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Owner's Manual
Hydraulic Transmissions
Series PM, PMB, PMV, PL and PLV



PARAGON POWER
The Ultra Marine Transmission.

Paragon Power, Inc., Mentor, Ohio, U.S.A.

PARAGON POWER INC.

WARRANTY

Paragon Power warrants that all their products will leave the factory in good condition, free from defects in material or workmanship. This warranty applies to normal recommended use and service, and will be effective for a period of one (1) year (or 400 hours, whichever occurs first) from date of delivery to first user purchaser or twenty-four months from date of shipment to the Seller's OEM or distributor customer - whichever comes first.

Our sole obligation under the foregoing warranty will be to repair or replace, at our option, any defective parts or transmissions returned to us with our approval, freight prepaid, which shall be the purchaser's exclusive remedy.

This warranty shall not apply to any product which shall have been repaired or altered without the manufacturer's knowledge and consent or operated or installed contrary to instruction or subjected to misuse, improper maintenance or is damaged by accident or negligence.

This warranty is produced in lieu of all other expressed warranties and any implied warranties applicable hereto are limited to the one (1) year (or 400 hours, whichever occurs first) period set forth above.

IN NO EVENT WILL PARAGON POWER BE LIABLE FOR ANY SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGE; RESULTING DIRECTLY OR INDIRECTLY FROM POSSESSION OR OF USE OF THIS PRODUCT.

Owner's Manual

Hydraulic Transmissions

Series PM, PMB, PMV, PL and PLV

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I. Specifications

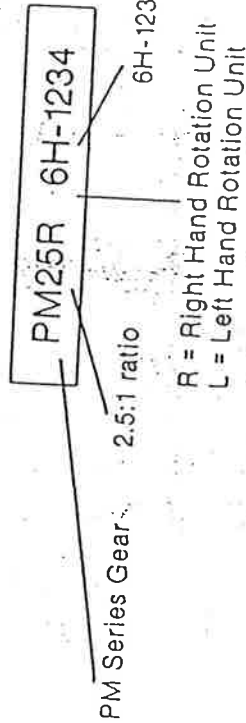
A. Description Chart

PM		PMB		SERIES AND MODEL		PL	PLV	REDUCTION RATIO
		PMV						
PM10R	PM10L	..	..	PMV10R	PMV10L	PL10R	PLV10R	DIRECT (1.0:1)
PM15R	PM15L	PMB15R	PMB15L	PMV100L	PMV15R	PL10L	PLV10L	DIRECT (1.0:1)
PM20R	PM20L	..	..	PMV15L	PMV15L	PL15R	PLV100L	1.0:1 OPPOSITE
PM25R	PM25L	PMB20R	PMB20L	PMV150L	PMV20R	PL15L	PLV15L	1.5:1
PM30R	PM30L	PMB25R	PMB25L	PMV200L	PMV200L	PL20R	PLV150L	1.5:1 OPPOSITE
		..	..	PMV25R	PMV25L	PL20L	PLV20R	2.0:1
		PMB30R	PMB30L	PMV250L	..	PL25R	PLV200L	2.0:1 OPPOSITE
		..	..	..	..	PL25L	PLV25R	2.5:1
						PL30R	PLV250L	2.5:1 OPPOSITE
						PL30L	..	3.0:1

*R and L suffix denotes direction of engine rotation.
See page 3, section B.

B. Model and Serial Numbers

Each reverse gear has a model number and a serial number. These numbers are on the name plate, located on the housing of the transmission.



II. Introduction

Series PM, PMB, PMV, PL and PLV hydraulic transmissions have been designed for smooth operation and dependability in marine use. The transmission is self-contained, having an oil pressure system and oil supply completely separated from engine lubricating oil systems.

Transmission oil under pressure is used to engage a forward or reverse drive. The forward drive is through a multiple disc clutch arrangement, while the reverse drive utilizes a reverse clamp band and planetary gear train. The transmission oil is circulated and cooled through a separate external oil cooler core, which is in turn cooled by the engine water. Paragon transmissions are furnished with either direct drive or reduction gears. Gear reduction ratios and corresponding model identification numbers are listed in Section I, under "SPECIFICATIONS".

III. Installation

A. The installation instructions below are for use when the original transmission has been removed for servicing and must be re-installed, or when the transmission unit is to be adapted as non-original equipment to a marine engine.

B. It is important that the engine and transmission rotations are matched. The direction of rotation of an engine is defined in this manual as the direction of rotation of the engine crankshaft as viewed from the output end of the transmission. A clockwise rotation of the engine is a right hand rotation and a counterclockwise rotation of the engine is a left hand rotation.

A letter "R" or "L" appearing on the transmission serial number plate illustrated in Section I, "SPECIFICATIONS", indicates whether the transmission is for use with a right or left hand rotating engine.

C. The hydraulic transmission is attached to the engine in the following manner:

1. Insert two 3-1/2" studs in opposite transmission mounting holes in the engine adapter plate.

2. Place the transmission against the studs so that the studs go through two of the matching holes in the transmission housing flange.

3. Slide the transmission along the studs toward the engine so that the spline on the shaft at the front of the transmission enters the matching splined hole in the engine vibration dampener.

4. Install and tighten four bolts with lockwashers through the transmission housing flange into the engine adapter plate. Remove the 3-1/2" studs. Install and tighten the two remaining bolts with lockwashers through the transmission housing flange.

D. The transmission and propeller shaft coupling must be carefully aligned before the propeller shaft is connected to the transmission, in order to avoid vibration and consequent damage to the transmission, engine, and boat hull during operation. To align the coupling, move the propeller shaft, with attached coupling flange, toward the transmission so that the faces of the propeller shaft coupling flange and transmission shaft coupling flange are in contact. The coupling flange faces should be in contact throughout their entire circumference. The total runout or gap between the faces should not exceed .002" at any point. If the runout exceeds .002", reposition the engine and attached transmission by loosening the engine support bolts and adding or removing shims to raise or lower either end of the engine.

If necessary, move the engine sideways to adjust the runout or to align the coupling flange faces laterally. Tighten the engine support bolts and recheck the alignment of the coupling before bolting the coupling flanges together. Connect the coupling flanges with bolts, lockwashers, and nuts.

E. Connect the oil cooler lines to the transmission.

F. Connect the shift control cable from the cockpit control station to the transmission control valve lever, shown in Figure on page 7. Place the transmission control valve lever in the neutral position and adjust the shaft control cable length until the cockpit control station hand lever is in the neutral position. Move the cockpit control hand lever to forward and reverse positions several times while observing the transmission control valve lever motion. The transmission control valve lever should move fully into forward or reverse position when the hand lever is moved into forward or reverse position, and should return exactly to the neutral position when the hand lever is in the neutral position.

G. Remove the oil dipstick, shown in Figure on page 7, and fill the transmission with transmission fluid to the mark on the dipstick. Replace the dipstick in the transmission housing.

