S4S4N

SOLAR BOREHOLE SYSTEM

DAB®
WATER•TECHNOLOGY

Sandro Stramare
Chief Executive Officer

WHO IS DAB?

"The added value of DAB has always been knowning when to combine long experience and tradition with the quest for technological innovation".

This challenge has been overcome thanks to the commitment of internal resources and the constant care of client relations.

Because the important thing is to always look at the origins, to never forget where you started.

The simple and effective solutions are the biggest form of innovation. The technology of our products speak the same language of those who buy or use them. This is our strength.

DAB has grown along with its employees and its clients over the years, developing a clear and unambiguous identity and providing a complete 360° service.

We have always invested a lot and we want to continue to do so. In the moments of aggregation with the client, we want to create not only a professional environment, but also a friendly one, forming a team that pursues a common objective.

The relationship with the client is not only essential, but it is also a virtuous model that keeps and maintains solid human relationships.

Because when you choose a DAB, you also choose the company, its continued support, communication and cooperation to achieve total client satisfaction.

RESIDENTIAL BUILDING SERVICE

DAB produces reliable products, technologically advanced, easy to install and efficient, ensuring high energy savings in the following domestic and residential application sectors: heating and air conditioning, water supply and pressurization, irrigation and gardening, use of rain water, drainage, collection and disposal of waste water, circulation and filtration of swimming pool water.

COMMERCIAL BUILDING SERVICE

DAB develops technologically advanced solutions, highly efficient and reliable for many commercial application sectors: from heating and air condition circulation systems, to water supply and fire fighting system pressurization, to the disposal of wastewater.

AGRICULTURE AND IRRIGATION

DAB offers pumping solutions for extraction of water from the subsoil for agricultural and irrigation applications. High quality submersible pumps and motors, reliable and capable of guaranteeing high energy efficiency. A wide range of products to meet the needs of any type of plant

SUBMERSIBLE SOLAR MOTOR

M220SOL

M220SOL

M220SOL-H

TECHNICAL DATA

Performance range:
Flow up to 21m³/h and max head of 240 meters
Motor versions:
M220SOL – 0.37 to 2.2kW (55V starting, 150m Pump Head Max)
M220SOL-H – 0.37 to 2.2kW (90V starting, 320m Pump Head Max)
Horizontal Installation:
Minimum 5° angle
Max input limit:
DC: 55 – 440Voc; 12A
90 – 440Voc; (H version)
AC: 90 – 280V; 10A
Max power output (P2): 2200W
Max speed: 3000rpm
Max water temp: 40°C
Min water temp: 0°C

General Data

- It is the ideal solution for supplying water in remote areas, where the normal power supply of electricity to the power grid is inconsistent or completely unavailable. The S4SUN is designed for ease of use, requiring no maintenance and is coupled exclusively with the DAB S4 to supply water using solar energy.
- The motor uses rare earth permanent magnets and has a built-in VFD. Vector control and MPPT are used to select the best operating point for the pump providing a highly efficient and cooler operating motor.
- Equipped with a fully built-in inverter and control system to allow direct connection of AC or DC power supplies. The inverter will guarantee even higher system operating efficiencies through less power loss and exposure to temperature variances. Therefore a smaller number of photovoltaic panels are required for the system to operate.
- The M220SOL has a lower starting voltage of 55V DC meaning less solar power required for operation.
- The M220SOL-H has a higher starting voltage requirement of 90V DC giving more support for higher pressure requirements.
- For an integrated fully automated pumping system, it is recommended that every solar motor is installed with a solar controller to use with multiple control inputs and power supplies (AC/DC).
- Dry run protection (No water in the borehole):
  The motor is equipped with dry run protection. If there is insufficient water for 10 seconds the motor will stop. After 60 seconds the motor will restart and run for 10 seconds. If no water is detected, the motor will stop and attempt to restart every 30 minutes.
- Pump operation with zero flow condition (Closed Valve):
  Motor will switch off but this action can take up to 3 – 45 minutes. Data received by the VSD inside the motor will be annualized and calculated in order for the motor to shut off.
- Pump operation with zero flow condition with flow sensor installed (Closed valve):
  With the flow sensor (accessory) in operation, the sensor will relay the zero flow information to the controller and after 3 minutes the motor will shut down unless flow resumes.

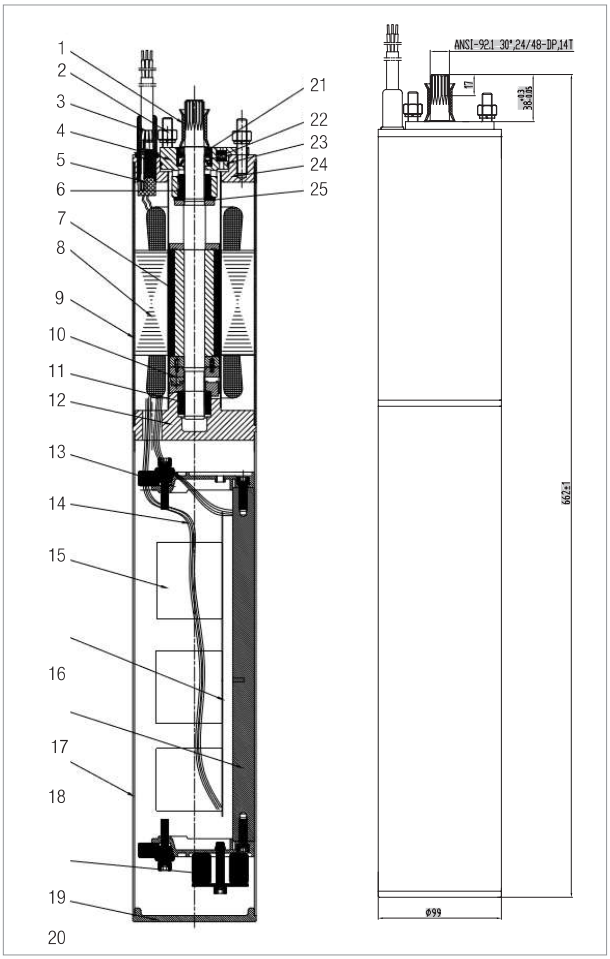
ELECTRICAL DATA								
MOTOR TYPE	AC V	DC V	P2 kW	In AC A	In DC A	AC MAX W	DC MAX W	RPM
MOTOR M220SOL	90-280	55-440	2,2	10	12	2200	3000	3000
MOTOR M220SOL-H	90-280	90-440	2,2	10	12	2200	3000	3000

DIMENSIONS			
MOTOR TYPE	LENGHT mm	WEIGHT kg	DIAMETER mm
MOTOR M220SOL	655	13,5	100
MOTOR M220SOL-H	695	14,5	95

SUBMERSIBLE SOLAR MOTOR

M220SOL

MATERIALS



NO.	COMPONENTS	MATERIAL
1	Sediment /Sand Guard	Fluorine Rubber
2	Fasteners	Stainless steel AISI 316
3	Cable gland	--
4	Upper Bearing Housing	Stainless steel AISI 304L
5	Internal cable connection	Stainless steel AISI 316 / Nitrile rubber
6	Upper Bearing	Graphite
7	Permanent Magnet Rotor	--
8	Stator	--
9	Motor Housing	Stainless steel AISI 304L
10	Thrust Bearing	Graphite / Stainless Steel AISI 420
11	Lower Bearing Support	Graphite
12	Lower Bearing Housing	Stainless steel AISI 304L
13	Stent	--
14	Internal Wire	--
15	Capacitor	--
16	PABA	--
17	Radiator	Aluminium
18	Base Plate	Stainless steel AISI 304L
19	Inductor	--
20	Base	Stainless Steel 304
21	Mechanical Seal / Sand Ring	Silicone Carbide
22	Lip Seal	Nitrile Rubber
23	O Ring	Nitrile Rubber
24	Upper Housing	Stainless steel AISI 304L
25	Wear Pads	Polytetrafluroethylene

SOLAR MOTOR CONTROLLER

M220CON

General Data

The M220CON controller is a microcontroller, designed, developed and manufactured for the S4SUN.
It is suitable for simultaneous AC and DC incoming power supplies. The controller is capable of switching manually or automatically between two power supplies depending on DC/Solar power availability.

AC, DC power mode or AUTO mode switchable.
In AC mode, the incoming power source can be from the main power supply or a generator. In DC mode, the power supply is from solar panels. However, DC will be the favoured power supply. When DC power source is below minimum 55V (M220) or 90V (M220-H) the device shuts down the supply for 10min's then switches to AC power when DC power returns it automatically switches back.

Features

- The M220CON controller can take signals from two digital switches placed in a tank or similar.
- The controller can also be configured as a pressure system with pressure switch, non-return valve and pressure tank.
- The high-level float LED light on the M220CON controller will indicate that the tank is full and will stop the pump.
- The low-level float LED light on the M220CON controller will indicate that the tank is empty and will start the pump after 10 minutes.
- On power-up, if the tank is not full, then the M220CON controller powers the pump to fill the tank.
- The M220CON controller is suitable for outdoor installation and is weather-proof (IP65 enclosure). However, installation in direct sunlight should be avoided.

Adjustable generator shut off timer to prevent repeated starting:

- The controller will automatically switch between DC and AC depending on device voltage.
- This timer locks the generator into a run state while the DC input stabilizes.

Adjustable flow sensor restart timer:

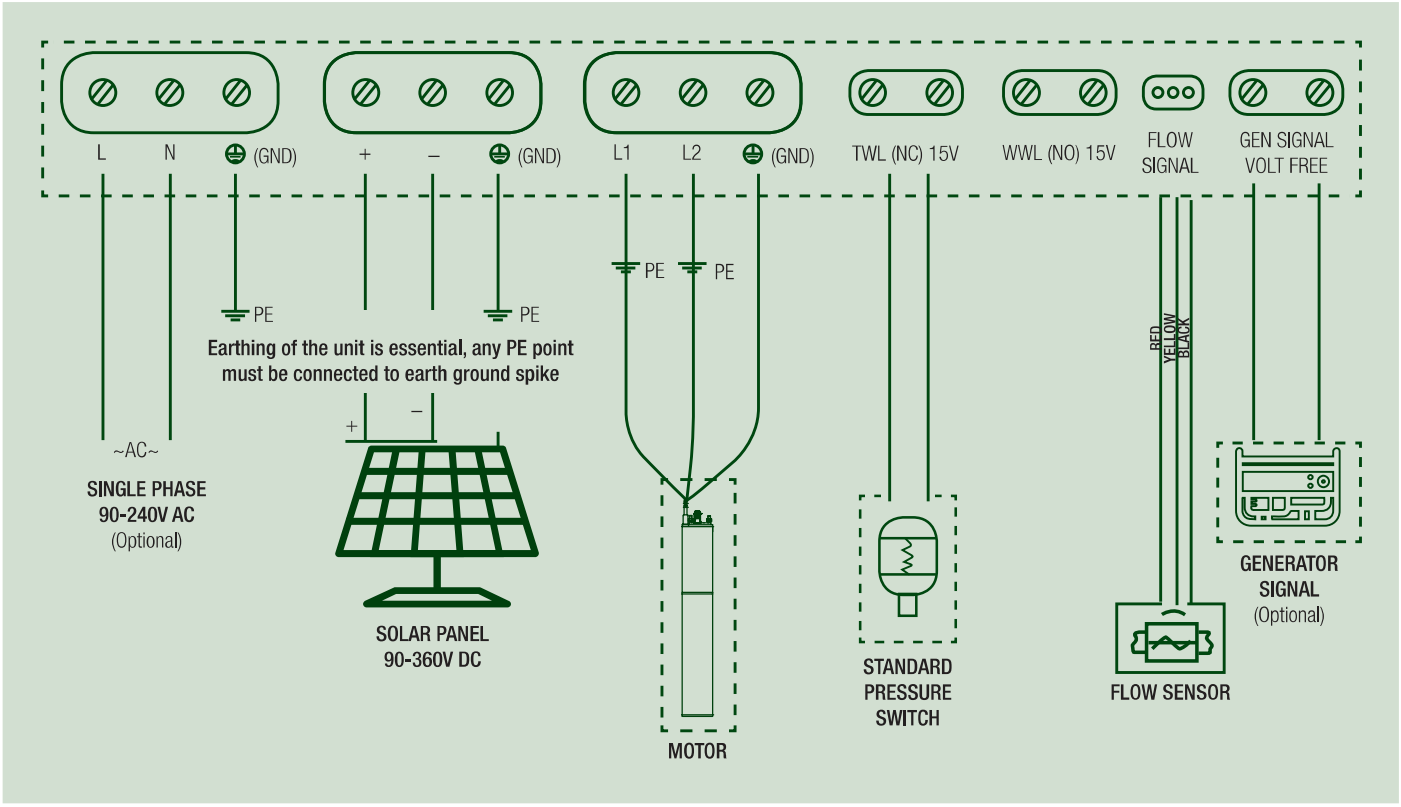
- Adjust restart delay after no flow, ideal for low yielding water source applications.
- Once zero flow is detected the control will maintain operation for 3 minutes then turn off the pump.
- There is a two minute lock out cycle when power is supplied to the controller.

