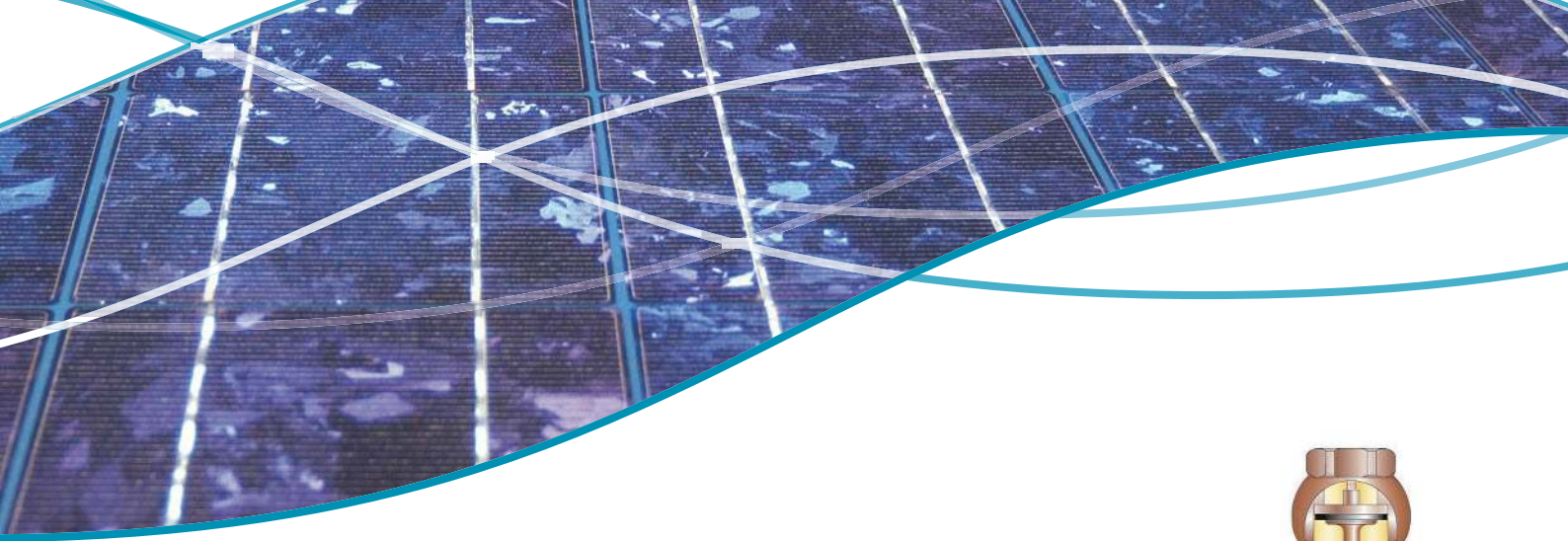


SunSub Borehole Solution Technical Information





The Mono® Subrotor pump offers the first real alternative to multi-stage centrifugal borehole pumps.

Unlike the conventional borehole pump which uses centrifugal force as the energy to move the water, the Mono Subrotor uses the Progressing Cavity Rotor/Stator principle to draw water up.

When the hard chrome plated rotor fits inside the rubber stator the two components touch and form a seal bead, behind which a sealed capsule is formed, which moves from the suction side to the discharge of the pump as the rotor rotates inside the stator.

The liquid within the capsule is delivered so positively that the pump is capable of very high pressure.

The Mono pumping principle was invented in the 1930's, and is one of the most efficient and reliable methods of pumping water. The design principle ensures that the pumps are also extremely reliable and can usually be expected to outlast multistage pumps, particularly on borehole water with a silt or iron oxide content.

Subrotor

- Lower running costs
- High head, less horsepower
- Stainless Steel
- Abrasion resistance
- Simple construction
- Just one moving part does all the pumping
- Easy to maintain
- Rotor/Stator self cleaning and ensures
- no algae or oxide deposits i.e. no
- clogged pump impellers
- More pump for your money!

More Flow at Higher Heads

The Mono system does not just spin water along. It pushes encapsulated water with positive force, so that ample volume is maintained at high heads.

More Water, Lower Energy Bills

Mono Subrotor pumps waste the least possible energy on internal friction, especially compared to multi-stage and jet pumps.

