



ASP SO Solar Deep Well Pumps Catalogue



PT. Archimedes Global Pump

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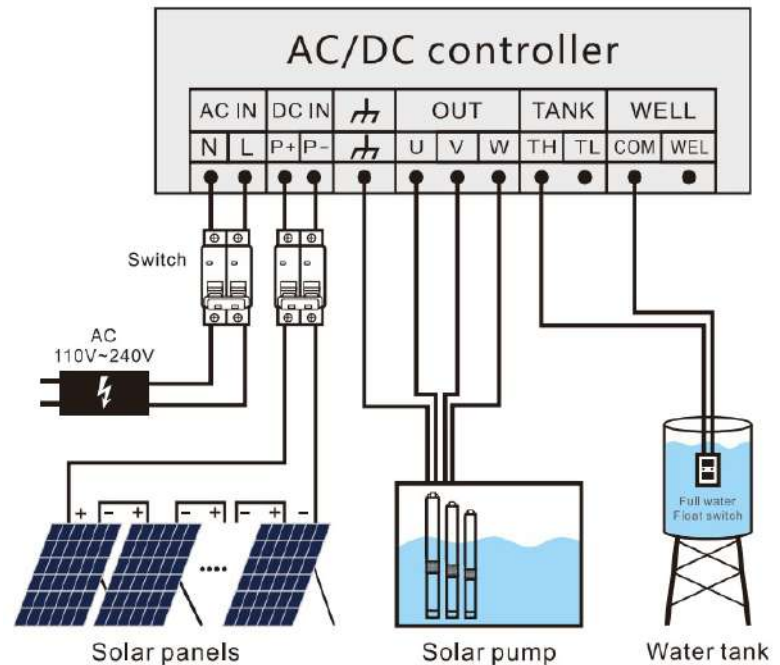
A4HS technology applied to renewable energy

A4HS MultiPower pumps (4HS MP), powered by renewable energy sources, is a new range of pumps with built-in inverters.

A4HS MultiPower pumps may be powered by AC or DC with a wide range of operating voltages (30-265 VAC / 30-340 VDC).

This means that 4HS MP pumps can be connected to solar panels, batteries, wind turbines and diesel generators.

A special software algorithm allows for adjusting the hydraulic performance to each source and to the available power while maximizing the water pumped.

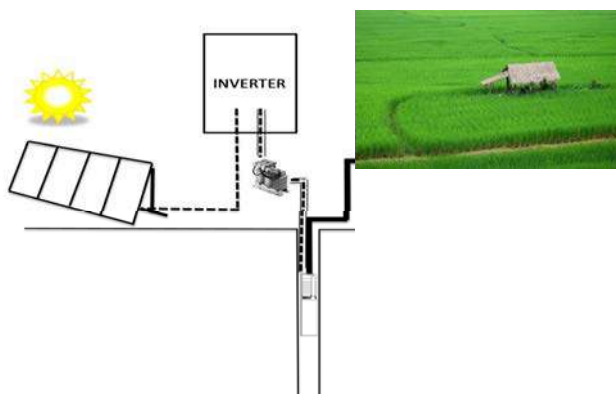


All the advantages of built-in electronics

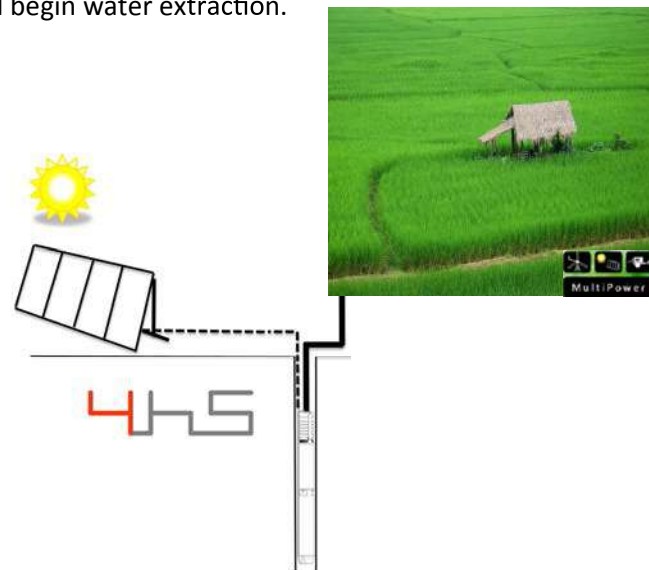
The built-in electronics inside the motor omits the need for shielded cables and output filters creating an ideal solution for any application in remote locations without surveillance and with adverse climatic conditions.

