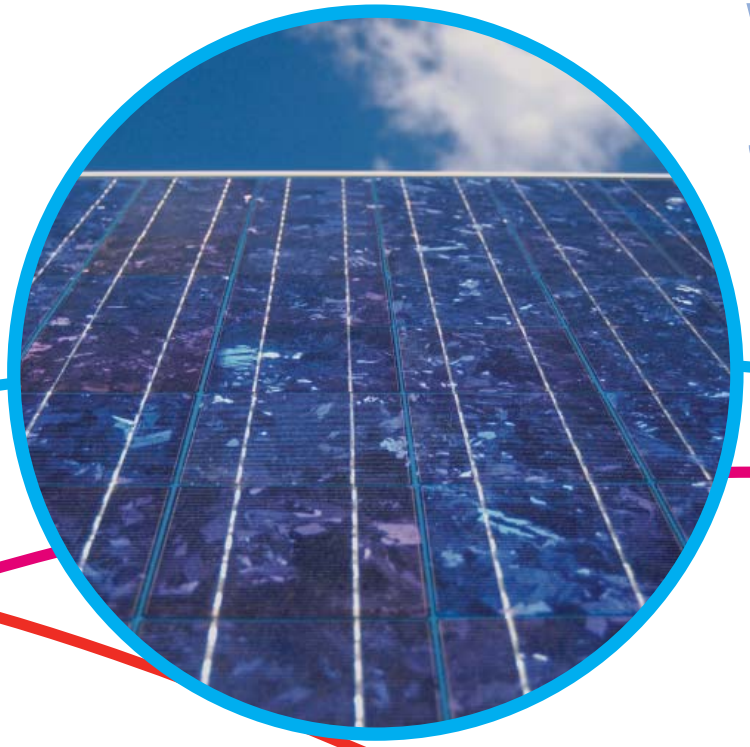
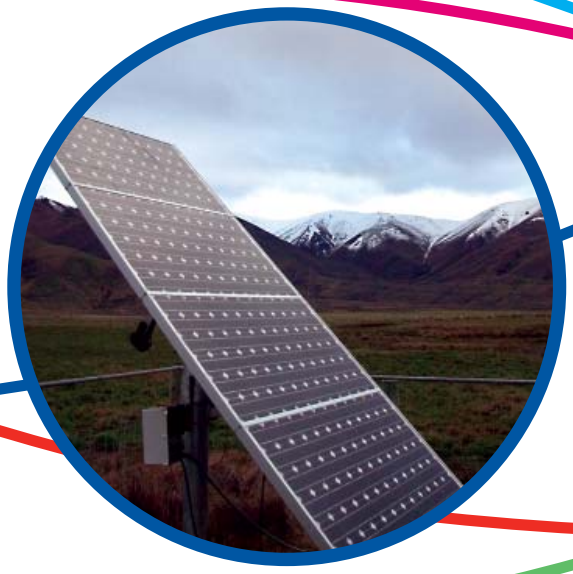
Solar Powered Water Pumping Systems