IV. Operation

A. Principle of Operation

The transmission forward and reverse drives are operated by transmission oil under pressure. An internal gear type oil pump delivers the transmission oil, under pressure, to the external oil cooler. The transmission oil is returned, still under pressure, to the oil distribution tube and relief valve. The relief valve maintains the oil pressure by remaining closed until the oil pressure reaches 60 PSI. When the control lever is shifted to the forward position, oil under pressure is delivered to the multiple disc clutch piston, which moves to clamp the clutch discs and planetary reverse gear case together. The discs and case then revolve as a solid coupling in the direction of engine rotation. The reverse drive is engaged by shifting the control lever to the reverse position, so that oil under pressure is delivered to the reverse piston. The reverse piston moves to clamp the reverse band around the planetary gear case, preventing the planetary gear case from moving but allowing the planetary gears to revolve to drive the output or propeller shaft in a direction opposite to the rotation of the engine. With the control lever in the neutral position, pressurized oil is prevented from entering the clutch piston or reverse band piston and the propeller shaft remains

stationary.

B. Starting Procedure

1. Always start the engine with the transmission in NEUTRAL to avoid moving the boat suddenly ahead or astern.
2. When the engine is first started, allow it to idle for a few moments. Stop the engine and check the transmission oil level. Add oil if necessary to bring the oil level up to the mark on the transmission dipstick.

NOTE: On subsequent start-ups, the transmission oil level may be checked before running the engine, when engine oil is checked.

3. Start the engine again, with the transmission in NEUTRAL, and allow the engine to warm up to operating temperature.

4. Shift the transmission into FORWARD or REVERSE as desired. If the engine should stall when the transmission is shifted to FORWARD or REVERSE, place the transmission in NEUTRAL before restarting the engine.

It is recommended that shifting be done at speeds below 1000 RPM, and preferably in the 800 RPM, or idle engine

range, to prolong the life of the engine, transmission, and boat. EMERGENCY shifts may be at higher engine speeds, but this is not a recommended practice.

V. Maintenance

A. Lubrication

Series PM, PMB PMV, PL and PLV transmissions are self-contained units, independent of the engine lubricating systems. The units are lubricated by pressure and by splash from its own oil. The type of oil recommended is transmission fluid, commonly used for automatic transmissions in automobiles, Dexron II or Type "A" transmission fluid is suggested.

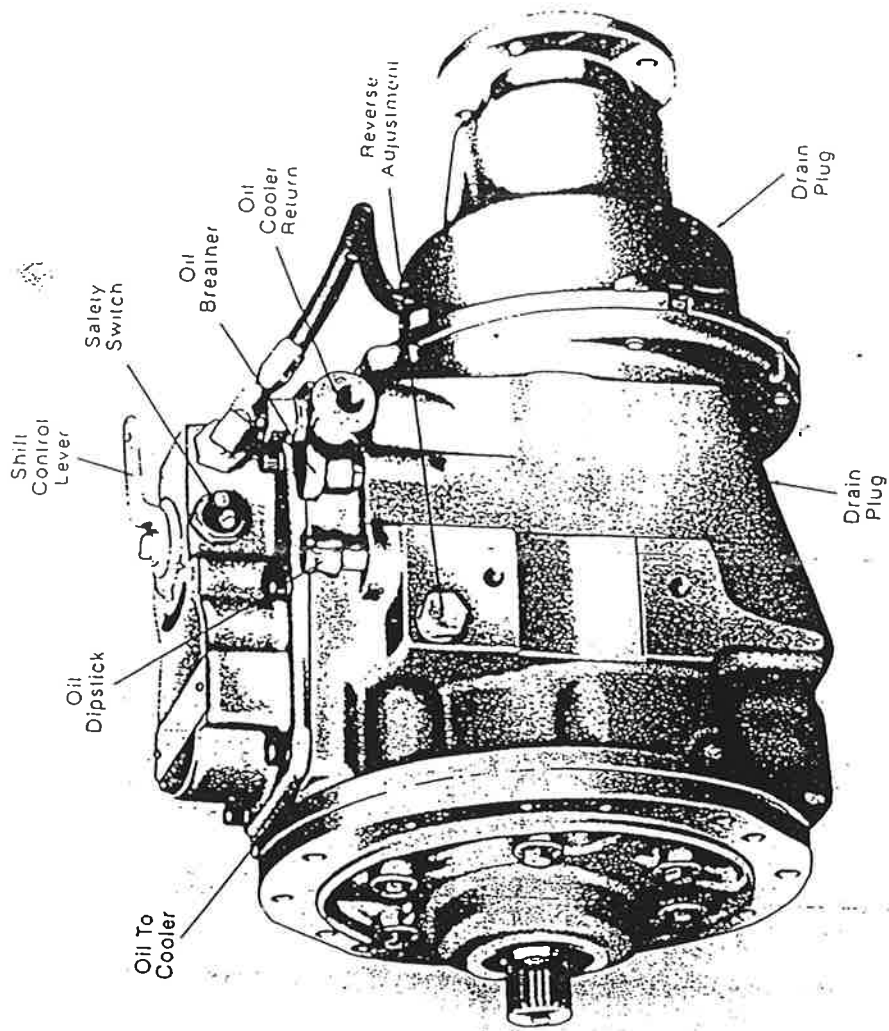
The quantity of oil depends upon the angle of installation, as well as the reduction model. The level must be maintained at the mark on the dipstick and should be checked periodically to ensure satisfactory operation.

When filling for the first time or refilling after an oil change, check the level after running for a few minutes to make certain that the oil cooler and the various passages are full. If necessary, refill to the mark on the dipstick to ensure proper operation of the transmission. The transmission oil level should be checked each time the engine oil level is checked, before running the engine.

The oil in the transmission should be changed every 100 hours, or each season under normal conditions. However, the number of hours than can be run between oil changes varies with the operating conditions. Drain plugs are located at the bottom of the reverse gear housing, reduction gear housing and the V-drive housing.
NOTE: Upon each oil change clean or replace filter assembly (part 63 in diagram 4) found on reduction and V-drive models only.

B. Adjustments

No adjustment is necessary for the FORWARD drive multiple disc clutches. Reverse band adjustment may be periodically required. External adjustment is accomplished by turning screw (part 76 in diagram 4).



C. Trouble Shooting Chart

PROBLEM	POSSIBLE CAUSES AND METHODS OF CORRECTION
<p>Gear Inoperative Drive Shaft does not operate with Selector Valve in forward or reverse.</p>	<p>1. Low Oil Pressure</p> <ul style="list-style-type: none"> a. Low oil supply. Add oil, refer to lubrication. b. Faulty oil gauge. Replace gauge. Oil gauge slow to register, air or obstruction in oil gauge line. Clean and bleed oil gauge line. c. Plugged oil lines or passages. Clean lines or passages. d. Oil pressure relief valve scored and sticking. Remove relief valve. Clean valve and valve bore in control valve housing with crocus cloth to free valve, or replace. e. Defective pistons and oil distributor seal rings. Replace seal rings. f. Defective oil pump. Check for wear, and replace if necessary. <p>2. High Oil Temperature</p> <ul style="list-style-type: none"> a. Low oil supply. Add oil, refer to lubrication. b. Low water level in cooling system. Add water, and check for leaks. c. Plugged raw water inlet screen. Clean screen. d. Collapsed or disintegrated water inlet hose. Replace hose. e. Air leak in cooling water suction line. Replace suction line.

