SECTION

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BY			

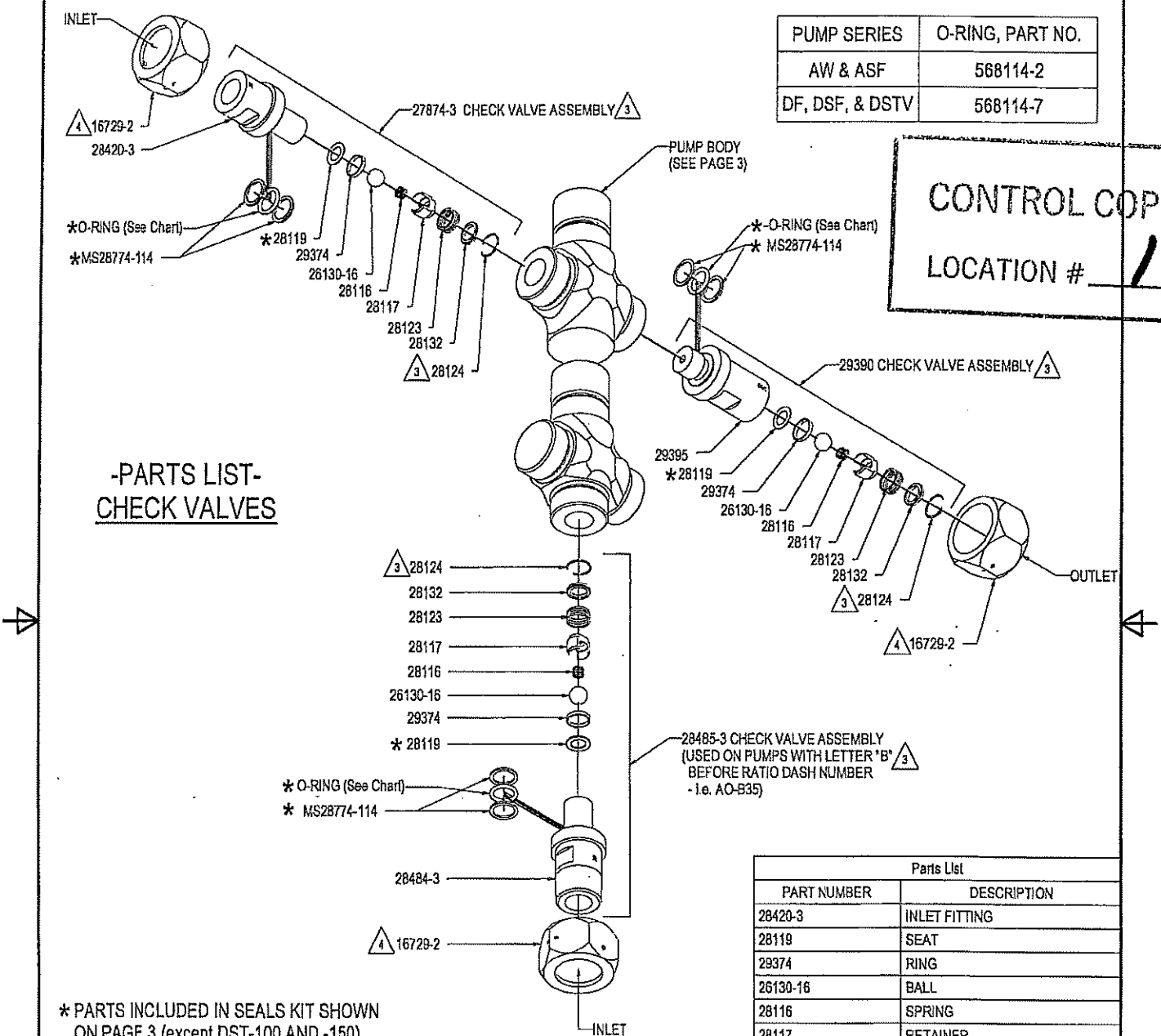


REVISIONS			
REV	DESCRIPTION	DATE	CHECKED
A	REVISED PER ECO 24990	1-27-04	<i>elpead</i>

PUMP SERIES	O-RING, PART NO.
AW & ASF	568114-2
DF, DSF, & DSTV	568114-7

**CONTROL COPY**  
LOCATION # 1

**-PARTS LIST-  
CHECK VALVES**



- 3 28124
- 28132
- 28123
- 28117
- 28116
- 26130-16
- 29374
- \* 28119
- \* O-RING (See Chart)
- \* MS28774-114
- 28484-3
- 4 16729-2

