

Owners Handbook



PRM

MADE IN ENGLAND

80

90

120

150

260

500

750

1000

1200A

1500

1750

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WARNING: THIS SYMBOL WARNS OF POSSIBLE PERSONAL INJURY.



CAUTION: THIS SYMBOL WARNS OF ANY POSSIBLE DAMAGE TO TRANSMISSION.

PRM Marine Ltd operate a policy of product improvement and therefore reserve the right to change specifications without prior notification. Whilst every effort is made to ensure complete accuracy of the information in this manual no liabilities for inaccuracies or the consequences thereof can be accepted by the manufacturer or the distributor/dealer who supplied the manual.

WARRANTY STATEMENT

PRM Marine Ltd warrants to Engine manufacturers and to PRM Marine Ltd distributors that all PRM Marine Gearboxes manufactured by PRM Marine Ltd will be free from defects in material and workmanship under normal use and service for the period as follows,

Twenty four months from date of despatch from PRM Marine Ltd.

It is essential that all PRM hydraulic and mechanical marine gearboxes are correctly installed, aligned and maintained.

This handbook contains important instructions to ensure this and it is of the utmost importance that these are carefully followed. PRM Marine Ltd can accept no responsibility under warranty or otherwise for any loss or damage resulting from failure to observe these instructions.

To avoid prejudicing warranty rights, do not undertake any repair or other work on the gearbox during the warranty period without first contacting PRM Marine Ltd or an authorised distributor or dealer for advice. In the event of failure, this should be done via the local PRM Marine Ltd distributor/dealer or PRM Marine Ltd direct.

This warranty does not apply to any gearbox or part that has been subject to misuse, negligence, damage, improper maintenance or use beyond rated capacity.

SERIAL NUMBER PLATE (Note it is important that this Serial Number is submitted with any warranty query)

On the top half of the gearcase of every PRM Marine Ltd gearbox is an identification plate with two lines of numbers. The top line is the gearbox serial number, whilst the lower line comprises the gearbox specification (model, ratio, etc.).

PRE-DELIVERY TEST

Before leaving the factory each gearbox is subject to a final test and inspection, which includes the following:

- | | |
|---|---|
| 1 Flush clean | 7 Check operating temperature |
| 2 Check time to reach operating temperature | 8 Check operating oil pressure (Not PRM80/90/120) |
| 3 Pressurise case, check for leaks | 9 Check output nut torque |
| 4 Check noise level | 10 Check input spline dimensions |
| 5 Check drag in neutral | 11 Check bolt torques |
| 6 Check valve block operating force | 12 Check coupling concentricity |

NOTE: Throughout this owner's handbook, engine and propeller rotations are always described as seen looking forward from propeller to gearbox.

INTRODUCTION

PRM Marine Ltd marine gearboxes are purpose designed and built for smooth, reliable and efficient operation. This handbook contains important information on the installation, operation and maintenance of your gearbox. **It is essential that all owners acquaint themselves thoroughly with their gearbox and follow carefully the instructions contained in this handbook.**

Important

In order to avoid possible danger to persons or property due to accidents arising from mis-use of the gearbox it is essential that the gearbox be used in conformity with the technical information provided by PRM Marine Ltd and that the owner operator carefully follows the installation, operation and maintenance instructions provided to ensure that operation is as safe as possible. All working machinery must be regularly checked and inspected to ensure this.

INSTALLATION

Engine/Gearbox Drive

Drive is transmitted to the gearbox via a flexible input coupling mounted on the engine flywheel, into the centre of which the gearbox input shaft locates. **It is most vital that engine, gearbox and coupling are correctly aligned; if not, vibration, transmission noise and even failure may result.** For complete alignment instructions refer to the gearbox workshop manual.

Oil Cooler

All PRM Marine Ltd gearboxes (except PRM80/90/120) **must** be fitted with an oil cooler to maintain correct working temperatures. Two $\frac{3}{8}$ in. BSP ($\frac{1}{4}$ in. BSP on PRM150, $\frac{1}{2}$ in. BSP on PRM1500) connections are provided on the valve block to allow a suitable cooler to be fitted; these are blanked off with "Redcap" plugs for delivery from the factory. The gearbox oil cooler is usually mounted on the gearbox adaptor flange or the bulkhead of the boat and then connected into the engine cooling system. Full instructions on cooler installation are provided in the workshop manual. See caution note reference cooler pressures page 7.