PROBLEM	POSSIBLE CAUSES AND METHODS OF CORRECTION
<p>Gear Inoperative Drive Shaft does not operate with Selector Valve in forward or reverse.</p>	<p>2. High Oil Temperature</p> <ol style="list-style-type: none"> 1. Raw water pump impeller worn or damaged. Replace impeller. g. Clogged or dirty oil cooler element. Remove and clean. <p>3. Reverse Band not engaging Planetary Gear Gauge</p> <ol style="list-style-type: none"> a. Adjust reverse band screw. b. Reverse band lining worn out. Replace lining. c. Defective reverse piston "O" ring. Replace "O" ring. <p>4. Failure of Planetary Assembly</p> <p>Remove gear case assembly, and check for defective or damaged parts. Replace defective or damaged parts.</p> <p>5. Failure of Reduction Gear</p> <p>Remove reduction gear assembly and check for defective or damaged parts. Replace defective or damaged parts.</p> <p>6. Failure of V-Drive</p> <p>Remove V-Drive assembly and check for defective or damaged parts. Replace defective or damaged parts.</p>
<p>Gear Dragging Drive Shaft rotates either forward or reverse with Selector Valve in neutral position.</p>	<ol style="list-style-type: none"> 1. Defective forward Clutch Plates <p>Forward clutch plates warped and sticking. Remove clutch plates and replace.</p> 2. Defective forward Clutch Piston Release Spring <p>Forward clutch piston release spring broken or weak. Replace spring.</p> 3. Binding in Planetary Assembly <ol style="list-style-type: none"> a. Bearings and gears worn excessively in gear case. Replace necessary parts. b. Input shaft bearings worn excessively, causing misalignment of input shaft. Replace necessary parts.

PROBLEM	POSSIBLE CAUSES AND METHODS OF CORRECTION
Gear Slipping or Slow to Engage With Selector Valve in forward or reverse position.	<p>1. Low Oil Pressure See "Gear Inoperative" (1)</p> <p>2. Worn forward Clutch Plates Remove forward clutch plates and check for wear excessively, replace clutch plates.</p> <p>3. Reverse Band not engaging Gear Case See "Gear Inoperative," (3)</p>
Internal and External Leaks	<p>1. Water in Lubricating Oil</p> <p>a. Hole in oil cooler element permitting water to seep into oil compartment. Replace oil cooler element.</p> <p>b. Oil cooler gaskets. Check gaskets and replace.</p> <p>2. Excessive Oil in Engine Crankcase or Flywheel Housing Defective front end plate oil seal. Replace oil seal.</p> <p>3. Oil on Exterior of Marine Gear</p> <p>a. Oil seeping from breather. Check for too high oil level.</p> <p>b. Defective rear end oil seal. Replace oil seal.</p> <p>4. Loss of Oil from Transmission Check for defective gaskets and seal.</p>

VI. Parts

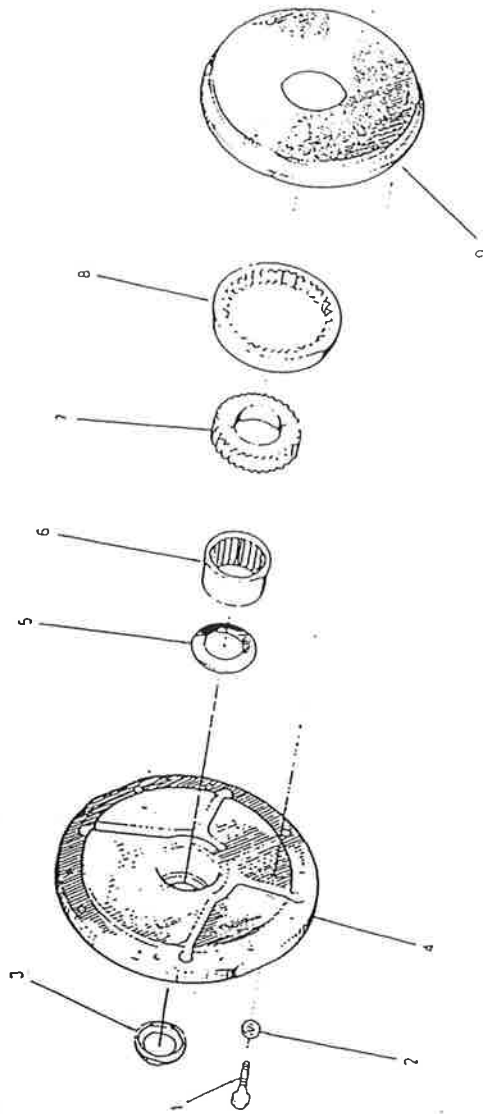
Each part illustrated in the exploded views has a key number and an arrow pointing from the key number to the part. Refer to the key number in the

parts list to determine the part number and name. Always give the part number, part name, transmission model number, and trans-

mission serial number when ordering parts.

Front End Plate and Pump Assembly/Diagram 1

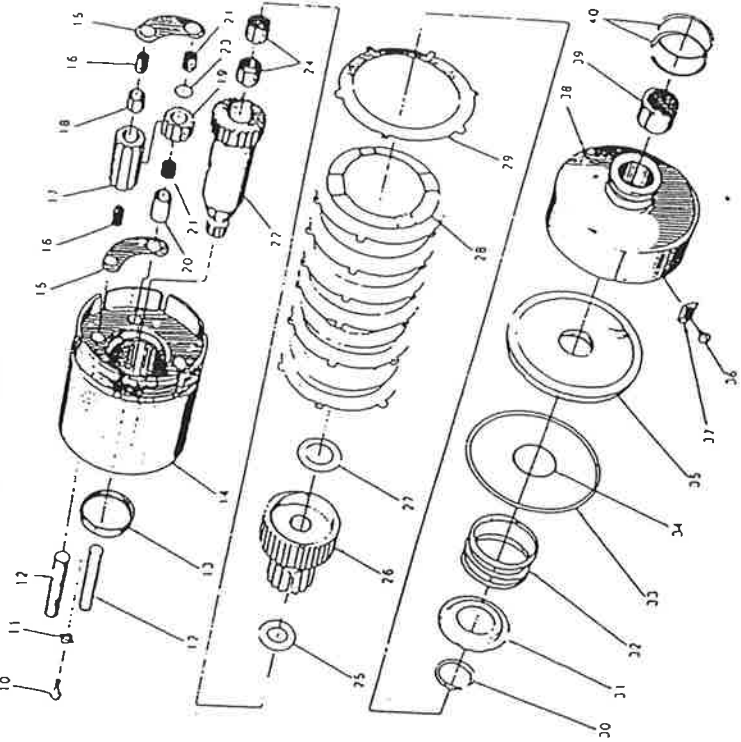
KEY HO.	PART HO.	DESCRIPTION	QTY.	WHERE USED
1	M-5001	CAPSCREW	6	ALL
2	14324	WASHER	6	ALL
3	11791	SEAL	1	ALL
4	12562	PLATE	1	ALL
5	11728	WASHER	1	ALL
6	11729	BEARING	1	ALL
7	11733	GEAR	1	ALL
8	HF1084	GEAR	1	ALL
9	12551	HOUSING	1	ALL



