SMART PUMP DRIVES

SWAN ELECTRIC
A MOBICON COMPANY

SWAN SPD PV/AC Range for Borehole Pumps 0.37kW – 2.2kW

TECHNICAL SPECIFICATIONS

1 Table of contents

1 Table of contents 2
2 Product range overview 4
3 New to the market 5
4 Designed For New World Markets 5
5 Ease Of Use 5
6 Least Intervention – Maximum Running Time 5
7 Why Not Another Product? 5
7.1 All motor voltages and types accommodated. 5
7.2 Widest possible solar array selection 5
7.3 Advanced system monitoring 5
7.4 No complicated settings 6
7.5 No additional switch gear required. 6
7.6 All in one 6
8 APRICUS-AQUA® For All Your Solar Pumping Needs 6
8.1 The APRICUS-AQUA® Solar Power Water Pumping System: 6
8.2 When do I use APRICUS-AQUA? 6
8.3 Where do I use APRICUS-AQUA? 6
8.4 Why the APRICUS-AQUA? 7
9 How it Works 7
10 PV DC supply only 8
10.1 Value Range – IN: 60-150Vdc; OUT: 1P 0,37-0,55kW, 3P 0,37-0,55kW. 8
10.2 Plug & Play Range – IN: 60-150Vdc, OUT: 1P 0,37-0,55kW, 3P 0,37-0,55kW. 9
10.3 Mini Range – IN: 60-450Vdc; OUT: 1P 0,37-0,75kW, 3P 0,37-1,1kW 10
10.4 Midi Range – IN: 90-450Vdc; OUT: 1P 0,37-1,1kW, 3P 0,37-3,7kW 11
10.5 Midi Range – IN: 90-700Vdc; OUT: 1P 0,37-1,1kW, 3P 0,37-3,7kW 12
11 PV or AC supply 13
11.1 Economical Change-over Switch Box 13
11.2 Economical standard rectified converter family 13
11.3 GENERATOR FRIENDLY converter family 14
11.3.1 3 phase generators not required. 14

11.3.2 Lower currents and no filters required. 14
11.3.3 Lower powered generators suitable 14
11.3.4 Power 3 phase motors from a single-phase source 14
11.4 Optional AC/DC Supply products 15
11.4.1 Mains back-up & Hybrid power supplies 15
11.4.2 PV or AC Change-over Switch Box....16
11.5 Optional Change-over Switch (CO) provision range....17
11.5.1 Mini Range – PV/AC CO – IN: 60-450Vdc/1P 230Vac; OUT: 1P 0,37-0,75kW 17
11.5.2 Mini/Midi Range – PV/AC CO – 90-700Vdc/3P 400Vac; OUT: Mini 3P 0,37-1,1kW, Midi 3P 0,75 – 3,7kW 18
11.6 Standard AC rectified range 19
11.6.1 Mini Range – PV/AC – IN: 60-450Vdc / 1P 230Vac; OUT: 1P 0,37 – 0,75kW, 3P 0,37 – 0,75kW.....19
11.7 PFC range 20
11.7.1 Mini Range – PV/AC generator friendly – IN: 60-150Vdc / 1P 230Vac; OUT: 1P 0,37 – 0,75kW, 3P 0,37 – 0,75kW 20
11.7.2 Mini Range – PV/AC generator friendly – IN: 90-450Vdc / 1P 230Vac; OUT: 1P 0,37 – 0,75kW, 3P 0,37 – 1,1kW 21
11.7.3 Midi Range – PV/AC generator friendly – IN: 90-450Vdc / 1P 230Vac; OUT: 1P 0,37 – 1,1kW, 3P 0,37 – 2,2kW 22
11.7.4 Midi Range – PV/AC generator friendly – IN: 90-700Vdc / 3P 400Vac; OUT: 3P 0,75 – 3,7kW 23

2 Product range overview

The APRICUS-AQUA range of solar water pump controllers offer a solution for every application, need or situation.

	FEATURE	PLUG & PLAY RANGE 304x260x150mm 3.2kg		MINI RANGE 400x250x250mm 9.5kg			MINI RANGE 640X250X250mm 13kg			MIDI RANGE 520X320X300mm 13KG						MIDI RANGE 640X320X300mm 17KG									
	STARTING	SOFT START		SOFT START			SOFT START			SOFT START						SOFT START									
	POWER IN	PV		PV			PV OR AC			PV						PV OR AC									
	AC OPTION	MAINS WITH CO - #28XXXX		MAINS WITH CO - 28XXXX			PFC FRONT-END - REDUCED CURRENT			MAINS WITH CO - 28XXXX						PFC FRONT-END - REDUCED CURRENT									
	ENCLOSURE	IP65 PLASTIC ENCLOSURE		IP54 METAL ENCLOSURE			IP54 METAL ENCLOSURE			IP54 METAL ENCLOSURE						IP54 METAL ENCLOSURE									
	CONNECTORS AND GLANDS	MC4 CONNECTORS		MC4 CONNECTORS			MC4 CONNECTORS			MC4 CONNECTORS						MC4 CONNECTORS									
		GLANDS		GLANDS			GLANDS			GLANDS						GLANDS									
	DC INPUT	DC INPUT - 60-150V		DC INPUT 60-150V			DC INPUT 60-450V			DC INPUT 90-450V					DC 90-700V	DC INPUT 90-450V								DC 90-700V	
	AC INPUT	1P 230Vac WITH CO		1P 230Vac WITH CO			1P 230Vac			1P 230Vac WITH CO					3P 400Vac	1P 230Vac WITH CO								3P 400Vac	
	OUTPUT	2P	3P	2P	3P		2P	3P		2P	3P					2P	3P									
	COMPLETE WITH DRY-RUN AND SURGE PROTECTION	382410																								285550
	APRICUS-AQUA VERSION	382410	382420	384410	384420	384430	384610	384620	384630	384640	385550	385560	385570	385800	385810	385820	385830	384710	384720	384730	384740	384910	384920	384930	384940	384950	384960	384970	384980	385440	385450	385460	385470	385480	385490	385500	385510	385520	385530	385540	385550
230Vac 50Hz SINGLE PHASE	0.37kW	•		•							•							•											•											
	0.55kW		•		•							•																												
	0.75kW					•							•																											
	1.1kW																				•																			
	2.2kW																					•																		
400Vac 50Hz THREE PHASE	0.37kW		•				•																										•							
	0.55kW			•				•																																
	0.75kW								•																																
	1.1kW									•							•																							
	1.5kW																									•														
	2.2kW																																						•	
	3.0kW																																							
	3.7kW																																							•

