



RELIABLE AS THE SUN

SOLAR POWERED PUMPING SYSTEMS

The complete solar powered pump product range that provides you with all your water requirements.

- Borehole Systems
- Pool Systems
- Irrigation Systems



Franklin Electric

www.franklin-electric.co.za

QUALITY • AVAILABILITY • SERVICE • INNOVATION • VALUE

AquaDuty Solar Borehole Pump Kit - up to 120m depth and 36m³/day

The AquaDuty Borehole Pump Kit contains all the necessary parts to pump water from boreholes, to provide water for household, game, farming, small holdings and other needs.

The kit consists of a pump, motor, controller and solar panels with wiring harness. The system operates at 300Vdc. Ancillaries are excluded (drop cable, drop pipe, fittings and splice).

Prices do not include installation cost. A site inspection is required in order to estimate installation cost. Warranty is only valid if the kit is installed by a qualified, approved installer.



Aquaduty Solar Borehole Pump Kit - daily water delivery*

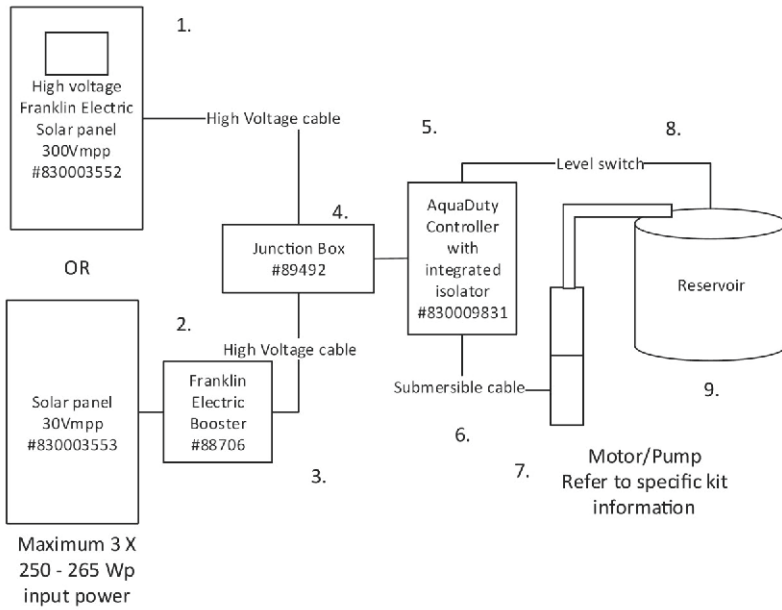
Aquaduty Solar Submersible Pump Performance with 250Wp									Part Number
6.5PSH*		Head (m)							
		10	20	30	40	50	60	70	
10LPM-1PV	Flow (l/day)	4400	3800	3200	2750	2150	1650	1300	830015112
SVM3010-1PV		5400	4300	3850	2700	1200	-	-	830015108
SVM5507-1PV		9600	7690	3800	-	-	-	-	830015107
SVM7004-1PV		13400	7750	2200	-	-	-	-	830015106

Aquaduty Solar Submersible Pump Performance with 500Wp														Part Number
6.5PSH*		Head (m)												
		10	20	30	40	50	60	70	80	90	100	110		
10LPM-2PV	Flow (l/day)	5900	5500	5300	5000	4600	4400	4000	3600	3200	2800	2400		830015113
SVM3010-2PV		12000	10320	8700	7080	5400	3900	2400	-	-	-	-		830014410
25LPM-2PV		14200	13700	12200	9100	7300	5600	4000	2500	2200	-	-		830015115
SVM5507-2PV		22800	18000	12120	8400	4440	-	-	-	-	-	-		830014412
SVM7004-2PV		27700	19800	12200	5520	-	-	-	-	-	-	-	-	