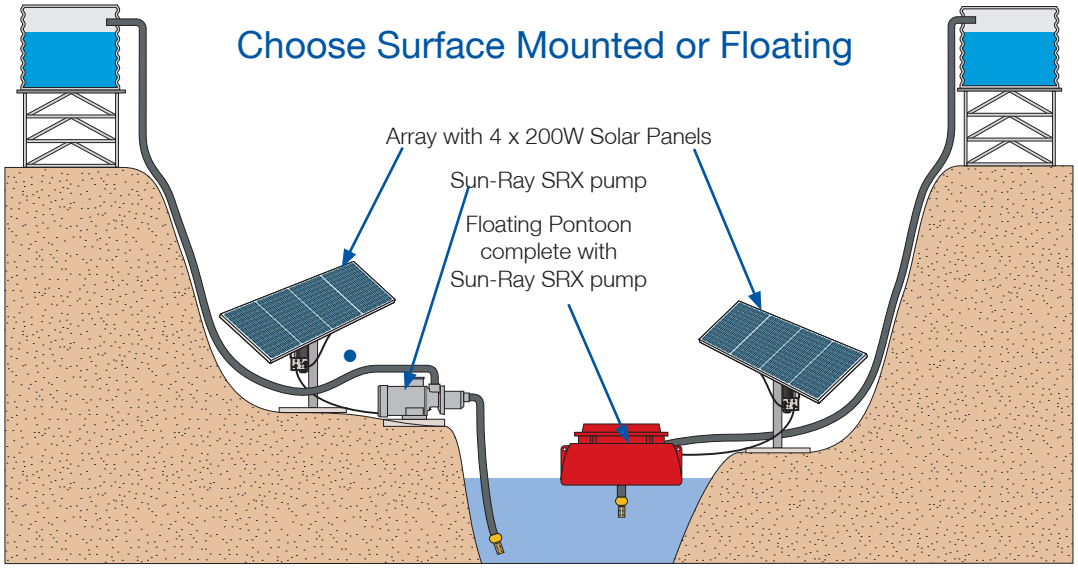
NOV Mono®

One Company, Unlimited Solutions

Sun-Ray SRX Surface and Floating Pumps

- Designed to transfer water efficiently and reliably from sources such as springs, rivers, tanks and dams.
- The Progressing Cavity (PC) pump element used in the Sun-Ray SRX pump is proven to provide maximum water output in a variety of water conditions.
- The highly efficient PC pump is self-priming, with suction lifts up to 6 metres. The high suction lift allows for the pump to be installed on the top of dam walls or on river-banks above the high water mark.
- Available with either stationary or GPS tracking solar arrays.
- The floating pontoon has been designed to enable the pump to float with safety on a dam or similar water source.
- Irrespective of pump speed and depending on the amount of sunlight available, the unique design of the Sun-Ray SRX means water is delivered for every revolution of the pump.
- All Sun-Ray SRX systems are supplied complete with pre-wired solar modules, array frames, pump element, variable speed DC brushless motor and solar motor controller. The complete package is easy to assemble, with all electrical connections fitted with plugs & sockets, thus eliminating the need for an electrician.

Choose Surface Mounted or Floating



Floating Solar Kits

For the simplest water supply under the sun!

- ✔ Self Priming
- ✔ High Stability

There is a wide range of floating kits to choose from to suit every application.

The easy to install kit comes complete with streamlined floating pontoon, MPPT (Maximum Power Point Tracker) and power cable.

Sun Ray SRX Range

Higher heads and volumes

SRX CP25
Up to 50 Mts
Up to 28 L/min

SRX CP800
Up to 35 Mts
Up to 68 L/min

SRX CP1600
Up to 25 Mts
Up to 130 L/min

6.5kw/hr average Performance Tracking

	System Size (Watts)					
Head (m)	200	400	600	800	1200	1600
5	33	53	102	104	110	112
10	24	46	81	93	105	108
15	17	39	47	79	98	104
20	14	31	42	62	90	99
25	11	25	36	49	80	93
30	9	20	31	34		
35	7	16	26	30		
40	6	12	15			
45		10	13			
50		8	11			

SRX CP 25 SRX CP800 SRX CP1600

ARRAY STRUCTURE

System Power (Watts)	200	400	600	800	1200	1600
No. of 200W Module	1	2	3	4	6	8
No. of Array Frames	1	1	1	1	2	2

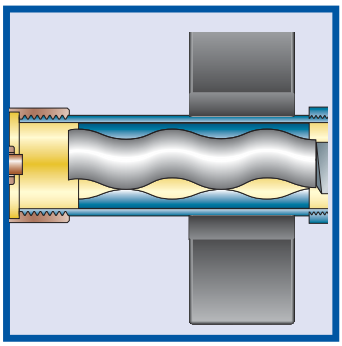
Figures indicate average daily Flow x 1000 litrs/m3
* Use Cass to accuartely estimate average daily flow for your region

