English

Installation, Operation and Maintenance Instructions

AGM - Agricultural Products

Mono®

MPA550/5

One Company, Unlimited Solutions

Contents

PLEASE READ THESE INSTRUCTIONS CAREFULLY BEFORE COMMENCING INSTALLATION

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Delivery Record

This form must be filled out and signed by the customer at the time the unit is delivered in order for the warranty to be valid.

CUSTOMER NAME.....

ADDRESS..... TOWN.....
.....

STATE..... PHONE.....

OWNERS/CUSTOMERS
SIGNATURE.....

NAME OF DEALER.....

ADDRESS.....

SIGNATURE OF DEALER..... DELIVERY DATE.....

PUMP DETAILS

PUMP MODEL.....SERIAL No.....

MOTOR MODEL..... SERIAL No.....

ENGINE MODEL..... SERIAL No.....

CONDITIONS OF SERVICE

PUMP CAPACITY.....L/hr (or GPH) SUCTION LIFT.....M (or ft)

TOTAL HEAD.....m/head (or ft/head)

PUMP SPEED.....rpm

MOTOR.....Phase.....volts.....rpm.....hp

ENGINE.....WATER USE.....

Warranty

MONO PUMPS (AUSTRALIA) PTY. LTD. (the Company) agrees to warrant to the original purchaser the quality of goods or part thereof manufactured by us by making good or replacing parts of goods which under proper use appear defective within twelve (12) calendar months after delivery and which are proved to be defective solely due to faulty workmanship or the use of defective material on our part.

Such defective parts shall be returned at purchasers expense to our works or as otherwise arranged. Defective parts replaced shall become our property.

The repaired or new parts will be delivered free to any site to which regular commercial transport is available.

In the case of any goods or part of the goods not manufactured by us, our warranty to you hereunder shall be the same as any warranty given to us by the supplier to us of such goods or part of such goods provided always that we shall not be liable for any greater expense than the amount which we shall actually recover from the supplier under any warranty given by him.

The Company accepts no responsibility for labour costs or travelling expenses incurred in fitting replacement parts.

The Company shall not be liable to you or to your servants or agents for any direct or indirect incidental or consequential damages including but not limited to loss of profits loss or production loss of sales opportunity or business reputation direct or indirect labour costs personal injury and overhead expenses and damage to equipment or property or any other claim whatsoever arising directly or indirectly or in any way attributable to the performance of this Contract.

This guarantee is invalidated by alterations made to the equipment without the Company's written consent, the operation of the equipment in excess of its rated capacity or under conditions detrimental to its successful running or likely to cause excessive wear and tear, the misuse or failure to follow the instructions contained in the instruction book or operators handbook.

Any benefits which we may confer upon you under the warranty contained herein are in addition to all other rights and remedies which may not be limited modified or excluded by contract in respect of the goods and/or services which you may have under the Trade Practices Act 1974 Commonwealth, the Goods Sales and Leases Act 1981 Victoria or any other like State and Territory Laws.

In case of claim please contact your Authorised Mono Dearler or contact Mono Pumps (Australia) Pty. Ltd. direct with details as completed in Delivery Record.

1 INTRODUCTION

Your Mono Pumps will come in one of 4 forms:-

(a) Electric Motor or petrol engine mounted above the pump body - i.e. no pressed steel base. This form would only occur with 320, 520 and 620 sizes.

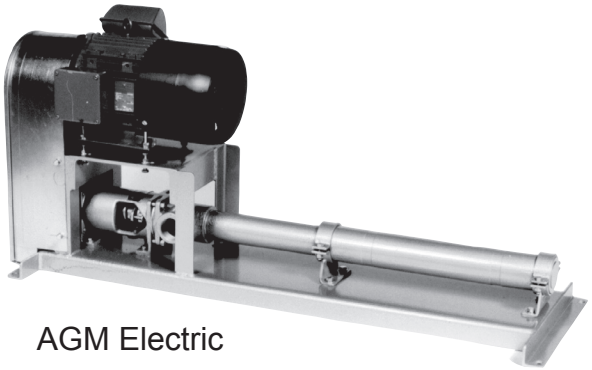
(b) Pump and motor mounted on a pressed steel or fabricated steel base. This is for higher powered motors and larger pumps.

(c) Fabricated base with diesel engine set up to drive the pump.

