RAINBOW POOL PRODUCTS
Quality Pool & Spa Products

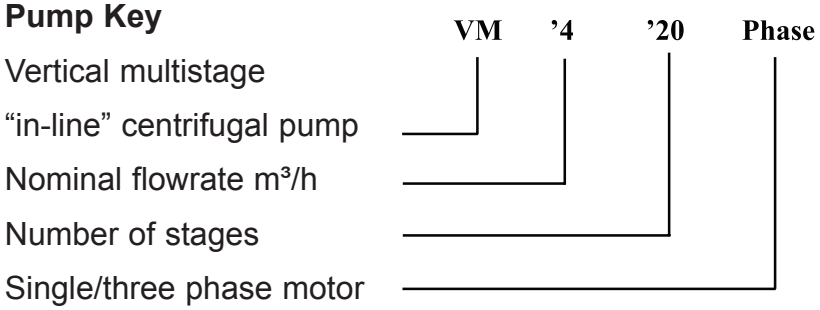
ONGA VERTICAL MULTISTATE PUMP

Code	Description	Max Head	BEP Flow	kW
VM2B-90/1PH	VM2B-90	68	40	0.75
VM2B-90/3PH	VM2B-90	88	40	0.75
VM4-40/1PH	VM4-40	40	84	0.75
VM4-40/3PH	VM4-40	40	84	0.75
VM4-60/1PH	VM4-60	58	84	1.1
VM4-60/3PH	VM4-60	58	84	1.1
VM4-80/1PH	VM4-80	79	84	1.5
VM4-80/3PH	VM4-80	79	84	1.5
VM4-100/1PH	VM4-100	99	84	2.2
VM4-100/3PH	VM4-100	99	84	2.2
VM4-120/1PH	VM4-120	118	84	2.2
VM4-120/3PH	VM4-120	118	84	2.2
VM8-40/1PH	VM8-40	45	150	1.50
VM8-40/3PH	VM8-40	45	150	1.50
VM8-60/1PH	VM8-60	68	150	2.20
VM8-60/3PH	VM8-60	68	150	2.20
VM8-100/3PH	VM8-100	110	150	4.00
VM8-160/3PH	VM8-160	178	150	5.50

RAINBOW POOL PRODUCTS PTY LTD

CODE IDENTIFICATION

Pump Key



OPERATING RANGES

- Liquid temperature:

  -15ºC to +120ºC
- Maximum Working Pressure:

  Oval Flanges = 16 bar (163 metres)

  DIN Flanges = 25 bar (255 metres)
- Maximum Inlet Pressure:

  VM2B-60 - VM2B-100 = 10 bar (102 metres)

  VM2B-130 - VM2B-160 = 15 bar (153 metres)

  VM4-40 - VM4-120 = 10 bar (102 metres)

  VM8-40 - VM8-160 = 6 bar (61 metres)
- Minimum Suction Head:

  Refer to NPSH values plus a 0.5 metres safety margin.

INSTALLATION

Pump Location

The pump should be located in a well ventilated frost free environment. (See Frost Protection). Care should be taken to ensure that both pump and motor are at least 150 mm clear of any obstruction and that an adequate air circulation reached the motor cooling fan. Inlet pipework must be kept as short as possible in order to reduce pipe friction losses to a minimum.

RAINBOW POOL PRODUCTS PTY LTD

Foundations

Concrete or a similar foundation of a suitable height should be provided for the pump stand. The pump can also be fixed in a vertical position from the wall via a suitable bracket. Dimensions of the base are shown in Fig. 1.

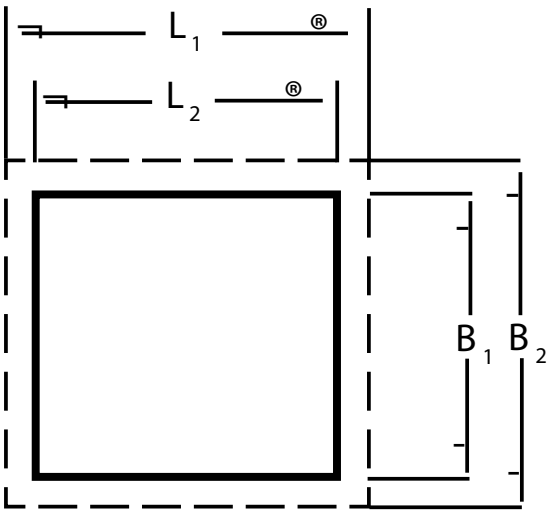


Fig. 1

Pump Type	B_1 (mm)	B_2 (mm)	L_2 (mm)	L_1 (mm)	Dia. (mm)
VM2B	'180	'210	'100	'147	'13
VM4	'180	'210	'100	'147	'13
VM8	'215	'246	'130	'190	'13

Connections

The arrows on the base indicate the flow direction of the water through the pump. Attention is drawn to the suction and delivery gaskets of the pump's oval flanges. **The centres must be cut out before they are placed in position.** The ports on the pumps with round flanges are protected by plastic plugs which are to be removed before the pump is commissioned. Always check that the water is able to pass freely through the pump.