Sun-Sub Submersible Pumps

- The Mono Sun-Sub draws its energy from the sun, thus eliminating the need for diesel fuel or AC power.
- Systems from 200 Watts to 2400 Watts. Available with either stationary or GPS Tracking arrays.
- High daily flows with discharge pressures up to 150 m.
- The system is easily automated by using a float switch, pressure kit or built in electronic pressure control.
- All Sun-Sub systems are supplied complete with pre-wired solar modules, array frames, pump element, submersible motor and solar motor controller.
- Sun-Sub solar pumping systems can be further enhanced with the use of GPS Tracking solar arrays, AC PowerPak generator interfaces or by using the latest UHF telemetry system.
- The PC pump element used in borehole applications is proven to provide maximum water output in a variety of water conditions.
- Depending on the amount of sunlight available, the unique design of the Sun-Sub means water will be delivered with every revolution of the pump.
- The Sun-Sub is suitable for a 4" bore and its little brother the SB3 is designed for 3"+ bore.
- All electrical cables are fitted with plugs & sockets eliminating the need for an electrician.

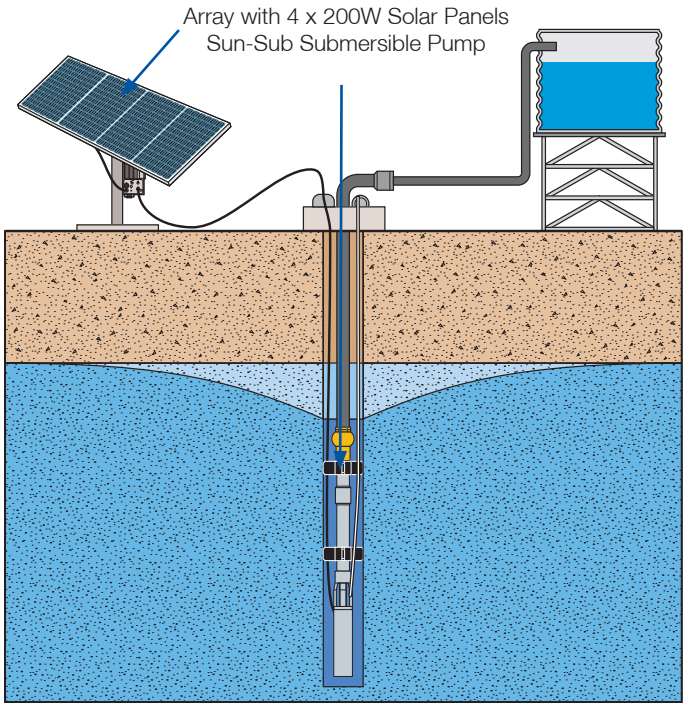
Brushless DC Motor

Solar Controllers



Rotor / Stator

Hand Held Display Unit (HHDU)



The System Components

Brushless DC Motor

The Sun-Sub's purpose built motor is the result of years of research and development by Mono's dedicated engineering staff. Specifically designed for use in solar pumps, this high torque motor is extremely efficient. Built completely from 316 stainless steel, the motor is fully sealed and filled with an environmentally friendly oil.

The robust motor design ensures longevity and the confidence that it will withstand our harsh conditions. As there are no brushes to wear out, therefore no on-going maintenance is required.

Solar Motor Controller (SMC)

The SMC has been specifically designed by Mono for solar pumping applications. Its inbuilt Maximum Power Point Tracker (MPPT) maximises the power provided by the array in all weather conditions. With a variable speed control easy regulation of the pump flow is achieved, making it ideal for low yield bores.

The SMC also has an electronic pressure control which enables automatic shutdown of the pump once tanks and troughs are full. The system can be monitored using the Mono Hand Held Display Unit (HHDU).

Furthermore, all Sun-Sub systems can be remotely monitored and managed using the latest UHF telemetry system developed by Observant.

Progressing Cavity Pump

Progressing Cavity pumps are among the most simple and efficient pumps in the world and with only one moving part they are ideal for solar water pumping systems.