Aquaduty Solar Submersible Pump Performance with 750Wp														Part Number
6.5PSH*		Head (m)												
		10	20	30	40	50	60	70	80	90	100	110	120	
10LPM-3PV	Flow (l/day)	6150	6100	6000	5900	5800	5700	5400	5000	4500	4300	3600	3100	830015114
SVM3010-3PV		15480	13680	11820	9960	8160	6480	4800	3360	-	-	-	-	830014411
25LPM-3PV		15400	14500	13500	12400	11200	10000	8400	7000	5600	4300	-	-	830015116
SVM5507-3PV		30000	24600	19100	14300	9720	5640	-	-	-	-	-	-	830015110
SVM7004-3PV		36500	27900	19100	11200	-	-	-	-	-	-	-	-	830015111

* Global Horizontal Insolation information determines how much sunshine you have available. The Peak Solar Hours (PSH) obtained from an insolation map is the effective pumping hours per day available. Note that the total sunshine hours is approximately 55% higher. Check the insolation in your area if you are not sure. Water delivery changes by approximately 10-20% for each 1PSH change.
- Not recommended

Aquaduty Solar Borehole Pump Kit — everything you need



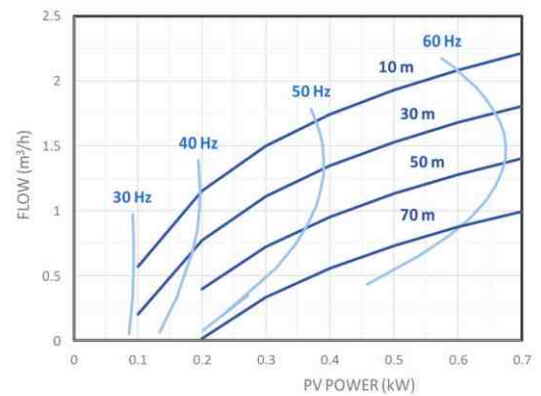
Kit Components

1. High Voltage Franklin Electric Solar Panel/s — #830003552 OR
 2. Standard Solar Panel/s — #830003553
 3. *Booster Box- #88706 **
 4. Junction Box- #89492
 5. AquaDuty Controller- #830009831
 6. *Submersible cable**
 7. Submersible pump/motor— see pump performance curves
 8. Float switch to control reservoir level *
 9. Reservoir to store water*
 10. *Drop pipe and fittings**
- * Not included in kit or optional

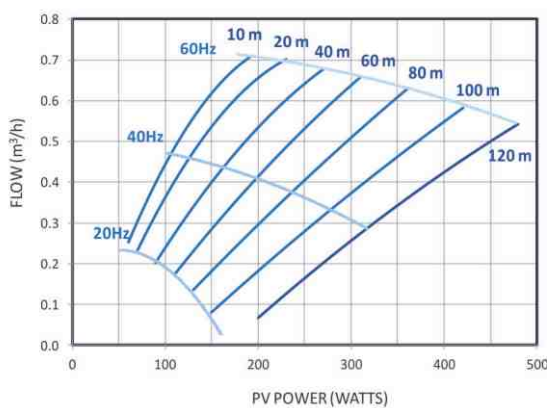
Aquaduty Solar Borehole Pump Kit — performance curves

The performance curves indicate the flow in m^3/h as a function of input power to the controller, received from the solar module array, at various total dynamic head conditions in metres H_2O .