Propeller Shaft Alignment

Correct alignment of the propeller shaft coupling flange and the gearbox output flange is essential, since misalignment can cause excessive vibration and stress, leading to damage and possible oil seal and bearing failure.

Alignment should only be carried out with the boat afloat, the maximum permissible misalignment being 0.05mm; see workshop manual for instructions.

Installation Angle

The transmission should normally be installed so that the maximum fore and aft angle relative to the waterline does not exceed 17° (15° on PRM80/90/120/150) with the vessel at rest. If installation angles greater than this are required, please consult PRM Marine Ltd for advice.

Twin Installations (Not PRM80/90/120)

For efficient operation, it is usually considered preferable for the starboard (right hand) propeller to rotate clockwise and the port (left hand) propeller to rotate anti-clockwise.

Remote Control Operating System

It is strongly recommended that PRM Marine Ltd gearboxes are used with a remote control operating system, **which should be connected strictly in accordance with the manufacturer's recommendations.** Care must be taken to ensure that the cable moves the gearbox operating lever approximately 2mm short of its forward or backward travel, to prevent the lever being brought 'hard-up' against its end stop with every gear shift. This does not apply to PRM80/90/120 which **must** be adjusted against the stop in both directions. Failure to correctly adjust the shift lever may result in premature wear to the drivetrain. PRM Marine Ltd gearboxes are provided with a positive neutral position, which greatly assists in setting up the remote control operating system.

NOMINAL POWER RATINGS - PRM HYDRAULIC REVERSE/REDUCTION MARINE GEARBOXES

MODEL	SHAFT ARRANGE- MENT	RATIO Ahead/ Astern	Input rotation	Output rotation	MAXIMUM INPUT SPEED REV/MIN		NOMINAL POWER RATINGS per 100 rev/min					
							PLEASURE		LIGHT COMMERCIAL		HEAVY COMMERCIAL	
					Con- tinuous	Inter- mittent	kW	BHP	kW	BHP	kW	BHP
PRM80D (note astern ratio)	Offset Offset 2.5:1	2:1 2.5:1	LH LH	RH RH	5000	-	0.84	1.12	0.55	0.74	-	-
					5000	-	0.73	0.98	0.48	0.65	-	-
PRM90D (note astern ratio)	Offset Offset 2.5:1	2:1 2.5:1	LH LH	RH RH	5000	-	0.93	1.25	0.93	1.25	-	-
					5000	-	0.75	1.00	0.64	0.86	-	-
PRM120D (note astern ratio)	Offset 2.5:1	2:1 2.5:1 3:1	LH LH LH	RH RH RH	5000	-	1.25	1.67	0.68	0.91	-	-
					5000	-	1.00	1.34	0.68	0.91	-	-
					5000	-	0.83	1.11	0.58	0.77	-	-
PRM150D	Offset	1.5:1/2:1/3:1	LH	LH/RH	4500	5000	1.6	2.1	1.1	1.5	-	-
PRM260D/C	Offset & In-Line	2:1/3:1	LH/RH	LH/RH	4000	4500	2.72	3.65	2.51	3.36	2.31	3.08
PRM500D	Offset	1.5:1/2:1 2.5:1/3:1	LH/RH LH/RH	LH/RH LH/RH	4000	4500	4.76	6.38	4.62	6.19	4.40	5.90
					4000	4500	4.62	6.19	4.40	5.90	4.40	5.90
PRM750A	8° Down Angle	1:1/1.5:1 2:1/2.5:1 3:1	LH/RH LH/RH LH/RH	LH/RH LH/RH LH/RH	4000	4500	7.17	9.62	5.68	7.62	5.39	7.23
					4000	4500	7.07	9.48	5.68	7.62	5.39	7.23
					4000	4500	5.96	8.00	5.60	7.51	5.24	7.02
PRM750D/C	Offset & In-Line 4:1 In-Line Not Available	1:1/1.5:1 2:1/2.5:1 3:1/4:1	LH/RH LH/RH LH/RH	LH/RH LH/RH LH/RH	4000	4500	7.85	10.52	6.07	8.13	5.86	7.85
					4000	4500	7.07	9.48	5.86	7.85	5.55	7.43
					4000	4500	5.96	8.00	5.60	7.50	5.24	7.02
PRM1000D	Offset Only	1.5:1 2:1 3:1/4:1	LH/RH LH/RH LH/RH	LH/RH LH/RH LH/RH	3000	3500	10.47	14.04	7.75	10.39	7.33	9.82
					3000	3500	9.43	12.64	7.44	9.96	7.02	9.40
					3000	3500	8.58	11.50	7.44	9.96	7.02	9.40
PRM1000A	10° Down Angle only	1.5:1 2:1 3:1	LH/RH LH/RH LH/RH	LH/RH LH/RH LH/RH	3000	3500	9.66	12.95	7.10	9.52	6.67	8.95
					3000	3500	9.43	12.64	7.10	9.52	6.67	8.95
					3000	3500	8.58	11.50	7.10	9.52	6.67	8.95
PRM1500D	Offset Only	3.12/3.88/4.5:1 4.9:1	LH LH	LH/RH LH/RH	2500	3000	15.70	21.06	14.65	19.65	13.63	18.28
					2500	3000	13.63	18.28	12.58	16.87	11.53	15.46
PRM1500S	Offset Only	1.22/1.56/1.94:1 2.25/2.45:1 3:1	LH LH	LH/RH LH/RH	2500	3000	15.70	21.06	14.65	19.65	13.63	18.28
					2500	3000	14.12	18.93	13.07	17.52	11.76	15.77
PRM1750D	Offset Only	3.12/3.88/4.5:1 4.9:1	LH LH	LH/RH LH/RH	2500	3000	18.33	24.58	17.04	22.85	15.76	21.13
					2500	3000	16.76	22.48	15.58	20.89	14.41	19.32
PRM1750S	Offset Only	1.22/1.56/1.94:1 2.25/2.45:1 3:1	LH LH	LH/RH LH/RH	2500	3000	18.33	24.58	17.04	22.85	15.76	21.13
					2500	3000	18.33	24.58	17.04	22.85	15.76	21.13