3 New to the market

New to the solar water pumping market, the **APRICUS-AQUA**® Solar Drive is not a conventional variable frequency drive, which is used to power motors and pumps powered from the sun. The **APRICUS-AQUA**® Solar Drive is an intelligent power converter that adapts available solar power to the required power levels and type, needed to power conventional pumps and motors.

4 Designed For New World Markets

The **APRICUS-AQUA**® Solar Drive is designed to power any single phase or three phase motor. It can power standard induction motors or synchronous permanent magnet motors. The **APRICUS-AQUA**® Solar Drive is used to provide water to remote locations by using standard serviceable borehole and pump equipment, adapting DC power from a solar array to AC power to operate standard motors.

5 Ease Of Use

The controller provides power control, motor and pump fault detection and soft starting characteristics. The **APRICUS-AQUA**® Solar Drive is designed to provide these features together with ease of installation. The **APRICUS-AQUA** ® Solar Drive is designed with the market, customer, economic conditions, state of the art technology and years' experience taken into consideration.

6 Least Intervention – Maximum Running Time

The **APRICUS-AQUA**® Solar Drive powers the pump and motor under all conditions by managing the output power necessary to protect the system components from damage and only shuts down when deemed necessary. Operation is restored automatically when normal conditions return. Diagnostic indications using universal mnemonics (pictures) keeps the user informed of the system status and when intervention is required.

7 Why Not Another Product?

7.1 All motor voltages and types accommodated.

The **APRICUS-AQUA**® electronic controller range offers models for all the usual voltage types.

7.2 Widest possible solar array selection

All models can operate with a wide selection/number of panels, reducing the complication of solar panel selection, starting with a single panel for the lower powered models.

7.3 Advanced system monitoring

Many **advanced watchdog parameters** have been incorporated into the compact **APRICUS-AQUA**® electronic controller, designed and manufactured in South Africa. Parameters include dynamic MPPT tracking, dynamic motor current monitoring, an expert motor load management algorithm to deal with and adapt to hydraulic and sun insolation variances.

7.4 No complicated settings

The **Expert System operating in the background** requires no user parameter settings, special knowledge, or frequent intervention from a solar, pump or electrical expert and operates continuously in the background. The Expert System designed for solar powered, and hybrid powered applications specifically takes care of typical solar water pumping system needs.

7.5 No additional switch gear required.

A **Switch input is provided** to control the motor/pump by external means as and when required.

7.6 All in one

The **APRICUS-AQUA®** system:

- powers standard type and voltage pump/motors,
- does not depend on a specific motor/pump model, type, manufacturer, distributor, or dealer,
- is supported by local expertise, design, experience, and backup and
- increases standard motor efficiencies by up to 15%, negating the need for special high efficiency motors that are not readily available.

8 APRICUS-AQUA® For All Your Solar Pumping Needs

8.1 The APRICUS-AQUA® Solar Power Water Pumping System:

- does not require you to change you existing pump and motor if you already have it and it's been working for years,
- does not make use of exotic motor and pump designs (low voltage or DC motors or pumps that do not have nationwide backup support),
- does not require a solar specialist, dealer, or importer to provide you with product and expertise,
- powers normal mains borehole and pressure pumps,
- accommodates any normal voltage,
- is serviced by the usual pump and farming industry and
- can be powered from as little as a single solar photovoltaic panel.

8.2 When do I use APRICUS-AQUA?

APRICUS-AQUA® is used when hassle-free borehole, pressure and transfer pump operation is required, powered from the sun. It is ideally suited to replace your mains supply for your existing pump/s and water transfer requirements. **APRICUS-AQUA®** Systems is designed to be powered either from solar only or a combination of solar power, grid power and/or generator. Installation requires a minimum amount of equipment and does not require lengthy and costly borehole, swimming pool or pressure pump replacement, simply add the **APRICUS-AQUA®** System Controller.

8.3 Where do I use APRICUS-AQUA?

APRICUS-AQUA® is suitable for all single and three phase borehole, surface and general water pressure applications, compatible with all borehole and other water pump installations and adaptable to residential, agricultural and other pump needs where solar powered may/is required.

8.4 Why the APRICUS-AQUA?

The **APRICUS-AQUA**® system works with standard equipment, including pumps, motors, switchgear, pressure switches, float switches and level control equipment. It is easy to install, and operating conditions and diagnostics are visible on the simplified display, giving you peace of mind and warning you before you experience any damage or loss of water supply.