Pipework

Please ensure that both suction and discharge pipelines are correctly sized to match the pump's capacity and the application requirements. It is advisable to check the following before the pump is installed:

- Friction losses through the suction pipe should be kept to a minimum.
- Avoid unnecessarily long suction pipelines.
- Foot valves and non-return valves should be suitably designed with low friction loss.
- All pipework should be assembled so that all air locks are avoided. (See Fig. 2 for suction side).Fig. 1

RAINBOW POOL PRODUCTS PTY LTD

Pipework (cont.)

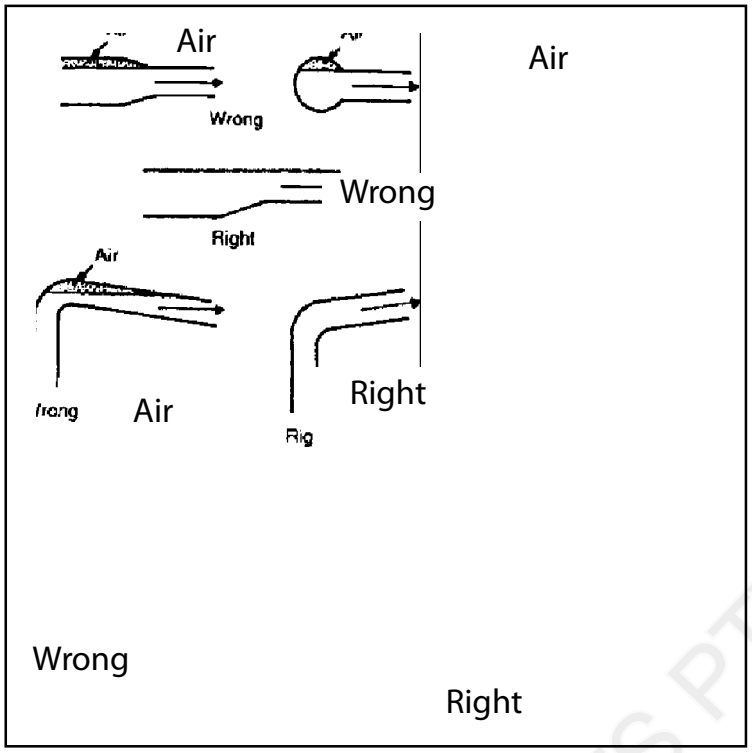


Fig. 2

If the pump is used as a boiler feed pump, a non-return valve should be fitted in the discharge pipe between the pump and the boiler. (See Fig. 3)

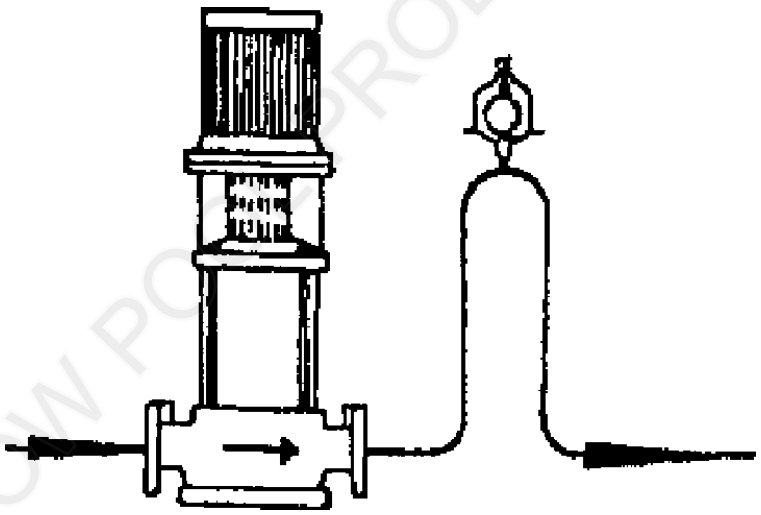


Fig. 3

By-Pass

If the possibility arises that the pump is made to work against a closed valve on the discharge side, it is necessary to install a by-pass line in order to guarantee an adequate supply of lubricating and cooling water through the pump.

RAINBOW POOL PRODUCTS PTY LTD

ELECTRICAL CONNECTIONS

All electrical connections should be carried out by authorised electricians in accordance with local regulations. Electric motors up to and including 5.5 kW (7.5 H.P.) are T.E.F.C. (totally enclosed fan cooled) squirrel cage type, with dimensions according to IEC and DIN standards. They are suitable for ambient temperatures up to 40ºC with an enclosure and insulation ratings as stated on the name plates.