All rotors in the Mono solar range are 316 stainless steel. They are self cleaning which makes them ideal for iron oxide environments.

Solar Panels

The most visible part of any solar pumping system are the solar panels. As the power behind any system, the correct choice of panels is a must. Quality, reliability and long life are the critical requirements.

6.5Kw/hr Average Performance Tracking

	System Size (Watts)							
Head (m)	200	400	600	800	1200	1600	1800	2400
5	28	71	107	113	116	117	118	120
10	24	64	93	104	113	115	115	115
15	21	54	79	95	108	113	113	113
20	18	45	62	81	102	109	111	112
25	16	34	55	69	96	105	107	111
30	14	29	48	58	88	100	103	108
35	10	24	41	53	78	94	99	105
40	9	22	35	46	68	88	94	102
45	8	20	31	41	59	79	84	92
50	8	18	28	35	56	66	68	72
55	7	17	26	33	51	62	65	70
60	6	13	23	30	45	59	63	68
65		12	21	27	40	44	45	47
70		11	20	25	38	43	45	47
75		11	18	22	36	42	43	46
80		10	17	22	34	41	42	45
85		9	11	20	31	37	41	44
90		9	11	19	29	37	40	43
95		8	11	17	22	25	28	28
100		7	11	16	22	24	27	27
105		7	10	14	23	24	26	27
110		6	10	13	21	23	25	26
115		5	9	12	20	22	24	26
120		5	9	10	19	22	24	25
125			8	9	18	21	23	24
130			7	9	17	19	22	24
135			7	9	15	17	21	23
140			6	8	13	15	20	22
145			5	8	12	14	19	21
150			4	7	10	13	18	20

1000 Series Motor & Controller

2000 Series Motor & Controller

3000 Series Motor & Controller

Figures indicate average daily Flow x 1000 litrs/m3
* Use Cass to accuartely estimate average daily flow for your region

SMC - Series 1000 & 2000.
Up to 600W Arrays

SMC - Series 3000
800W to 2400W Arrays

Solar Controllers & Accessories

Solar Motor Controller (SMC)

The SMC is the heart of the Sun-Sub solar pumping system. This highly efficient microprocessor controlled drive, coupled with the brushless DC submersible motor ensures maximum water output of your solar pump.

- Microprocessor controlled power point tracking
- Variable speed control - low yield bores
- High pressure cut-out for tank filling applications
- Compatible with HHDU (Hand Held Display Unit) diagnostic tool
- Full plug & socket design - no electrical wiring required

Power Master Controller

The Mono Power Master or Maximum Power Point Tracker (MPPT) continually monitors the available solar power. This ensures maximum power is delivered to the DC motor used in Sun-Ray solar pumping systems.

- Microprocessor controlled power point tracking
- Full plug & socket design
- Compatible with HHDU diagnostic tool

GPS Tracking Array

To maximise the efficiency of your solar pumping system, you need an accurate and reliable tracking array. Mono's patented GPS (Global Positioning Satellite) tracker will ensure that your solar array is always facing the sun.

Utilising a GPS sensor built into the controller, the system can accurately calculate the exact position of the sun and correctly positions the solar array to take advantage of the available light.

The GPS tracker overcomes problems traditionally associated with dust, high wind, refrigerant gas, and light sensor and timer trackers. Increased flows of around 30% are achievable with the GPS tracker.

AC PowerPak (Optional Accessory)

Not every solar pump will need generator backup, however if you do, you need a 100% reliable supply - designed to enable connection of your Sun-Sub pump to a generator. The AC PowerPak, designed by Mono will enable you to pump water 24/7.