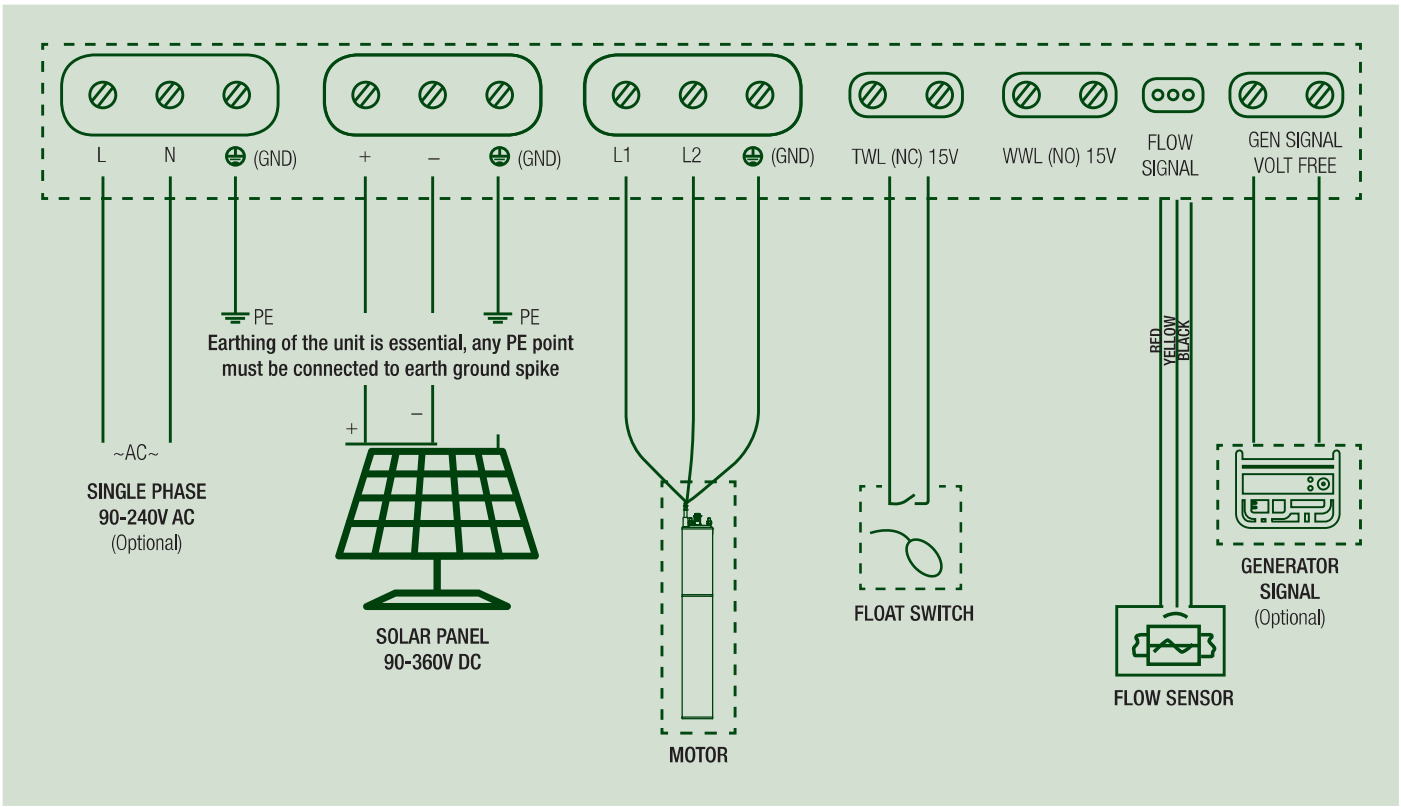
Sizing of generator:

- Total Watt of the solar array, multiplied by 1.1 and then devided by 0.8 to arrive at the minimum kVA required from the generator.

SOLAR MOTOR CONTROLLER

WIRING DIAGRAM





ACCESSORIES

Flow Sensor	Item Desc	Specification	Waterproof cable	Item Desc	Specification
	Flow sensor 2“ with waterproof connection	Inlet & outlet diameter is 2", flow range 10-300L/min, working voltage 3-24V, pulse characteristic F=0.2*Q, pressure range =>2.0MPA (To be used with waterproof cable)		Flow sensor cable - 10m extra lentgh waterproof	10 meters extra length waterproof cable to suit flow sensor with waterproof connectors
Zinc Anode	**Item Desc**	**Specification**	**Solar Panel**	**Item Desc**	**Specification**
	Zinc anode	50mm clamp on 50mm		330 Watt solar panel	Wattage 330 V_{oc}(V): 46.15 - 46.27 I_{sc} (A): 8.92 - 9.41 Dimensions (mm) (±2) 1958 x 987 x 40

CABLE SELECTION

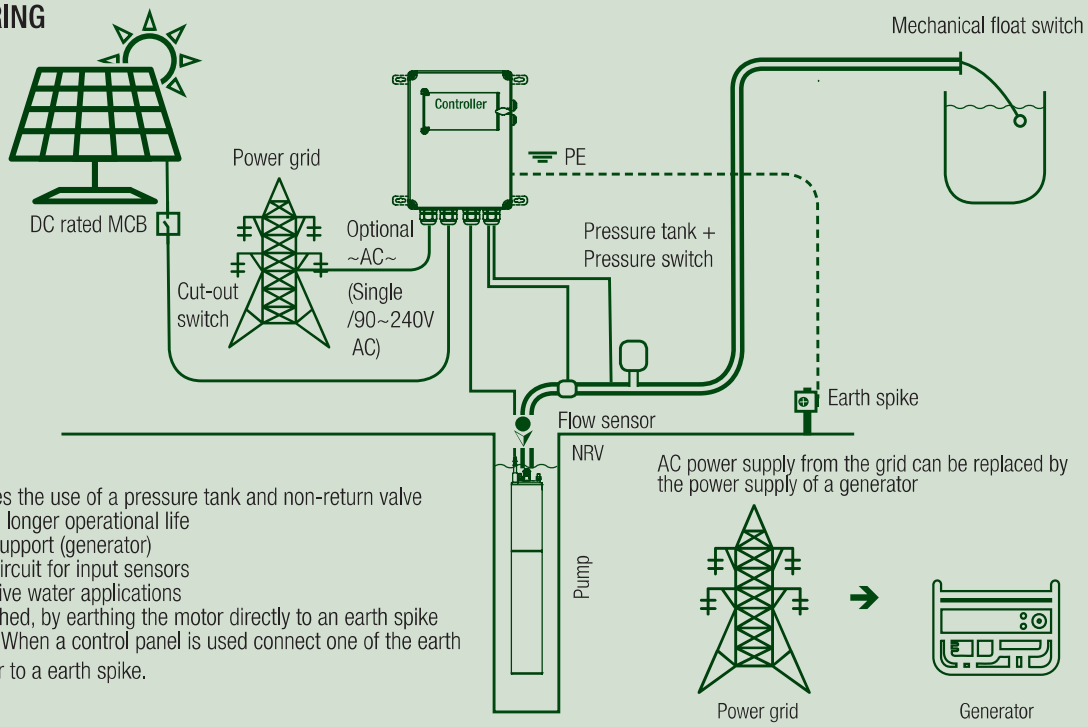
			Cable Length H (Up to ‘X’ Meters)									
Solar Panel Input			10	25	50	75	100	125	150	200	250	300
DC Input Power (W)	VMPP (V)	IMPP (A)	Cross Section mm²									
600	60	10	2,5	6	16	25	25	35	35	50	70	70
700	70	10	2,5	6	10	16	25	25	35	50	50	70
800	80	10	2,5	6	10	16	25	25	25	35	50	50
900	90	10	1,5	4	10	16	16	25	25	35	50	50
1000	100	10	1,5	4	10	10	16	25	25	35	35	50
1100	110	10	1,5	4	10	10	16	16	25	25	35	50
1200	120	10	1,5	4	6	10	16	16	25	25	35	35
1300	130	10	1,5	4	6	10	16	16	16	25	35	35
1400	140	10	1,5	2,5	6	10	10	16	16	25	25	35
1500	150	10	1,5	2,5	6	10	10	16	16	25	25	35
1600	160	10	1,5	2,5	6	10	10	16	16	25	25	25
1700	170	10	1,5	2,5	4	6	10	10	16	16	25	25
1800	180	10	1,5	2,5	4	6	10	10	16	16	25	25
1900	190	10	1,5	2,5	4	6	10	10	16	16	25	25
2000	200	10	1,5	2,5	4	6	10	10	10	16	25	25
2100	210	10	1,5	2,5	4	6	10	10	10	16	16	25
2200	220	10	1,5	2,5	4	6	10	10	10	16	16	25
2300	230	10	1,5	1,5	4	6	6	10	10	16	16	25
2400	240	10	1,5	1,5	4	6	6	10	10	16	16	25
2500	250	10	1,5	1,5	4	4	6	10	10	16	16	16
2600	260	10	1,5	1,5	4	4	6	10	10	16	16	16
2700	270	10	1,5	1,5	2,5	4	6	10	10	10	16	16
2800	280	10	1,5	1,5	2,5	4	6	6	10	10	16	16
2900	290	10	1,5	1,5	2,5	4	6	6	10	10	16	16
3000	300	10	1,5	1,5	2,5	4	6	6	10	10	16	16
3100	310	10	1,5	1,5	2,5	4	6	6	10	10	16	16

INSTALLATION GUIDE

BEST PRACTICE

Option 1: System using mechanical float switch, pressure switch, pressure tank, flow sensor & NRV