Note: These powers are expressed in BHP and KW per 100 rev/min engine operating speed and are measured at the engine flywheel. Ratings have been established to ensure the long and trouble free life of the gearbox which should not therefore, be used at powers in excess of those shown. PRM Marine Ltd accepts no liability, whether under warranty or otherwise, in respect of transmissions which have been used at ratings higher than those listed above.

SERVICE CLASSIFICATION DEFINITIONS

PLEASURE: limited to planing hull pleasure craft with a maximum of 500 hours operating time per year, of which not more than 5% should be at full engine throttle, with the balance of usage at 90% or less of full throttle. The use of PRM Marine gearboxes according to this classification in any commercial boat, or in sport-fishing charter boats or long-range pleasure cruisers, is not approved.

LIGHT COMMERCIAL: planing or semi-displacement craft used in pleasure or commercial application may qualify for light commercial rating if annual usage is less than 1500 hours and full throttle operation is limited, with most operating time at partial throttle.

HEAVY COMMERCIAL: all displacement and semi-displacement craft used for commercial applications should be classed as heavy commercial duty. In this type of vessel (such as trawlers, purse seiners, lobster and crab boats, tugs, ferries, offshore supply boats etc.) the gearbox is expected to work at full governed engine speed. The power setting of the engine must be known and must be within the permitted heavy commercial rating of the gearbox.

IMPORTANT NOTE

- 1 It is essential that the engine, transmission model, reduction ratio and propeller size are correctly matched so that the engine can attain its rated speed appropriate to the relevant service classification without labouring.
- 2 It is also necessary to ensure the torsional compatibility of the complete propulsion system from engine through to propeller, since disregarding this may result in gear noise, particularly at low speed operation and may even result in damage to the engine as well as to transmission components.

PRM Marine Ltd will provide all possible information and assistance to help find solutions to potential torsional problems, but it is the ultimate responsibility of the person assembling the drive and driven equipment to ensure that they are torsionally compatible.

PRM 150/260/500/750/1000/1500/1200A/1750	
TEMP.	TYPE OF OIL
Below Zero	10W30 or 20W. Engine Oil.
0°C to 30°C	10W30 or 15W40. Engine Oil.
Above 30°C	10W30 or 40W. Engine Oil.

PRM 80/90/120 - Automatic Transmission Fluid (ATF)

It is essential that only **good quality** engine oil, supplied by a **recognised and well known manufacturer**, is used in PRM Marine Ltd Marine Transmissions. **Do not mix different brands, types or grades of oil.**

Failure to comply with the above oil types or to seek advice from PRM Marine Ltd for approval for any type of oil not listed may result in forfeiture of warranty cover since no claims under warranty will be entertained if oil of the wrong type is used.