9 How it Works

The **APRICUS-AQUA**® 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. A level switch can be installed inside the tank to regulate the water level. The **APRICUS-AQUA**® Drive runs at variable speed to match the changing power available from the PV solar array. Variable speed operation limits in-rush or surge current during the pump/motor start-up, 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 start-up.

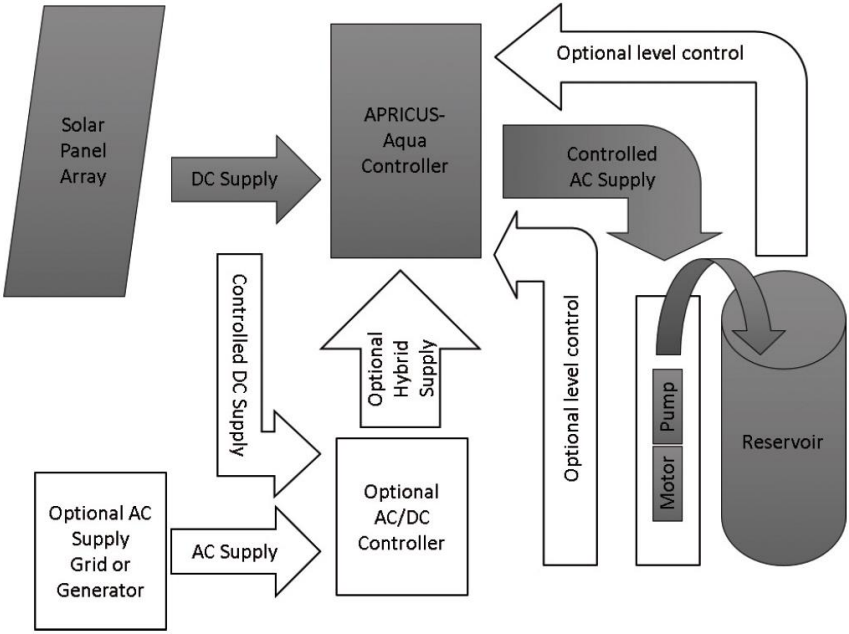

Figure 1 How it works

10 PV DC supply only

10.1 Value Range – IN: 60-150Vdc; OUT: 1P 0,37-0,55kW, 3P 0,37-0,55kW.

Application

- ✓ Game watering
- ✓ Reservoir filling
- ✓ House water supply
- ✓ Rural water supply

Value Range – 60-150Vdc

- ✓ UV resistant Plastic enclosure
- ✓ Total environmental protection IP65
- ✓ Natural cooling – No fans to service
- ✓ Size 340x260x150mm - Compact
- ✓ Weight 3.2kg – Light weight

Why?

- ✓ Use standard borehole motors.
- ✓ Most affordable solar power solution for your pump application
- ✓ No programming, setting or special motors/pumps required.
- ✓ Complete installation instructions supplied.
- ✓ Solar array 500-1500Wp

	Technical Information					
Motor	1~ 230Vac 50Hz					
Ordering code	282410	282411	-	-	-	-
Motor rating (kW)	0.37kW	0.55kW	-	-	-	-
Max Motor amps (A)	4	6	-	-	-	-
Min Input volts (Vdc)	60	60	-	-	-	-
Max Input volts (Vdc)	150	150	-	-	-	-
Max input amps (A)	11	11	-	-	-	-
Min input power (W)	500	500	-	-	-	-
Max input power (W)	1500	1500	-	-	-	-
Motor	3~ 400Vac 50Hz					
Ordering code	282440	282450	-	-	-	-
Motor rating (kW)	0.37kW	0.55kW	-	-	-	-
Max Motor amps (A)	1.6	2	-	-	-	-
Min Input volts (Vdc)	60	60	-	-	-	-
Max Input volts (Vdc)	150	150	-	-	-	-
Max input amps (A)	11	11	-	-	-	-
Min input power (W)	500	500	-	-	-	-
Max input power (W)	1500	1500	-	-	-	-

10.2 Plug & Play Range – IN: 60-150Vdc, OUT: 1P 0,37-0,55kW, 3P 0,37-0,55kW.

Plug & Play Range – 60-150Vdc.

- ✓ UV resistant Plastic enclosure
- ✓ Total environmental protection IP65
- ✓ Natural cooling – No fans to service
- ✓ Size 340x260x150mm - Compact
- ✓ Weight 3.2kg – Light weight

Why?

- ✓ Use standard borehole motors.
- ✓ Convenient and affordable solar power solution for your pump application
- ✓ No programming, setting or special motors/pumps required.
- ✓ Complete installation instructions supplied.
- ✓ MC4 connectors included.
- ✓ ON/OFF switch included
- ✓ Solar array 500-1500Wp

Application

- ✓ Game watering
- ✓ Reservoir filling
- ✓ House water supply
- ✓ Rural water supply
- ✓ Add only panels and wiring.