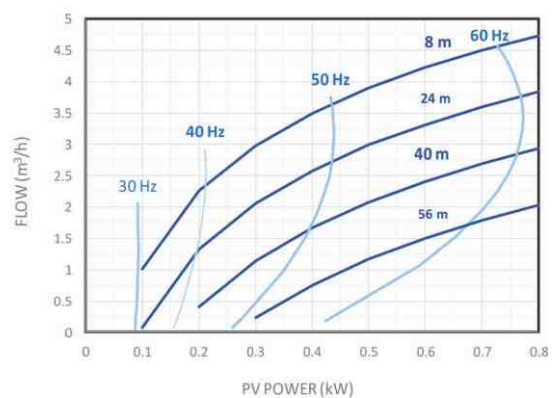
SVM3010



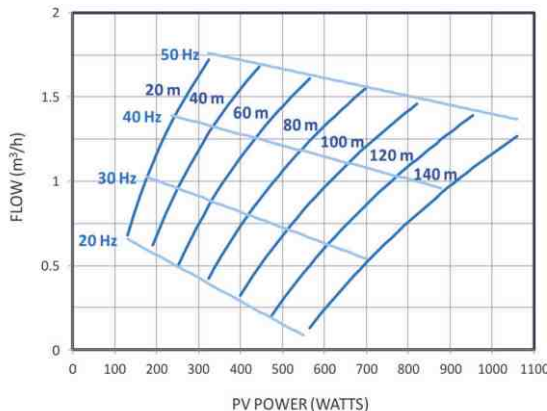
10LPM



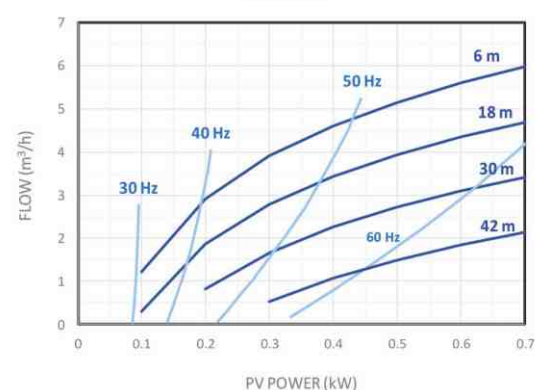
SVM5507



25LPM



SVM7004



AquaDuty Solar Pool Pump Kit - up to 138 000 litres/day



The AquaDuty Solar Pool Pump kit contains all the necessary parts to convert your pool pump to solar power. Your savings on electricity costs will pay for the AquaDuty Solar Pool Kit in less than 3-5 years.

The kit consists of the pump, motor, controller & solar panels with wiring harness. The system operates on 300V dc. Ancillaries are excluded. Prices do not include installation cost. A site inspection is required in order to estimate installation cost. Warranty is only valid when the installation is done by an authorised installer.

AquaDuty Solar Pool Pump Kit - daily water delivery*

Aquaduty Solar Pool Pump Kit Performance									Part Number
6.5PSH*		Pressure (bar)							
		0.2	0.4	0.6	0.8	1	1.2		
0.25kW & 1PV	Flow (m ³ /day)	42.0	31.0	20.0	9.0	-	-		830014413
0.75kW & 2PV		96.0	75.5	53.0	31.0	12.0	-		830014414
0.75kW & 3PV		116.7	92.3	67.8	43.8	21.0	-		830014415
1.1kW & 4PV		138.1	112.8	87.4	62.1	37.0	13.2		830014416

* Global Horizontal Insolation information determines how much sunshine you have available. The Peak Solar Hours (PSH) obtained from an insolation map is the effective pumping hours per day available. Note that the total sunshine hours is approximately 55% higher. Check the insolation in your area if you are not sure. Water delivery changes by approximately 10-20% for each 1PSH change.

- Not recommended

The AquaDuty range of solar pool pumps are suitable for small and larger pools. Typical applications include swimming pools, water features, spas, koi ponds and portable surface pools.

The following selection will give the best results:

- 10-15 000 litre pool—0.25kW with 1 x 250 Wp solar panel
- 25-40 000 litre pool—0.75kW with 3 X 250Wp solar panels
- 50-70 000 litre pool—1.1kW with 4 X 250Wp solar panels
- 65-85 000 litre pool — 1.1kW with 4 X 250Wp solar panels



AquaDuty Solar Pool Pump Kit

— performance curves

The performance curves indicate the flow in m^3/h as a function of input power to the controller, received from the solar module array, at various pressure conditions indicated in m. (10m is approximately 1 bar.)

Any pool filter should be cleaned when the pressure reaches 0.6 to 0.7 bar.

Backwash pool filter at noon when maximum solar power is available.

Aquaduty Solar Pool Pump Kit

pays for itself

Consider the power consumption of your pool pump. If you are running a swimming pool pump for 8 hours per day, it could cost you as much as R25 000.00 over a five year period just on electricity!

