

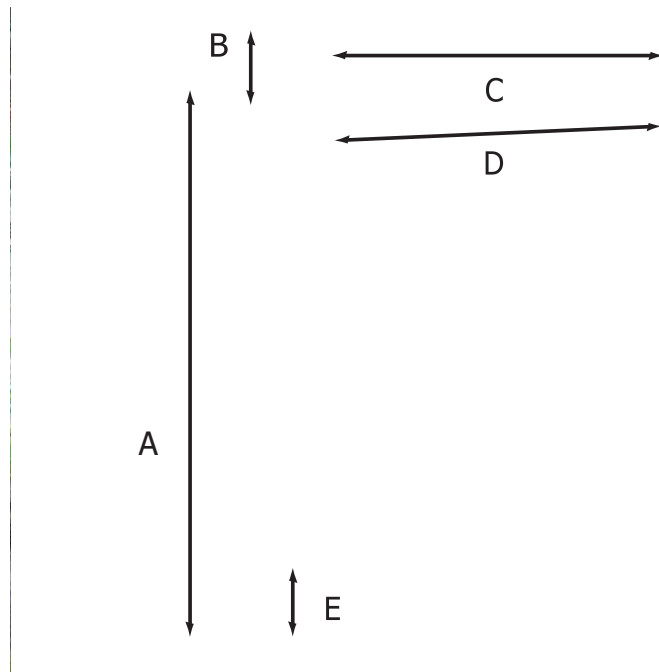
Instruction Manual



Thank you for buying a ZM–MAXXI hydraulic pump.
 ZM–MAXXI pumps are designed to give you long service life,
 low maintenance and constant water delivery.

First, some basic technical facts concerning installation and use.

- A Diameter of the wheel
- B Distance between the tube and the top of the wheel: approximately 10cm
- C Length of the tube:
- D Slope of the tube: 3% to 5% of the length
- E Between the wheel and the ground: not less than 10cm



Installation

Pumps should be installed on a level, firm platform or other concrete or wood surface. Set the pump frame level and square on the platform, secure with bolts.

Then, assemble the pump, fitting the suction and propulsion pipes and the water wheel. Then bring a water stream to the wheel (as shown) to commence operation.

Movement of the Wheel

The wheel can be driven by water falling from the open end of a wooden, cement, plastic or P.V.C. pipe.

Table of water flow need to move the wheel

MODEL	WATER FLOW TO TURN WHEEL	ESTIMATED FLOW	FLOW (l/sec)	DISTANCE	TOTAL HEAD	PRODUCTION (l/day)	HEIGHT FROM BASE
ZM 44 MAXXI	50mm – 100mm	50mm	2	12km	190m	4–10,000	1,5m
ZM 38 MAXXI	100mm – 150mm	50–75mm	2–4	12km	300m	5–11,000	1,75m
ZM 51 MAXXI	75mm – 200mm	75–200mm	4–30	12km	200m	9–18,000	1,9m
ZM 63 MAXXI	150mm – 200mm	200mm	15–30	12km	150m	16–32,000	2,0m
ZM 76 MAXXI	175mm – 250mm	250mm	30–60	12km	200m	30–55,000	2,3m
ZM 95 MAXXI	200mm – 300mm	300mm	50–70	12km	130m	40–90,000	2,5m

NB! For applications where water is to be lifted to heights greater than 70 meters between the pump and the retention tank, an additional wheel should be employed. This pump should also be driven by a more powerful water stream.

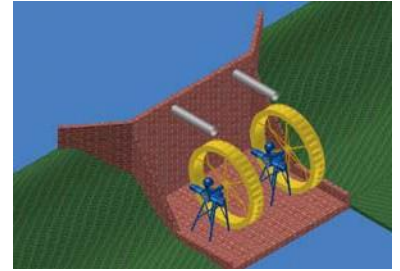
*** Rotation estimated between 20 and 40 r.p.m. (revolutions/min)*

Water feed

Depending on the availability of water and pipework, the pump's wheel can be driven in one of three ways:

1 – Water supply at top

This is the best way to drive the wheel. The delivery pipe must be centralised with the top of the wheel no more than 10cm above the drive vanes. The delivery of water will determine the rotation of the wheel.

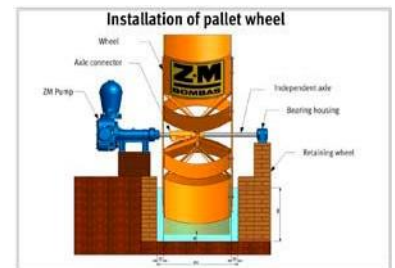


2 – Water supply at lower level

In situations where it is not possible to provide a water supply to the top of the wheel, it is possible to direct the jet at the spokes of the wheel and drive it in that fashion. Where this methodology is required, it is essential to utilise a larger wheel in order to optimise the water pressure available.