\* PARTS INCLUDED IN SEALS KIT SHOWN ON PAGE 3 (except DST-100 AND -150)

**NOTES:**

1. SEE PAGE 3 FOR PACKING PUMP BODY AND PISTON ASSEMBLY PLUNGER
2. SEE PAGE 1 FOR PARTS INCLUDED IN AIR DRIVE SECTION.
- 3 USE TOOL P/N 29370 TO ASSEMBLE AND DISASSEMBLE PARTS.
- 4 THESE ITEMS ARE LOCKWIRED TOGETHER WITH  $\varnothing$ .032 STAINLESS STEEL WIRE AT ASSEMBLY.

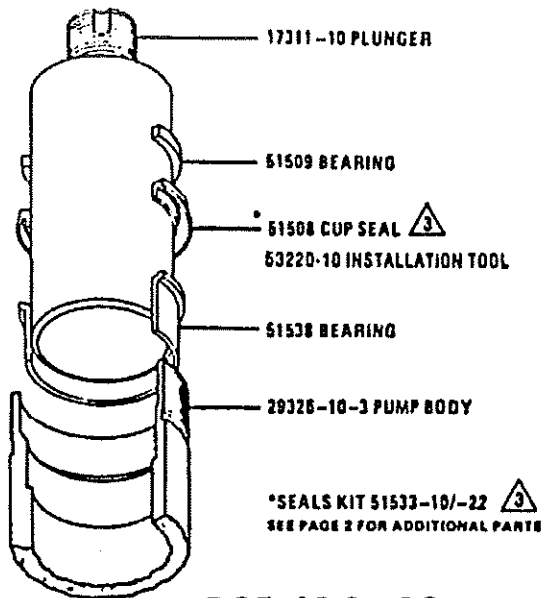
NOTE: ON PUMPS USING DISTANCE PIECE, NUTS WILL BE INDIVIDUALLY WIRED TO DISTANCE PIECE.

Parts List	
PART NUMBER	DESCRIPTION
28420-3	INLET FITTING
28119	SEAT
29374	RING
26130-16	BALL
28116	SPRING
28117	RETAINER
28123	SPRING
28132	RETAINER
28124	SNAP RING
MS28774-114	BACKUP
16729-2	NUT
29395-3	OUTLET FITTING
28484-3	INLET FITTING

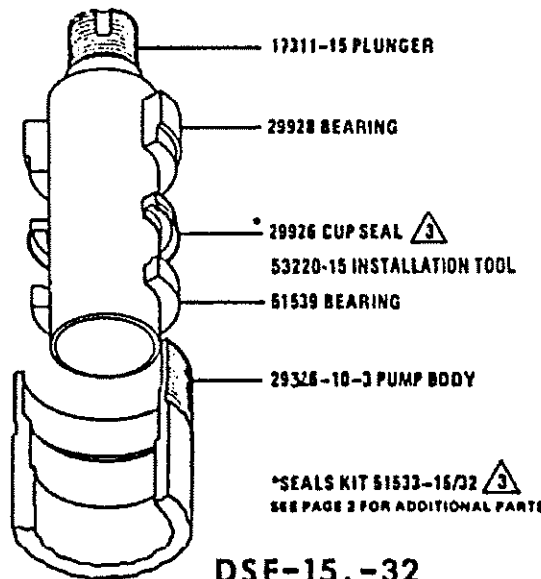
*Haskel* International, Inc.  
Industrial Technologies Division  
INTERNATIONAL Burbank, California 91502