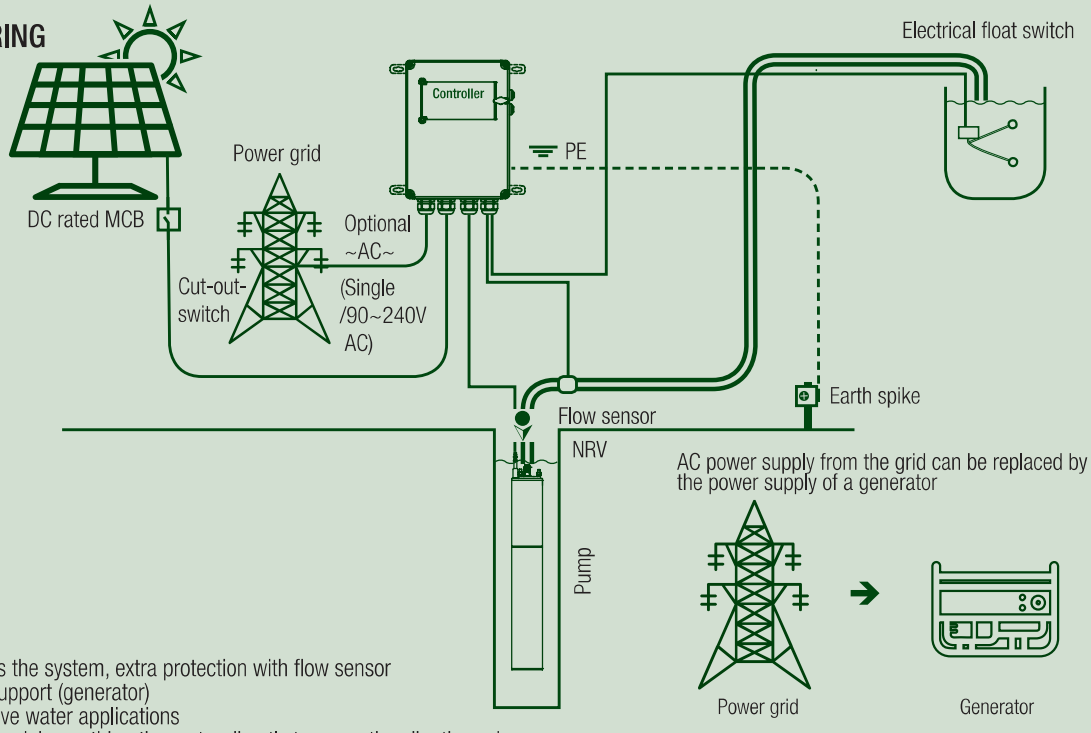
DC & AC POWER WIRING



- Pressure switch requires the use of a pressure tank and non-return valve
- The system guarantees longer operational life
- Backup power supply support (generator)
- Complete low voltage circuit for input sensors
- Zinc anode for aggressive water applications
- The unit should be earthed, by earthing the motor directly to an earth spike through the earth wire. When a control panel is used connect one of the earth lines from the controller to a earth spike.

Option 2: System using electronic float switch, flow sensor & NRV

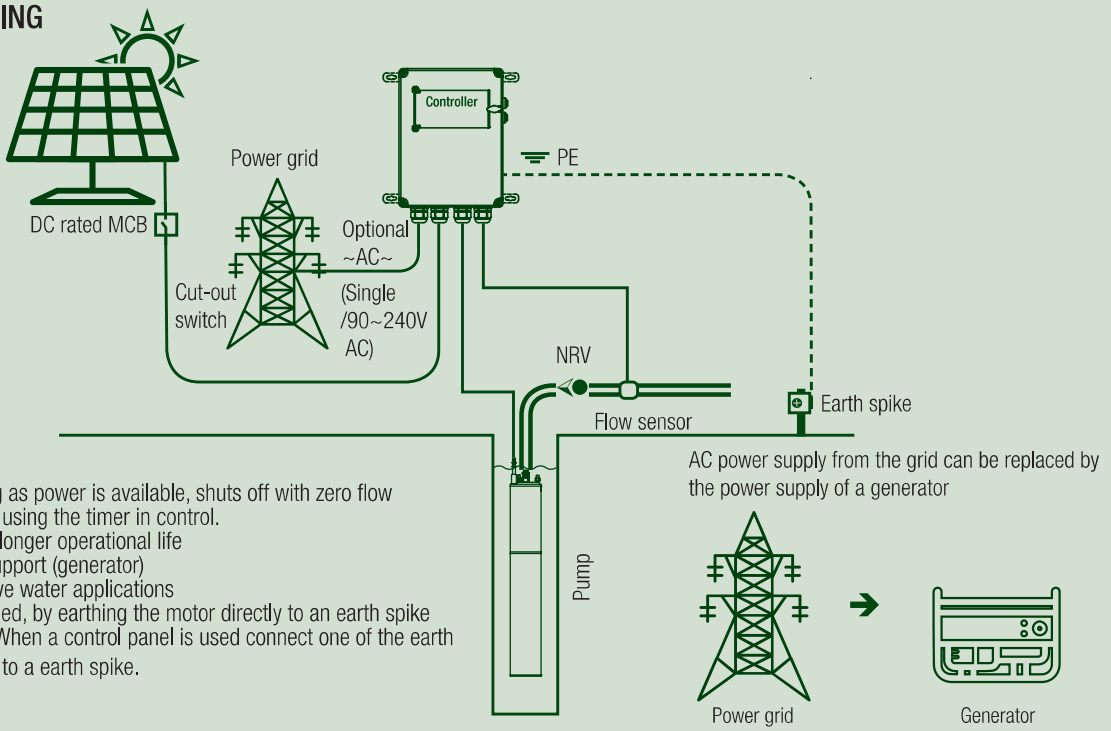
DC & AC POWER WIRING



- Electronic float activates the system, extra protection with flow sensor
- Backup power supply support (generator)
- Zinc anode for aggressive water applications
- The unit should be earthed, by earthing the motor directly to an earth spike through the earth wire. When a control panel is used connect one of the earth lines from the controller to a earth spike.

Option 3: System using flow sensor & NRV

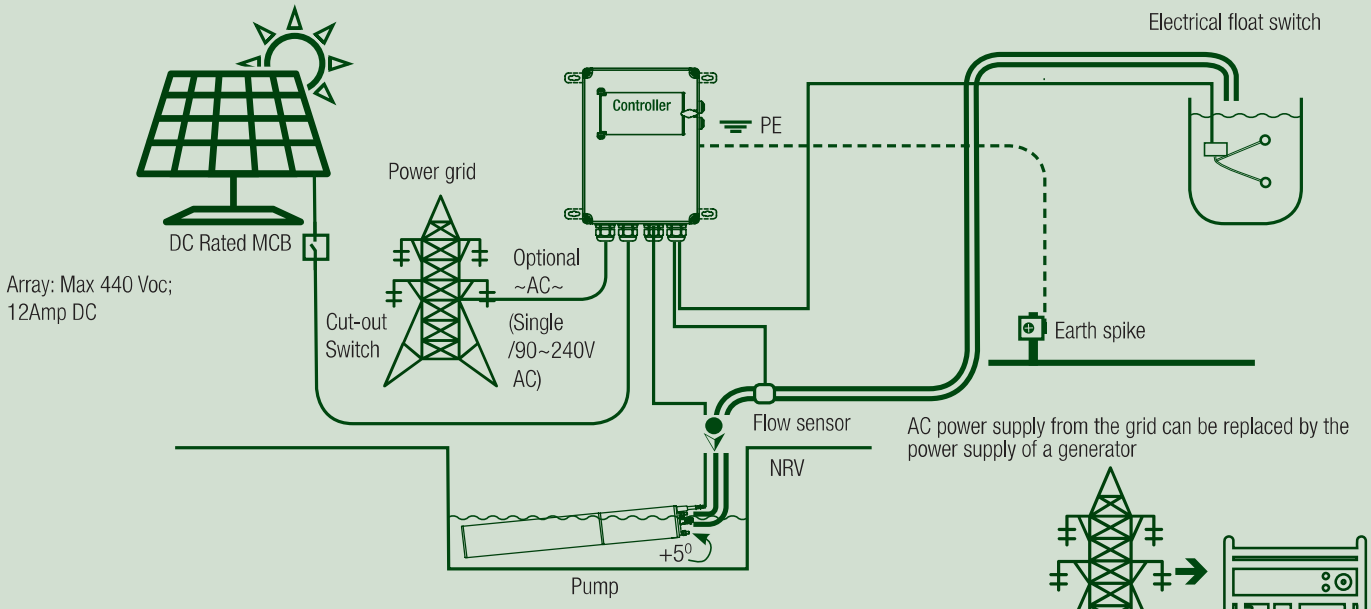
DC & AC POWER WIRING



- The system runs as long as power is available, shuts off with zero flow and continues to restart using the timer in control.
- The system guarantees longer operational life
- Backup power supply support (generator)
- Zinc anode for aggressive water applications
- The unit should be earthed, by earthing the motor directly to an earth spike through the earth wire. When a control panel is used connect one of the earth lines from the controller to a earth spike.

Horizontal installation of the system using electronic float switch, flow sensor & NRV

DC & AC POWER WIRING



- A cooling sleeve is recommended and the minimum angle of installation must be greater than 5 degrees.
- When installing horizontally the bleed hole must be at the top to allow hot water to escape and cool water to enter (Bleed hole is indicated by arrow on the motor casing).
- Ensure the motor and pump is in clear water, contamination will lead to blockages and higher power consumption.
- The unit should be earthed, by earthing the motor directly to an earth spike through the earth wire. When a control panel is used connect one of the earth lines from the controller to a earth spike.

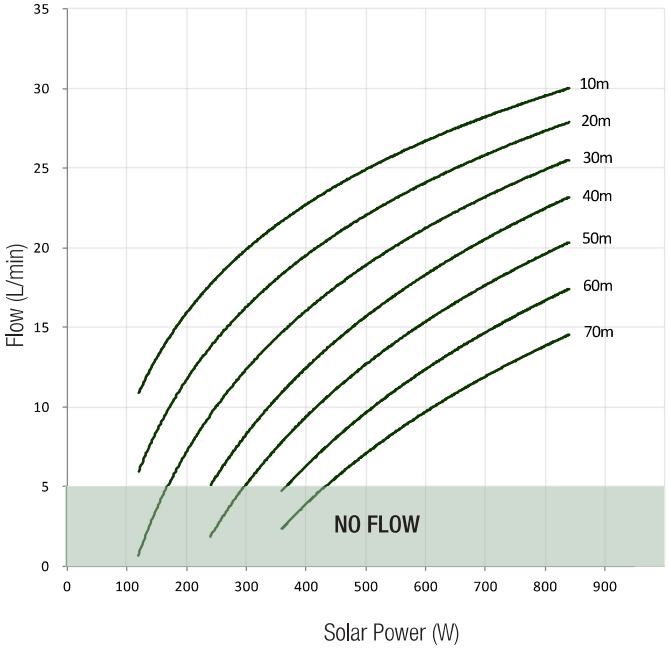
EASY SOLAR SELECTION CHART

Flow (l/h)	Total Pump Head (m)	S4SUN Model	Panel Selection Based on 330W solar panels connected in series
900	240	S4SUN 2/40 H	8
1020	240	S4SUN 2/40 H	8
1020	50	S4SUN 1/19 L	3
1020	80	S4SUN 1/26 L	4
1020	115	S4SUN 1/37 L	5
1020	130	S4SUN 1/37 L	6
1200	200	S4SUN 2/40 H	8
1500	160	S4SUN 4/27 H	9
1500	180	S4SUN 2/40 H	8
1800	160	S4SUN 2/28 H	8
2100	160	S4SUN 3/39 H	9
2160	20	S4SUN 2/7 L	2
2160	30	S4SUN 2/10 L	2
2160	48	S4SUN 2/14 L	3
2160	63	S4SUN 2/20 L	4
2160	90	S4SUN 2/28 L	6
2160	130	S4SUN 2/28 L	8
3000	20	S4SUN 3/13 L	2
3000	30	S4SUN 3/19 L	3
3000	40	S4SUN 3/19 L	3
3000	60	S4SUN 3/19 L	4
3000	80	S4SUN 3/32 L	7
3000	100	S4SUN 3/39 L	8
3000	120	S4SUN 3/39 L	10
3600	20	S4SUN 4/7 L	2
3600	32	S4SUN 4/9 L	3
3600	40	S4SUN 4/9 L	4
3600	65	S4SUN 4/19 L	6
3600	90	S4SUN 4/27 L	8
5400	20	S4SUN 6/7 L	3
5400	30	S4SUN 6/10 L	4
5400	40	S4SUN 6/14 L	5
5400	55	S4SUN 6/21 L	8
7800	20	S4SUN 8/6 L	4
7800	30	S4SUN 8/13 L	6
7800	40	S4SUN 8/13 L	8
12000	20	S4SUN 12/11 L	7
15600	15	S4SUN 16/8 L	7
15600	20	S4SUN 16/8 L	8

* The easy solar selection chart is only a guideline and final selection should be confirmed by the performance curve.