Connections

Please make sure that the motor is suitable for the electrical supply on which it will be used. The electric motor should be connected to the supply as shown in the diagram in the terminal box cover and in accordance with the information given on the motor name plate.

Terminal Box Position

To ensure easy access to the electrical connection, the terminal box can be turned as shown in Fig. 4. Remove the coupling guard with the four screws which viewed from the pump side are screwed to the motor flange. Turn the motor to the required position, replace and tighten the screws. Refit the coupling guard. This is kept in position by spring tension.

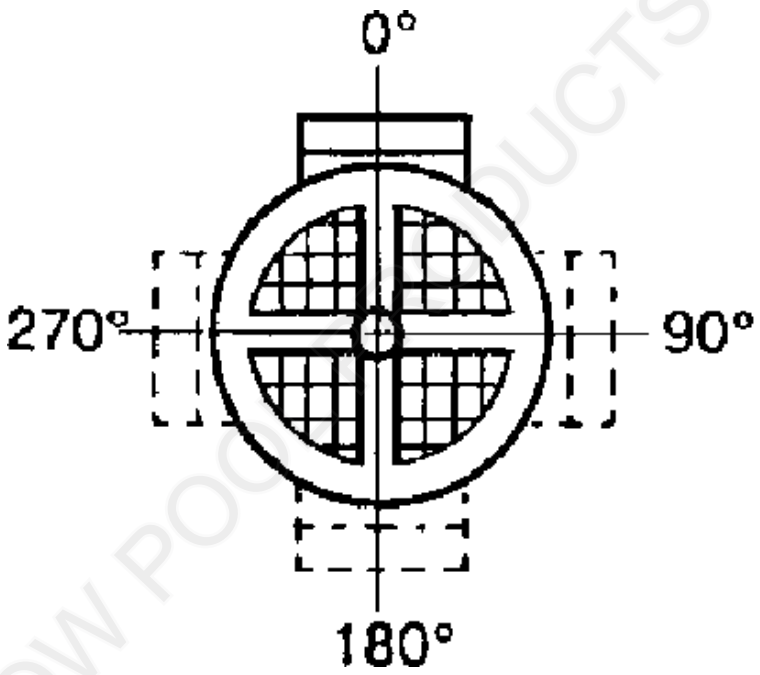


Fig. 4

Motor Protection - Single Phase/Three Phase Motors

The motors must be connected to an approved starter of the correct load rating to ensure that the motor is protected against damage from phase failure, voltage variations and overloads.

RAINBOW POOL PRODUCTS PTY LTD

PRIMING

Do not start the pump until it has been filled with water (or the liquid to be pumped).

Flooded suctions - To prime the pump in a closed or open system, where the liquid level is above the pump:

First close the pump inlet/outlet valves and open the vent valve (see Figs. 5 and 6). Gradually open the inlet valve on the suction pipeline until a steady stream of water runs out of the vent valve. Close the vent valve and tighten securely. Now completely open both isolation valves and start the pump.

Suction Lift - In open systems where the pump is installed above the liquid level, the pump and suction pipe must be filled and vented of air before starting the pump.

Models VM2B - VM4

Close gate valve on outlet (discharge) side of pump. Loosen the small hex bolt (spanner size 11 mm), fully open priming valve (Fig. 6). Open and remove the priming plug and pour the water through the hole until both the pump and suction pipeworks are full. The vent valve ensures complete filling of the pump. Once correct filling has been checked, replace and tighten priming plug, close the priming valve. Slightly open the outlet (discharge) gate valve and start pump. Check that there is no air escaping from the vent valve, fully close vent valve and open outlet (discharge) gate valve to suit application requirements.