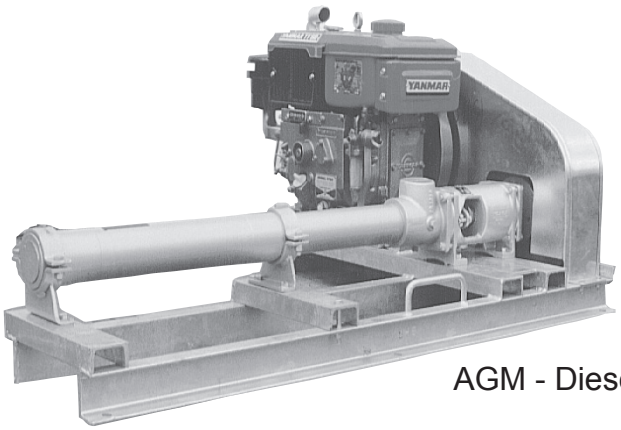
(d) Bareshaft - for motorising by other.

Please read this Manual carefully, so that your pump is correctly installed, safe to operate and will be properly maintained to give years of trouble free pumping.

AGM - Bareshaft



AGM Electric



AGM - Diesel

Installation

(a) **Handling.** Mono pumps generally are heavy. Lift carefully to avoid injury. If possible use slings and lifting equipment.

(b) **Mounting.** Ensure your pump sits on a firm flat foundation. It should either be bolted down or sat on rubber pads to prevent fretting. If bolting ensure the base is not twisted, especially if the motor is direct coupled (i.e., no belts and pulleys).

(c) **Pipe or Hose Fittings.** Often the pump is sited above the supply water level to the pump. Appendix A shows how to calculate the maximum total suction lift. If this exceeds the maximum allowable suction lift as shown on Table 1 cavitation will occur. This will result in a reduced water supply, noisy operation, possibly vibration and if severe, premature pump failure. If in doubt regarding the total suction lift, check with your MONO DEALER.

The following points will lead to a better installation:

(i) Keep the entry pipe as short as possible.

(ii) It should be equal to or larger than the port size. For long entry lines, the pipe size may need to be larger to cut down friction losses.

(iii) Keep the entry line as straight as possible. Do not allow coils or kinks in a hose.

(iv) Use bends not elbows.

(v) On suction lift applications fit pipe-work to give a "U" tube which will retain liquid in the pump for lubrication. (See Figure 1).

(vi) Ensure all joints are airtight.

(vii) On long suction lines and static delivery heads, it is recommended that the non-return valve be fitted on the discharge pipe, a distance away from the pump equal to about one-third the length of suction pipe. This will aid priming during start-up.

(viii) Ensure the foot valve is mounted vertically. Most types do not work if inclined more than 20°-30°.

(ix) Ensure suction conditions are within the pump limits.

TABLE 1	MAXIMUM ALLOWANCE SUCTION LIFT											
	L/S	0.2	0.4	0.6	0.8	1.0	1.2	1.5	1.8	2.1	3.0	4.0
AGM320		8.0	8.0	8.0	7.5	7.0	6.0					
AGM520		8.0	8.0	8.0	8.0		7.5		7.0	6.5		
AGM620								8.0	7.5	7.5	6.5	5.5
AGM640								8.0	7.5	7.5	6.5	5.5

	L/S	2.1	3.0	4.0	5.0	6.0	7.0	7.5	8.0	10	12	14
AGM720			8.0	7.5	7.0	6.5	6.0	5.5				
AGM740			8.0	7.5	7.0	6.5	6.0	5.5	5.5			
AGM820		8.5		8.0		7.5			6.5	5.5	3.5	1.5

(i) Friction losses due to pipe, bends, check valve and/or foot valve and suction strainer must be included in total suction lift calculations.

(ii) Water at 20°C.

(iii) Deduct 0.3M for every 250M elevation above sea level.

(d) **Electrical.** Connections should only be made using equipment suitable for both power rating and environment. Mono pumps are designed for DOL (Direct on line) starting. If Star - delta or Auto transformer starting are to be used on larger sizes, please consult your authorised Agent or Mono Pumps. It may be necessary to use a larger motor if starting against a high head, or arrangements made to start against a reduced head. With both methods (S-D or Auto) starting torque available is severely reduced. Similar problems occur in areas of lower voltage with single phase motors.

Earthing points are provided on the motor. It is essential for your safety these are used.

Before checking the direction of rotation of three phase motors, disconnect the motor from the pump.

NOTE: DRY RUNNING EVEN FOR A FEW REVOLUTIONS MAY CAUSE SERIOUS DAMAGE TO THE STATOR. THE INTERNAL COMPONENTS OF THE PUMP MAY UNSCREW.