Easy Maintenance

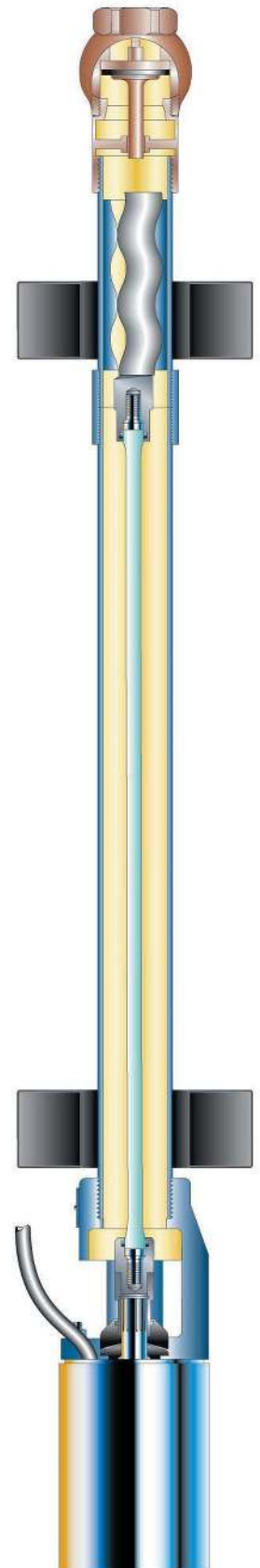
Unlike centrifugal pumps, the Subrotor has only one moving pump part - the rotor. Its companion, the rubber stator is also very resistant to wear and can easily be replaced with just a wrench.

Self Cleaning

The rotor sweeps the full surface of the rubber stator every turn. It is impossible for growth or iron oxide deposits etc. to develop on the surface. "No clogged pump impellers".

Chrome Plated Rotor

Mono chrome plated, stainless rotors are up to 4 times harder than the stainless you find in centrifugal pumps.



Solar Motor Controller

The SMC is at the heart of any Solar Pumping System.

Designed by Mono Pumps for solar pumping applications, the SMC has a highly efficient microprocessor, it also features variable speed control which allows for easy regulation of the pump flow, therefore ideal for low yield bores.

The SMC also has an inbuilt electronic pressure control, which eliminates the need for pressure tanks and switches.

The system can be monitored using the Hand Held Display Unit, particularly useful for commissioning and setting up higher functions.

Brushless DC Motor

This purpose built motor is the result of years of research and development by Mono Pumps. Specifically designed for use with solar pumps, this high torque motor is extremely efficient.

Built completely from 316 stainless steel, the motor is oil filled for better cooling and fully sealed. This design allows for extremely long life, even in the harshest environments.

Maximum Power

The Maximum Power Point Tracker is key to the systems high efficiency.

The MPPT constantly monitors the available power from the solar panels, maximising and providing power to the motor in the most efficient manor.