In traditional solutions, solar inverters are placed above ground and, being exposed to the weather, could suffer from:

- Overheating
- Water penetration
- Thermal fluctuations
- Accidental damage



4HS MultiPower pumps do not need any external electronic components. Simply connect the pump cable to the power source and begin water extraction.



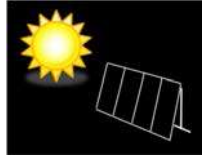
The built-in electronics are directly cooled by water flow. The operating temperature of the electronic components ensures considerably longer life than a surface inverter which is affected by high temperature, humidity, dust, and solar radiation.

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MPPT: Maximum Power Point Tracking

In the application with solar panels, the MPPT function (Maximum Power Point Tracking) maximizes the power input for various radiation and temperature conditions.



When radiation increases, pump speed and water flow increase as well.

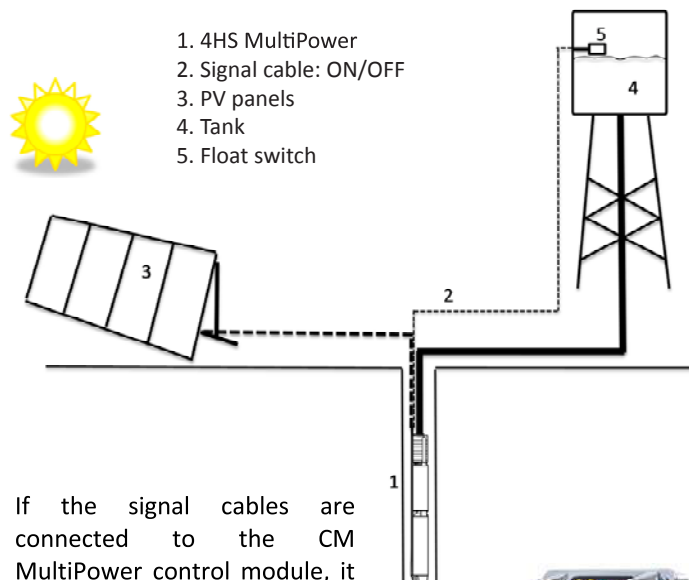
In cases where there is less direct solar radiation or cloud cover, the speed of the pump will decrease, but still will deliver water flow up to the moment that the radiation falls below the minimum requested value.

This is a benefit of the built-in AC/DC converter.

Installation

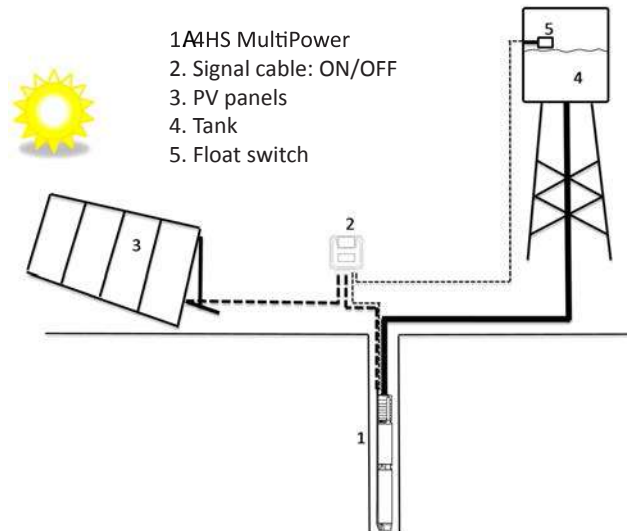
The A4HS MultiPower pump can be installed with or without a CM Multipower control module, creating a "plug and go" system.

If the CM MultiPower control module is not used, signal cables must be used to control pump operation, for example a float switch. All protections against overloading, high voltage and dry running are integrated with the inverter.