The AGM Pump is designed to run in an ANTI CLOCKWISE direction when viewed from the drive end of the pump. See arrow on pump label.

3 OPERATION

NEVER RUN THE PUMP IN A DRY CONDITION, EVEN FOR A FEW REVOLUTIONS, OR THE STATOR WILL BE IMMEDIATELY DAMAGED.

(a) Fill the pump with water, and turn a few revolutions by hand. This initial filling is not for priming purposes, but to provide the necessary lubrication of the stator until the pump primes itself.

(b) Check joints for tightness before starting up and again when running.

(c) On start up, should the pump appear not to be perating correctly, stop it immediately. Check for the problem before trying to restart. NEVER RUN THE PUMP WITH A CLOSED INLET OR OUTLET VALVE.

(d) For long delivery lines it is recommended that a relief valve set to 10% above the working pressure be fitted to the pump delivery line. This will prevent water hammer and damage from closed valves.

(e) Gland. Glands are not tightened in the factory. You will need to adjust this during the running in period. Some leakage should occur to keep the shaft cool. Adjust after 1/2 hour of running for 10-20 drips a minute. Adjust only as necessary after this.

Fig. 1. TYPICAL PIPE INSTALLATION

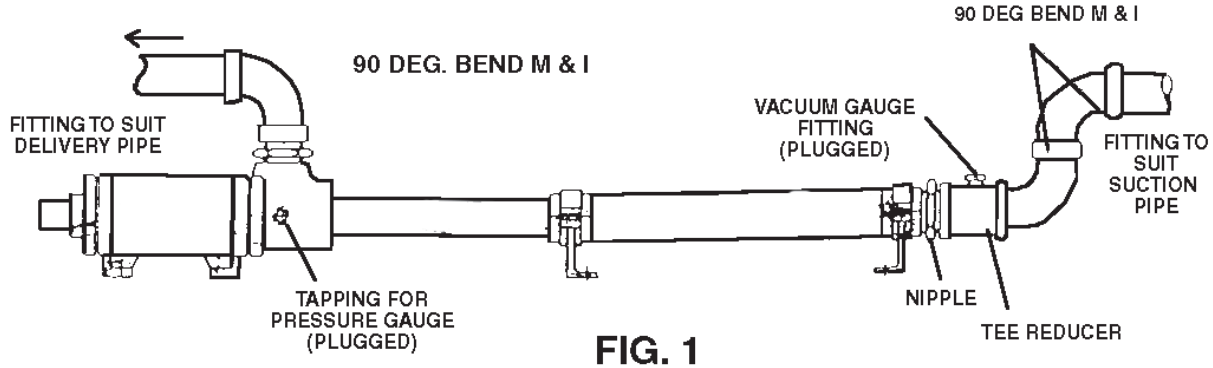


FIG. 1

4 MAINTENANCE

(a) **Stripping and Repacking the Gland.**
Ensure that all valves are shut off to isolate the pump from the system. With the pressure off the stuffing box remove the gland follower nets and pull the gland follower clear of the stuffing box (See Figure 2).

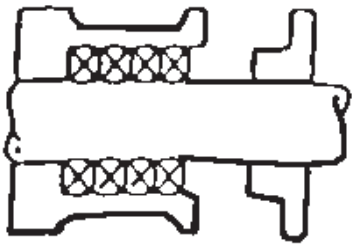


FIG. 2

Carefully withdraw the old packing using a packing extractor, a narrow shafted screw driver being very careful not to damage the driveshaft within the stuffing box (See Figure 3). Check the condition of the shaft and gland back plate to ensure that they are free from defects.

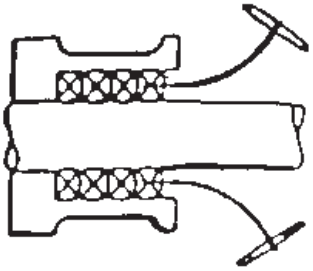


FIG. 3

(b) **Ring Cutting**. If precut rings are not available, it may be necessary to cut the rings from a roll of packing. Wrap the packing around a mandril of the same diameter as the driveshaft and cut at an angle of 45° diagonally across the packing. No gap is to be left between the two ends.

(c) **Fitting and Packing**. Check the shaft to ensure that it turns freely. Fit each packing ring individually (See Figure 4).