Gear Case Assembly/Diagram 2

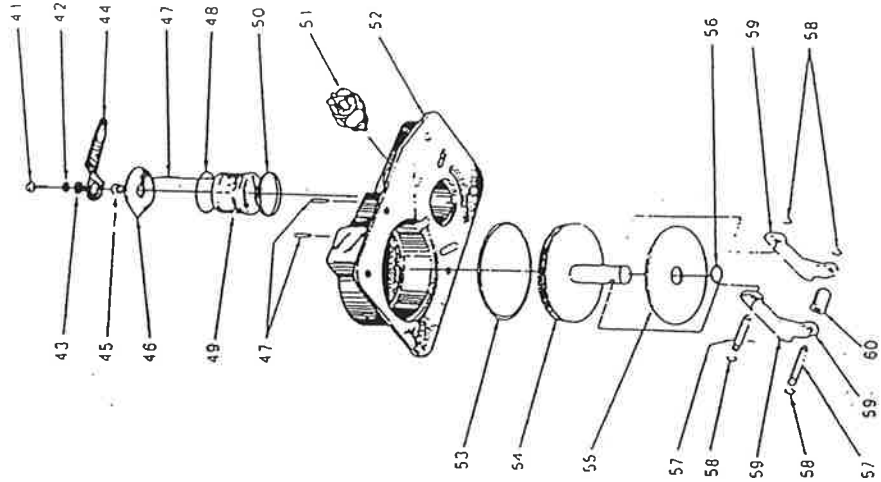
KEY NO.	PART NO.	DESCRIPTION	QTY.	WHERE USED
10	M-5002	CAPSCREW	2	PM,PMB,PMV
11	M-5002	CAPSCREW	3	PL,PLV
11741	11741	CLIP	2	PM,PMB,PMV
11741	11741	CLIP	3	PL,PLV
12922	12922	SHAFT	4	PM,PMB,PMV
12922	12922	SHAFT	6	PL,PLV
11667	11667	BEARING	1	ALL
12040	12040	CASE	1	PM,PMB,PMV
16055	16055	CASE	1	PL,PLV
10177	10177	PAD	4	PM,PMB,PMV
10177	10177	PAD	6	PL,PLV
10272	10272	BEARING	128	PM,PMB,PMV
10272	10272	BEARING	192	PL,PLV
HF1120	HF1120	PINION	2	PM,PMB,PMV
HF1120	HF1120	PINION	3	PL,PLV
HF11138	HF11138	SPACER	2	PM,PMB,PMV
HF11138	HF11138	SPACER	3	PL,PLV
HF1120A	HF1120A	PINION	2	PM,PMB,PMV
HF1120A	HF1120A	PINION	3	PL,PLV
11832	11832	SPACER	2	PM,PMB,PMV
11832	11832	SPACER	3	PL,PLV
10273	10273	BEARING	128	PM,PMB,PMV
10273	10273	BEARING	192	PL,PLV
11792	11792	GEAR	1	ALL
HF1113A	HF1113A	SPACER	2	PM,PMB,PMV
HF1113A	HF1113A	SPACER	3	PL,PLV
11750	11750	BEARING	2	ALL
11754	11754	WASHER	1	ALL
12324	12324	GEAR	1	PM,PMB,PMV
12924	12924	GEAR	1	PL,PLV
12606	12606	WASHER	1	ALL
11759	11759	PLATE	6	PM,PMB,PMV
11759	11759	PLATE	8	PL,PLV
11758	11758	PLATE	7	PM,PMB,PMV
12049	12049	RING	1	PL,PLV
12325	12325	RETAINER	1	ALL
12330	12330	SPRING	1	ALL

KEY NO.	PART NO.	DESCRIPTION	QTY.	WHERE USED
33	10280	O-RING	1	ALL
34	11352	O-RING	1	ALL
35	12323	PISTON	1	PM,PMB,PMV
35	12923	PISTON	1	PL,PLV
36	11237	LOCKSCREW	2	ALL
37	11240	CLIP	2	ALL
38	12322	COLLAR	1	ALL
39	11763	BEARING	1	ALL
40	HF1094	RING	2	ALL