OIL CAPACITIES AND PRESSURES

Model	Approximate Oil Capacity		Operating Pressures			
	Litres	Pints	Minimum kPa	Minimum lb/in ²	Maximum kPa	Maximum lb/in ²
PRM80	0.6	1.00	-	-	-	-
PRM90	0.5	1.00	-	-	-	-
PRM120	0.7	1.25	-	-	-	-
PRM150	1.4	2.50	2500	370	2850	420
PRM260D	1.5	2.64	1800	265	2200	320
PRM260C	1.7	3.00	1800	265	2200	320
PRM500D	2.5	4.40	1800	265	2200	320
PRM750D	2.5	4.40	3000	440	3300	485
PRM750D4	3.5	6.16	3000	440	3300	485
PRM750A	3.0	5.28	3000	440	3300	485
PRM750C	3.0	5.28	3000	440	3300	485
PRM1000D	3.0	5.28	3000	440	3300	485
PRM1000D4	4.0	7.04	3000	440	3300	485
PRM1000A	3.5	6.16	3000	440	3300	485
PRM1500S	10.0	17.60	2827	410	3100	450
PRM1500D	8.0	14.00	2827	410	3100	450
PRM1750S	10.0	17.60	2827	410	3100	450
PRM1750D	8.0	14.00	2827	410	3100	450

The pressures listed above assume a gearbox operating temperature of 70°C and an input speed of not less than 1500 rev/min. Pressure gauge reading 600PSI maximum can be connected to the 1/8"BSP pressure port on the valve block (See opposite illustration).

IMPORTANT

The oil capacities listed are approximate since they do not include the amount needed to fill the cooling circuit (not PRM80/90/120), which therefore has to be added to give the total volume of oil required for the total gearbox system.

In any event, the above table is provided for guidance only and care must be taken to ensure that the gearbox is topped up to the maximum level on the dipstick.

The correct way of checking the oil level by using the dipstick is:

- 1 First fill the gearbox with the correct quantity and specification of oil (see above and page 5).
- 2 Ensure that the gearbox is in neutral.
- 3 Run the engine and gearbox to ensure that there is oil in the cooling circuit.
- 4 Switch off, then remove and wipe the dipstick.
- 5 **Screw the dipstick fully down**, then remove it and read the oil level.
- 6 Top up with an approved oil (see page 5) to the maximum mark on the dipstick.
- 7 Replace the dipstick, **ensuring that it is fully screwed down into position**.



**WARNING: Do not remove dipstick with engine running.
HOT OIL CAN CAUSE BURNS**



CAUTION: Clean area around dipstick prior to filling with oil or checking level

Note: using the gearbox with insufficient oil is likely to lead to low oil pressure, unsatisfactory operation, overheating and eventual failure. Equally, filling the gearbox with too much oil may cause overheating and oil leaks; **it is the owner/operators responsibility, therefore, to ensure that the oil level is correct at all times.**

Dipstick Location

PRM80/90 1/2 in. A/F hex plug, front of case, R/H side; **PRM120** 18mm A/F hex plug, rear of case, R/H side; **PRM150** 18mm A/F hex plug, rear of case, L/H side; **PRM260/500/750** 18mm A/F hex plug, front of case, R/H side; **PRM1000** 18mm A/F hex plug, front of case, L/H side; **PRM1500/1750** 18mm A/F hex plug, R/H side mounting pad.



If the operating pressure is below the minimum value listed for your specific gearbox model, corrective action **must** be taken (see fault-finding chart) or gearbox damage may result. (Not applicable to PRM80/90/120.)

If operating pressure is higher than the maximum listed, (other than for very short periods after start-up when the oil is still cold), qualified assistance must be sought to correct the condition. (Not applicable to PRM80/90/120.)



It is important to ensure that any oil cooler used is capable of withstanding lubrication pressures in the order of 2040 kpm (300lb/in²). This may be seen on initial start-up from cold at maximum engine speed.

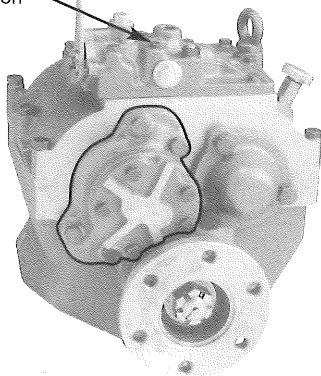
GENERAL

Input Rotation

In their standard form, PRM Marine Ltd Marine gearboxes are built for use with left hand (anti-clockwise) rotating engines, at the ratings listed on page 4. The majority can, however, easily be adapted to accept right-hand (clockwise) rotating engines, simply by turning the oil pump through 180°. (**Note:** this does not apply to the PRM80/90/120/150/1500/1750 gearboxes, which **must** be used with left hand rotating engines **only**.)