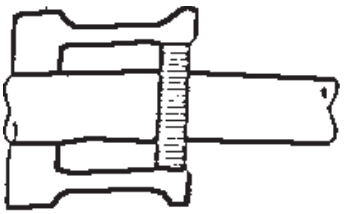


FIG. 4

The gland follower can be used for pushing each ring of the gland packing into the stuffing box. The AGM pump requires six rings of gland packing and each ring joint should be staggered. (See Figure 5).

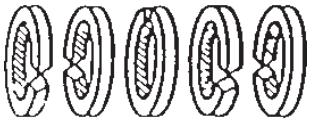


FIG. 5

Check the shaft to ensure that it can be turned after fitting each packing ring.

(d) **Dismantling the Pump**

Note - For part numbers referred to below see exploded drawing and Spare Parts List at the back of this Manual.

Safety - BEFORE ATTEMPTING TO DISMANTLE THE PUMP, ALWAYS ISOLATE THE PUMP FROM THE MAIN ELECTRICAL SUPPLY AND CLOSE THE PUMP ISOLATING VALVES IF FITTED.

(e) **Removal of Stator (2200)**

1. Disconnect suction pipework from suction bush (5120).
2. Unscrew suction bush.
3. Remove top straps of support feet (6200).
4. While holding the stator adaptor bush (5121) unscrew the stator.
5. Check rotor stator for wear. If the rotor is not worn leave in place and only renew the stator. If the rotor is worn too, proceed as follows:

(f) **Removal of Rotor (2520)**

1. Unscrew stator adaptor bush (5121) from barrel extension (2310). This will expose rotor head connection.

2. Use small stilsens to grip the SHOULDER of the flexishaft (2600) close to rotor head. Use another pair of stilsens on rotor HEAD and unscrew rotor in clockwise direction (left hand thread).

   CAUTION: Take great care not to damage main body of flexishaft. Do NOT use any form of grips on this portion of flexishaft.

(g) **Rotor Replacement**

1. Lubricate flexishaft threads with an anti-seize compound (e.g. coppercote or molyb-denum grease). Screw on rotor (L.H. thread) and tighten, being careful only to grip the flexishaft head (largest diameter part - see sketch above).

(h) **Stator Replacement**

1. Cover rotor with rubber grease or Castrol Spheerol AP3 (not ordinary mineral oil base grease as it attacks the stator). This makes fitting easier.

2. Slide stator over rotor and fasten onto stator adaptor bush (5121). Coat threads of bush with jointing compound (Stag preferred).

3. Refit suction bush (5120) using Stag and also inlet pipework. Tighten all joints securely.

4. Prime pump and start (see Operation section).

(i) **Bearing Lubrication**

Pumps are fitted with taper roller bearings and should be inspected periodically to see if grease replenishment is necessary. If so grease should be added until the chambers at the ends of the bearing spacer are approximately one third full. A normal period for such inspection would be 6 months, but under favourable conditions the bearings will run considerably longer without attention. Under tropical or other arduous conditions, however, a more frequent examination may be necessary. It is advisable to establish a correct maintenance schedule by periodical inspection and we would recommend at least annual inspection until a schedule is established. Shell Retinax AM or Alvania R3 grease or equivalent must be used for the bearings.

(j) **Bearing Inspection**

This is done after removal of the rotor and stator (see (i) and (ii) above).

1. Remove pulley from stub-shaft (3210).

2. Remove cap screws - item 25 attaching stub-shaft to hollow shaft.

3. Withdraw stub-shaft and flexishaft as an assembly. (If necessary, gently tap end of flexishaft with soft mallet to release stub-shaft/hollow shaft joint).

4. Remove delivery pipework.

5. Remove discharge chamber (2300) complete with chamber extension (2310) from body (0100) by undoing 4 nuts - item 11.

6. Remove gland section (6500) complete with gland and packing.

7. Remove bearing cover (1100).

8. The whole shaft assembly complete with bearings can now be withdrawn from body. If necessary gently tap other end of shaft with soft mallet until first bearing is clear of housing.

(k) **Assembly of Shaft Bearings**

1. Press the large bearing (item 17) onto the hollow shaft and suitably grease.

2. Assemble the bearing spacer (3500) onto the shaft.

3. Press the small bearing (item 18) on until the locknut can be screwed onto the shaft with its tab washer. The locknut can be used to position the bearing so that a gap of between 0.02 and 0.07 mm (.001-.003 ins.) is evident between the bearing spacer and bearing outer race.