Hand Held Display Unit



Brushless DC Motor

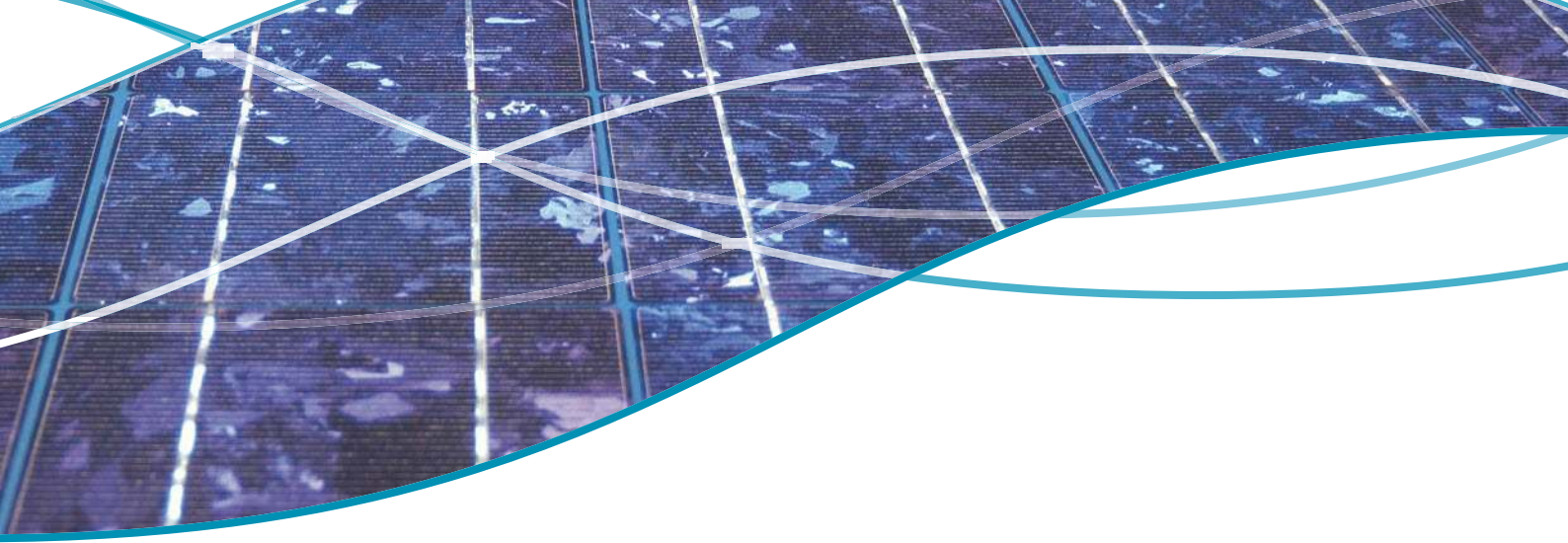
Head in M (ft)	System Power (Watts)			
	175W panels	175W 350W	525W	700W 1050W 1400W 2100W 2800W
	Drive Packs	Series 1000	Series 2000	Series 3000
5 (16.5)				
10 (33)		SM041	SM061	
15 (49.5)				SM151
20 (66)				
25 (82.5)				
30 (98.5)				
35 (115)			SM041	SM101
40 (131.5)				
45 (148)				
50 (164.5)				
55 (180.5)				
60 (197)				
65 (213.5)				
70 (230)		SM022	SM042	SM062
75 (246.5)				
80 (262.5)				
85 (279)				
90 (295.5)				
95 (312)				
100 (328.5)				
105 (344.5)				
110 (361)				
115 (377.5)				
120 (394)				
125 (410.5)				
130 (427)				
135 (443)				
140 (459.5)				
145 (476)				
150 (492.5)				