S4-1 SERIES

S4-1/13



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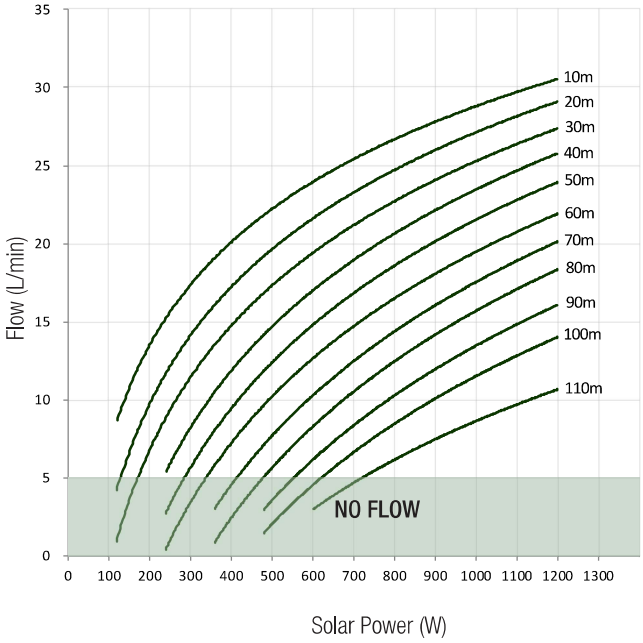

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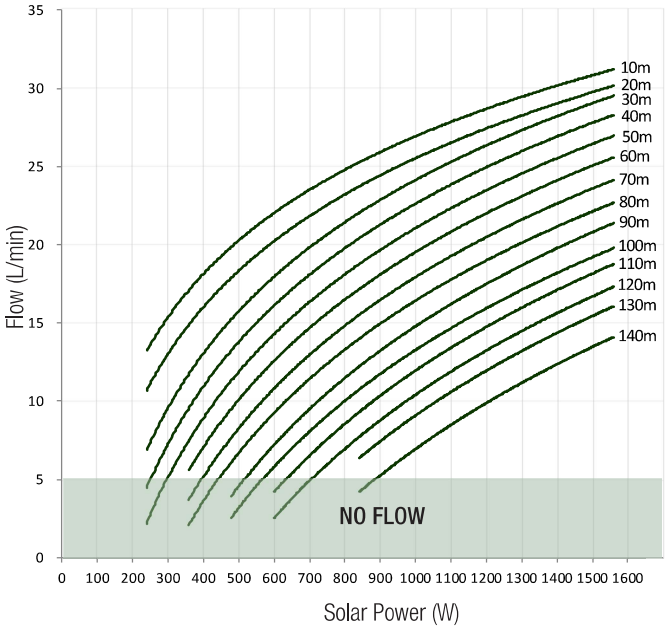

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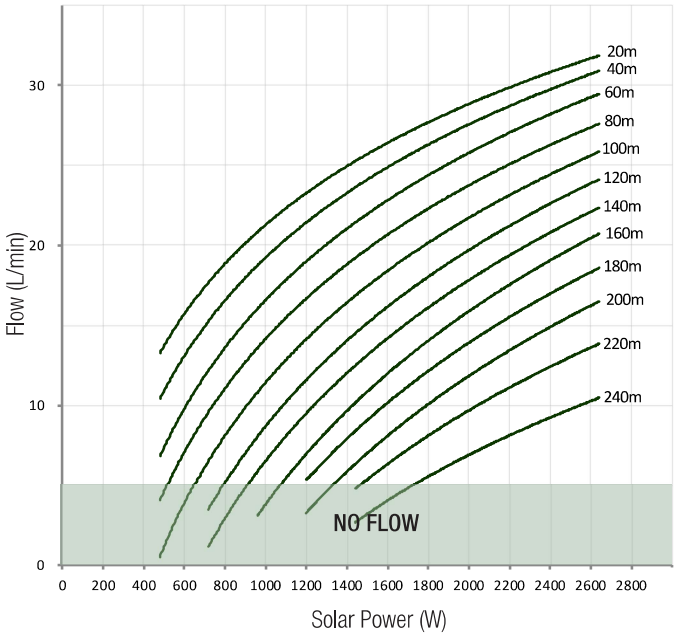
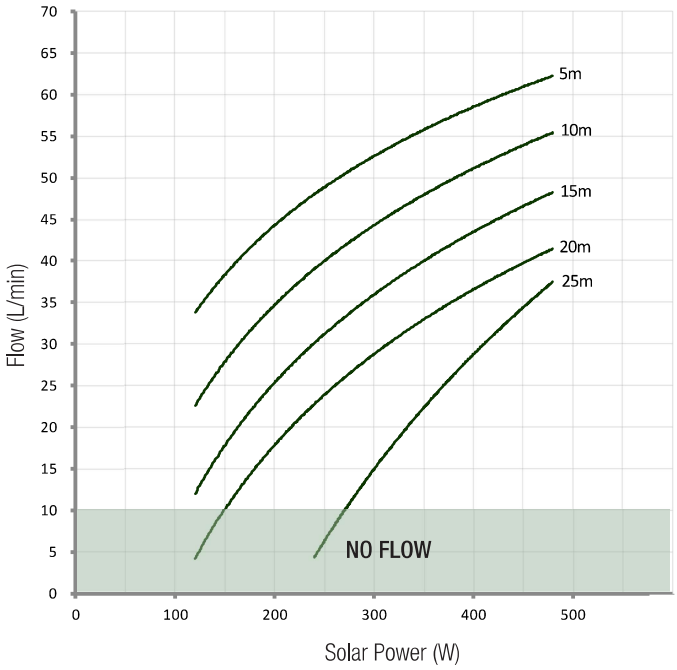


S4-2 SERIES

S4-2/5



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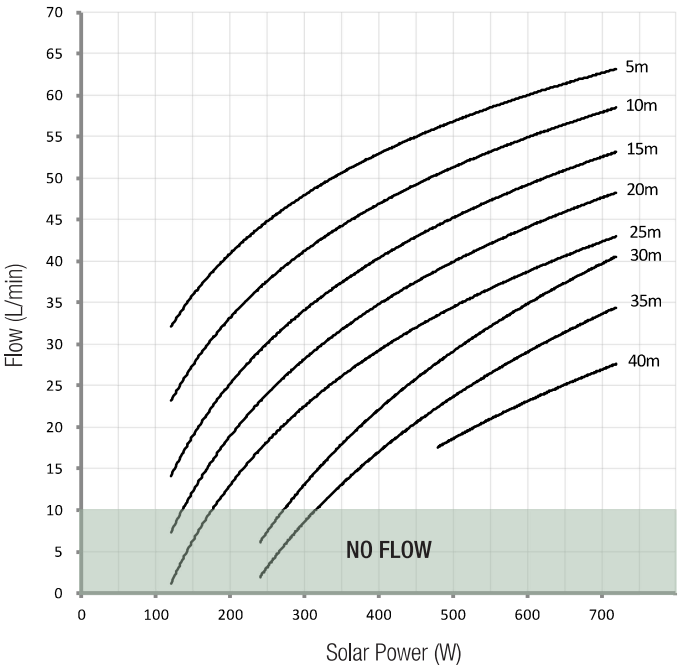

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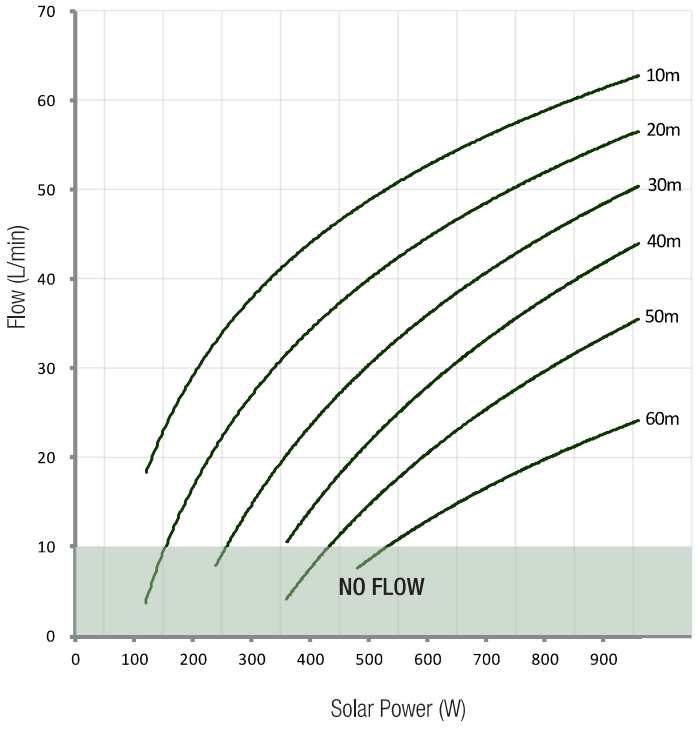

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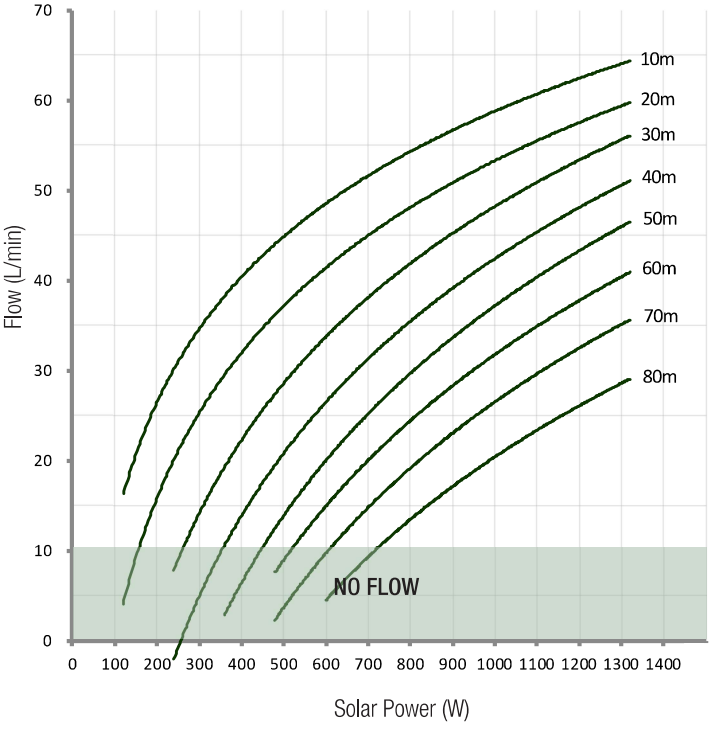
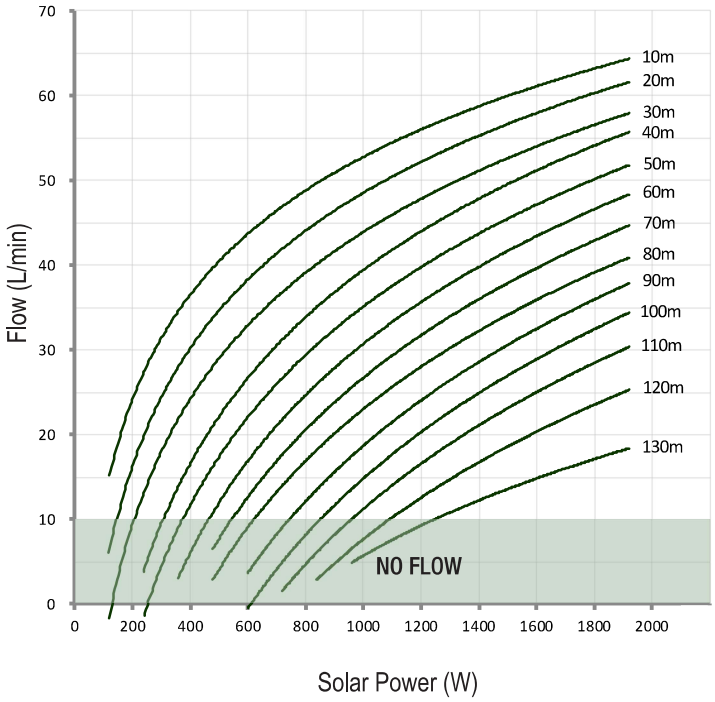