4. Align a tab on the washer with one of the notches on the locknut and bend into notch. Re-check gap.

5. Insert shaft assembly into bearing housing ensuring bearing lip seal (item 16) is not damaged.

6. Refit bearing cover and tighten screws.

7. Refit thrower (4200) onto shaft.

(l) **Gland Section**

If gland packing is still in good condition refit gland section assembly ensuring it is fully
located in bearing housing and gasket (2020) is in place and is in a serviceable condition.
NOTE: If the gland packing is in doubtful condition it is more convenient to replace it while the gland section is out of the pump. Use either a dummy shaft of the correct size or the hollow shaft to locate each ring prior to assembly.

(m) **Re-assembly**

1. Refit discharge chamber.

2. Refit stub-shaft with flexishaft not forgetting "O" ring seal - item 29.

3. Refit rotor, using suitable anti-seize lubricant on flexishaft threads.

4. Refit stator adaptor bush, stator support feet clamps and suction bush.

   NOTE: Ensure all screwed pipe threads are properly assembled with pipe thread sealing compound.

5. Refit suction and delivery pipework.

6. Before attempting to start pump follow the same procedure and checks outlined in Operation (Section 3).

Trouble Shooting Guide

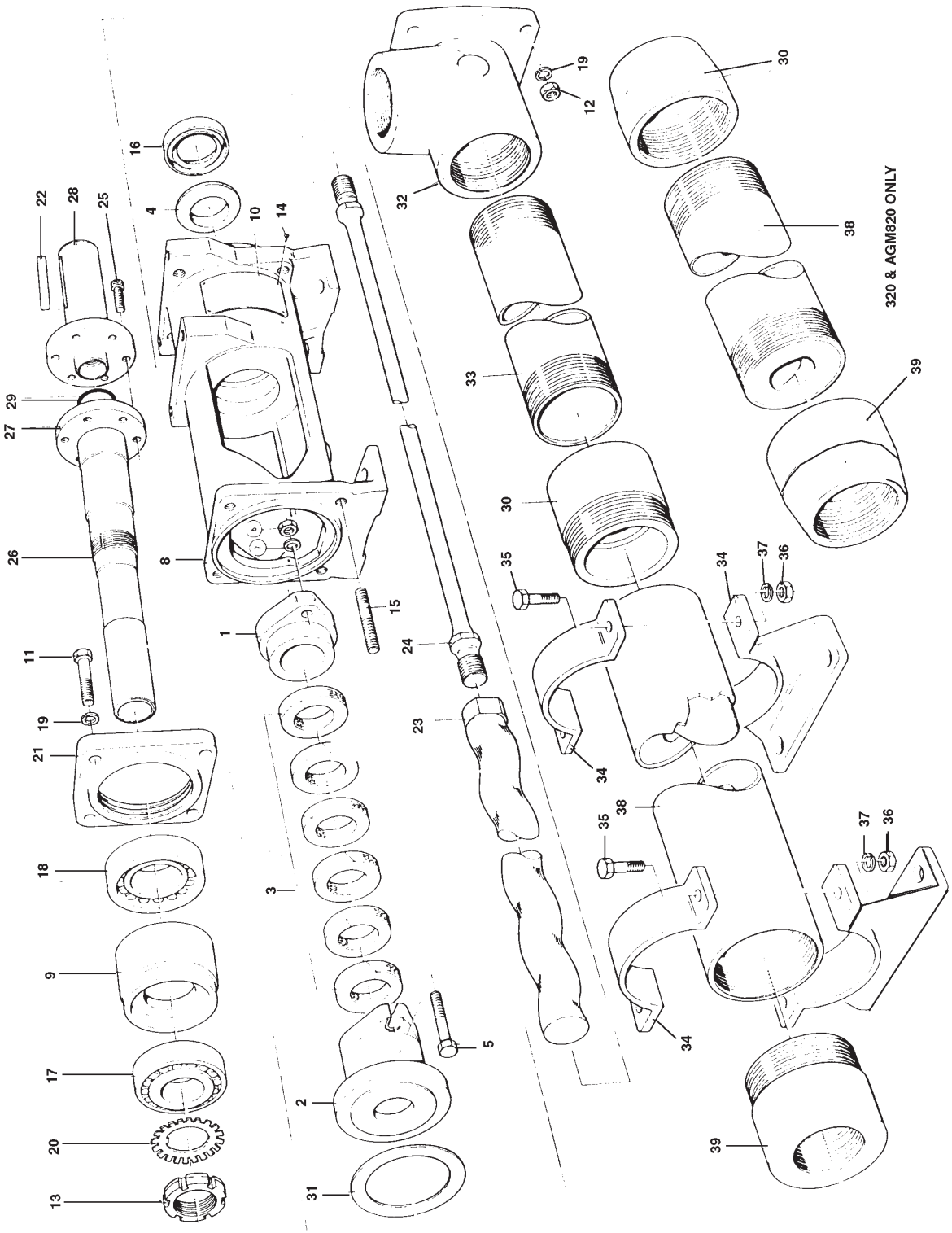
PROBLEM		CAUSE
1.	Motor will not run	- Overload tripped out - Blown fuse/power failure - Defects in motor - Faulty pressure switch (pressure system)
2.	No liquid delivered (pump will not prime)	- Pump not filled before starting - Air leak on suction - Discharge head too high (above rating) - Suction lift too high - Inlet pipe not submerged enough - Not enough suction head - Non return valve too close to pump - Insufficient net inlet head - Damaged/worn stator/rotor
3.	Not enough liquid delivered	- Air leak on suction - Discharge head too high (above rating) - Suction lift too high - Inlet pipe not submerged enough - Viscosity of liquid greater than rating - Insufficient net inlet head - Pump R.P.M. too low for required capacity - Damaged/worn stator/rotor
4.	Loss of liquid after starting	- Air or gas in liquid - Air leak on suction - Suction lift too high - Inlet pipe not submerged enough - Insufficient net inlet head - Blocked inlet
5.	Pump is noisy (cavitation)	- Air or gas in liquid - Blocked foot valve/strainer - Restriction in line - Too great total suction lift
6.	Pump vibrates	- As for noisy pump - Pump not bolted down firmly
7.	Pump will not give rated pressure	- Worn stator/rotor
8.	Motor runs hot engine overloads	- Pump R.P.M. too high for drive rating - Voltage/frequency differ to rating - Overloads set too low (three phase) - Defects in motor/engine - Pump overloaded (current too high)
9.	Overload tripped out	- Low voltage - Too frequent starting (single phase) - Overload set too low (three phase) - Pump overloaded (current too high) - Motor not protected from sun
10.	Pump starts too often (pressure system)	- Incorrect pressure switch setting - Leaking non return valve - Leak in system pipework - Pressure/diaphragm tank too small - Pressure diaphragm tank air pre-charge too low
11.	Pump runs continuously	- Pressure switch set incorrectly