3 – Water supply at ground level

When topographic conditions do not permit installation of the feed water tube in the normal way, a suitable culvert should be constructed either from brick or wood. This should be approximately the same width as the paddles on the wheel, in order to optimise the water pressure available. This method of propulsion is not very efficient and a typical rotation speed is 8–12 r.p.m. should be anticipated. To increase efficiency, multiple streams can be fed into the culvert to increase feed water volume and thereby, pressure.



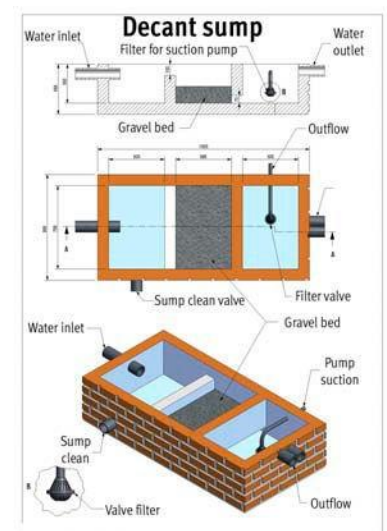
NB! Gap between paddles and base must not be less than 50mm

Wheels should be specified for specific water feed applications and preferably only after a survey of the water availability has been undertaken.

Suction System

Notes

- The maximum vertical lift in water head possible with ZM-MAXXI pumps is approximately 7m. Horizontally, the suction distance is approximately 60m. For installations exceeding 2m vertically, or a horizontal distance more than 5m, a non return valve should be installed at the foot of the pump.
- Pumps should always be primed with water before use, when point of suction is more than 2m from pump.
- As a rule, 1m of vertical water lift is equivalent to 10m horizontal pumping
- Water quality will affect the pump's leather seals and mechanism. Where sand and other gritty substances are carried in the water flow, the life of the pump could be adversely effected. This additional wear and tear is not covered by the unit's guarantee.



Output pipe

When installing, prepare a trench from the pump to the holding tank. Specify a pipe with sufficient internal diameter to optimise water flow and lay this pipe in the trench. Run the pump to ensure there are no punctures, or holes in the pipe and then cover.

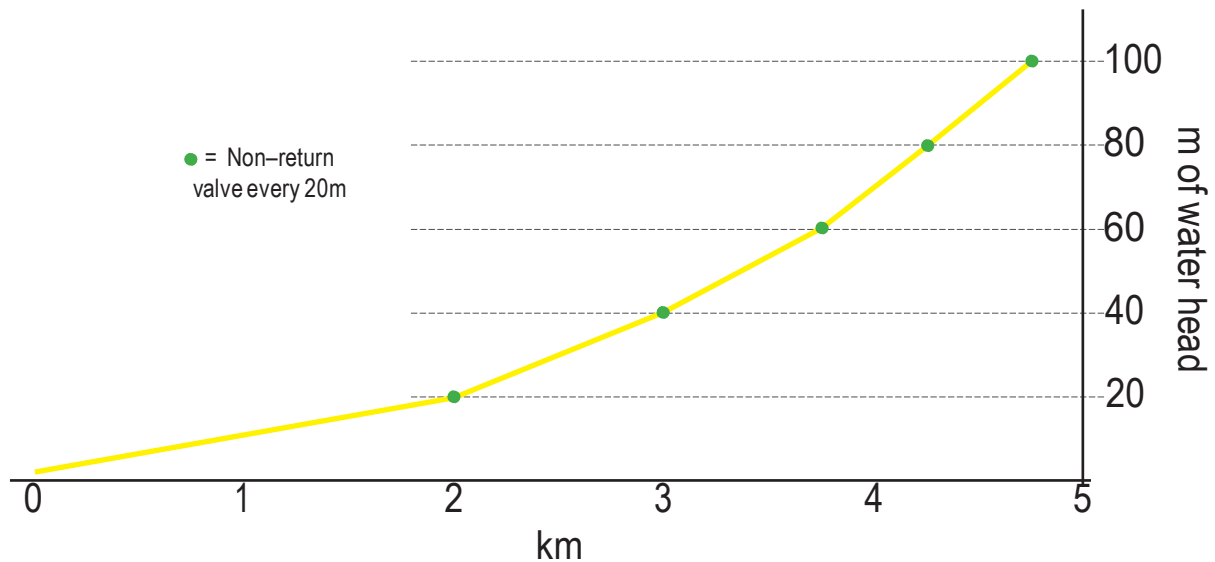
ZM-MAXXI pumps can pump water horizontally up to 12,000m (12km) or to an elevation of up to 300m (defined as Water Column Meters), according to the model and the table no. 3 below. A combination of distance and height is possible and advice in this regard is available from ZM Pompe's engineers.