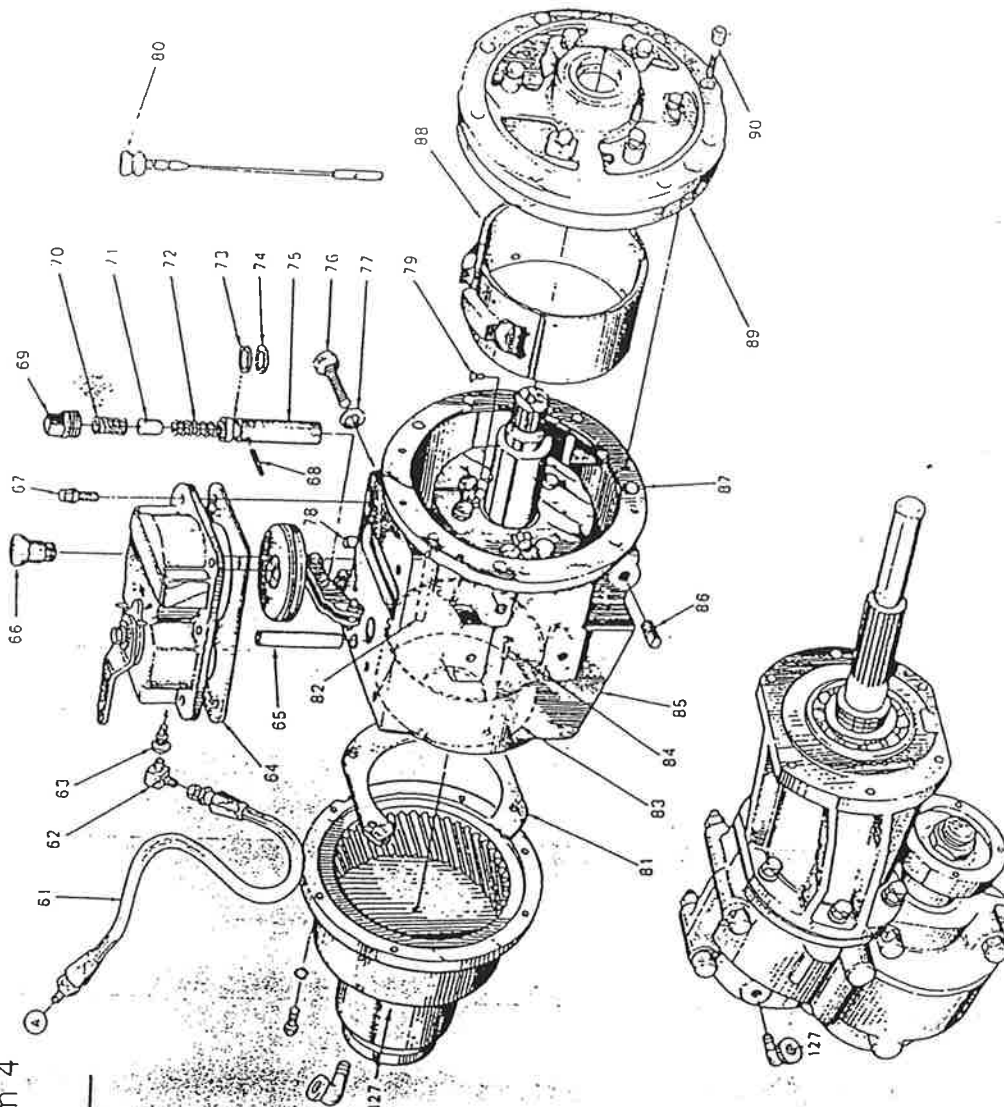


Cover Assembly/Diagram 3

KEY NO.	PART NO.	DESCRIPTION	QTY.	WHERE USED
41	M5000	CAPSCREW	1	ALL
42	M5004	LOCKWASHER	1	ALL
43	12113	WASHER	1	ALL
44	11930	LEVER	1	ALL
45	11933	BUSHING	1	ALL
46	11929	PAWL	1	ALL
47	12088	PIN	3	ALL
48	11769	O-RING	1	ALL
49	12559	VALVE	1	ALL
50	11770	RING	1	ALL
51	16739	SWITCH	1	ALL
52	16740	COVER	1	PM10,PL10
	16742	COVER	1	ALL (EXCEPT PM10,PL10)
53	12221	O-RING	1	ALL
54	12304	PISTON ASSY.	1	ALL
55	12214	PLATE	1	ALL
56	12222	O-RING	1	ALL
57	12217	PIN	2	ALL
58	10284	RING	4	ALL
59	12285	LEVER	2	ALL
60	12218	ROLL	1	ALL



Complete Assembly/Diagram 4

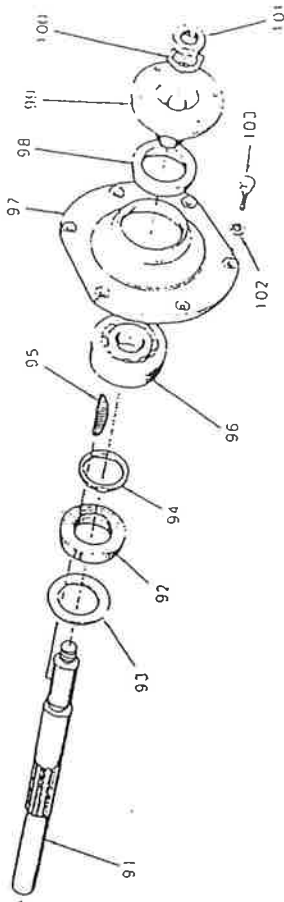


KEY NO.	PART NO.	DESCRIPTION	QTY.	WHERE USED
61	16168	HOSE ASSY.	1	V-DRIVE AND 200 MODEL RED. ALL STD. RED.
62	13970	HOSE ASSY.	1	ALL V-DRIVE AND RED. MODELS
63	13972 14248	ELBOW FILTER	1	ALL
64	12576	GASKET	1	ALL
65	12286	TUBE	1	ALL
66	12226	BREATHER	1	ALL
67	M-5005	CAPSCREW	6	ALL
68	HF1095	PIN	1	ALL
69	M-5006	PLUG	1	ALL
70	12349	SPRING	1	ALL
71	HF1068C	PLUG	1	ALL
72	HF1075	SPRING	1	ALL
73	12351	RING	1	ALL
74	11779	O-RING	1	ALL
75	12350	HOUSING	1	ALL
76	12540	SCREW	1	ALL
77	14139	WASHER	3	ALL
			MAX.	
78	12045	TUBE	1	ALL
79	11196	KEY	1	ALL
80	12472	DIPSTICK	1	ALL
81	11083	GASKET	1	ALL
82	12220	PIN	1	ALL
83	11830	BAFFLE	1	ALL
84	M-5007	CAPSCREW	2	ALL
85	12563	HOUSING	1	ALL
86	M-5008	PLUG	1	ALL
87	11721	TUBE	1	ALL
88	12301	BAND ASSY.	1	ALL
89	12640	GASKET	1	ALL
90	M-5009	CAPSCREW	8	ALL

Direct Drive Group/Diagram 5A

KEY NO.	PART NO.	DESCRIPTION	QTY.	WHERE USED
91	12331	TAILSHAFT	1	PM10
	12930	TAILSHAFT	1	PL10
92	11765	WASHER	1	PM10
93	11590	WASHER	1	PM10, PL10
94	16196	O-RING	1	PM10
95	M-5022	KEY	1	PM10
	M-5023	KEY	1	PL10
96	10351	BEARING	1	PM10
	10353	BEARING	1	PL10
97	11338	PLATE	1	PM10
	12928	PLATE	1	PL10
98	2XE-446A	SEAL	1	PM10
	11518	SEAL	1	PL10
99	16737	COUPLING	1	PM10
	16738	COUPLING	1	PL10
100	DA-366	LOCKWASHER	1	PM10
101	DA-363	NUT	1	PM10
	11862	NUT	1	PL10
102	M-5010	LOCKWASHER	6	PM10, PL10
103	M-5011	CAPSCREW	6	PM10, PL10

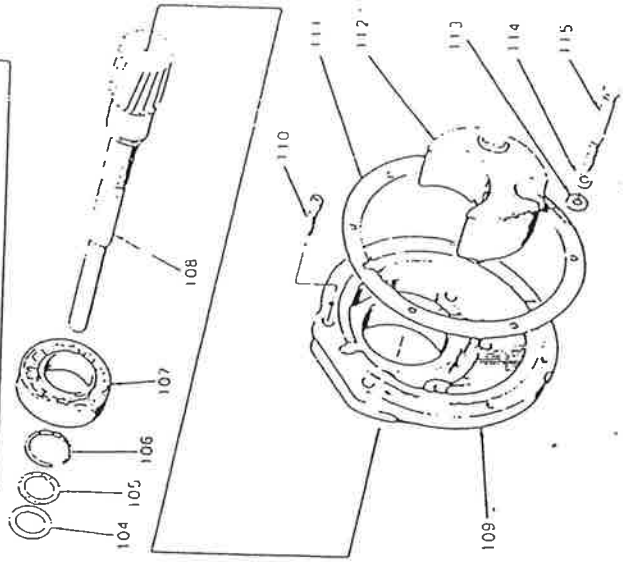
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PART NO.	DESCRIPTION	QTY.	WHERE USED
11857	RING	1	PL10
11856	RING	1	PL10