If the signal cables are connected to the CM MultiPower control module, it is possible :

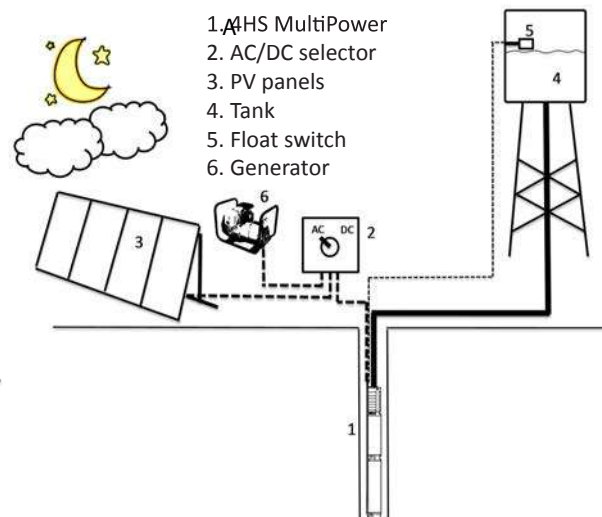
- Control the electrical parameters (current-power-voltage)
- Record and store all the alarms related to the hours of operation.
- Connect a pressure or a flow sensor to control the pump operation.
- Connect a pressure or float switch.
- Provide an alarm digital output for remote control.



Use of auxiliary genset

With an auxiliary genset to provide the desired power, it will be possible to improve pump performance if solar energy is absent or insufficient.

An AC/DC selector is used to change the power source.



Integrated onboard protection

Protections against voltage or motor overload and dry running are integrated into the pump's electronic circuitry.

Electronic protection against dry running avoids the need for the probes.

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Pump selection in a PV system

For the correct selection of a 4HS MultiPower pump to be used in a photovoltaic (PV) system, it is necessary to know:

- Desired daily water
- Total required head (static + dynamic).
- Installation location.
- Duration of operation (seasonal or yearly).

Based on location it is possible to obtain from maps and tables (available on the web) the following information:

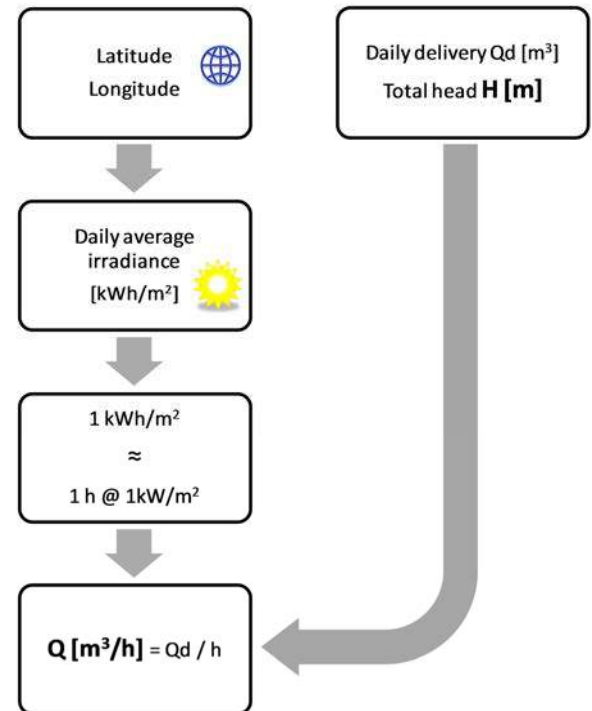
Minimum, maximum and average daily radiation per year, in kWh/m².

- Minimum, maximum and average daily radiation per month
- Optimal tilt angle for photovoltaic panels.

The number of hours of available solar radiation should be considered with 1 kW/m², the standard value by which PV panel performance is referred.

Calculating the hourly flow rate, the nominal pump capacity and head can be determined for pump selection.

Our technical department is always willing to assist if needed.

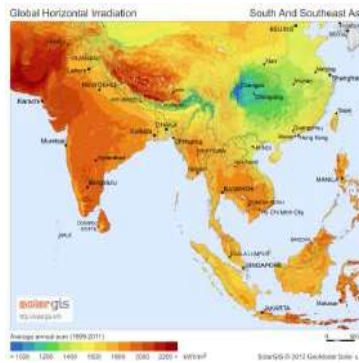


Sizing example

Location:	Chiang Mai, Thailand	Manila, Philippines
Latitude:	18° 79'	14° 58'
Longitude:	98° 99'	121° 00'
Optimal tilt:	71°	75°

Solar radiation in kWh/m²/day

	Chiang Mai	Manila
January	5.93	4.58
February	6.35	5.01
March	6.27	5.41
April	6.02	5.42
May	5.10	5.19
June	4.66	4.72
July	4.29	4.29
August	4.03	3.75
September	4.37	4.14
October	4.65	4.11
November	5.06	4.18
December	5.54	4.05
Year average	5.19	4.57
Dry months average	5.75 (Nov-May)	5.10 (Jan-Apr)