S4-2 SERIES

S4-2/20



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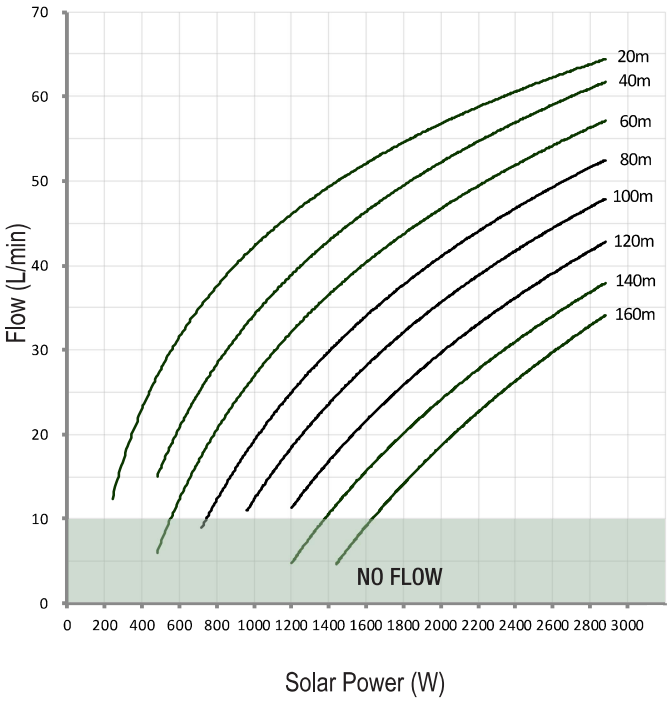

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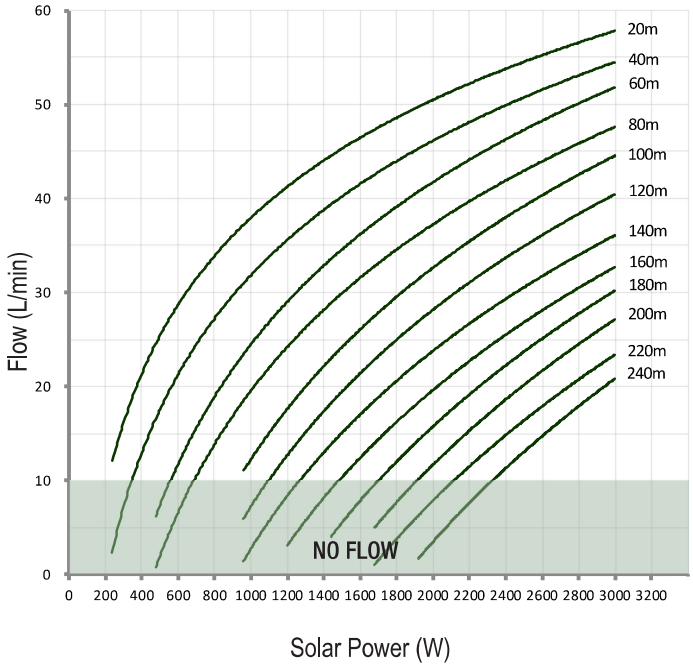
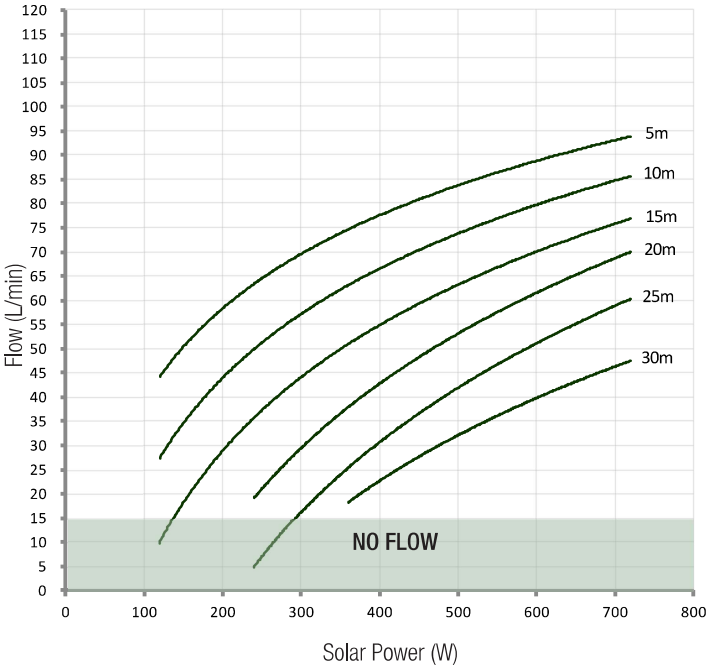


S4-3 SERIES

S4-3/6



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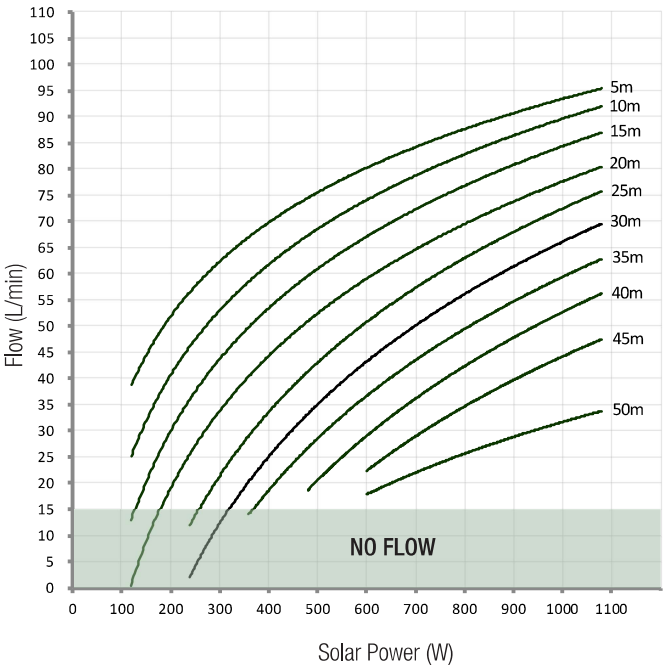

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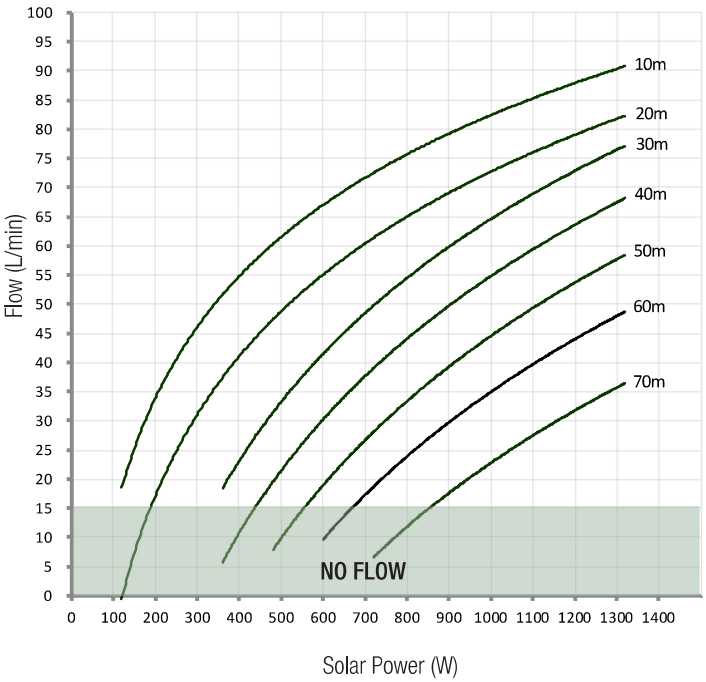

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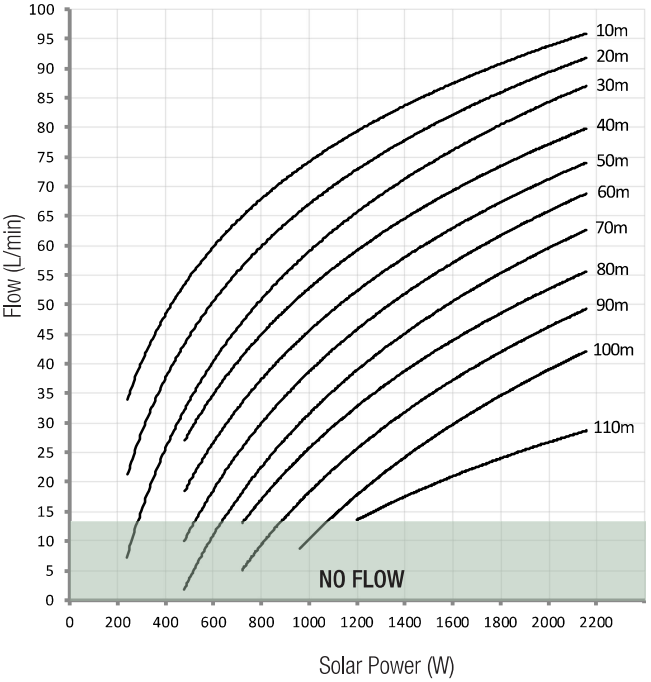
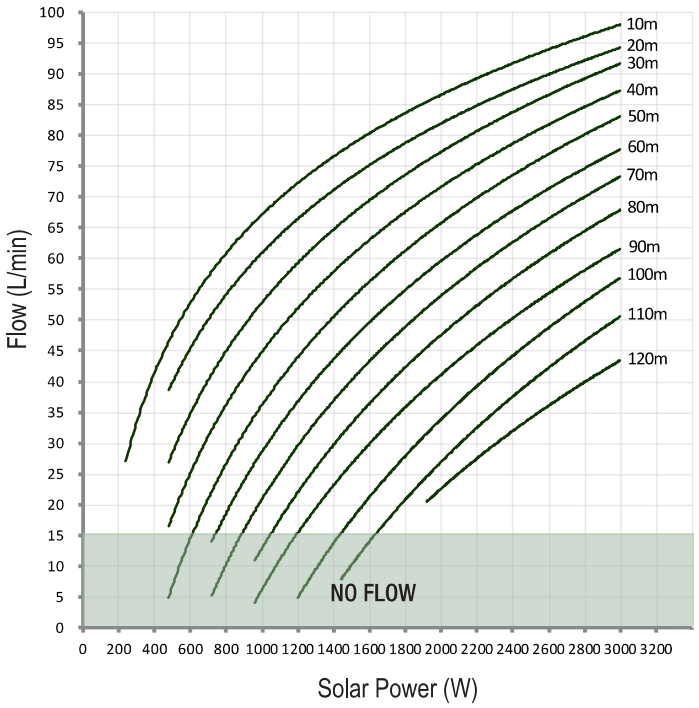