The mounting positions of the oil pump are as follows:-

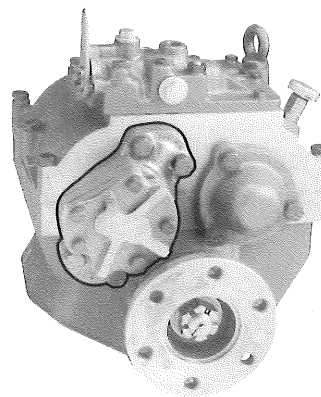
Pressure Gauge
Connection



anti-clockwise engines
(or clockwise on angle drive and in-line gearboxes)

OIL PUMP MOUNTING

(Not applicable to PRM80/90/120/150/1500 & 1750)



clockwise engines
(or anti-clockwise on angle drive and in-line gearboxes)

Note: Engine rotation is described as seen looking on the flywheel from behind the engine.

Output Rotation (does not apply to PRM80/90/120)

Because PRM Marine Ltd gearboxes have identical clutches, gears and bearings on both input shaft and layshaft, either a L.H. or R.H. propeller can be used at their full speed and horse power ratings, irrespective of input rotation (see rating chart). (PRM150/1500/1750: **L.H. input rotation only.**)

On all offset gearboxes (except PRM150) used with the more common left hand (anti-clockwise) rotating engines, moving the gearbox operating lever back provides right hand propeller rotation and moving it forward provides left hand propeller rotation.

If the gearbox is used with the less common right hand (clockwise) rotating engines, the operation is reversed:- moving the gearbox operating lever back provides left hand propeller rotation and moving it forward gives right hand propeller rotation. On angle drive (PRM750A, PRM1000A) and in-line (PRM260C, PRM750C) gearboxes, the movement of the operating lever is the reverse of that described above.

On PRM150 **only** moving the gearbox operating lever to port provides right hand propeller rotation and moving it to starboard provides left hand propeller rotation.

IMPORTANT RIGHT HAND PROPELLER REQUIRED FOR PRM80/90/120

Note

Engine and propeller rotations are described as seen looking forward from propeller to gearbox. In order to achieve the best possible gear shifting, it is recommended that a single lever control system (i.e. connected to the engine throttle as well as the gearbox) should be used.

OPERATION

First Time Usage

Before starting the engine remove the dipstick, fill the gearbox with one of the recommended lubricants (see table on page 5) to the maximum mark on the dipstick, then replace the dipstick by screwing it fully down for correct level.

Ensure that the gearbox is in neutral (we recommend that the optional neutral safety start switch (not available on PRM80/90/120) be wired into the starter circuit to avoid uncontrolled boat movement on start-up), then start the engine and run for a few minutes to allow the oil to circulate through the cooling circuit. Stop the engine, let the oil settle, then re-check the level and 'top up' to the maximum mark on the dipstick (see page 5).

Operating Temperature

Normal operating temperature should be between 50°C - 80°C with a maximum of 90°C (120°C for PRM80/90/120) permissible for very short periods only. If the gearbox consistently runs at temperatures above 80°C, carry out the checks listed in the fault-finding chart; if no fault is found, fit a larger capacity cooler.

Gear Shifting (Except PRM80/90/120)

PRM Marine Ltd Hydraulic Marine gearboxes have been designed and tested to ensure rapid shifts from ahead to astern and vice versa at full horsepower ratings and speeds if necessary. **However, since full-power shifts do place abnormal, even if short lived, loads on the gearbox and if used indiscriminately will reduce its operating life, they should be reserved for emergency use only.**



Gear Shifting PRM80/90/120 only.

Engine **must be at idle** before changing direction. Pause in neutral when selecting ahead or astern. The PRM80/90/120 can be used with remote control operating systems which must be of the single lever type of remote control, i.e. Morse MT3 or SL3 which controls both the engine throttle and gear selection.

Trailing (Free-wheeling) the Propeller

The bearings used in PRM Marine Ltd gearboxes have been carefully selected to ensure that prolonged trailing (free-wheeling) of the propeller will not harm the transmission. This allows the propeller to turn freely with the engine shut down, making the gearbox particularly well suited for use in auxiliary sailboats, motor sailers, or multi-engine installations where the boat may be operated with one or more engines shut down.