RAINBOW POOL PRODUCTS (NZ) LTD

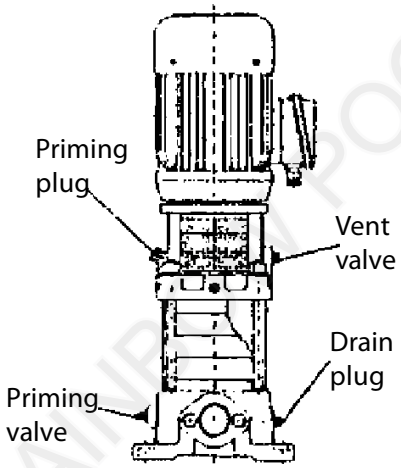


Fig. 5

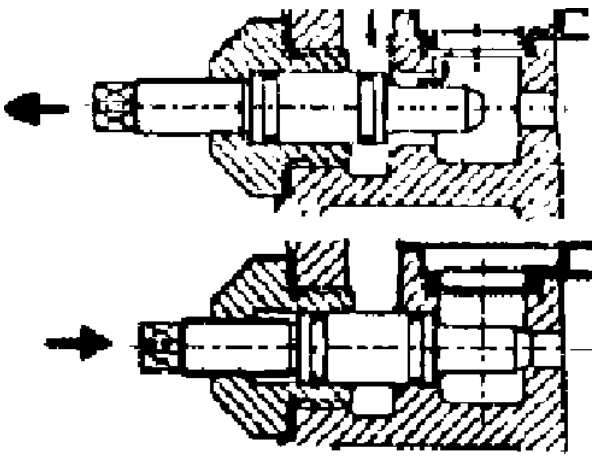


Fig. 6

Model VM8

Close the discharge isolating valve. Unscrew the top priming plug (Fig. 7). Pour water through the hole (using a funnel) until the suction pipework and the pump are completely filled. After having opened the outlet (discharge) gate valve, start the pump, using the vent valve to completely eliminate air from the pump.

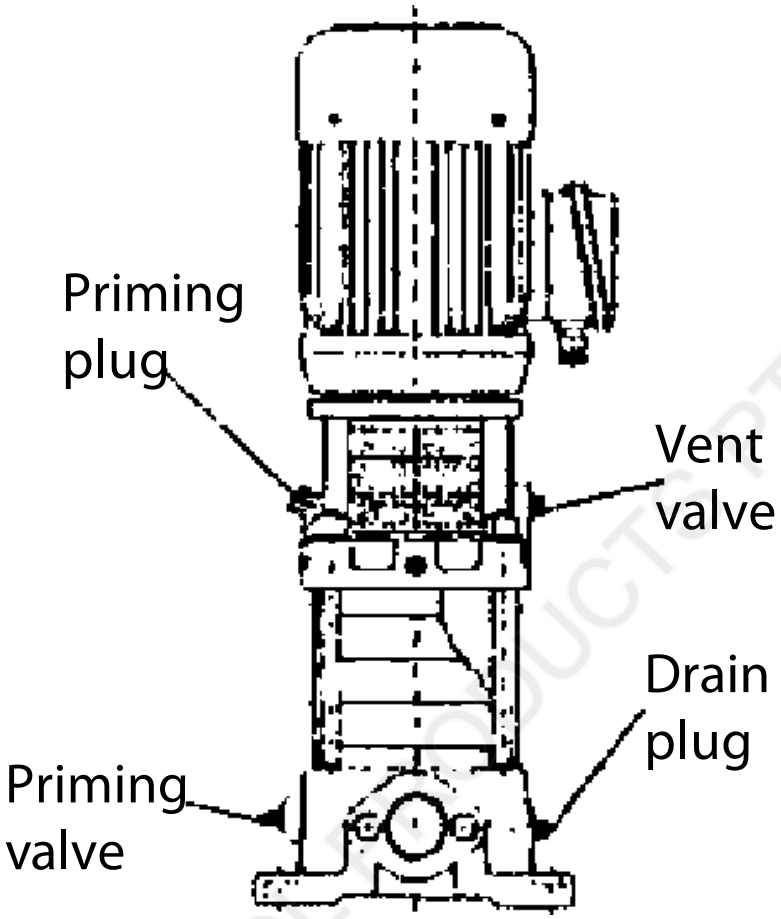


Fig. 7

RAINBOW POOL PRODUCTS PTY LTD

Checking rotation direction

1. Switch off the power supply.
2. Check to make sure that the pump has been filled and air vented.
3. Check that the electrical connections are in accordance with the wiring diagram in the motor terminal box cover.
4. Switch on the power supply and observe the direction of pump rotation (as seen from the motor fan end). The correct direction of rotation is shown by arrows on the top housing. The rotation is in an anti-clockwise direction.
5. If the rotation is incorrect, switch off the power and disconnect the unit from the power supply. Swap over two of the line wires on the three phase motor terminal box. On single phase units, check the wiring diagram inside the terminal box lid.

START-UP

Before starting the pump, check:

1. That the pump is completely filled with liquid.
2. That the power supply matches the motor requirements as listed on the motor data plate.
3. That the rotation direction is correct.
4. That all pipework is secure and properly supported.
5. Ensure inlet gate valves are fully opened.
6. For initial starting, the outlet (discharge) gate valve should be gradually opened only after the pump has started. Opening this valve too fast may cause some water hammer in the delivery pipeline. Finally, make sure that this valve is completely open.
7. If pressure gauges are fitted, check ratings match the pump performance.
8. All controls associated with the pump operations.

OPERATION AND MAINTENANCE

Frequency of Starts and Stops

Local regulations may set limits on the frequency of starts and stops. For smaller than 4 kW, a maximum of 100 starts per hour is recommended. If it is found that the pump starts too often, adjustment must be made to the control equipment to reduce the frequency. It may be necessary to check application requirements.