Torque Tightening

TORQUE TIGHTENING TABLE - FOR FASTENERS

Thread Size	Hex Head Bolts		Socket Head Cap Screws	
	Nm	lb	Nm	lb
M6	-	-	16	12
M8	11	8	41	30
M10	22	16	75	55
M12	48	35	-	-
M16	95	70	-	-

Spare Parts



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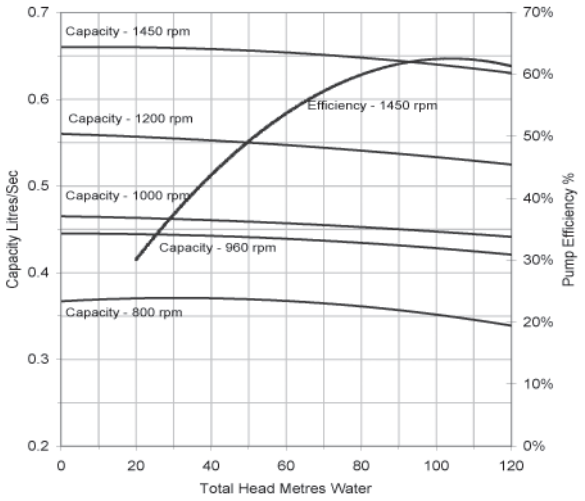
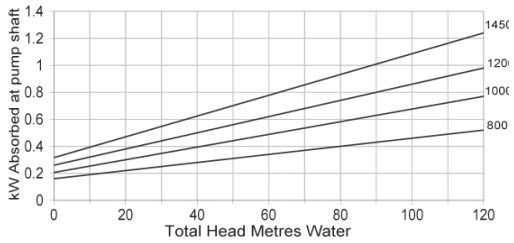
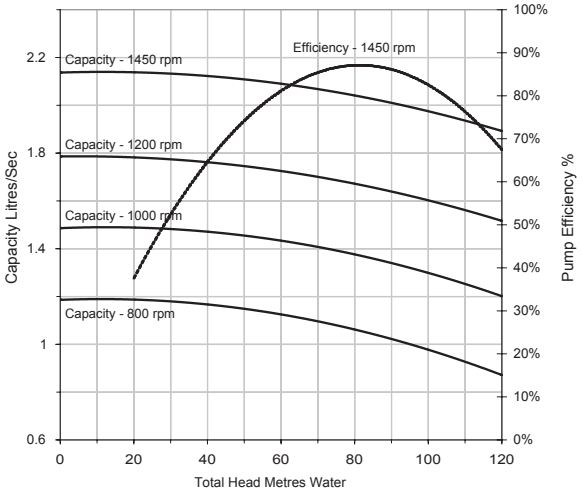
Typical Performance