	Technical Information					
Motor	1~ 230Vac 50Hz					
Ordering code	283410	283411	-	-	-	-
Motor rating (kW)	0.37kW	0.55kW	-	-	-	-
Max Motor amps (A)	4	6	-	-	-	-
Min Input volts (Vdc)	60	60	-	-	-	-
Max Input volts (Vdc)	150	150	-	-	-	-
Max input amps (A)	11	11	-	-	-	-
Min input power (W)	500	500	-	-	-	-
Max input power (W)	1500	1500	-	-	-	-
Motor	3~ 400Vac 50Hz					
Ordering code	283440	283450	-	-	-	-
Motor rating (kW)	0.37kW	0.55kW	-	-	-	-
Max Motor amps (A)	1.6	2	-	-	-	-
Min Input volts (Vdc)	60	60	-	-	-	-
Max Input volts (Vdc)	150	150	-	-	-	-
Max input amps (A)	11	11	-	-	-	-
Min input power (W)	500	500	-	-	-	-
Max input power (W)	1500	1500	-	-	-	-

10.3 Mini Range – IN: 60-450Vdc; OUT: 1P 0,37-0,75kW, 3P 0,37-1,1kW

Application

- ✓ Game watering
- ✓ Reservoir filling
- ✓ House water supply
- ✓ Rural water supply
- ✓ Add only panels and wiring.
- ✓ Large daily water volumes

Mini Range -60-150Vdc

- ✓ Metal epoxy coated enclosure
- ✓ Total environmental protection IP65
- ✓ Natural cooling – No fans to service
- ✓ Size 400x250x270mm - Compact
- ✓ Weight 13kg

Why?

- ✓ Use standard borehole motors.
- ✓ Convenient and affordable solar power solution for your pump application
- ✓ No programming, setting or special motors/pumps required.
- ✓ Complete installation instructions supplied.
- ✓ MC4 connectors included.
- ✓ ON/OFF switch included
- ✓ Solar array 750-5400Wp

	Technical Information					
Motor	1~ 230Vac 50Hz					
Ordering code	284410	284420	284430	-	-	-
Motor rating (kW)	0.37kW	0.55kW	0.75kW	-	-	-
Max Motor amps (A)	4	6	7.5	-	-	-
Min Input volts (Vdc)	60	60	60	-	-	-
Max Input volts (Vdc)	450	450	450	-	-	-
Max input amps (A)	12	12	12	-	-	-
Min input power (W)	500	500	500	-	-	-
Max input power (W)	1500	1500	1500	-	-	-
Motor	3~ 400Vac 50Hz					
Ordering code	284610	284620	284630	284640	-	-
Motor rating (kW)	0.37kW	0.55kW	0.75kW	1.1kW	-	-
Max Motor amps (A)	1.6	2.0	2.5	3.2	-	-
Min Input volts (Vdc)	60	60	60	60	-	-
Max Input volts (Vdc)	450	450	450	450	-	-
Max input amps (A)	12	12	12	12	-	-
Min input power (W)	750	750	750	750	-	-
Max input power (W)	1500	1500	1500	5400	-	-

10.4 Midi Range – IN: 90-450Vdc; OUT: 1P 0,37-1,1kW, 3P 0,37-3,7kW

Application

- ✓ Game watering
- ✓ Reservoir filling
- ✓ House water supply
- ✓ Rural water supply
- ✓ Add only panels and wiring.
- ✓ Large daily water volumes

Midi Range – 90-450Vdc

- ✓ Metal epoxy coated enclosure
- ✓ Total environmental protection IP65
- ✓ Natural cooling – No fans to service
- ✓ Size 520x320x300mm mm - Compact
- ✓ Weight 9.5kg
- ✓ Complete with glands and ON/OFF switch
- ✓ Convenient mounting lugs

Why?

- ✓ Use standard borehole motors.
- ✓ Convenient and affordable solar power solution for your pump application
- ✓ No programming, setting or special motors/pumps required.
- ✓ Complete installation instructions supplied.
- ✓ MC4 connectors included.
- ✓ ON/OFF switch included
- ✓ Solar array 750-5400Wp

	Technical Information					
Motor	1~ 230Vac 50Hz					
Ordering code	284710	284720	284730	284740	-	-
Motor rating (kW)	0.37kW	0.55kW	0.75kW	1.1kW	-	-
Max Motor amps (A)	4.0	6.0	7.5	9.0	-	-
Min Input volts (Vdc)	90	90	90	90	-	-
Max Input volts (Vdc)	450	450	450	450	-	-
Max input amps (A)	12	12	12	12	-	-
Min input power (W)	750	750	750	750	-	-
Max input power (W)	5400	5400	5400	5400	-	-
Motor	3~ 400Vac 50Hz					
Ordering code	284910	284920	284930	284940	284950	284960
Motor rating (kW)	0.37kW	0.55kW	0.75kW	1.1kW	1.5kW	2.2kW
Max Motor amps (A)	1.6	2.0	2.5	3.2	4	6
Min Input volts (Vdc)	90	90	90	90	90	90
Max Input volts (Vdc)	450	450	450	450	450	450
Max input amps (A)	12	12	12	12	12	12
Min input power (W)	750	750	750	750	750	750
Max input power (W)	5400	5400	5400	5400	5400	5400

10.5 Midi Range – IN: 90-700Vdc; OUT: 1P 0,37-1,1kW, 3P 0,37-3,7kW

Midi Range – 90-700Vdc

- ✓ Metal epoxy coated enclosure
- ✓ Total environmental protection IP65
- ✓ Natural cooling – No fans to service
- ✓ Size 520x320x300mm mm - Compact
- ✓ Weight 9.5kg
- ✓ Complete with glands and ON/OFF switch
- ✓ Convenient mounting lugs

Application

- ✓ Game watering
- ✓ Reservoir filling
- ✓ House water supply
- ✓ Rural water supply
- ✓ Add only panels and wiring.
- ✓ Large daily water volumes

Why?