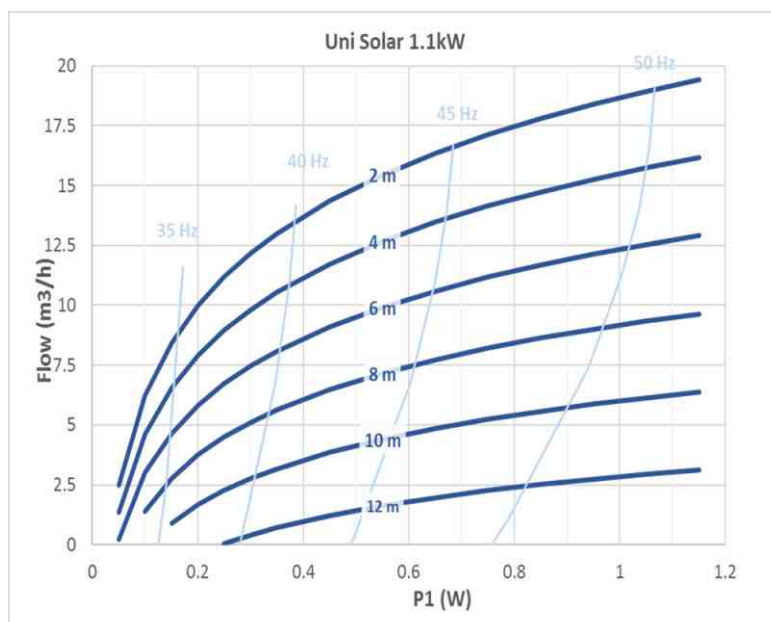
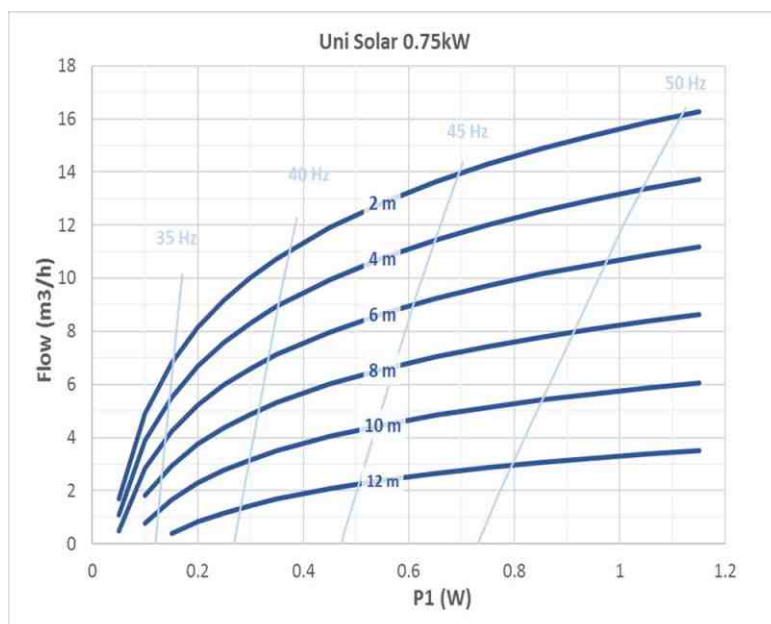
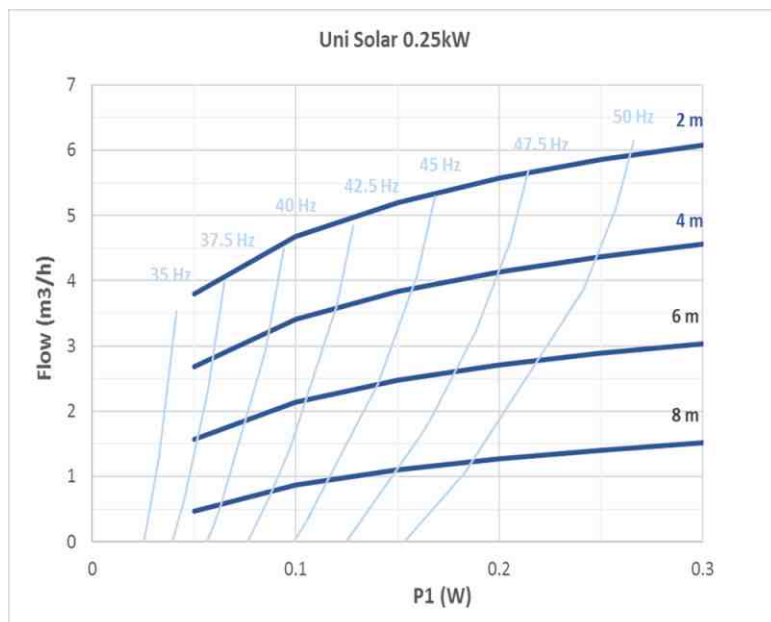
Additionally a solar pool filtration system is more efficient, adding to your savings. Ask your dealer about improved filtration systems.