TITLE CHECK VALVES MEDIUM RATIO	DWG NO. <b>CV-M</b>
REV A	PAGE 2

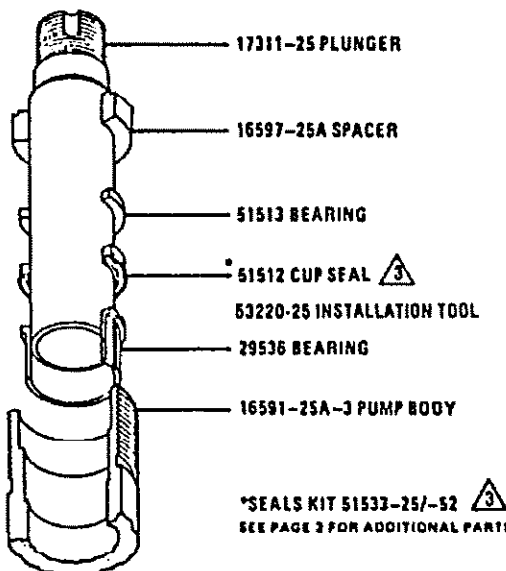




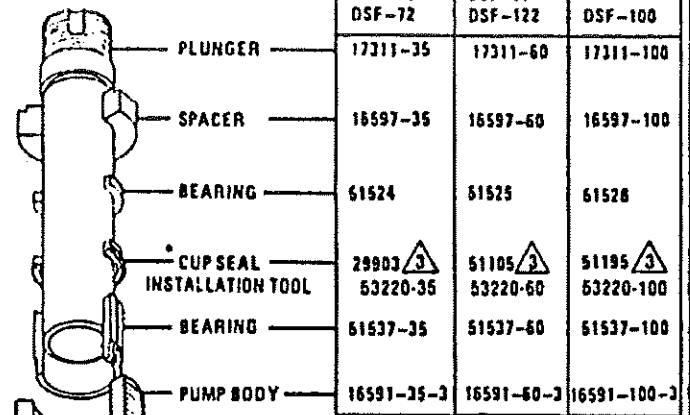
DSF-10 & -22



DSF-15, -32

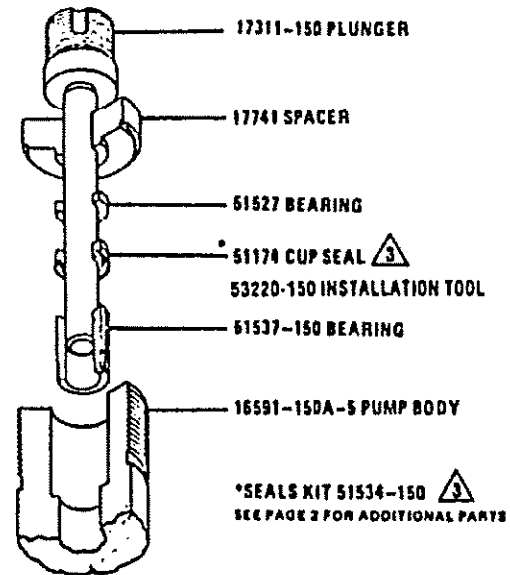


DSF-25, -52



\*SEALS KIT 51534-35/-72/-60/-100/-122 (with warning triangle)  
SEE PAGE 2 FOR ADDITIONAL PARTS

DSF-35, -60, -72  
DSF-100, -122



DSF-150

(with warning triangle) This Cup Seal must be installed with indicated installation tools included in the Pump Section Seals Kit. MN without installation tools has suffix '-0' in Part No. (i.e. 51534-150-0).

2. See page 1 for parts included in air drive section.  
1. See page 2 for parts included in inlet and outlet check valves.

NOTE:

## - PARTS LIST - PUMP SECTION

<i>Haskel</i> INC.		HASKEL, INC. 100 E. GRAMM PLACE BUREAU, CALIFORNIA 91502 · U.S.A.	
TITLE	PUMP SECTION DSF PACKING, PUMP BODY & PLUNGER	NO.	FS-DSF
REV.	2/79	PAGE	3