- ✓ Use standard borehole motors.
- ✓ Convenient and affordable solar power solution for your pump application
- ✓ No programming, setting or special motors/pumps required.
- ✓ Complete installation instructions supplied.
- ✓ MC4 connectors included.
- ✓ ON/OFF switch included
- ✓ Solar array 750-5400Wp

	Technical Information					
Motor	3~ 400Vac 50Hz					
Ordering code					284970	284980
Motor rating (kW)					3kW	3.7kW
Max Motor amps (A)					2.0	2.5
Min Input volts (Vdc)					90	90
Max Input volts (Vdc)					700	700
Max input amps (A)					12	12
Min input power (W)					500	750
Max input power (W)					5400	5400

11 PV or AC supply

Traditionally solar powered water pumps are driven by variable frequency drives supplied with either DC voltage from photovoltaic modules or AC voltage from the grid, generators, or other AC voltage sources. The approach to rectifying AC voltages (single phase more so than three phase) causes reduced (bad) power factor conditions (0.55 to 0.65 for single phase rectification and 0.85 to 0.9 for three phase rectification).

While the practice of three phase rectification for general variable frequency drive applications are widely acceptable, rectified single phase applications are prone to supply side complications for power ratings larger than 1kW. APRICUS-AQUA developed the 'GENERATOR FRIENDLY' family of converters to improve single phase AC supplied solar powered water pumps resulting in:

- Reduced RMS input current, allowing for higher-power operation.
- Power-supply holdup, allowing for a longer life of bulk link capacitors.
- Enabled wide input voltage capability by providing a constant bus voltage.
- Improved efficiency of downstream power conversion.
- Increased efficiency of the power-distribution system due to lower RMS currents reducing distribution wiring losses.
- Reduced VA rating of standby power generators.

Three ranges are available:

- Economical Change-over Switch Box
- Economical standard rectified converter family
- GENERATOR FRIENDLY converter family

11.1 Economical Change-over Switch Box

For single-phase AC (0.37kW to 2.2kW) and three phase systems (0.37kW to 3,7kW) the APRICUS-AQUA Economical Change-over switch offers an economical solution to add AC power to standard single phase and three phase motors, especially suitable for upgrading existing installations where AC back-up is required. The system utilizes the existing motor/pump control gear and retains the standard mains operated motor supply and control functions.

11.2 Economical standard rectified converter family

For smaller single-phase AC (less than 1kW) and three phase systems the APRICUS-AQUA Economical PV/AC converter family offers a price competitive alternative where required.

11.3 GENERATOR FRIENDLY converter family

First in its class – the AC input to this range of controller is generator friendly! To understand what this means let's look at the advantages of this feature.

11.3.1 3 phase generators not required.

With regular solar powered water pumping controllers (including professional systems), when making use of AC power a three-phase 400V supply is required. Single phase supply is marginally suitable where 230V 50Hz small three phase motors (not common and less than 1kW in size) are used or where single phase 230V motors are used. The APRICUS-AQUA range of ACDC controllers makes it possible to power standard 3 phase 400V motors from a single phase 230V supply.

11.3.2 Lower currents and no filters required.

The significantly higher single phase displacement power factor (meaning that you need a supply capacity of up to 4 times that of the pump being powered) requires oversized current limiting circuit breakers, resulting in reduced levels of protection and higher cost distribution board construction when required to supplement a PV powered solar water pump. This is often not feasible. The APRICUS-AQUA ACDC controller range eliminates the need for a higher current rated AC supply or the need to include line filters in the AC supply line to reduce peak current loading.

11.3.3 Lower powered generators suitable

Higher peak current peak demand when using single phase 230V AC supply requires that higher rated generators be used to supply your solar powered water pump or even regular single phase 230V water pump. Usually, a 3.5 to 4.5 times generator rating, compared to pump rating, is required. With the APRICUS-AQUA range of ACDC controllers no higher rated generator is required. This means that small portable generators (of the correct rating) are suitable to power your pump.

11.3.4 Power 3 phase motors from a single-phase source

Most importantly, 3 phase 400V motors/pumps can be powered with a single phase 230V supply (power limitations apply – usually 2.2kW pumps present no problem to a standard single-phase outlet rated at 15A.

***134#834**

11.4 Optional AC/DC Supply products

11.4.1 Mains back-up & Hybrid power supplies

Mains Back-up power supply

- ✓ Manually select PV or DC operation.
- ✓ Size 340x260x150mm - Compact
- ✓ Weight 3.2kg – Light weight

Hybrid power supply

- ✓ Automatic PV / DC operation.
- ✓ Priority given to PV supply available.
- ✓ AC supplements PV supply to provide continuous flow rate.
- ✓ Size 340x260x150mm - Compact
- ✓ Weight 3.2kg – Light weight

Application

- ✓ Add AC power to APRICUS-AQUA PV only controllers.
- ✓ Extend the useful pumping time where required.
- ✓ Pump water on cloudy days
- ✓ Supply peak demands such as game farm weekend crowding.

	Technical Information		
Ordering code	286410	286420	286430
AC input voltage (Vac)	250Vac	250Vac	250Vac
AC input max current (A)	10	10	10
Min DC Input volts (Vdc)	30	60	60
Max DC Input volts (Vdc)	150	450	450
DC output volts (Vdc)	30-150	60-450	365
DC output amps (Adc))	15	15	10
Type	Mains back-up	Mains back-up	Hybrid
Enclosure	Plastic	Plastic	Mini

11.4.2 PV or AC Change-over Switch Box

PV or AC Change-over switch box

- ✓ Utilize existing control box for standard motor.
- ✓ Low-cost option to add AC to APRICUS-AQUA PV control panel.
- ✓ Manually select PV or DC operation.
- ✓ Size XXXxXXXxXXXmm - Compact
- ✓ Weight Xkg – Light weight

Application

- ✓ Add AC power to APRICUS-AQUA PV only controllers.
- ✓ Extend the useful pumping time where required.
- ✓ Pump water on cloudy days
- ✓ Supply peak demands such as game farm weekend crowding.