- Compact design - easy to move it to where you need it
- Efficient - only requires 1kVA generator, (but will also work on large generators). Less fuel consumption, longer run time
- Intelligent - automatically protects itself and the solar pump from voltage spikes
- The AC PowerPak can be moved from one system to another
- Auto change over - automatically switches from AC back to solar power when the generator stops

Solar Tracker Controller

AC PowerPak

Solar Selection - CASS

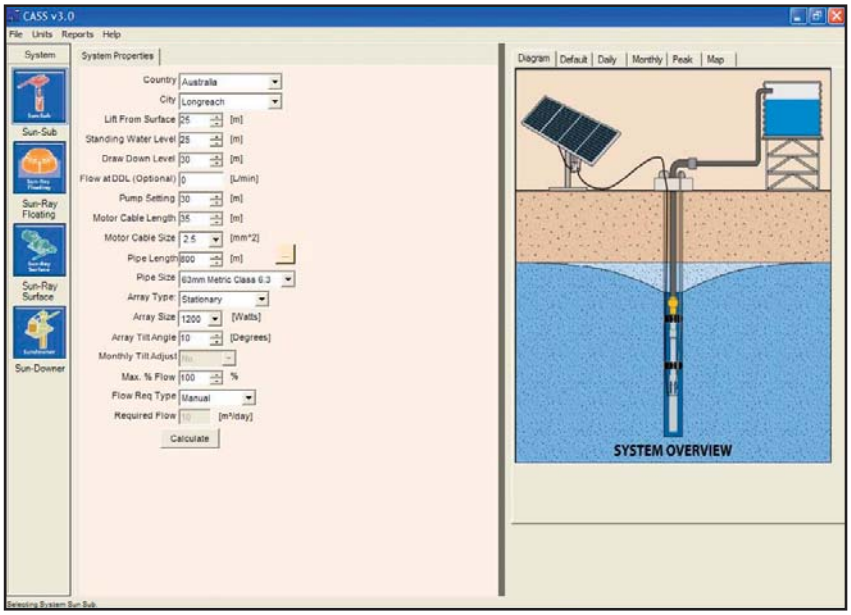
The right solution for your site.

The correct selection is vital when sizing a solar system and the Mono Computer Aided Solar Selection (CASS) program, helps you to choose the right system every time.

Using historical meteorological data, and the results of extensive system testing, we can predict the daily average flows from every system in the Mono solar range.

CASS takes into consideration location, type of pumping system, solar array size and length of your discharge pipe work. This information allows CASS to accurately predict the flow rate of your system, using your pipe work, in your location.

CASS allows for a variety of systems to be modelled easily to ensure you get the Mono solar system to suit your requirements.



Frequently Asked Questions

On cloudy days

A Mono solar pump keeps working even in low light. When it is cloudy, your Mono will slow down but because it has no minimum speed (unlike a centrifugal pump), it will keep drawing water.

Daily flow rates

Minute by minute flow is irrelevant to a system that pumps from dawn to dusk. Our figures are based on the daily average performance of a pump. Flow will be highest on sunny days when you most need water.

Weather resistance

Solar panels are far more cyclone resistant than windmills. All array frames have been designed to withstand 140km/hr winds and can be easily modified to withstand 210km/hr storms. The toughened glass panels are renowned for their resistance to hail.

Pump and panel life

Mono pumps can last for decades. Our first installation was back in 1985 and we are still going strong. We do not know how long it takes to wear out solar panels, but we do know that owners of a Mono solar system can expect many years of reliable pumping power.

How Mono solar pumps work without batteries

Other solar pump motors need batteries to keep up speed, wasting up to 30% of the electrical energy in the process. Mono solar pumps use the same DC (direct current) produced by the panels. Together with Mono's low-speed pumping power and the electrical efficiency of the MPPT you have today's most productive solar pumping systems available.

Store energy as water

The simplest way to store solar energy is to use gravity by pumping water into elevated tanks.

Budgeting for solar

A solar pumping system costs about the same as an old-fashioned windmill.

Your Mono solar powered pump will quickly pay for itself by saving on diesel, petrol or electricity bills.

Water level protection

Like any electric pump, your Mono solar pump can be controlled with pressure and/or float switches. A connector on the MPPT control box makes it easy to protect against dry bores or full water storage.

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