S4-3 SERIES

S4-3/25



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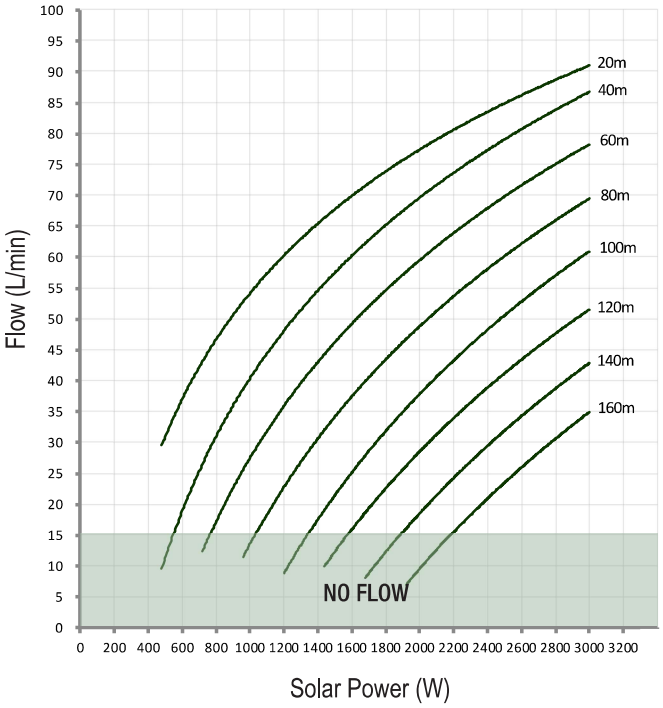

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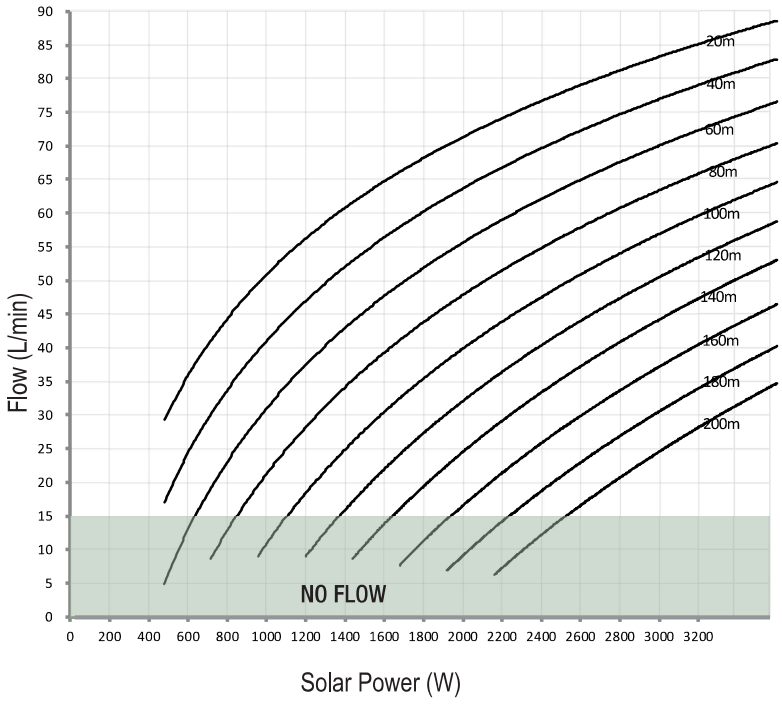
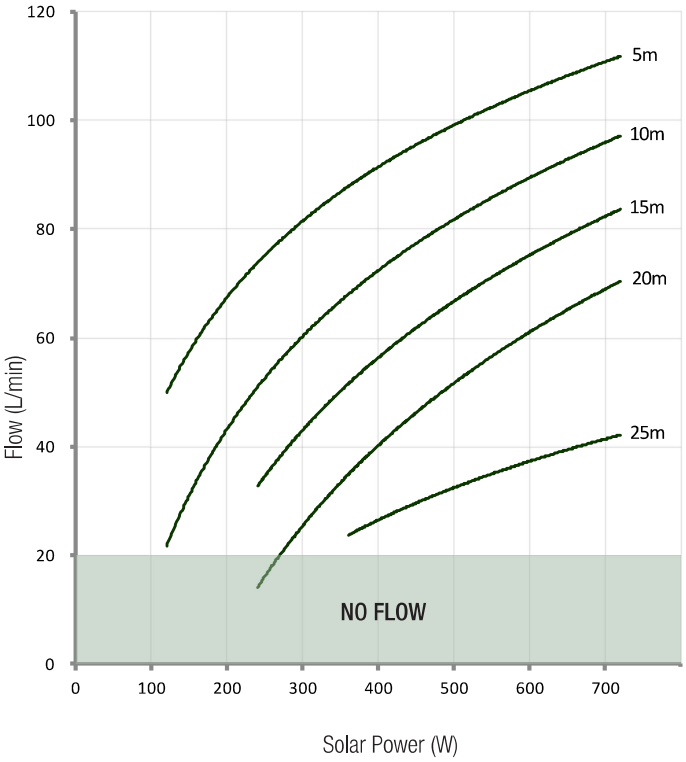
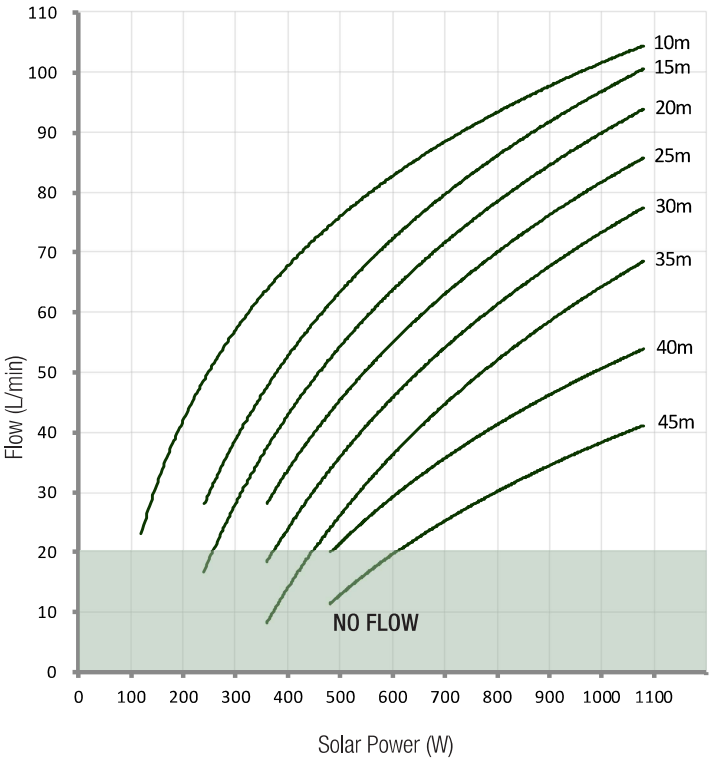


S4-4 SERIES

S4-4/4



S4-4/7



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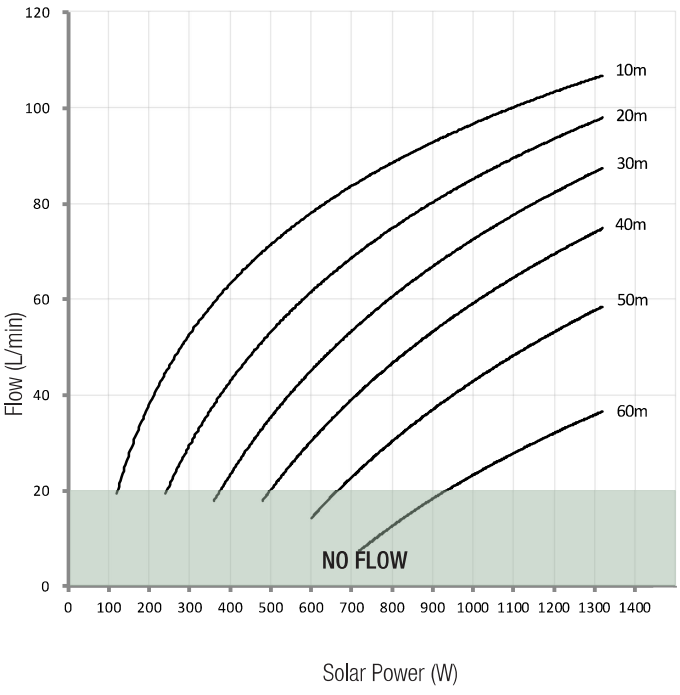

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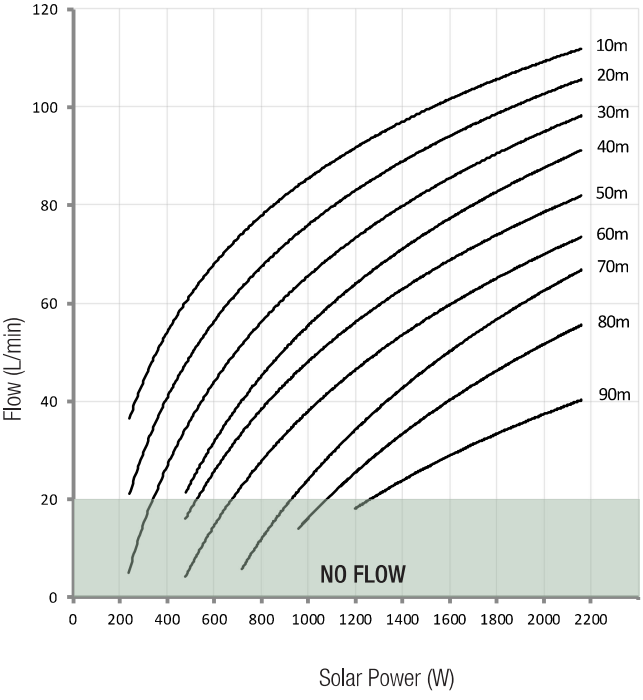