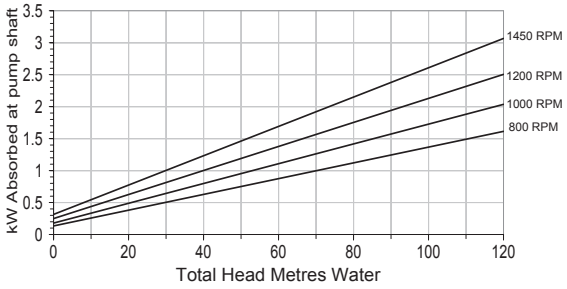
TYPICAL PUMP PERFORMANCE - AGM 320





TYPICAL PUMP PERFORMANCE - AGM 520





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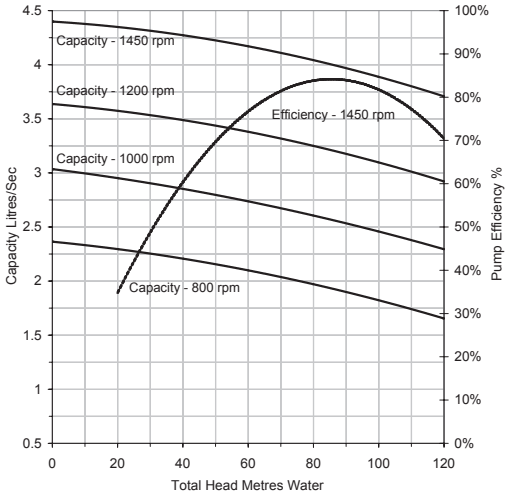
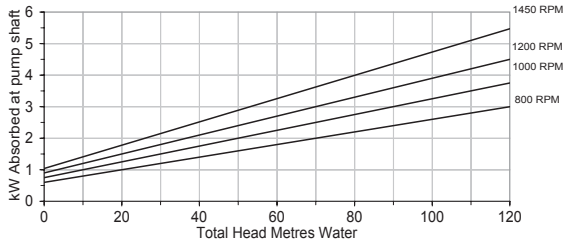
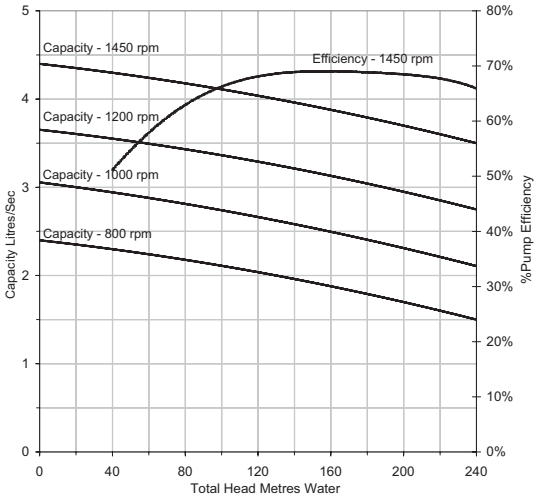
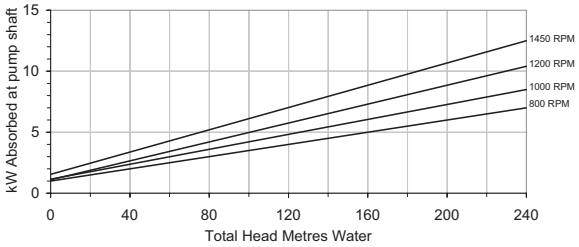