In a nutshell - your solar pool pump will pay for itself in 3-5 years. Do not delay your decision. Every day that goes by is costing you money.

You purchased your property to avoid rental costs. Do the same for your pool - take ownership of your assets and avoid future high electricity costs. Ask your dealer how your bond can be used to convert your pool pump to solar power virtually cost free.

What size pool pump should you get?

Proper filtration of the pool requires the water to pass through the filter at least once per day; this is also referred to as "turning the water over". Calculate your pool pump size and select accordingly. A solar pool pump does not need to be rated at the same level as your normal pool pump - solar powered pool pumps are more efficient and therefore lower in power rating.



AquaDuty Irrigation Pump Kit - Precipitation up to 30mm/day covering 1000m² from sources up to 60m deep.



The **AquaDuty Irrigation Pump Kit** contains all the necessary parts to pump from any source (up to 60m borehole/wells) to provide water for drip irrigation as required by most farming needs to cover up to 1000m².

The kit consists of the pump, motor, controller, solar panels with wiring harness and drip irrigation system for all vegetable types or row crops grown on up to 1000 m². The reservoir is excluded.

The Challenges

Small-holders using traditional irrigation methods on family plots are met with fundamental challenges in their effort to raise yields and improve crop quality. The key obstacles they are routinely confronted with, include uneven distribution of water and nutrients, wasted water due to runoff and evaporation and increased labor requirements.

Additional obstacles include limited or inaccessible water supply, varying water sources and quality, inadequate electricity supplies that hamper pump operation and insufficient funding.

FDS™: A Big Idea for Small-holders in cooperation with the Franklin Electric AquaDuty Solar Powered Pumping System is an all-embracing gravity-based drip irrigation system utilizing Netafim's low volume drip-irrigation technology and Franklin Electric's solar powered pumping system to maximize productivity through the use of current and existing resources, thus eliminating the need for additional investments in infrastructure.

Franklin Electric in conjunction with Netafim offers a comprehensive service structure, planning, training, technical and agronomic field support, designed to suit local conditions and meet the specific requirements of each project upon request.

Drip Irrigation- powered by the Sun - The ideal solution for small-holders

Developed by Netafim™
over 40 years ago,
drip irrigation uses
specially designed
pipes that are pre-



Picture courtesy of Netafim

fitted with advanced drippers and is now powered by the Franklin Electric AquaDuty Solar Powered Water Pumping System, dripping precise quantities of water and nutrients right at the root zone? The result is a highly effective distribution of water, leading to improved crop quality and increased year round yields.

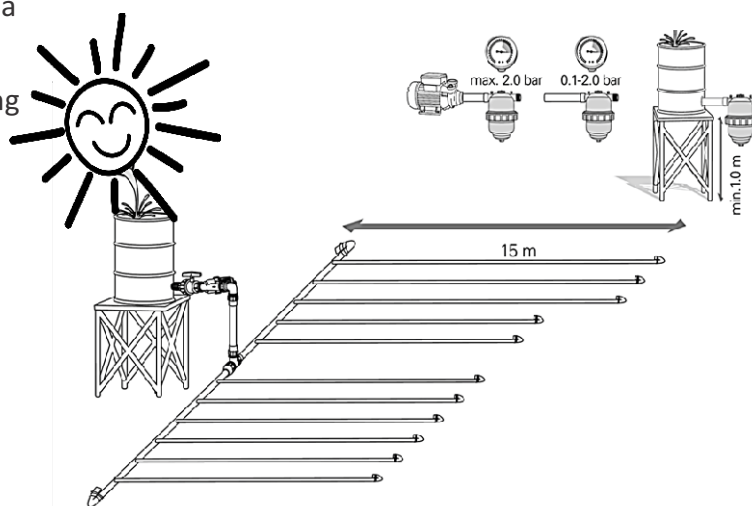
System Features include effective application for field crops as well as small greenhouses, dealing with plots of any shape and size, from 250-2000m², built up in modular blocks. It is designed for all types of crops and year-round application. It can be attached to any water tank. The Franklin Electric AquaDuty Solar Powered Pumping System fills the tank for daylong irrigation. No diesel or electricity is required for operation. It is simple to install, operate and maintain and applicable for a wide variety of water sources