Reduction Adapter Group/Diagram 5B

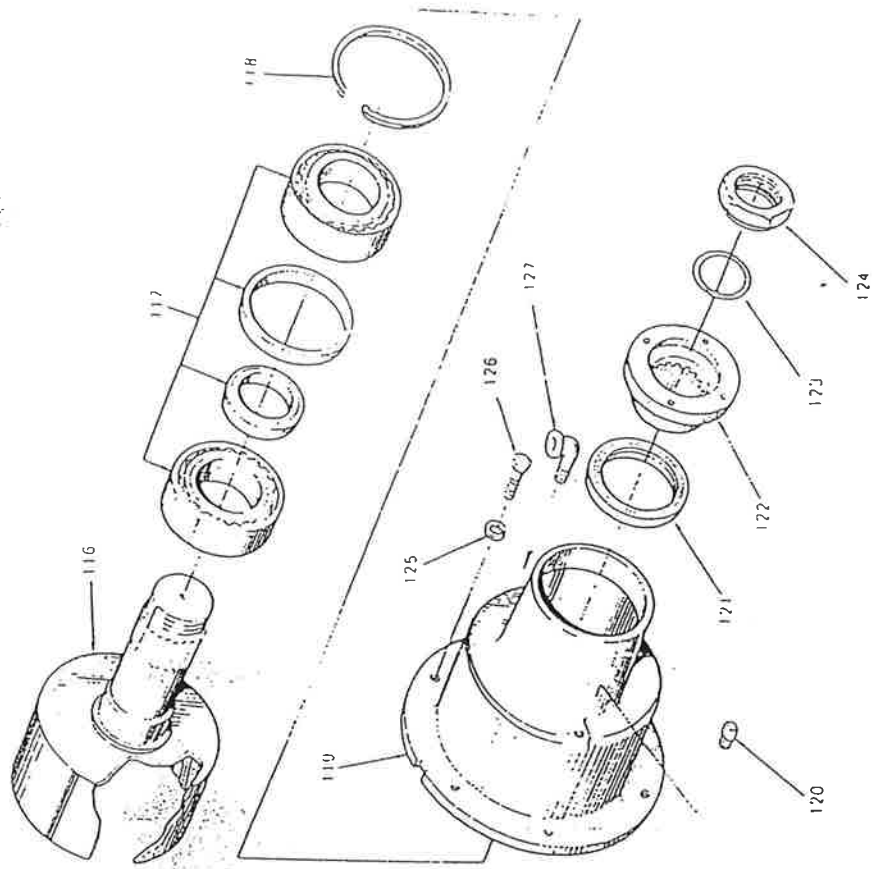
KEY NO.	PART NO.	DESCRIPTION	QTY	WHERE USED	KEY NO.	PART NO.	DESCRIPTION	QTY	WHERE USED
104	12494	RACE	1	PM,PMB,PL	109	16757	ADAPTER	1	PMB200, PL200
105	12493	BEARING	1	PM,PMB,PL		12953	PLATE	1	PMB25, PL25
106	11857	RING	1	PM		12954	PLATE	1	PMB30, PL30
	11858	RING	1	PMB,PL		14134	GEAR	1	PM200
	11859	RING	1	15,20,200		16758	GEAR	1	PMB5, PL200
107	10353	BEARING	1	PMB, PL25,30		14131	BEARING	2	PMB5, PL200
	12476	BEARING	1	PM15		14133	WASHER	2	ALL 200S
	10354	BEARING	1	PM20,200, 25,30		14135	SHAFT	1	ALL 200S
	10355	BEARING	1	PMB15,20, 200,PL15		14140	SPACER	1	ALL 200S
	12478	BEARING	1	PMB25		M-5012	CAPSCREW	1	PM200
	12477	BEARING	1	PMB30, PL25,30		M-5018	CAPSCREW	1	PMB200, PL200
108	12335	TAILSHAFT	1	PL20,200	110	M-5013	CAPSCREW	6	PM15,20, 25,30
	12336	TAILSHAFT	1	PM15		M-5013	CAPSCREW	4	PM200, PMB15,20, PL15,20
	12042	TAILSHAFT	1	PM20		M-5014	CAPSCREW	2	PM200
	14330	TAILSHAFT	1	PM200		M-5014	CAPSCREW	4	PMB200, PL200
	14332	TAILSHAFT	1	PM25		M-5012	CAPSCREW	4	PMB25,30, PL25,30
	12936	TAILSHAFT	1	PM30		M-5012	CAPSCREW	2	PMB200, PL200
	12937	TAILSHAFT	1	PMB15, PL15		RA20-15A	GASKET	1	PM
	16759	TAILSHAFT	1	PMB20, PL20		RB20-15A	GASKET	1	PMB,PL
	12938	TAILSHAFT	1	PMB200, PL200		RB15-39	CRESCENT	1	PMB15, PL15
	12939	TAILSHAFT	1	PMB25, PL25		RB20-39	CRESCENT	1	PMB20, PL20
109	RA15-IT	PLATE	1	PMB30, PL30	111	RB25-39F	CRESCENT	1	PMB25,30, PL25,30
	RA20-IV	PLATE	1	PM15			(NOT REQUIRED ON PM SERIES)		
	14226	ADAPTER	1	PM20	112	M-5015	WASHER	2	PMB,PL
	14329	PLATE	1	PM200		M-5010	LOCKWASHER	2	PMB,PL
	14331	PLATE	1	PM25		M-5016	CAPSCREW	2	PMB,PL
	12931	PLATE	1	PM30					
	12932	PLATE	1	PMB15, PL15	113				
				PMB20, PL20	114				
					115				

NOT SHOWN			
PART NO.	DESCRIPTION	QTY	WHERE USED
14134	GEAR	1	PMB15, PM15
16758	GEAR	1	PMB5, PL200
14131	BEARING	2	ALL 200S
14133	WASHER	2	ALL 200S
14135	SHAFT	1	ALL 200S
14140	SPACER	1	ALL 200S
M-5012	CAPSCREW	1	PM200
M-5018	CAPSCREW	1	PMB200, PL200