TYPICAL PUMP PERFORMANCE - AGM 640





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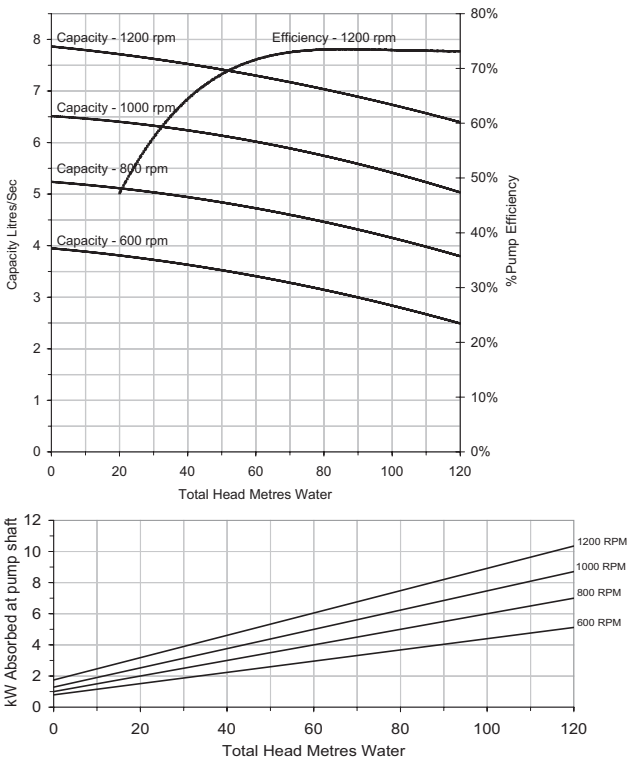
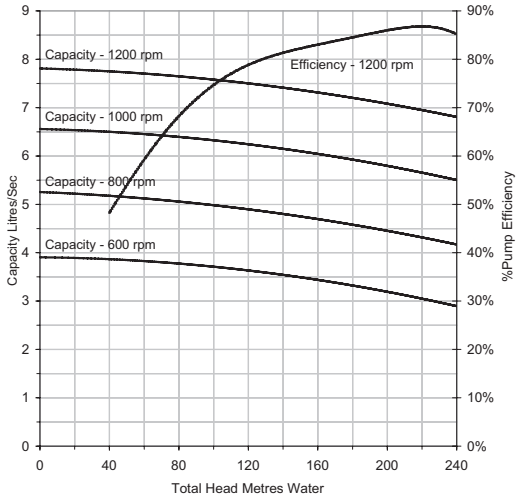
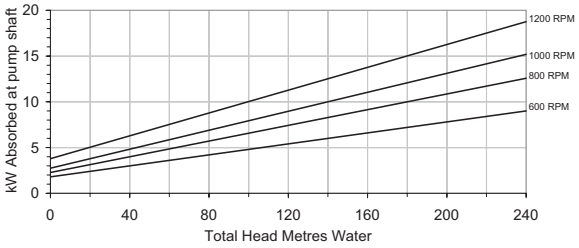
Typical Performance

TYPICAL PUMP PERFORMANCE - AGM 720A

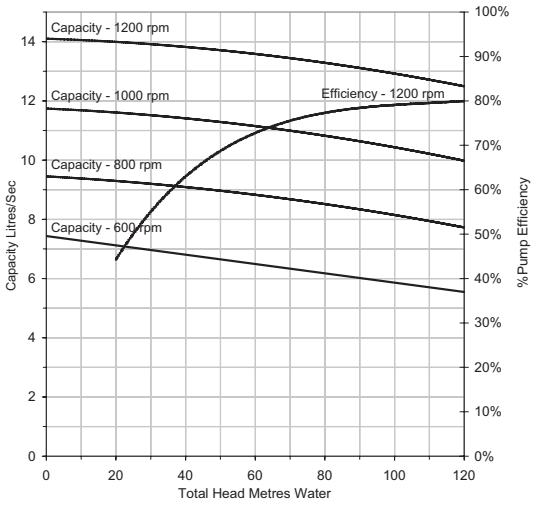


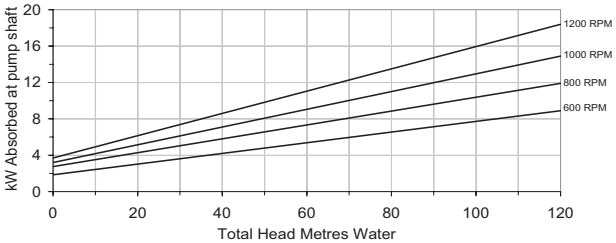
TYPICAL PUMP PERFORMANCE - AGM 740A





TYPICAL PUMP PERFORMANCE - AGM 820





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Adelaide	T.	08 8447 8333	F.	08 8447 8373
Perth	T.	08 9303 0444	F.	08 9303 0400
Darwin	T.	08 8931 3300	F.	08 8931 3200
Kalgoorlie	T.	08 9022 4880	F.	08 9022 3660
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