	Technical Information		
Ordering code	28xxxx	28xxxx	
AC input voltage (Vac)	250Vac	400Vac	
AC input max current (A)	15	15	
Min DC Input volts (Vdc)	~~30~~	~~60~~	
Max DC Input volts (Vdc)	~~150~~	~~450~~	
DC output volts (Vdc)	~~30-150~~	~~60-450~~	
DC output amps (Adc))	~~15~~	~~15~~	
Type	Change-over	Change-over	
Enclosure	Plastic	Plastic	

11.5 Optional Change-over Switch (CO) provision range

11.5.1 Mini Range – PV/AC CO – IN: 60-450Vdc/1P 230Vac; OUT: 1P 0,37-0,75kW

Midi Range - PV or AC Change-over

- ✓ Provision for optional switch gear installation
- ✓ Manually select PV or DC operation.
- ✓ Metal epoxy coated enclosure
- ✓ Total environmental protection IP65
- ✓ Natural cooling – No fans to service
- ✓ Size 640x300x250mm - Compact
- ✓ Weight 17kg
- ✓ Complete with glands and ON/OFF switch

Application

- ✓ Game watering
- ✓ Reservoir filling
- ✓ House water supply
- ✓ Rural water supply
- ✓ Add only panels and wiring.
- ✓ Large daily water volumes
- ✓ Supplement AC supply & reduce cost.
- ✓ Supplement intermittent higher water supply needs
- ✓ Add to cloudy day critical pumping.

Why?

- ✓ Use standard borehole motors.
- ✓ Use standard motor/pump control gear
- ✓ Convenient and affordable solar power solution for your pump application
- ✓ No programming, setting or special motors/pumps required.
- ✓ Complete installation instructions supplied.
- ✓ MC4 connectors included.
- ✓ ON/OFF switch included

	Technical Information					
Motor	1~ 230Vac 50Hz					
Ordering code	284415	284425	284435	-	-	-
Motor rating (kW)	0.37kW	0.55kW	0.75kW	-	-	-
Max Motor amps (A)	4.0	6.0	7.5	-	-	-
Min Input volts (Vdc)	60	60	60	-	-	-
Max Input volts (Vdc)	450	450	450	-	-	-
Max input amps (A)	12	12	12	-	-	-
Min input power (W)	750	750	750	-	-	-
Max input power (W)	5400	5400	5400	-	-	-

11.5.2 Mini/Midi Range – PV/AC CO – 90-700Vdc/3P 400Vac; OUT: Mini 3P 0,37-1,1kW, Midi 3P 0,75 – 3,7kW

Mini/Midi Range – PV or AC Change-over

- ✓ Provision for optional switch gear installation
- ✓ Manually select PV or DC operation.
- ✓ Metal epoxy coated enclosure
- ✓ Total environmental protection IP65
- ✓ Natural cooling – No fans to service
- ✓ Mini size 640x300/250x250mm – Compact
- ✓ Midi size
- ✓ Mini weight
- ✓ Midi Weight 17kg
- ✓ Complete with glands and ON/OFF switch

Application

- ✓ Game watering
- ✓ Reservoir filling
- ✓ House water supply
- ✓ Rural water supply
- ✓ Add only panels and wiring.
- ✓ Large daily water volumes
- ✓ Supplement AC supply & reduce cost.
- ✓ Supplement intermittent higher water supply needs
- ✓ Add to cloudy day critical pumping.

Why?

- ✓ Use standard borehole motors.
- ✓ Use standard motor/pump control gear
- ✓ Convenient and affordable solar power solution for your pump application
- ✓ No programming, setting or special motors/pumps required.
- ✓ Complete installation instructions supplied.
- ✓ MC4 connectors included.
- ✓ ON/OFF switch included
- ✓ Solar array 750-5400Wp

	Technical Information – Mini Enclosure					
Motor	3~ 400Vac 50Hz					
Ordering code	284615	284625	284635	284645		
Motor rating (kW)	0.37kW	0.55kW	0.75kW	1.1kW		
Max Motor amps (A)	2.5	3.2	2.5	3.2		
Min Input volts (Vdc)	90	90	60	60		
Max Input volts (Vdc)	450	450	450	450		
Max input amps (A)	12	12	12	12		
Min input power (W)	750	750	750	750		
Max input power (W)	5400	5400	1500	5400		
	Technical Information – Midi Enclosure					
Motor	3~ 400Vac 50Hz					
Ordering code	284935	284945	284955	284965	284975	284985
Motor rating (kW)	0.75kW	1.1kW	1.5kW	2.2kW	3kW	3.7kW
Max Motor amps (A)	2.5	3.2	4	6	2.0	2.5
Min Input volts (Vdc)	90	90	90	90	90	90
Max Input volts (Vdc)	700	700	700	700	700	700
Max input amps (A)	12	12	12	12	12	12
Min input power (W)	750	750	750	750	500	750
Max input power (W)	5400	5400	5400	5400	5400	5400