Where the height from the pump and holding tank is greater than 70m, an extra wheel is recommended on the pump.

Also, as distance between pump and tank increases, it is recommended that the water pipe diameter be increased to minimise pressure loss (see table No.2).

Useful Recommendation

The use of a union at the exit of the pump and a non return valve near of the pump (within 2m) is strongly advised. In situations where extended distance and heights are encountered, a non return valve is necessary for every 20m of water head created.



Percentage Losses

DISTANCE		0,5km	1,0	1,5	2,0	2,5	3,0	3,5	4,0	4,5	5,0km
UNDERGROUND TUBE DIAMETER	0,75"	2,00	7,50	16,00	27,00	35,00	58,00	80,00	100,00	•	•
	1,0"	0,70	2,70	5,00	10,00	16,00	21,50	26,00	37,00	45,00	55,00
	1,25"	0,20	0,75	1,60	2,70	4,50	6,00	8,00	10,00	12,00	15,50
	1,5"	•	0,22	0,50	0,80	1,40	1,80	2,40	3,00	3,70	4,70
	2,0"	•	0,08	0,17	0,28	0,40	0,60	0,80	1,05	1,30	1,60
	2,5"	•	•	•	0,07	0,12	0,16	0,22	0,27	0,32	0,42
	3,0"	•	•	•	•	•	0,05	0,08	0,10	0,12	0,15

Maintenance

Lubrication

- SAE 90 oil is recommended in the body of the pump
- The oil level can be seen in the port provided in the pump's casing
- The oil must be changed between 6 and 12 months depending on usage
- Check the oil level every 30 to 60 days, topping-up as necessary. The capacity of the body casting is: ZM44 – MAXXI = 1,2 litres, ZM 38/51/63 – MAXXI = 2 litres, ZM 76/95 – MAXXI = 3 litres

Fixing

- Check the tightness of the pump and its fixings every 60 days

Explanation of the tables

- Pumps are manufactured in the normal versions shown in the green rows of the tables
- The elevation column indicates the maximum water head possible in Meters of Water Column
- The water flow specified in the tables refers to a 24 hours production cycle
- All the models have a extra stroke of the piston, that is used in situations where the customer has land with a small elevation and a large quantities of water and where it is possible to use efficiently the equipment referring to the extra column of the annex tables

ZM 38 MAX 1					
Production by revolutions and pump stroke					
Stroke	20 r.p.m.	30 r.p.m.	40 r.p.m.	50 r.p.m.	Elevation
Extra	6,230	9,340	12,460	15,570	200m
Normal	5,250	7,800	10,500	13,000	220m
A	4,500	6,880	8,000	11,400	240m
B	3,900	5,800	7,500	9,600	260m
C	3,200	4,900	6,500	8,200	280m
D	2,200	3,400	4,500	5,700	300m

Maximum elevation: 300m

ZM 44 MAX 1					
Production by revolutions and pump stroke					
Stroke	20 r.p.m.	30 r.p.m.	40 r.p.m.	50 r.p.m.	Elevation
Extra	5,200	7,800	10,400	13,000	130m
Normal	4,300	6,400	8,600	10,800	150m
A	3,400	6,100	6,900	8,600	170m
B	2,600	3,900	5,200	6,400	190m

Maximum elevation: 190m

ZM 51 MAX 1					
Production by revolutions and pump stroke					
Stroke	20 r.p.m.	30 r.p.m.	40 r.p.m.	50 r.p.m.	Elevation
Extra	10,600	16,000	21,000	26,600	140m
Normal	9,000	13,300	18,000	22,200	160m
A	8,000	11,700	15,600	20,000	170m
B	6,800	10,000	13,700	17,000	180m
C	5,700	8,300	11,200	14,000	190m
D	3,600	5,800	7,800	10,000	200m

Maximum elevation: 200m

ZM 76 MAX 1					
Production by revolutions and pump stroke					
Stroke	20 r.p.m.	30 r.p.m.	40 r.p.m.	50 r.p.m.	Elevation
Extra	31,500	47,250	63,000	78,700	130m
Normal	27,500	41,300	55,000	68,700	150m
A	23,600	35,400	47,200	59,000	160m
B	19,600	29,500	39,300	49,100	170m
C	15,750	23,600	31,500	39,300	200m

Maximum elevation: 200m

ZM 63 MAX 1					
Production by revolutions and pump stroke					
Stroke	20 r.p.m.	30 r.p.m.	40 r.p.m.	50 r.p.m.	Elevation
Extra	17,300	25,900	34,600	43,300	100m
Normal	14,500	21,800	29,100	36,400	110m
A	12,700	19,100	25,500	31,900	120m
B	10,900	16,400	21,800	27,300	130m
C	9,000	13,600	18,200	22,700	140m
D	6,300	9,500	12,700	15,900	150m