Benefits offered include quality increased crop yields through affordable, cost effective operation and water supply. The need for electricity or diesel is eliminated, whilst enhancing the use of existing resources and saving labour. The system prevents water run-off, deep percolation, leaching and soil erosion. Water efficiency is maximized and multi seasonal application is enabled. Operation and maintenance is easy with no special skills or previous experience necessary or required. Even large projects according to community requirements can be addressed and technical support and agronomic training provided.

Complete solution. The system operates on 300V dc and uses normal voltage motors, reducing cable size and wiring problems. The complete solar array wiring harness is included. Supply only the water and the sun! All critical components are included. Ancillaries are excluded. Prices do not include installation cost. A site inspection is required in order to estimate installation cost. Warranty is valid when the installation is done by an authorised installer.

Aquaduty Solar Irrigation Pump Models						
Model	Area	Number of drip lines	Line length	Min. tank size	Max. pump flow rate at 30m head	Max. pump head (mH ₂ O)
Aquaduty DIS 250 SVM5507-1PV	250m ²	20	12.5m	4000 litre	1200l/h	30m
Aquaduty DIS 500 25LPM-2PV	500m ²	40	12.5m	5000 litre	1700l/h	70m
Aquaduty DIS1000 25LPM-3PV	1000m ²	80	12.5m	10 000 litre	1700l/h	60m

Models Various models are available. The comprehensive AquaDuty DIS (drip irrigation system) is equipped with a valve, a filter, a distribution pipe, dripper lines, and all required connectors and accessories, along with detailed user-friendly installation, operation and maintenance instructions. The installation of the solar powered pump and solar modules are explained in the accompanying manuals.



Picture courtesy of Netafim



AquaDuty Solar Pump Irrigation Kit - daily water delivery* and precipitation rates

Aquaduty Solar Irrigation Pump Performance									Tank height min 2m	Part Number
6.5PSH*		Source/Borehole Head (m)								
		10	20	30	40	50	60	70		
Aquaduty DIS 250 SVM5507-1PV	Precipitation (mm/day)	38	31	15	-	-	-	-	Per 250m ² Min tank size 4kl	830014417
Aquaduty DIS 500 25LPM-2PV		28	27	24	18	15	11	8	Per 500m ² Min. tank size 5kl	830014418
Aquaduty DIS1000 25LPM-3PV		30	25	19	14	10	6	-	Per 1000m ² Min. tank size 10kl	830014416

* Global Horizontal Insolation information determines how much sunshine you have available. The Peak Solar Hours (PSH) obtained from an insolation map is the effective pumping hours per day available. Note that the total sunshine hours is approximately 55% higher. Check the insolation in your area if you are not sure. Water delivery changes by approximately 10-20% for each 1PSH change.
- Not recommended

Suitable for plots of land ranging from 250m² to 1,000m², the do-it-yourself AquaDuty DIS (drip irrigation system) is utilized for a wide range of general open-field and small greenhouse crops regardless of climate or season. A comprehensive solution accompanied with capacity-building tools and an optional “training-the-trainer” package, AquaDuty DIS (drip irrigation system) is an affordable, cost-effective system that addresses the specific conditions and needs of small-scale farmers world-wide. Powered by gravity, AquaDuty DIS (drip irrigation system) is also an environmentally-friendly solution that significantly lowers energy reliance and consumption. Designed for small-scale farming, the AquaDuty DIS (drip irrigation system) is easy and inexpensive to install, operate and maintain, and requires minimal to no infrastructure investment. With thousands of Netafim FDS™ successful deployments in dozens of countries throughout Africa, Asia and South America, AquaDuty DIS (drip irrigation system) now supplements the field-proven and reliable drip irrigation system that delivers benefits to farming families, their communities and the world-at-large.