	Chiang Mai		Manila	
	Dry season		Dry season	
Q (m ³ /h)	4.52		5.10	
H (m)	50	50	30	30
4HS MultiPower	06/04	04/03	06/04	04/03
P1 (W)	1700	2100	1200	1700
PV Panels *	8	9	5	8

Daily water requirement $Q_d = 26 \text{ m}^3/\text{d}$

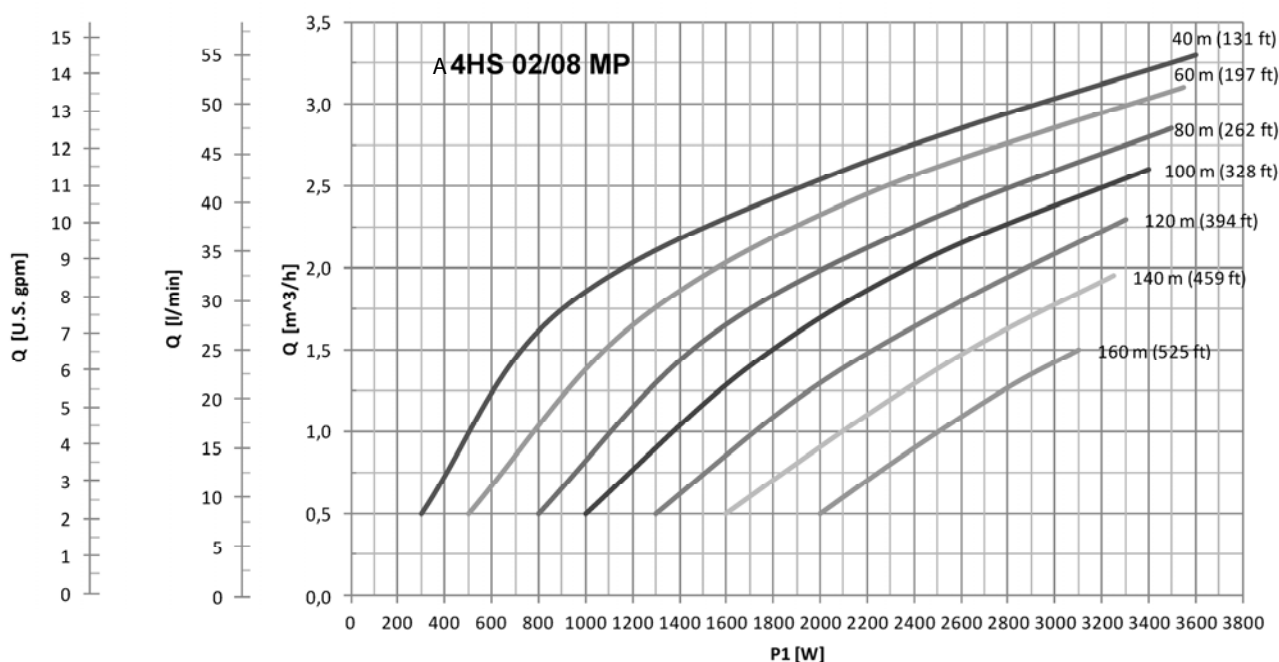
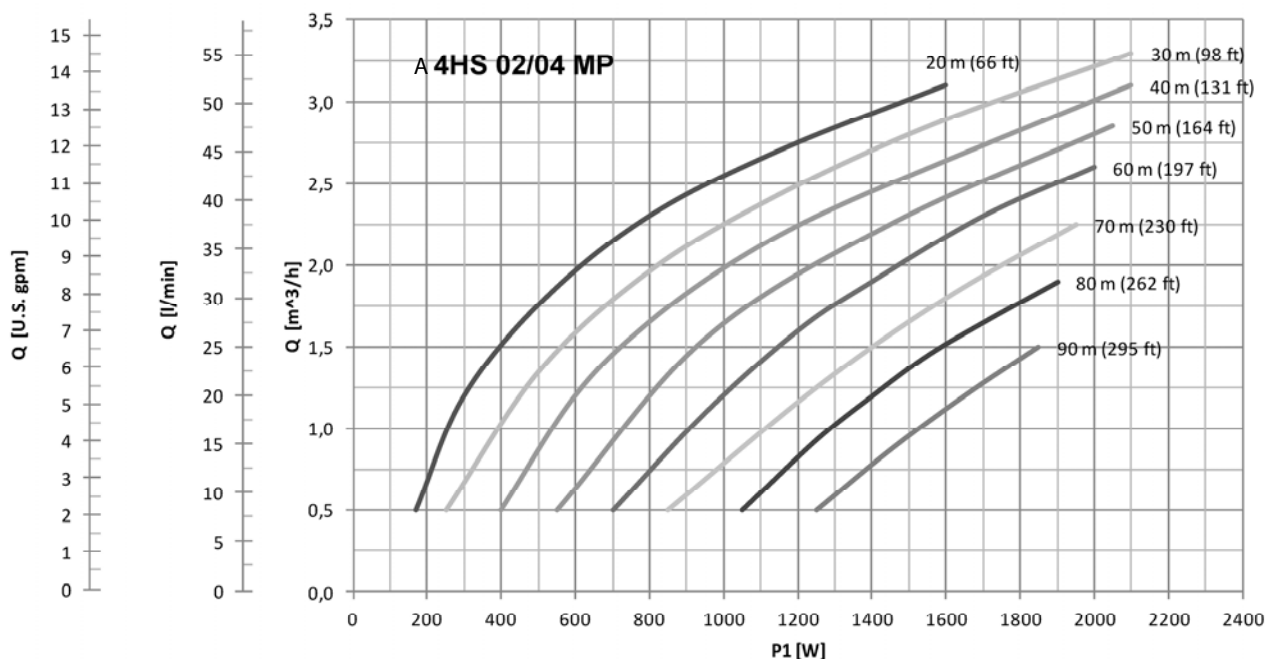
For Chiang Mai, the hourly water capacity $Q_h = 26/5.75 = 4.52 \text{ m}^3/\text{h}$. It is assumed that the pump will mainly be used during the dry months of November – May.