Series 1000 & 2000 Controller



Series 3000 Controller

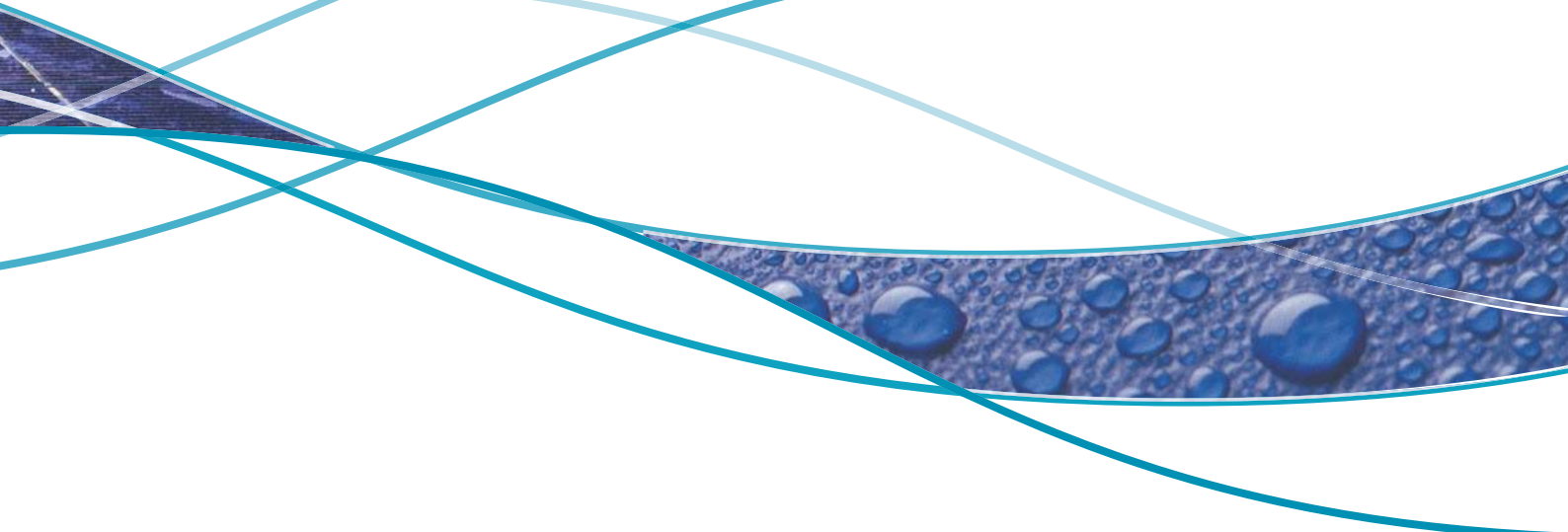


Pump Specifications

Size / Range	SM022	SM041	SM042	SM061	SM062	SM101	SM151
Maximum Speed	3000 rpm	3000 rpm	3000 rpm	3000 rpm	3000 rpm	3000 rpm	3000 rpm
Maximum Flow	20 lpm	40 lpm	40 lpm	60 lpm	60 lpm	100 lpm	150 lpm
Maximum Pressure	15 bar	7.5 bar	15 bar	7.5 bar	15 bar	7.5 bar	15 bar
Pump Length	860 mm	850 mm	940 mm	850 mm	940 mm	890 mm	900 mm
Typical Weight	7.9 kg	7.9 kg	7.9 kg	7.9 kg	7.9 kg	7.9 kg	7.9 kg
BSP Outlet	1½"	1½"	1½"	1½"	1½"	1½"	1½"

Materials (All Models)

Motor Adaptor	316 Stainless Steel
Pump Barrel	304 Stainless Steel
Socket Adaptor	304 Stainless Steel
Stator	304 Stainless Steel tube with Natural Rubber Lining
Flexishaft	431 Stainless Steel coated with Halar
Rotor (Standard)	316 Stainless Steel coated with Hard Chrome Plating
Rotor MK3	316 Stainless Steel
Rotor MK5	316 Stainless Steel
Non Return Valve	Bronze with Nitrile seat and anti-rotating pin
O Rings	Nitrile