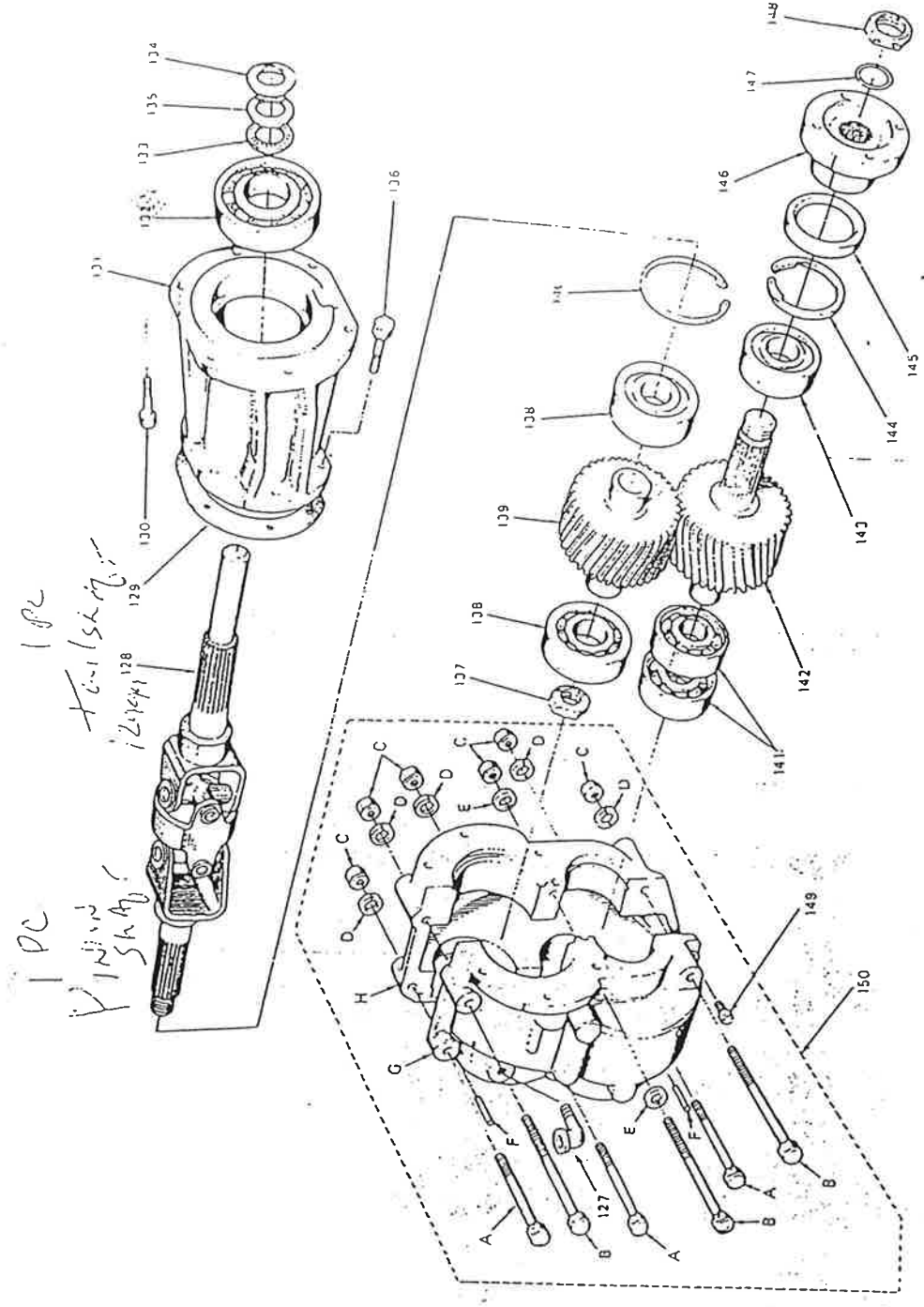
Reduction Assembly/Diagram 6

KEY HO.	PART HO.	DESCRIPTION	QTY	WHERE USED
116	16712	GEAR	1	PM
	16726	GEAR	1	PMB,PL
117	16743	BEARING ASSY.	1	PM
	16744	BEARING ASSY.	1	PMB,PL
118	RA20-350	RING	1	PM
	12308	RING	1	PMB,PL
119	16713	HOUSING	1	PM
	16727	HOUSING	1	PMB,PL
120	M-5008	PLUG	1	PM,PMB,PL
121	16724	SEAL	1	PM,PMB,PL
122	16723	COUPLING	1	PM,PMB,PL
123	16725	O-RING	1	PM,PMU,PL
124	12674	NUT	1	PM,PMB,PL
125	M-5010	LOCKWASHER	6	PM,PMB,PL
126	M-5011	CAPSCREW	6	PM,PMB,PL
127	M-5017	ELBOW	1	PM,PMU,PL



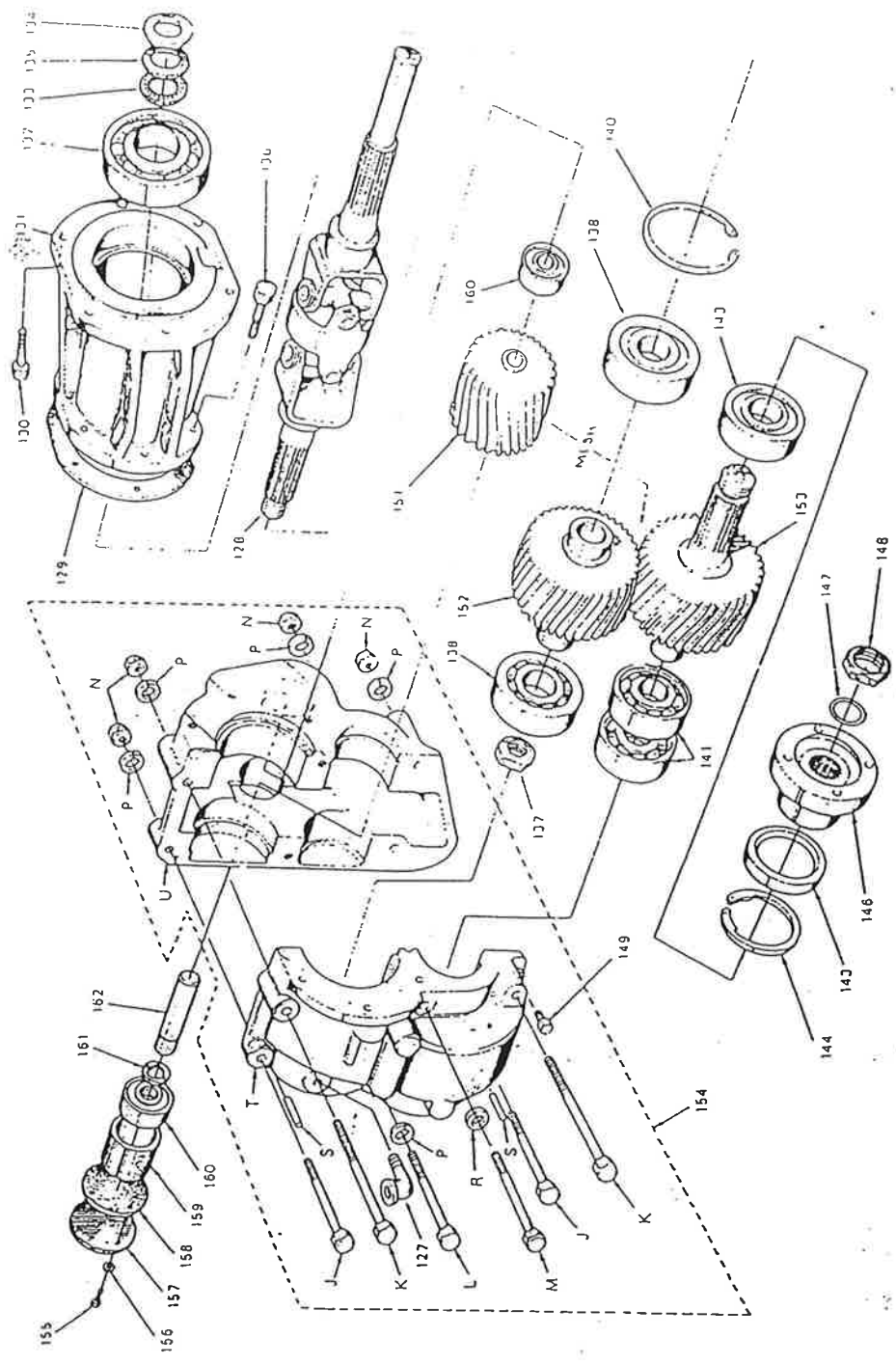
V-Drive Assembly Standard Rotation (2 Gear Set)/Diagram 7