Emergency Operation (Not applicable to PRM80/90/120)

Included as standard in every PRM Marine Ltd Hydraulic marine gearbox is a “get-you-home” device which, in the unlikely event of hydraulic failure, enables the gearbox to be locked in 'ahead' allowing the boat to be brought to safety.



To operate, **first switch off the engine, disconnect the operating cable and ensure that the gearbox operating lever is in the neutral position**, then proceed as follows:

a PRM150

- 1 Remove the 9 hexagonal bolts securing the rear manifold to the gearcase and taking care not to lose the small socket wrench located inside it, take off the manifold complete with oil pump.
- 2 Rotate the input shaft until two socket screws in the clutch align with the two holes in the rear of the gearcase.
- 3 Insert the socket wrench through the two holes and tighten each screw in turn; this locks up the clutch plates, providing drive for a right-hand rotating propeller. (**Note:** left-hand rotation **cannot** be provided).
- 4 Refit the rear manifold and tighten the bolts to a torque of 30Nm .
- 5 Ensure that sufficient oil remains in the gearbox to avoid further damage.

b PRM260

- 1 Remove the top cover (located alongside the valve block).
- 2 Select the shaft which provides the appropriate propeller rotation (see note 'a' on page 10) and rotate until one of the grooves on the outer edges of the clutch end plate is uppermost.
- 3 Take one of the top cover securing screws and screw it tightly into the threaded hole in the clutch plate directly beneath the groove: this clamps the clutch and provides drive.
- 4 Check that the dipstick does not foul the head of the screw now fitted in the clutch: if it does, remove the dipstick and plug the hole with a clean cloth.
- 5 Ensure that sufficient oil remains in the gearbox to avoid further damage and refit the top cover, tightening the bolts to a torque of 28Nm .

c PRM500 and PRM750

- 1 Remove the top cover (located alongside the valve block).
- 2 Select the shaft to provide the required propeller rotation (see note 'a' on page 10) and rotate until the spring clip, which holds the two clamping screws in position, is accessible.
- 3 Remove the spring clip and tighten the two screws: this locks up the clutch pack and provides the drive.
- 4 Check that the dipstick does not foul the head of either clamping screw: if it does, remove the dipstick and plug the hole with a clean cloth.
- 5 Ensure that sufficient oil remains in the gearbox to avoid further damage and refit the top cover, tightening the bolts to a torque of 28Nm .

d PRM1000

- 1 Remove the top cover (located alongside the valve block): the hexagonal key for operating the emergency device is held in a clip on the underside of this cover.
- 2 Select the shaft to provide the required propeller rotation (see note 'a' below).
- 3 Locate the clutch end plate: this has three tapped holes, angled to provide access. Rotate the shaft until one of the holes is uppermost.
- 4 Insert the hexagonal key and screw the grub screw as tight as possible, rotating the clutch gear to ensure the screw locates in between the spline teeth.
- 5 Rotate the shaft and similarly tighten the other two grub screws.
- 6 Ensure that sufficient oil remains in the gearbox to avoid further damage and refit the top cover, tightening the bolts to a torque of 28Nm .

e PRM1500/1750

- 1 Remove the oil pump, held on by 6 hexagonal bolts.
- 2 Remove shimming and bearing cup.
- 3 Rotate the input shaft by using the pump slot to expose 4 socket headed grub screws. These need to be tightened with a 4mm hexagon key to engage the clutch.
- 4 Repeat above operation by removing the cover, if appropriate clutch is used for ahead. This is located next to the oil pump.
- 5 Replace bearing cup and shimming.
- 6 **Re-seal** the oil pump back into place and fix on with the six bolts.
- 7 Ensure that sufficient oil remains in the gearbox to avoid further damage.

The engine can now be run, but to minimise the possibility of further damage being caused to the gearbox, engine speed should be limited to 1/3rd full throttle.

IMPORTANT NOTES

a Assuming an anti-clockwise engine, the shaft to select is:

- left hand propeller: left hand shaft (PRM260D, 500D, 750D, 1000D, 1500S/D, 1750S/D)
right hand shaft (PRM260C, 750A, 750C, 1000A)
- right hand propeller: right hand shaft (PRM260D, 500D, 750D, 1000D, 1500S/D, 1750S/D)
left hand shaft (PRM260C, 750A, 750C, 1000A)

(all rotations are described as seen looking forward from the propeller to the gearbox).