S4-4 SERIES

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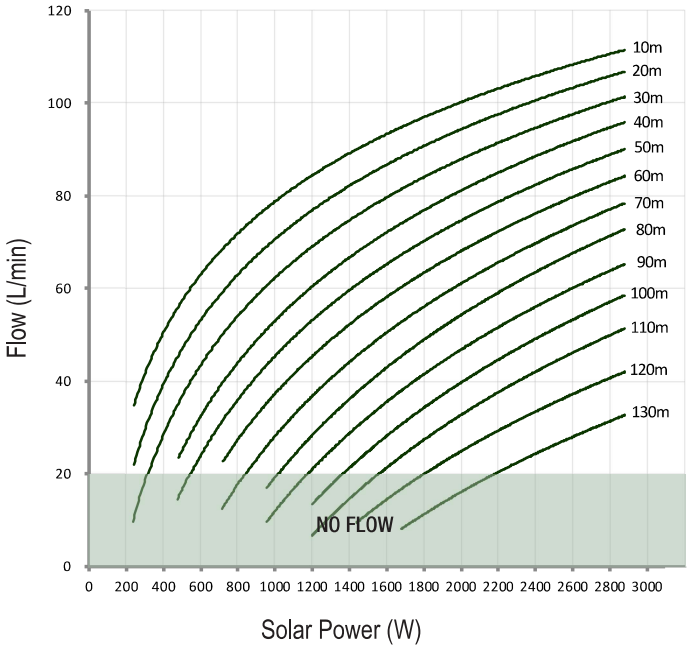
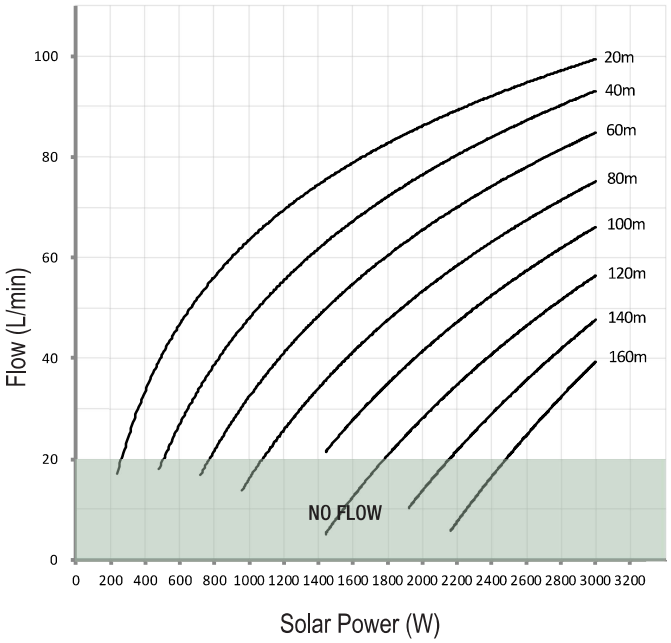
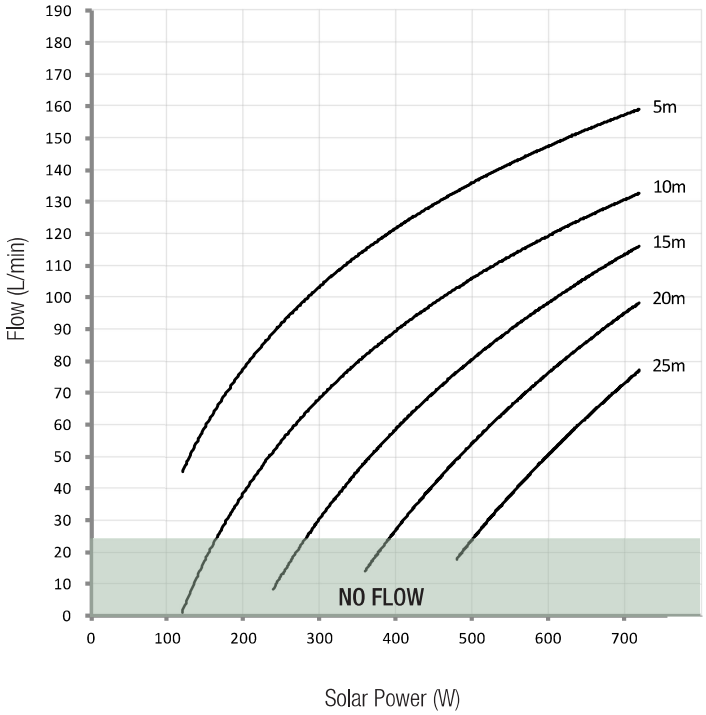


S4-4/27



S4-6 SERIES

S4-6/5



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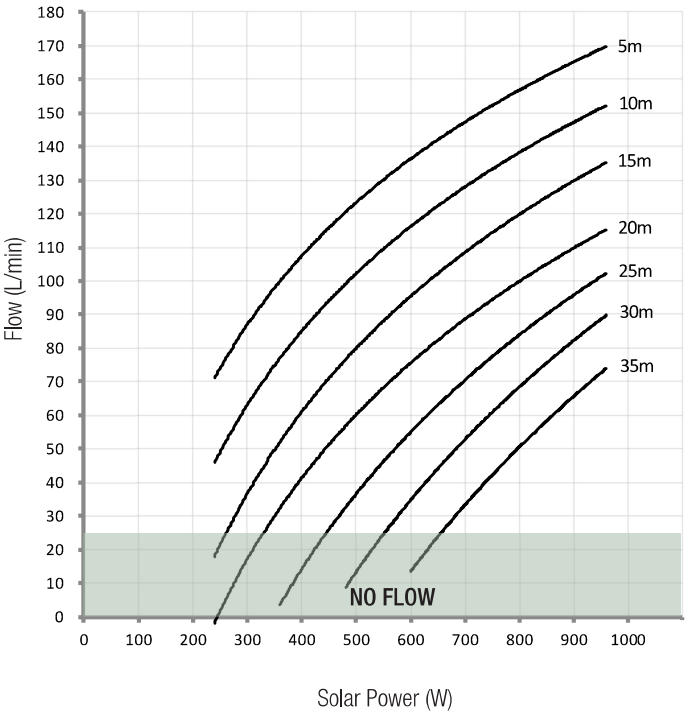
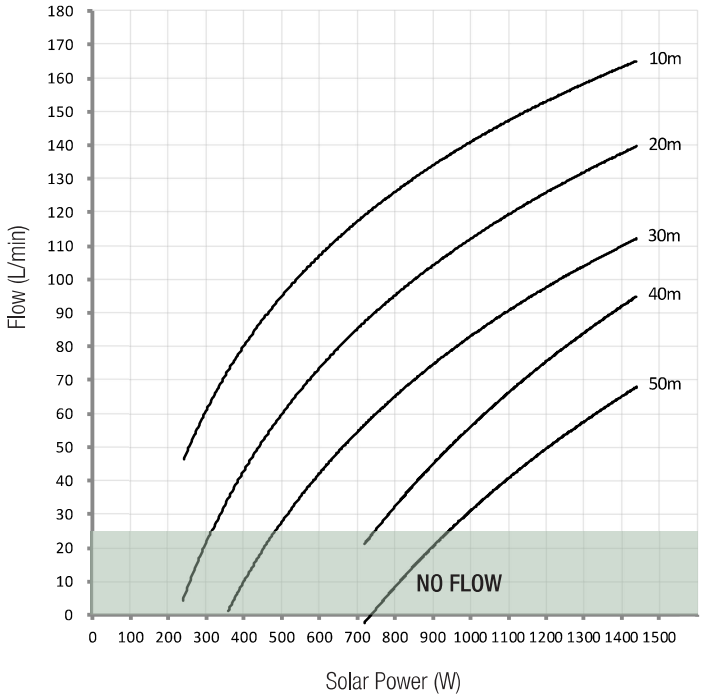


S4-6 SERIES

S4-6/10



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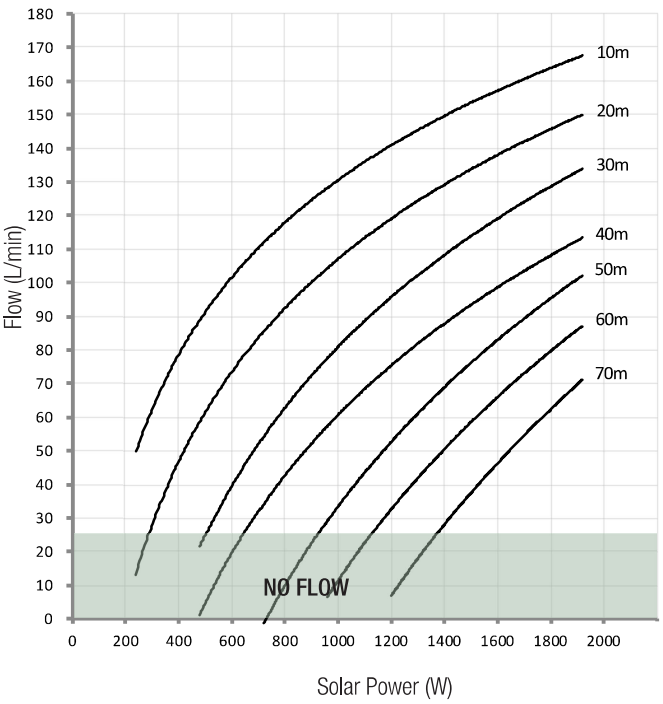

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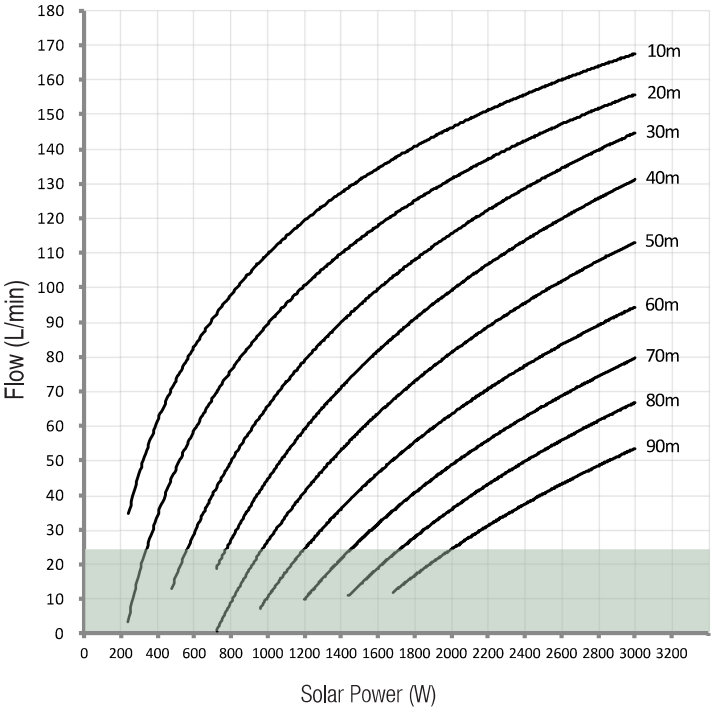

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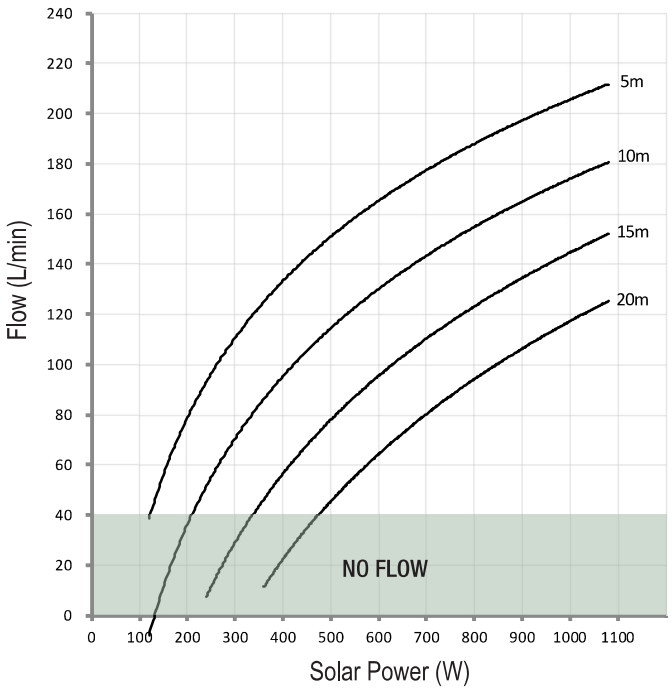
S4-8/4



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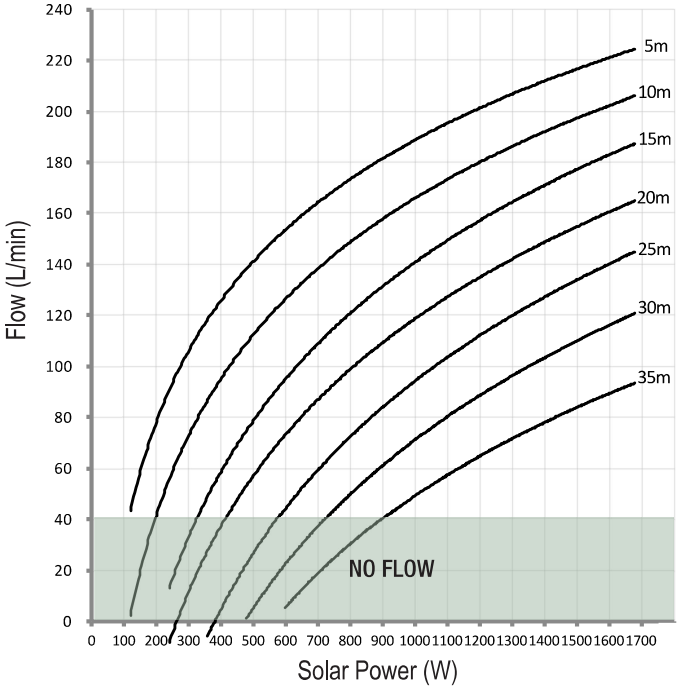