11.6 Standard AC rectified range

11.6.1 Mini Range – PV/AC – IN: 60-450Vdc / 1P 230Vac; OUT: 1P 0,37 – 0,75kW, 3P 0,37 – 0,75kW

Mini Range – PV/AC generator friendly

- ✓ Manually select PV or DC operation.
- ✓ Metal epoxy coated enclosure
- ✓ Total environmental protection IP65
- ✓ Natural cooling – No fans to service
- ✓ Size 640x250x250mm - Compact
- ✓ Weight 13kg
- ✓ Complete with glands and ON/OFF switch
- ✓ Convenient mounting lugs

Application

- ✓ Game watering
- ✓ Reservoir filling
- ✓ House water supply
- ✓ Rural water supply
- ✓ Add only panels and wiring.
- ✓ Large daily water volumes
- ✓ Supplement AC supply & reduce cost.
- ✓ Supplement intermittent higher water supply needs
- ✓ Add to cloudy day critical pumping.

Why?

- ✓ Use standard borehole motors.
- ✓ Convenient and affordable solar power solution for your pump application
- ✓ No programming, setting or special motors/pumps required.
- ✓ Complete installation instructions supplied.
- ✓ MC4 connectors included.
- ✓ ON/OFF switch included
- ✓ Solar array 750-5400Wp

	Technical Information					
Motor	1~ 230Vac 50Hz					
Ordering code	284412	284422	284432	-	-	-
Motor rating (kW)	0.37kW	0.55kW	0.75kW	-	-	-
Max Motor amps (A)	4.0	6.0	7.5	-	-	-
Min Input volts (Vdc)	60	60	60	-	-	-
Max Input volts (Vdc)	450	450	450	-	-	-
Max input amps (A)	12	12	12	-	-	-
Min input power (W)	750	750	750	-	-	-
Max input power (W)	5400	5400	5400	-	-	-
Motor	3~ 400Vac 50Hz					
Ordering code	284612	284622	284632	-	-	-
Motor rating (kW)	0.37kW	0.55kW	0.75kW	-	-	-
Max Motor amps (A)	1.6	2.0	2.5	-	-	-
Min Input volts (Vdc)	60	60	60	-	-	-
Max Input volts (Vdc)	450	450	450	-	-	-
Max input amps (A)	12	12	12	-	-	-
Min input power (W)	750	750	750	-	-	-
Max input power (W)	1500	1500	1500	-	-	-

11.7 PFC range

11.7.1 Mini Range – PV/AC generator friendly – IN: 60-150Vdc / 1P 230Vac; OUT: 1P 0,37 – 0,75kW, 3P 0,37 – 0,75kW

Application

- ✓ Game watering
- ✓ Reservoir filling
- ✓ House water supply
- ✓ Rural water supply
- ✓ Add only panels and wiring.
- ✓ Large daily water volumes
- ✓ Supplement AC supply & reduce cost.
- ✓ Supplement intermittent higher water supply needs
- ✓ Add to cloudy day critical pumping.

Mini Range – PV/AC generator friendly

- ✓ Manually select PV or DC operation.
- ✓ Metal epoxy coated enclosure
- ✓ Total environmental protection IP65
- ✓ Natural cooling – No fans to service
- ✓ Size 640x250x250mm - Compact
- ✓ Weight 13kg
- ✓ Complete with glands and ON/OFF switch
- ✓ Convenient mounting lugs

Why?

- ✓ Use standard borehole motors.
- ✓ Convenient and affordable solar power solution for your pump application
- ✓ No programming, setting or special motors/pumps required.
- ✓ Complete installation instructions supplied.
- ✓ MC4 connectors included.
- ✓ ON/OFF switch included
- ✓ Solar array 750-5400Wp

	Technical Information					
Motor	1~ 230Vac 50Hz					
Ordering code	285410	285420	285430			
Motor rating (kW)	0.37kW	0.55kW	0.75kW			
Max Motor amps (A)	4	6	7.5			
Min Input volts (Vdc)	60	60	60			
Max Input volts (Vdc)	150	150	150			
Max input amps (A)	12	12	12			
Min input power (W)	500	500	500			
Max input power (W)	1500	1500	1500			
Motor	3~ 400Vac 50Hz					
Ordering code	285700	285710	285720	-	-	-
Motor rating (kW)	0.37kW	0.55kW	0.75kW	-	-	-
Max Motor amps (A)	1.6	2.0	2.5	-	-	-
Min Input volts (Vdc)	60	60	60	-	-	-
Max Input volts (Vdc)	150	150	150	-	-	-
Max input amps (A)	12	12	12	-	-	-
Min input power (W)	750	750	750	-	-	-
Max input power (W)	1500	1500	1500	-	-	-

11.7.2 Mini Range – PV/AC generator friendly – IN: 90-450Vdc / 1P 230Vac; OUT: 1P 0,37 – 0,75kW, 3P 0,37 – 1,1kW

Mini Range – PV/AC generator friendly

- ✓ Manually select PV or DC operation.
- ✓ Metal epoxy coated enclosure
- ✓ Total environmental protection IP65
- ✓ Natural cooling – No fans to service
- ✓ Size 640x250x250mm - Compact
- ✓ Weight 13kg
- ✓ Complete with glands and ON/OFF switch
- ✓ Convenient mounting lugs

Application

- ✓ Game watering
- ✓ Reservoir filling
- ✓ House water supply
- ✓ Rural water supply
- ✓ Add only panels and wiring.
- ✓ Large daily water volumes
- ✓ Supplement AC supply & reduce cost.
- ✓ Supplement intermittent higher water supply needs
- ✓ Add to cloudy day critical pumping.