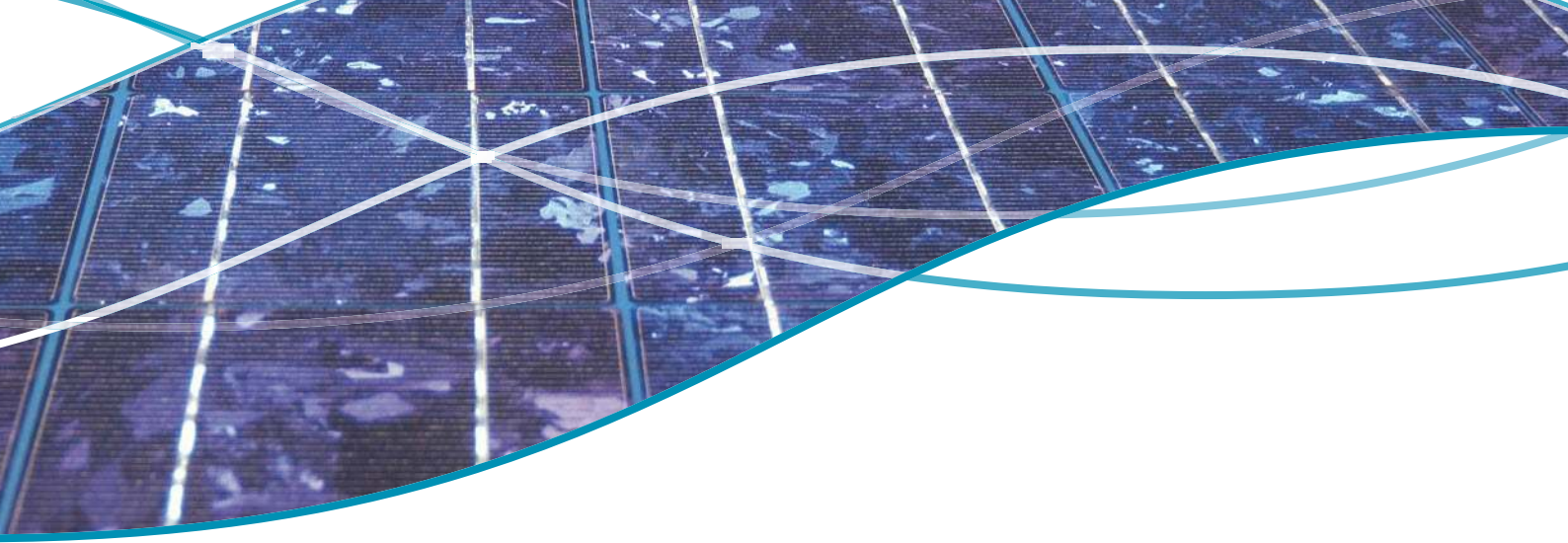


Motor Specification

Size / Range	Series 1000	Series 2000	Series 3000
Nominal Torque	0.7 Nm	1.5 Nm	3.0 Nm
Nominal Speed	3000 rpm	3000 rpm	3000 rpm
Variable Speed	Via SMC	Via SMC	Via SMC
Efficiency	85 %	85 %	85 %
Maximum Motor Voltage	180 V	181 V	182 V
Input Voltage Range	0-180 V DC	0-180 VI DC	0-180 VII DC
Operating Frequency	0-100 Hz	0-100 Hz	0-100 Hz
Maximum Current	3 Amps	5 Amps	8 Amps
Motor Length	366 mm	411 mm	456 mm
Motor Diameter	93 mm	94 mm	95 mm
Motor Weight	8 kg	10 kg	12 kg

Materials (All Models)

Casing & External Shaft	316 Stainless Steel
Studs, Screws, Nuts & Washers	316 Stainless Steel
Cable Plug	Santoprene & Nylon with Gold Plated Contacts
Top & End Cap	Glass filled polyphthalamide (50%) PPA GF50
Thrust Bearing	7203 BECBP
Radial Bearing	6202
Mechanical Seal	Carbon / Ceramic
Magnets	Neodymium Iron Boron
Lubricant	Caltex White Oil Pharma
Cable	4 core 1.5mm ² submersible
O Rings	Nitrile



Controller Specification

Size / Range	Series 1000	Series 2000	Series 3000
Input Voltage	30-100 V DC	30-165 V DC	30-165 V DC
Input Current	0-5 Amps	0-5 Amps	0-15 Amps
Maximum Array	350 Watt	700 Watt	3000 Watt
Output Voltage (Switched 3 Phase)	0-180 V DC	0-180 V DC	0-180 V DC
Output Frequency	0-100 Hz	0-100 Hz	0-100 Hz
Output Current	0-3 Amps	0-4 Amps	0-9 Amps

Connectors

Float Switch	
Pin 1-2	15 V DC / 50mA Max
Pin 3-4	NO Switch (pump shutdown on open contact)
Com Port	
6 Pin HHDU Interface	RS232, 9600 BAUD, RTS/CTS