Maximum elevation: 150m

Maximum elevation: 150m

ZM 95 MAX 1					
Production by revolutions and pump stroke					
Stroke	20 r.p.m.	30 r.p.m.	40 r.p.m.	50 r.p.m.	Elevation
Extra	48,900	73,400	97,800	–	90m
Normal	42,800	64,200	85,600	107,000	100m
A	36,600	55,400	73,900	92,300	110m
B	30,500	45,700	61,000	76,200	120m
C	24,200	36,700	48,900	61,100	130m

Maximum elevation: 130m

Possible defects, causes and solutions

Problems	Causes	Solutions
The wheel turns and stops	Water flow insufficient to drive the wheel.	Increase the water volume to move the wheel or change the stroke of the pistons. *
The pump functions but does not propel water	<ol style="list-style-type: none"> Grit/obstructions in the valve Air intake The propulsion tube is cracked 	<ol style="list-style-type: none"> Clean the suction tube and place a nylon screen (mosquito net type), in front of tube Clean the valve, remove obstructions Check the connections at the top and base of the suction tube, eliminating any possibility of air intake Adjust the leather seals by moving the lateral part of the leather assembly, or replacement To test the pressure of the pump, close the exit. If you have an reduction (stop) of the rotation of the wheel, the different closing of the pump are corrects, in this case the tube is fissured. In this case that the wheel does not stop stop, check the valves and the leathers of the pump
The pump doesn't suck water	<ol style="list-style-type: none"> The level difference between the pump and the water to be lifted is higher than 7 meters. Problem in the valves Degraded leathers If water to be lifted is higher than the level of the pump, the water enters the pump with an abnormal pressure, closing the suction valve 	<ol style="list-style-type: none"> Instal a vertical non return valve and prime the tube with water before use Verify that the valves are not blocked Change the leather seals Bring water in a tank near of the pump and make the suction in this tank.
The pump pumps in a jet	<ol style="list-style-type: none"> Valves blocked Degraded leather seals 	<ol style="list-style-type: none"> Verify that the valves are not blocked Adjust leather seals
Production (flow) insufficient of the pump	<ol style="list-style-type: none"> Degraded leather seals Water flow to the wheel is insufficient Valves out of alignment Water availability limited 	<ol style="list-style-type: none"> Change the leather seals Verify if the water production is suitable for the wheel rotation Change the valves Find another water source

* See the instruction on the pistons stroke modification – pg ?

Terms of Guarantee

ZM Pompe guarantees the equipment in this manual and will repair, or replace any components which might fail in normal service, or where manufacturing defect may be identified.

Period of guarantee

24 (twenty and four) months, from the date of the sale.

Application of the guarantee

The guarantee will be honoured by ZM Pompe, after examination of the faulty unit and where failure is as a result of a mechanical, or manufacturing defect.

Pumps will only be replaced in situations where repairs cannot be successfully carried out by replacement of failed components.

Loss of the guarantee rights

Any one of the following that will automatically revoke the provisions of the guarantee:

Use of equipment in contravention of the recommendations of this manual, abuse, over work, or accidents

- Incorrect handling, preventive/corrective maintenance of incorrect usage
- Use of components not provided by ZM Pompe
- Alterations to the pump, or components not sanctioned by ZM Pompe
- Change, destruction or loss of the original sale documentation

Items excluded from the guarantee:

The items below are not covered by the guarantee:

Wear and tear due to normal usage: the filter elements, the leather carriers, O rings, valves, cylinders, movements, as well as the carrying out of routine maintenance

- Components destroyed, or disabled by natural causes, other than caused by manufacturing, installation (if by ZM Pompe) or raw material defect
- Failure due to accident
- Incorrectly specified, or employed hydraulic oils, lubricants, greases and similar materials
- Damage by the user, or a third party
- Damage caused during transit

Note:

The guarantee does not cover the expense of transportation. This charge will be for the customer's account.

Precautions

- Do not attempt to stop the pump with pieces of wood, iron or other objects
- Do not lubricate the leathers with the grease, oil or other lubricants, only use Vaseline
- Do not exceed the oil limit stipulated in the manual
- Do not forget to change the pump oil after its useful life
- Ensure that water to be lifted is not in the same stream as the water used to drive the pump
- Do not permit the pump rotational speed to exceed the maximum r.p.m. indicated in the specification
- Do not attempt to lift water containing sand and/or grit
- Do not reuse the leather seals
- Ensure that the pump is properly installed and clear of any rocks, trees or other elements which might cause damage under extreme weather and environmental conditions
- Utilise a decanting tank and a filter for sand in the suction section

Follow these simple instructions for maximum pump life and minimal maintenance.