Solar Pump Controller

The AquaDuty Solar Drive provides water in remote applications where electrical grid power is either unreliable or unavailable. The system pumps water using a DC power source such as an array of solar panels. Since the sun is only available during certain hours of the day and only in good weather conditions, the water is generally pumped into a storage tank or circulated for example in a swimming pool. A level switch can be installed inside the tank to regulate the water level.

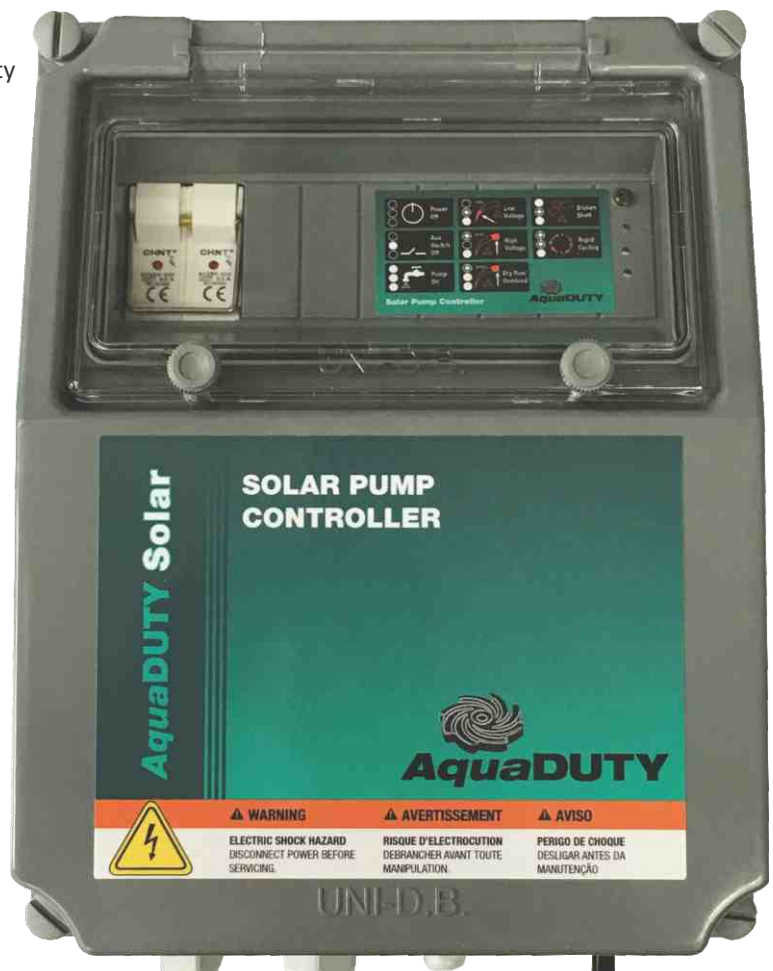
The AquaDuty Solar Drive runs at variable speed to match the changing power available from the PV solar array. A DC disconnect switch is incorporated, making it easy to disconnect power supplied by the solar panel/s from the controller. An ON/OFF switch is provided. The AquaDuty Solar Drive system controller controls a three phase motor powered by a DC solar array. Applications include:

- Powering a 4-inch submersible borehole pump
- Powering a swimming pool pump
- Powering a surface pump for pressure applications
- Providing water for drip irrigation systems

The AquaDUTY Solar Drive continuously monitors system performance and incorporates a number of features for pump system protection. In the event of a fault, the AquaDUTY Drive will indicate the type of fault on the diagnostics panel. The AquaDUTY Solar Drive system is optimized for pumping under adverse input power conditions unique to solar arrays. Whenever possible, the controller attempts to regulate the pump load in an optimized manner for maximum power transfer from the solar array.