Lubrication and Maintenance

Pumps installed in accordance with these instructions will operate efficiently with very little maintenance. The mechanical shaft seal is self adjusting, the seal faces and the pump bearings are lubricated and cooled by the pumped liquid. Motors have sealed self-lubricating spherical bearings. No additional lubrication is required.

Frost Protection

The pump may be used in systems where an anti-freeze has been added to the water. If the pump is assembled in a position which might encourage frost, a quantity of anti-freeze should be added to the pump liquid to prevent damage.

If anti-freeze products are not used, the pump and the system must be emptied during the period of inactivity and when there is a likelihood of frost occurring. To drain the pump, close the isolating valves, remove the priming plug and vent valve at the base of the pump. Do not replace plugs until the pump is once again in use.

If anti-freeze products are not used, the pump and the system must be emptied during the period of inactivity and when there is a likelihood of frost occurring. To drain the pump, close the isolating valves, remove the priming plug and vent valve at the base of the pump. Do not replace plugs until the pump is once again in use.

SUNFLOW POOL PRODUCTS PTY LTD

Recommended Inspections

At regular intervals, depending on operating conditions, the following checks should be made:

- Pump performance and operating pressures.
- Possible leaks.
- Possible overheating of motor.
- Remove and clean all filters and strainers in the system.
- Tripping time for the motor overload units.
- Frequency of stops and starts per hour.
- Operations of all systems controls.
- Lowering of water level (well/bore holes).

If the above checks do not reveal any abnormal operating details, no further checks are necessary. Should any faults be found, check the symptoms with the fault finding chart.

RAINBOW POOL PRODUCTS PTY LTD

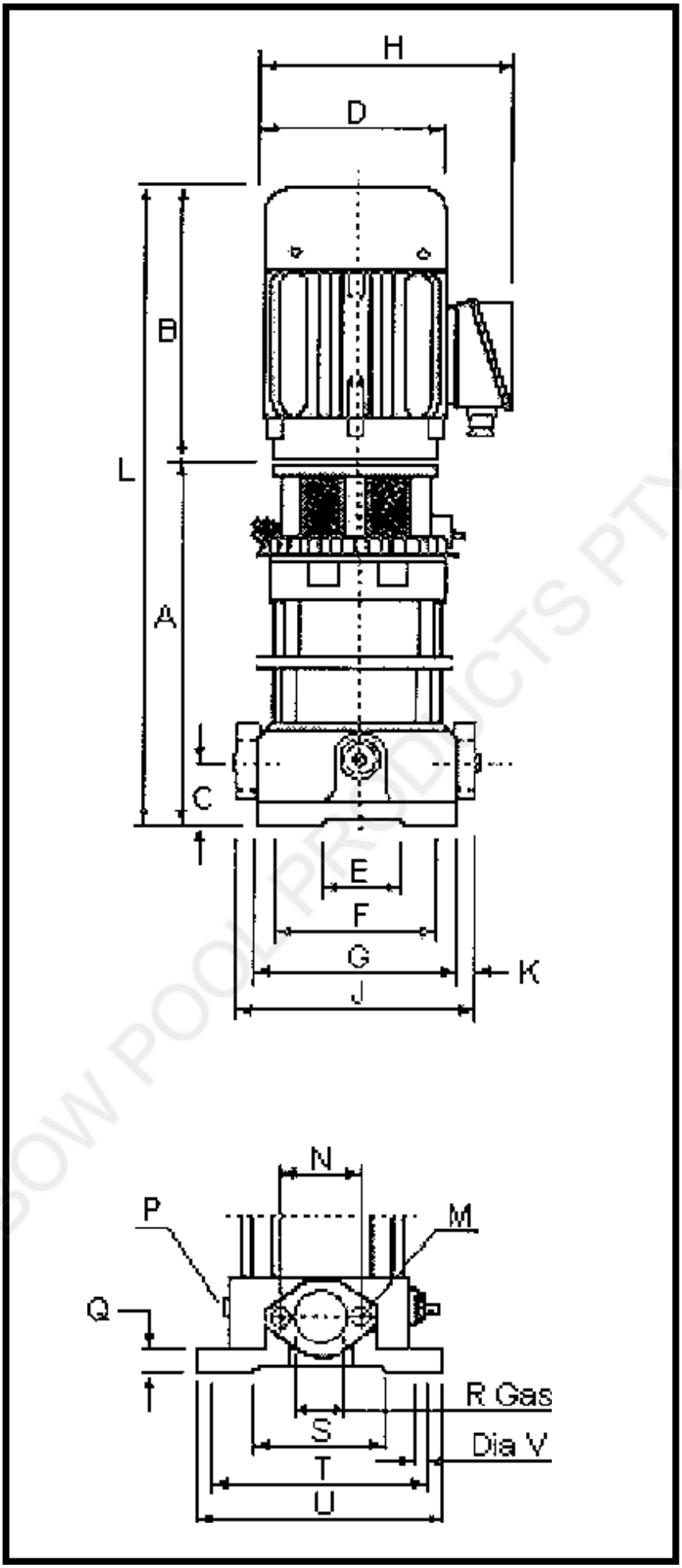
FAULT FINDING CHART

If the pump fails to operate, the chart below may assist in identifying the causes of some of the most common faults or disturbances of operation.