Why?

- ✓ Use standard borehole motors.
- ✓ Convenient and affordable solar power solution for your pump application
- ✓ No programming, setting or special motors/pumps required.
- ✓ Complete installation instructions supplied.
- ✓ MC4 connectors included.
- ✓ ON/OFF switch included
- ✓ Solar array 750-5400Wp

	Technical Information					
Motor	1~ 230Vac 50Hz					
Ordering code	28550	28560	28570			
Motor rating (kW)	0.37kW	0.55kW	0.75kW			
Max Motor amps (A)	4	6	7.5			
Min Input volts (Vdc)	90	90	90			
Max Input volts (Vdc)	450	450	450			
Max input amps (A)	12	12	12			
Min input power (W)	500	500	500			
Max input power (W)	5400	5400	5400			
Motor	3~ 400Vac 50Hz					
Ordering code	285800	285810	285820	285830	-	-
Motor rating (kW)	0.37kW	0.55kW	0.75kW	1.1kW	-	-
Max Motor amps (A)	1.6	2.0	2.5	3.2	-	-
Min Input volts (Vdc)	90	90	90	90	-	-
Max Input volts (Vdc)	450	450	450	450	-	-
Max input amps (A)	12	12	12	12	-	-
Min input power (W)	750	750	750	750	-	-
Max input power (W)	5400	5400	5400	5400	-	-

11.7.3 Midi Range – PV/AC generator friendly – IN: 90-450Vdc / 1P 230Vac; OUT: 1P 0,37 – 1,1kW, 3P 0,37 – 2,2kW

Application

- ✓ Game watering
- ✓ Reservoir filling
- ✓ House water supply
- ✓ Rural water supply
- ✓ Add only panels and wiring.
- ✓ Large daily water volumes
- ✓ Supplement AC supply & reduce cost.
- ✓ Supplement intermittent higher water supply needs
- ✓ Add to cloudy day critical pumping.

Midi Range – PV/AC generator friendly

- ✓ Manually select PV or DC operation.
- ✓ Metal epoxy coated enclosure
- ✓ Total environmental protection IP65
- ✓ Natural cooling – No fans to service
- ✓ Size 640x300x250mm - Compact
- ✓ Weight 17kg
- ✓ Complete with glands and ON/OFF switch
- ✓ Convenient mounting lugs

Why?

- ✓ Use standard borehole motors.
- ✓ Convenient and affordable solar power solution for your pump application
- ✓ No programming, setting or special motors/pumps required.
- ✓ Complete installation instructions supplied.
- ✓ MC4 connectors included.
- ✓ ON/OFF switch included
- ✓ Solar array 750-5400Wp

	Technical Information					
Motor	1~ 230Vac 50Hz					
Ordering code	285440	285450	285460	285470	-	-
Motor rating (kW)	0.37kW	0.55kW	0.75kW	1.1kW	-	-
Max Motor amps (A)	4.0	6.0	7.5	9.0	-	-
Min Input volts (Vdc)	90	90	90	90	-	-
Max Input volts (Vdc)	450	450	450	450	-	-
Max input amps (A)	12	12	12	12	-	-
Min input power (W)	750	750	750	750	-	-
Max input power (W)	5400	5400	5400	5400	-	-
Motor	3~ 400Vac 50Hz					
Ordering code	285480	285490	285500	285510	285520	285530
Motor rating (kW)	0.37kW	0.55kW	0.75kW	1.1kW	1.5kW	2.2kW
Max Motor amps (A)	1.6	2.0	2.5	3.2	4	6
Min Input volts (Vdc)	90	90	90	90	90	90
Max Input volts (Vdc)	450	450	450	450	450	450
Max input amps (A)	12	12	12	12	12	12
Min input power (W)	500	500	750	750	750	750
Max input power (W)	1500	1500	5400	5400	5400	5400

11.7.4 Midi Range – PV/AC generator friendly – IN: 90-700Vdc / 3P 400Vac; OUT: 3P 0,75 – 3,7kW

Midi Range – PV/AC generator friendly

- ✓ Manually select PV or DC operation.
- ✓ Metal epoxy coated enclosure
- ✓ Total environmental protection IP65
- ✓ Natural cooling – No fans to service
- ✓ Size 640x300x250mm - Compact
- ✓ Weight 17kg
- ✓ Complete with glands and ON/OFF switch
- ✓ Convenient mounting lugs

Application

- ✓ Game watering
- ✓ Reservoir filling
- ✓ House water supply
- ✓ Rural water supply
- ✓ Add only panels and wiring.
- ✓ Large daily water volumes
- ✓ Supplement AC supply & reduce cost.
- ✓ Supplement intermittent higher water supply needs
- ✓ Add to cloudy day critical pumping.

Why?

- ✓ Use standard borehole motors.
- ✓ Convenient and affordable solar power solution for your pump application
- ✓ No programming, setting or special motors/pumps required.
- ✓ Complete installation instructions supplied.
- ✓ MC4 connectors included.
- ✓ ON/OFF switch included
- ✓ Solar array 750-5400Wp

	Technical Information					
Motor	3~ 400Vac 50Hz					
Ordering code				285535	285540	285550
Motor rating (kW)				2.2kW	3kW	3.7kW
Max Motor amps (A)				6	2.0	2.5
Min Input volts (Vdc)				90	90	90
Max Input volts (Vdc)				700	700	700
Max input amps (A)				12	12	12
Min input power (W)				750	500	750
Max input power (W)				5400	5400	5400

Notes