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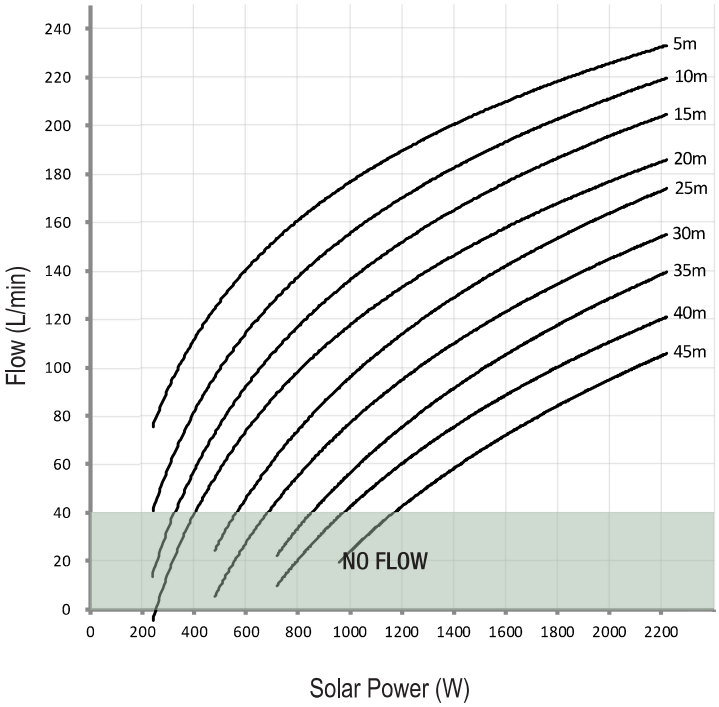

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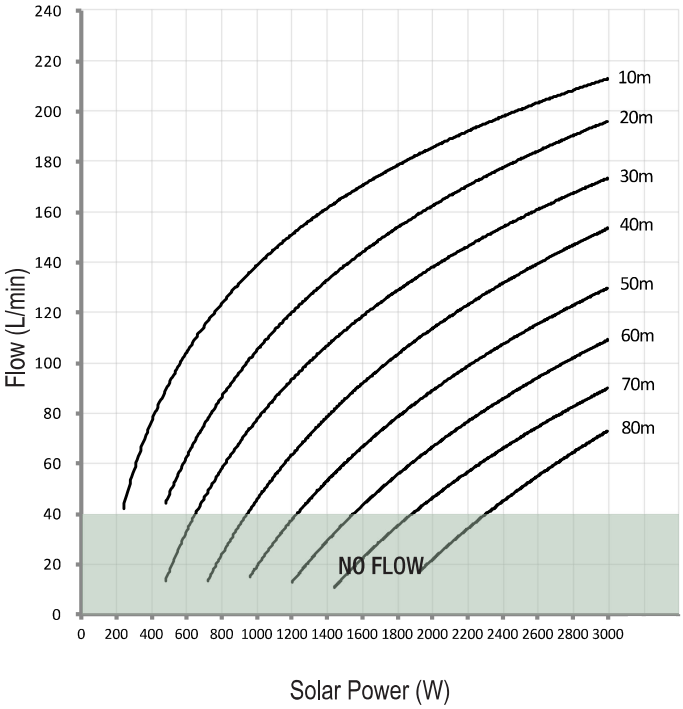

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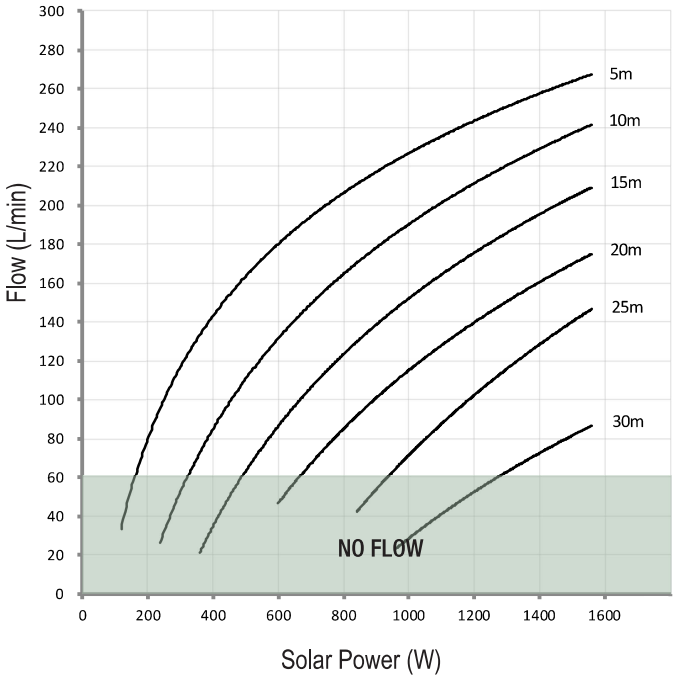
S4-12/5



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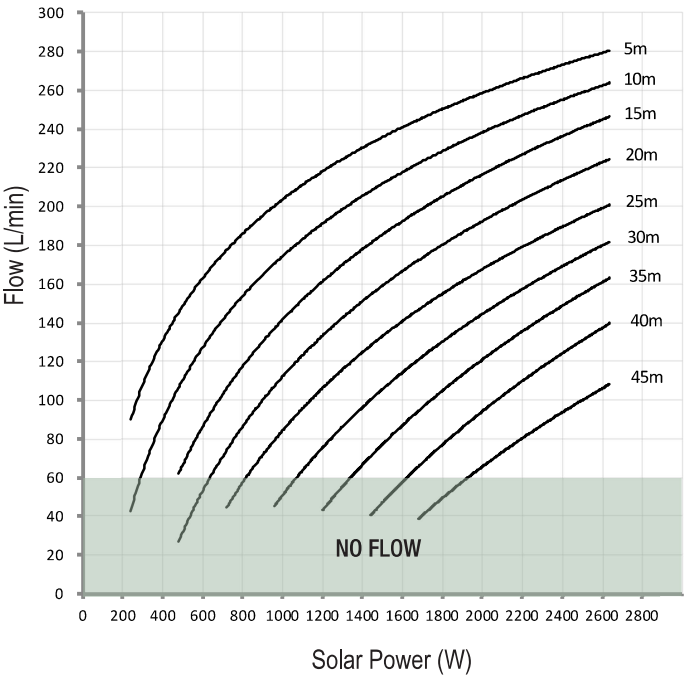

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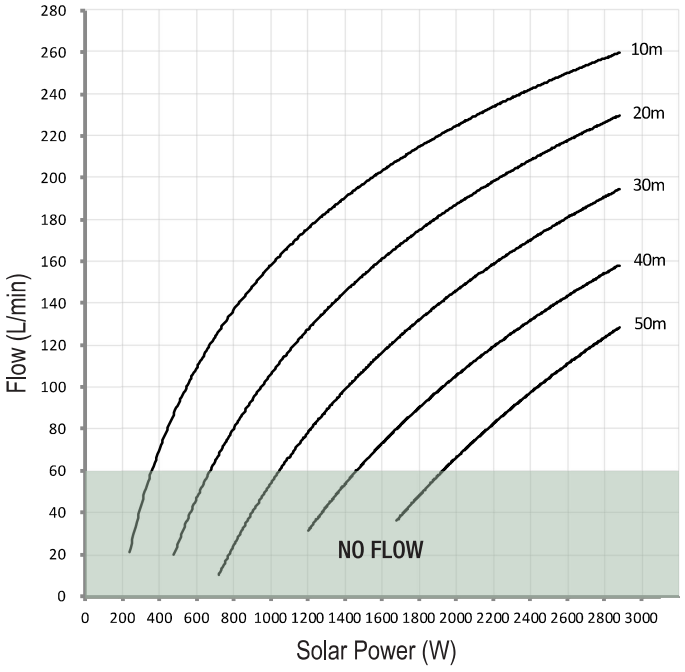
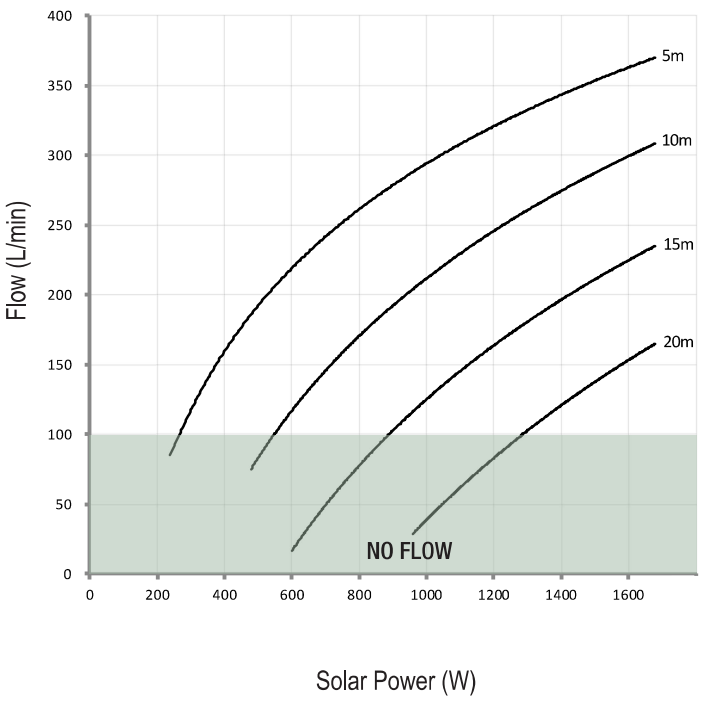


S4-16 SERIES

S4-16/5



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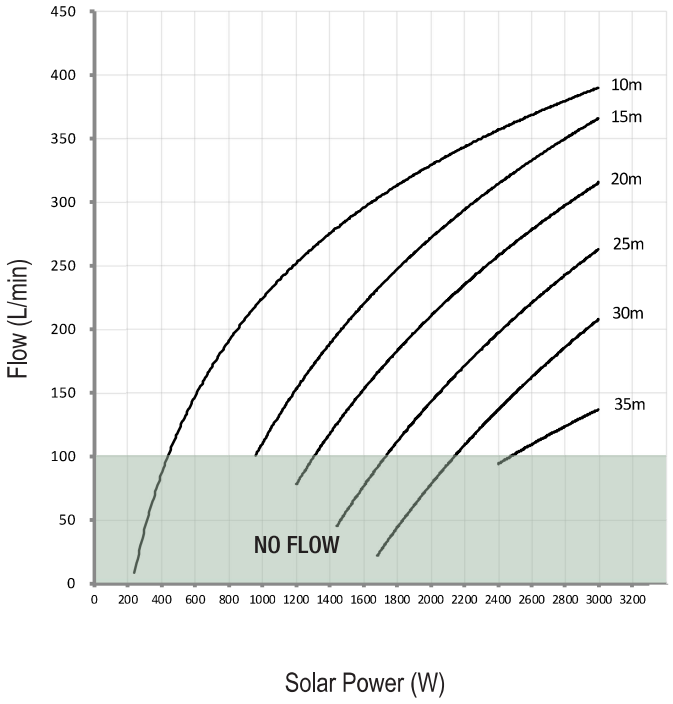

NOTES

NOTES

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