FAULT	CAUSE
1. Motor will not start when switched on.	a) Power supply failure. b) Fuses blown. c) Circuit breakers operating. d) Thermal overload active. e) Control system faulty. f) Motor faulty.
2. Motor starts but immediately cuts out.	a) Circuit breakers operating. b) Cable connections loose. c) Motor windings are defective. d) Debris blocking pump.
3. Intermittent operation of overload protection.	a) Periodic power supply failure. b) Low voltage at peak demand. c) Pump partially blocked by debris.
4. Variation in pump performance.	a) Suction pipe is too small. b) Insufficient water available at pump inlet. c) Water level too low. d) Air pockets in system. e) Suction pipe partially blocked by debris.
5. Pump operates but does not supply any water.	a) Suction/foot valve blocked by debris. b) Foot/non-return valves closed or blocked. c) Air in suction pipe or pump.
6. Pump runs backwards when switched off.	a) Leakage in suction pipe. b) Foot/non-return valves closed or blocked. c) Foot valve blocked in open or closed position. d) Air pockets in suction pipe.

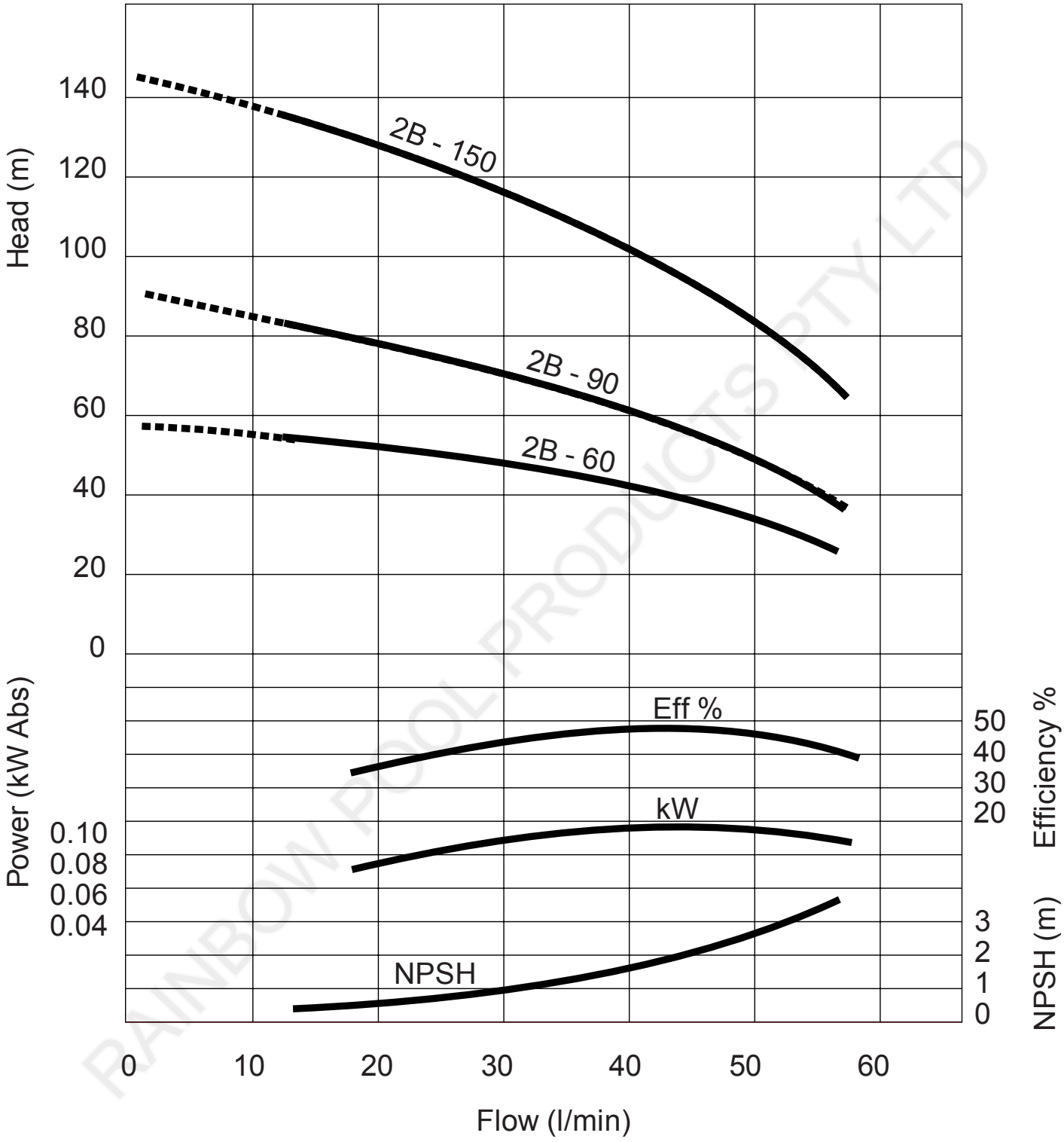
RAINBOW POOL PRODUCTS PTY LTD

Dimensional Drawing - VM Series Multistage Pumps



RAINBOW POOL PRODUCTS PTY LTD