(only right hand propeller rotation can be provided by the PRM150 emergency device).



b When emergency drive is engaged, neither astern or neutral can be used and there is thus no means of stopping the boat using the gearbox; consequently great care must be taken when manoeuvring the boat, particularly during docking.

c After emergency drive has been used, qualified assistance must be sought to check the transmission thoroughly before it is used again.

d Never use the top cover for topping up the oil.

ROUTINE MAINTENANCE

It is recommended that all PRM Marine Ltd gearboxes be run for 15minutes before the oil is drained and replaced.

After the first 25 hours running

Run the engine until the oil reaches a minimum temperature of 50°C, then switch off, drain the oil from the gearbox and cooling system and re-fill with one of the recommended lubricants. Operate the engine and gearbox, allowing the oil to circulate, then stop the engine and let the oil settle. Re-check the oil level by screwing the dipstick down fully and top up if necessary to the maximum mark on the dipstick.

Note: Drain plug located rear right hand side on PRM1500/1750, 1000, 750 and 150, front on 500 and 260 and in the centre of the main case of PRM80/90/120.



WARNING: Hot oil burns

Daily

Check the oil level and check visually for oil leaks, especially around the output shaft oil seal and at gasket sealing surfaces.

Annually

Check oil cooler hoses and connections and correct/replace as necessary. Check propeller shaft alignment and correct if necessary. Ensure that the remote control operating linkage is adjusted to give the correct travel on the gearbox operating lever (see page 3). Check that all fasteners are tightened to the correct torque (see workshop manual for this information).

Oil changes

Gearbox oil should routinely be changed annually or at intervals corresponding with engine oil changes, whichever occurs first. However, if the oil should become contaminated by water, or if the gearbox suffers major mechanical damage, the gearbox, oil cooler and hoses **must be thoroughly flushed out** and the gearbox re-filled with fresh oil to the correct specification.



WARNING: Hot oil burns

OPTIONAL EQUIPMENT

Neutral Safety Switch (Not available for PRM80/90/120)

This switch ensures the engine cannot be started unless the gearbox is in neutral; PRM Marine Ltd strongly recommends that it should be fitted in all installations. The device is standard supply on the PRM1000.

Power Take Off - PRM500/750/1000/1500/1750

The power take off mounts directly to the rear face of the gearbox and is available factory fitted or as an assembly for retro-fitting on existing gearbox installations.

It is designed for use with hydraulic pumps to SAE J744C series "B" (and series "C" for PRM1500/1750 only) specification and is a very compact, economical and effective method of powering hydraulic equipment on vessels where the provision of an auxiliary drive from the main engine may be difficult or expensive.

Whilst gear, vane or piston hydraulic pumps can be used with these units, **they must not be fitted with any adaption for driving an outrigger pulley** since the mounting provided is not designed to handle the side loads which this would entail.

The clutched PTO unit available on the PRM1000 provides pump rotation in the same direction as the engine, whereas the clutched PTO for the PRM1500/1750 and the direct drive PTO offered for the PRM500 and PRM750 provides rotation opposite to the engine.

IMPORTANT NOTE - PRM1000/1500/1750 ONLY - PTO Retrofit. A soft shift valve is fitted as standard. When retro-fitting a PTO this valve MUST be changed using the replacement valve block supplied with the PTO kit.

All hydraulic circuits driven by PRM Marine Ltd PTOs must be designed, installed and maintained in accordance with the hydraulic equipment manufacturer's recommendations and be properly safeguarded against overloading.

Angle Drives - PRM750A/1000A

The angle drive assembly mounts on the front of the gearbox and provides a down angle on the output shaft of 8° on the PRM750, and of 10° on the PRM1000. It also reduces the centreline distance between the engine crankshaft and the gearbox output shaft.

Note: If an angle drive is retro-fitted, the gearbox output rotation will be reversed, it will therefore be necessary to reverse the control lever movements to give the correct output rotation for 'ahead' or 'astern' (see page 8). The oil capacity also increases (see chart, page 6) and a replacement dipstick will have to be fitted. (See reference to pump position below).

In-line- PRM260C/750C

A factory fitted 'step-up' gearbox fitted to the main gearcase brings the output shaft on to the same centreline as the input shaft and reproduces the input shaft length and spline, the adaptor flange and the mounting pads used on certain competitors in-line gearboxes. For oil pump mounting positions, operating lever movements and output rotations (see pages 7 and 8).

Trolling Valve - PRM260,500,750,1000,1500,1750

A separate instruction leaflet is issued with each trolling valve.