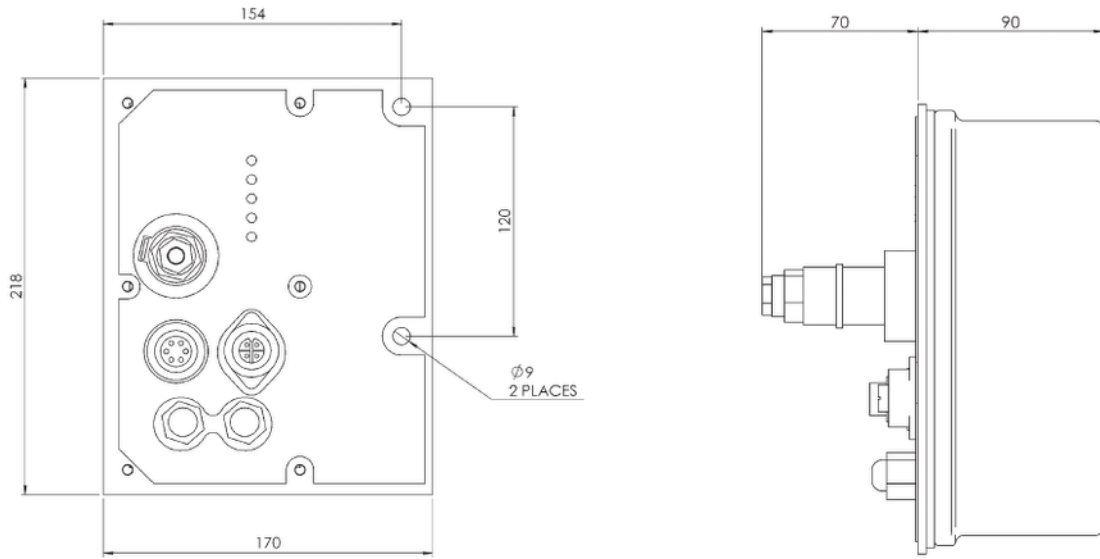
Environment

Operating Temperature	-10 to 50 Degrees Celsius
Humidity	95% Max
IP Rating	Water and Dust Tight
Shipping Dimension	390 x 275 x 290 mm
Shipping Weight	6.5 kg

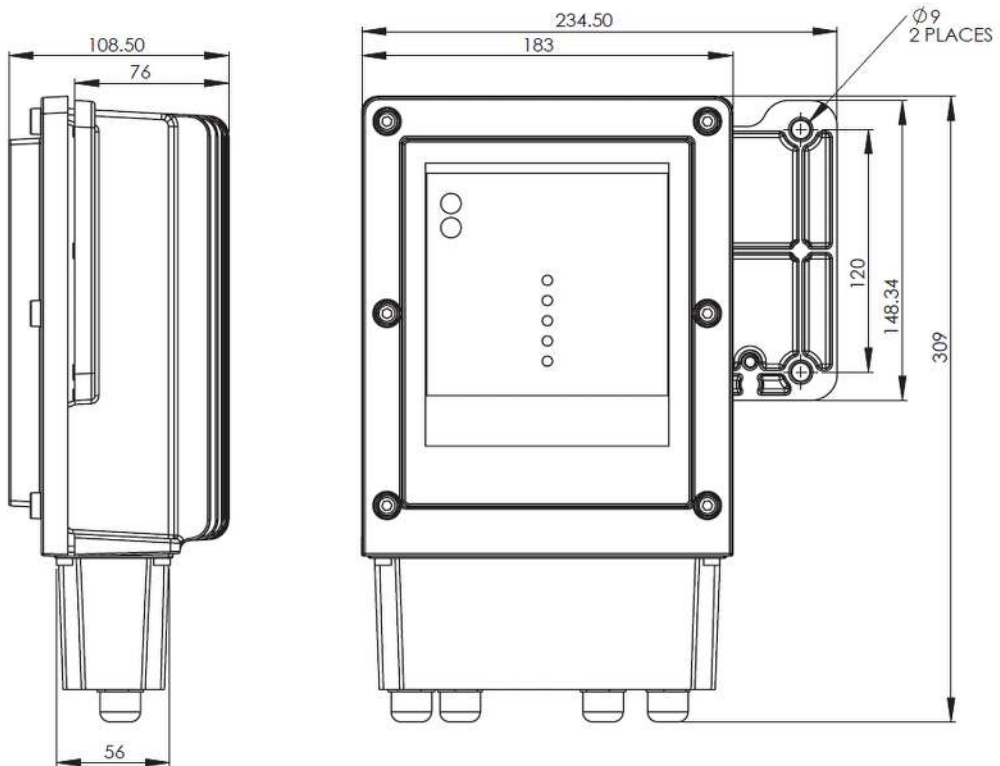
Lightning Protection

In a solar water pumping system it is necessary to avoid having two earth points. (e.g. The motor itself and the earth rod attached to the solar array frame.) Mono recommends tying the pump safety wire to earth and bonding across to the earth stake with a 1.0"-2.0" galvanized earth strap. The most vulnerable point is at the motor cable entry to the electronics where it is possible to receive an extreme earth potential rise after a lightning strike nearby. Metal Oxide Varistors are fitted on the array input and Transorbs on the Motor output.

Series 1000 & 2000 SMC



Series 3000 SMC



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