Performance Curves - Model VM2B



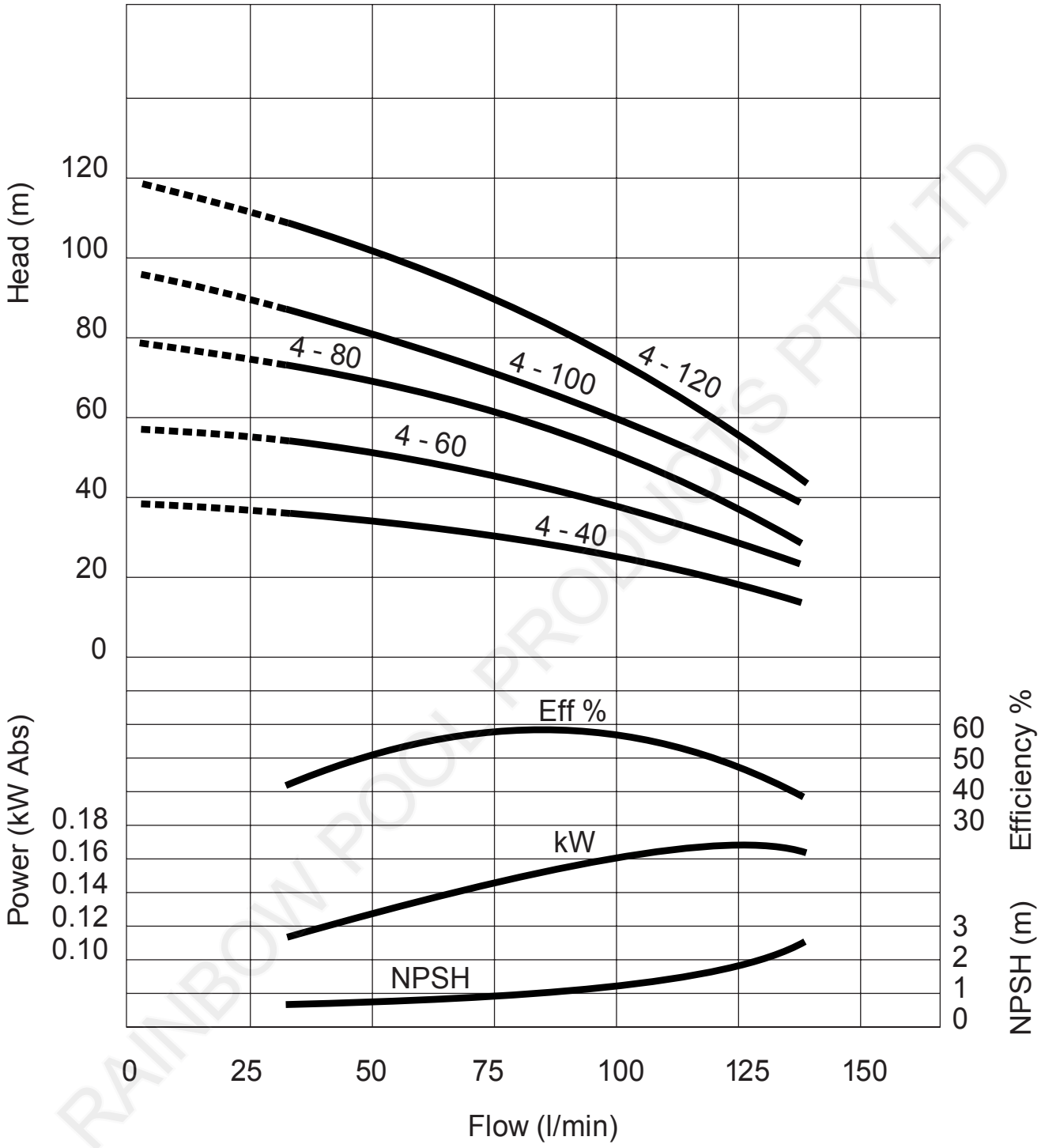
RAINBOW POOL PRODUCTS PTY LTD

NOTE

1- All test carried out with water at ambient air temperature at sea level

2- Power (kW Abs) curves are per stage

Performance Curves - Model VM4



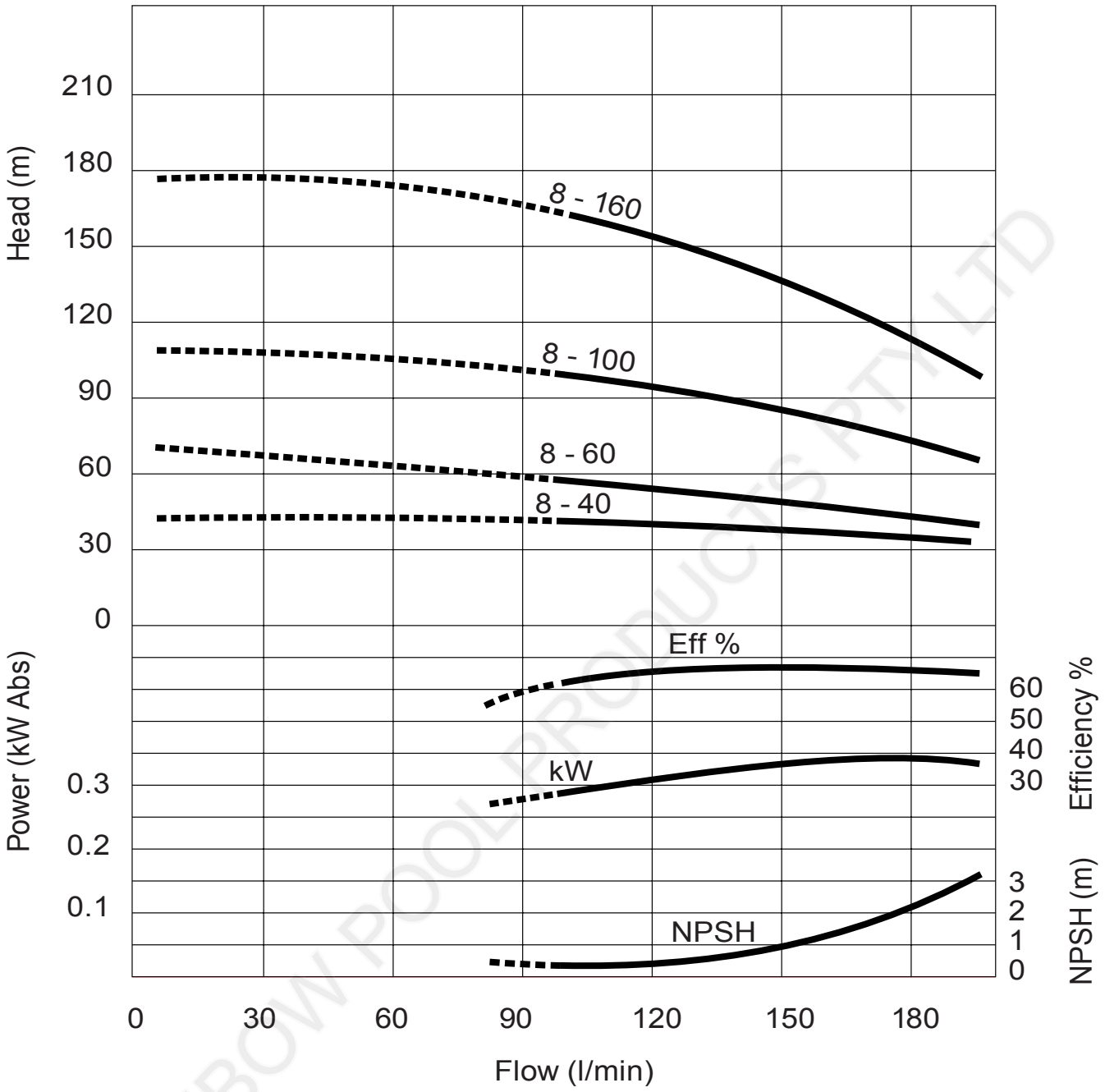
RAINBOW POOL PRODUCTS PTY LTD

NOTE

1- All test carried out with water at ambient air temperature at sea level

2- Power (kW Abs) curves are per stage

Performance Curves - Model VM8



RAINBOW POOL PRODUCTS PTY LTD

NOTE

1- All test carried out with water at ambient air temperature at sea level

2- Power (kW Abs) curves are per stage