FAULT FINDING CHART

Symptom	Cause	Reason	Remedy
No drive ahead or astern	No oil pressure*	Damaged oil pump* Broken input coupling Oil leaks Insufficient oil	Replace oil pump* Replace coupling Check for evidence and rectify Check level, top up as necessary
Propeller speed does not increase with engine speed, ahead and astern	Low oil pressure to both clutches*	Damaged oil pump* Remote control cable or linkage not allowing F-N-R lever to move correct distance Pressure relief valve spring defective*	Replace oil pump* Remove cable and operate lever by hand to check movement. Adjust cable if necessary Remove valve block and replace spring*
Propeller speed does not increase with engine speed in one direction only	Low oil pressure to one clutch*	Piston rings or feeder worn* Blocked oil strainer* Damaged 'O' ring in hydraulic circuit* Blocked hydraulic passage in valve block* Damaged clutch plates or clutch cones (PRM80/90/120)	Remove appropriate clutch shaft and replace worn feeder or piston rings* Remove, clean and replace if necessary* Check 'O' rings in feeder connectors and piston; replace if necessary* Remove valve block, examine and clean* Remove and examine clutch/clutch cone on appropriate shaft and replace if necessary
Excessive noise from gearbox at low speeds	Engine idle speed set too low Torsional vibration	Faulty adjustment Torsional incompatibility of elements in driveline	Increase idling speed If not cured by increasing engine idling speed, refer to engine supplier
Excessive noise throughout	Defective input coupling operating range Propeller shaft misalignment	Input coupling worn or damaged Hull flexing or faulty installation	Remove, examine and replace if necessary Check the alignment of the propeller shaft coupling; if necessary rectify by adjusting the shims under the engine mounts or the engine mounts themselves

*does not apply to PRM80/90/120

Symptom	Cause	Reason	Remedy
Excessive noise throughout operating range	Propeller out of balance	Propeller damaged or badly machined	Remove the propeller and check that the pitch, weight, diameter and balance of all the blades are equal and rectify if necessary
	Engine/gearbox misalignment	Faulty installation	Remove the transmission and check that the flywheel face is flat and that the flexible input coupling is aligned correctly
	Defective bearing	Bearing worn or damaged	Isolate defective bearing, remove and replace
Excessive oil temperature	Fault in cooling system*	Defective oil cooler*	Replace oil cooler*
		Oil cooler too small*	Fit larger capacity cooler*
		Defective pressure relief valve*	Remove and examine relief valve* and replace if necessary
		System blocked*	Check and flush out oil cooler and * hoses
	Power too high	Oil pipes too small*	Fit larger diameter hoses*
Oil level needs constant topping-up	Oil leaks	Incorrect engine rating	Re-assess engine power
		Defective oil seal, gasket or 'O' ring	Clean the outside of the gearcase, particularly around the ends of shafts including the output shaft. Run the engine and inspect the gearbox for leaks. Replace seals as required
		Defective oil cooler or hoses*	Check for traces of water in the gearbox oil or oil in the cooling water system. Replace cooler or hoses as necessary
Escape of high pressure from	Defective breather causing leaks gearbox when dipstick is removed	past oil seals	Contact distributor or factory for advice
Difficulty in moving single lever control	Control lever on valve block too stiff	Defective valve or detent spring	Contact distributor or factory for advice
	Faulty installation	Remote control operating cable	Check the installation and eliminate all tight bends in the cable

*does not apply to PRM80/90/120



IMPORTANT: The above operations should be carried out by suitably qualified personnel and strictly in accordance with the procedures detailed in the workshop manual. Before carrying out any service work always ensure that the engine is switched off and disconnect the operating cable from the gearbox.

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MAINTENANCE RECORD

PRM GEARBOX

RECORD YOUR GEARBOX
DETAILS HERE

Model Number _____

Serial Number _____

Ratio _____

Date of Purchase _____

First Operated _____

Distributor/Where Purchased _____

Oil Changed

Date	Date	Date

Service Record

Date	Service Carried Out

WARRANTY:- PRM Marine Ltd warrants to Engine manufacturers and to PRM Marine Ltd distributors that all PRM Marine Gearboxes manufactured by PRM Marine Ltd will be free from defects in material and workmanship under normal use and service for the period as follows, whichever occurs first, always quote Serial Number in any claim:-

1 Twenty four months from date of despatch from PRM Marine Ltd.

This warranty does not apply to any gearbox or part that has been subject to misuse, negligence, damage, improper maintenance or use beyond rated capacity.

NOTES

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