KEY NO.	PART NO.	DESCRIPTION	QTY	WHERE USED	KEY NO.	PART NO.	DESCRIPTION	QTY	WHERE USED
128	14199	UNIVERSAL	1	PMV	141	12489	BEARING	2	PMV
	16200	UNIVERSAL	1	PLV		12892	BEARING	2	PLV
129	12770	GASKET	1	PMV	142	12716	GEAR	1	PMV10
	12946	GASKET	1	PLV		12717	GEAR	1	PMV15
130	M5011	CAPSCREW	6	PMV, PLV		12718	GEAR	1	PMV20
131	12746	HOUSING	1	PMV		12719	GEAR	1	PMV25
132	12898	HOUSING	1	PLV		12909	GEAR	1	PLV10
	10352	BEARING	1	PMV		12910	GEAR	1	PLV15
	10351	BEARING	1	PLV		12911	GEAR	1	PLV20
133	12493	BEARING	1	PMV, PLV		12912	GEAR	1	PLV25
134	12494	RACE	1	PMV, PLV	143	12183	GEAR	1	PMV
135	12942	WASHER	1	PMV ONLY		12891	BEARING	1	PLV
136	M5011	CAPSCREW	6	PMV, PLV	143	12710	RING	1	PMV
137	13000	NUT	1	PMV, PLV	143	12893	BEARING	1	PLV
138	10351	BEARING	2	PMV		12894	RING	1	PMV
	16167	BEARING	2	PLV	145	12712	OIL SEAL	1	PMV
139	12715	PINION	1	PMV10	146	12717	OIL SEAL	1	PLV
	12714	PINION	1	PMV15		12873	COUPLING	1	PMV
	12713	PINION	1	PMV20	147	12783	COUPLING	1	PLV
	12712	PINION	1	PMV25		12895	O RING	1	PMV
	12905	PINION	1	PLV10	148	12675	NUT	1	PLV
	12906	PINION	1	PLV15		12894	NUT	1	PMV
	12907	PINION	1	PLV20	149	M5021	PLUG	1	PLV
	12908	PINION	1	PLV25	150	12734	HOUSING ASSY	1	PMV, PLV
140	16190	RING	1	PMV			HOUSING ASSY	1	PMV
	12893	RING	1	PLV		12880	HOUSING ASSY	1	PLV



V-Drive Assembly Opposite Rotation (3 Gear Set)/Diagram 8

KEY NO.	PART NO.	DESCRIPTION	QTY.	WHERE USED	KEY NO.	PART NO.	DESCRIPTION	QTY.	WHERE USED
151	12727	IDLER GEAR	1	PMV	155	M5019	CAPSCREW	4	PMV
	12904	IDLER GEAR	1	PLV100, 150, 200	156	M5002	CAPSCREW	3	PLV
	16581	IDLER GEAR	1	PLV250	157	M5020	LOCKWASHER	4	PMV
	12722	PINION	1	PMV100	157	M5004	LOCKWASHER	3	PLV
	12713	PINION	1	PMV150	157	12767	COVER	1	PMV
	12721	PINION	1	PMV200	158	12899	COVER	1	PLV
	12720	PINION	1	PMV250	158	12772	GASKET	1	PMV
	12913	PINION	1	PLV100	159	12895	GASKET	1	PLV
	12914	PINION	1	PLV150	159	12768	SPACER	1	PMV
	12915	PINION	1	PLV200	160	12903	SPACER	1	PLV
153	12916	PINION	1	PLV250	160	12758	BEARING	2	PMV
	12723	GEAR	1	PMV100	161	16174	BEARING	2	PLV
	12724	GEAR	1	PMV150	161	12759	RING	1	PMV
	12725	GEAR	1	PMV200	162	12593	RING	1	PLV
	12726	GEAR	1	PMV250	162	12766	SHAFT	1	PMV
	12917	GEAR	1	PLV100	162	12766	SHAFT	1	PMV
	12918	GEAR	1	PLV150		12897	SHAFT	1	PLV
	12919	GEAR	1	PLV200					
	12920	GEAR	1	PLV250					
	154	12739	HOUSING	1	PMV100				
12738		HOUSING	1	PMV150					
12737		HOUSING	1	PMV200					
12736		HOUSING	1	PMV250					
12882		HOUSING	1	PLV100					
12883		HOUSING	1	PLV150					
12884		HOUSING	1	PLV200					
12885		HOUSING	1	PLV250					



Maintenance

(also see section V, page 4)

General

As with all running equipment, it is good practice to establish daily routine checks of the transmission. A visual inspection of the unit should include looking for minor leaks and checking the oil level. Maintain the oil level at the mark on the dipstick by checking prior to starting the engine.

Oil Change

The transmission oil should be changed each season or every 100 hours of service under normal conditions. See diagram 4, part 86 for the location of the drain plug. Make certain the drain plug is tightened before refilling.

Shift Cable and Controls

The cable controls should be periodically checked to make certain travel is maintained. Also check that the transmission shift lever is in the neutral position, when the control lever is positioned in neutral. Inspect cables every 100 hours of operation.

Neutral Safety Switch

This safety switch (part 51, diagram 2) has been provided to help guard against engine start up while transmission is in either forward or reverse.

Major Repairs

A service manual is available to assist in all necessary repairs.

Notes