Electronic monitoring gives the controller the capability to monitor the system and automatically shut down in down in the event of:

- Dry running conditions – with smart pump monitoring
- Locked pump– with auto retry
- High voltage surge – with auto retry
- Low input voltage – with auto retry
- Open motor circuit
- Short circuit
- Shut valve (when using pressure switch)
 - with auto retry
- No flow conditions (when using a flow switch)
 - with auto retry



The AquaDuty Solar Drive runs at variable speeds to match the changing power available from the PV solar array. Variable speed operation limits in-rush or surge current during the pump/motor startup, thus reducing wear on the motor and pumping system. A leading cause of pump motor failure is the stress applied to the motor during a full voltage startup. This operation results in more efficient operation and longer life, making solar powered pumping systems more reliable.

Features

Motor Soft-Start

When the AquaDuty Drive starts operating, the controller ramps up the motor/pump rotational speed gradually with an increase in motor voltage, resulting in lower start-up current compared to conventional motor start operations. In cases where the demand for water is low, the system may cycle on and off. Due to the controller's soft-start feature this will not harm the motor.

Level Control Switch

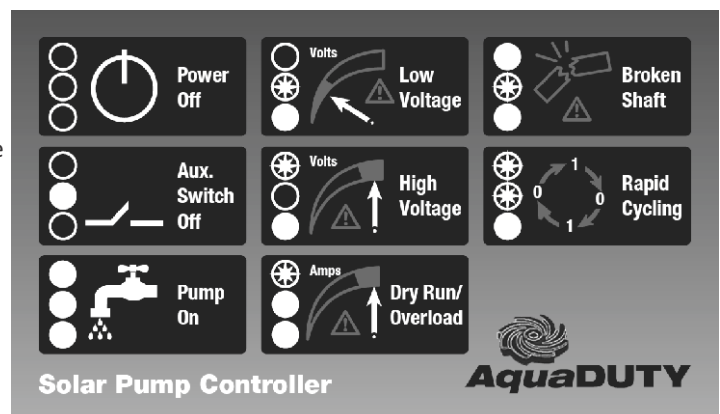
A level control switch can be wired into the AquaDuty Drive for water level control. This is optional and is not required to run the AquaDuty Drive.

System Diagnostics

The AquaDuty Drive comes equipped with a mnemonic legend to convey operational status to the user.

The following conditions are detected and indicated:

- Power Off - when no electrical input power is applied.
- Aux. Switch Off - Power is applied and pump will operate if any external switch (ON/Off switch at the bottom of the controller or remote level switch) is switched on.
- Pump On - Pump is running.
- Low Voltage - input voltage too low normally due to low sunlight or poor connection from the solar array to the controller.
- High Voltage - the input voltage exceeds the rating of the AquaDUTY Drive.
- Dry Run/Overload - pump is running dry or a shut valve is experienced (in the case of a progressing cavity pump) or the pump is locked and cannot turn.
- Broken Shaft - pump not connected or the pump shaft is broken.
- Rapid Cycling - pump is starting and stopping too often, usually caused by a float switch bobbing up and down in a reservoir, a pressure tank failure or some external control switch trying to switch the pump on and off too often or cloudy conditions causing rapid starting and stopping of the pump.



Franklin Electric high voltage solar panel and connection system

When using the Franklin Electric high voltage panels with voltage boost capability, the most cost effective Rands/W modules can be used, having higher power ratings and made of larger cells diameter. This characteristic enhances the ability to cost effectively balance the required voltage with required power for a water need. Franklin Electric's high voltage panels also create the ability to operate lower power systems using a standard industrial voltage (200V 60Hz or 230V 50Hz) motor.

The Franklin Electric high voltage panel makes it possible to deal with partial shading - shading one panel in an array of say 3-4 panels will reduce performance by 25% as opposed to a conventional series sting losing 60-70% of its output power.

Research has shown that as little as 3-10% shade can cause 15-35% power loss.

The Franklin Electric high voltage panel is unique in its design. The patented design avoids the use of components that may deteriorate with temperature and harsh environmental conditions. The design makes it possible to obtain maximum power point tracking without additional equipment and controls. The simplified design ensures durability and high reliability, making it possible to operate without fail over the lifetime of the solar panel.