For Manila, the hourly water capacity $Q_h = 26/5.10 = 5.10 \text{ m}^3/\text{h}$. It is assumed that the pump will mainly be used during the dry months of January – April.

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Performance A4HS

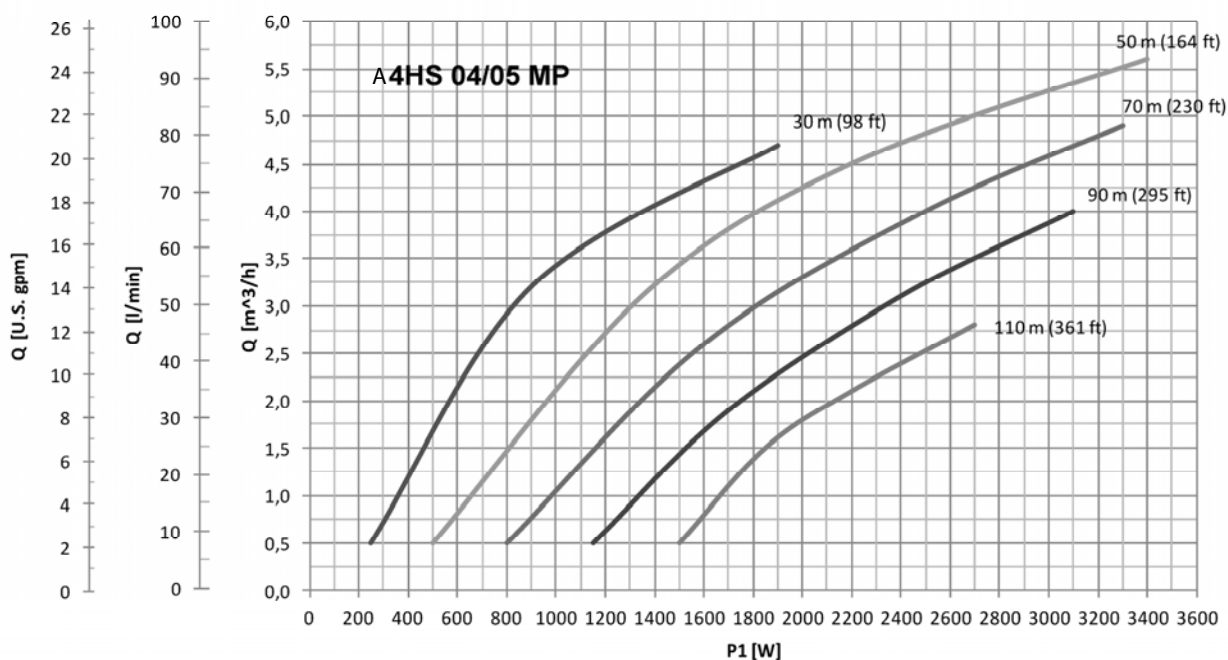
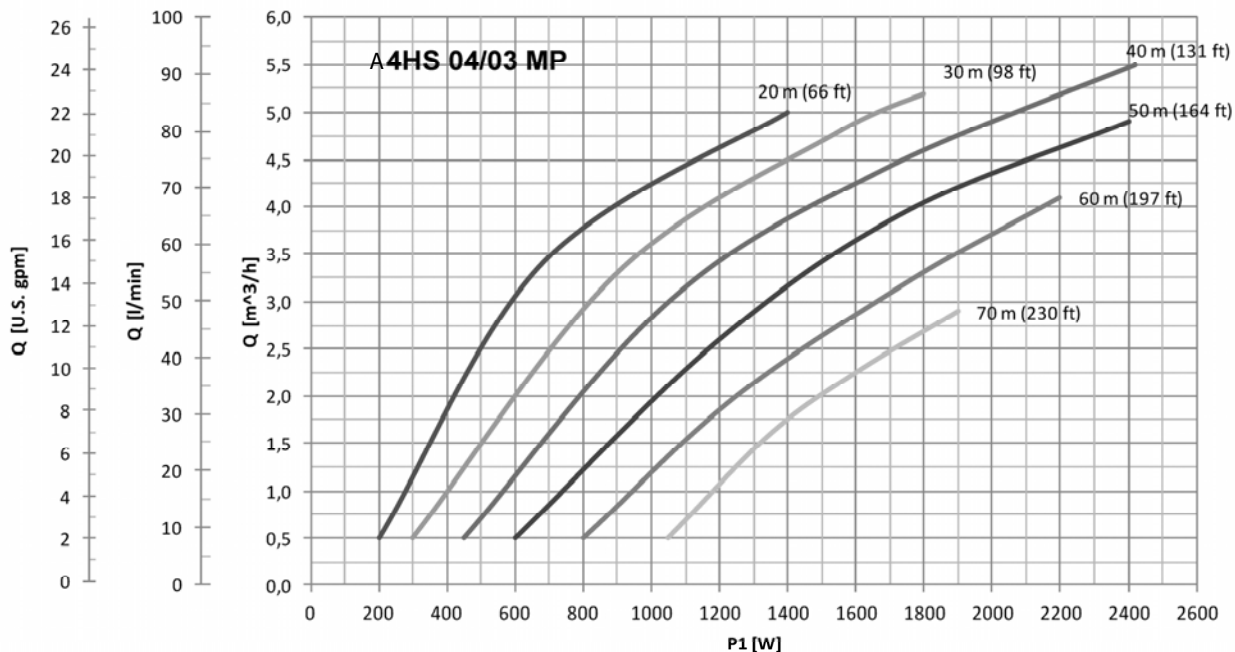


Model	Voltage	Max. absorbed current	Power factor	Max. absorbed power	Length	Delivery	Pump weight	Max. diameter	Packing size	Total weight
A4HS	[V]	[A]		P1 [W]	[mm]		[kg]	[mm]	[cm]	[kg]
02/04 AMP	30-340 VDC 30-265 VAC	16 (130VDC) 16 (130 VAC)	1	2100	936	1 ¼"	19.5	101 **	120x20x29	20.5
02/08 AMP	30-340 VDC 30-265 VAC	16 (220 VDC) 16 (220 VAC)	1	3500	1065	1 ¼"	22	101 **	120x20x29	23

** Max, external diameter including cable and cable cover

Manufactured for by **ISO 9001:2008**

Performance A4HS



Model	Voltage	Max. absorbed current	Power factor	Max. absorbed power	Length	Delivery	Pump weight	Max. diameter	Packing size	Total weight
A4HS	[V]	[A]		P1 [W]	[mm]		[kg]	[mm]	[cm]	[kg]
04/03 AMP	30-340 VDC 30-265 VAC	16 (150 VDC) 16 (150 VAC)	1	2400	915	1 ¼"	19.4	101 **	120x20x29	20
04/05 AMP	30-340 VDC 30-265 VAC	16 (207 VDC) 16 (207 VAC)	1	3300	1002	1 ¼"	21	101 **	120x20x29	22

** Max, external diameter including cable and cable cover

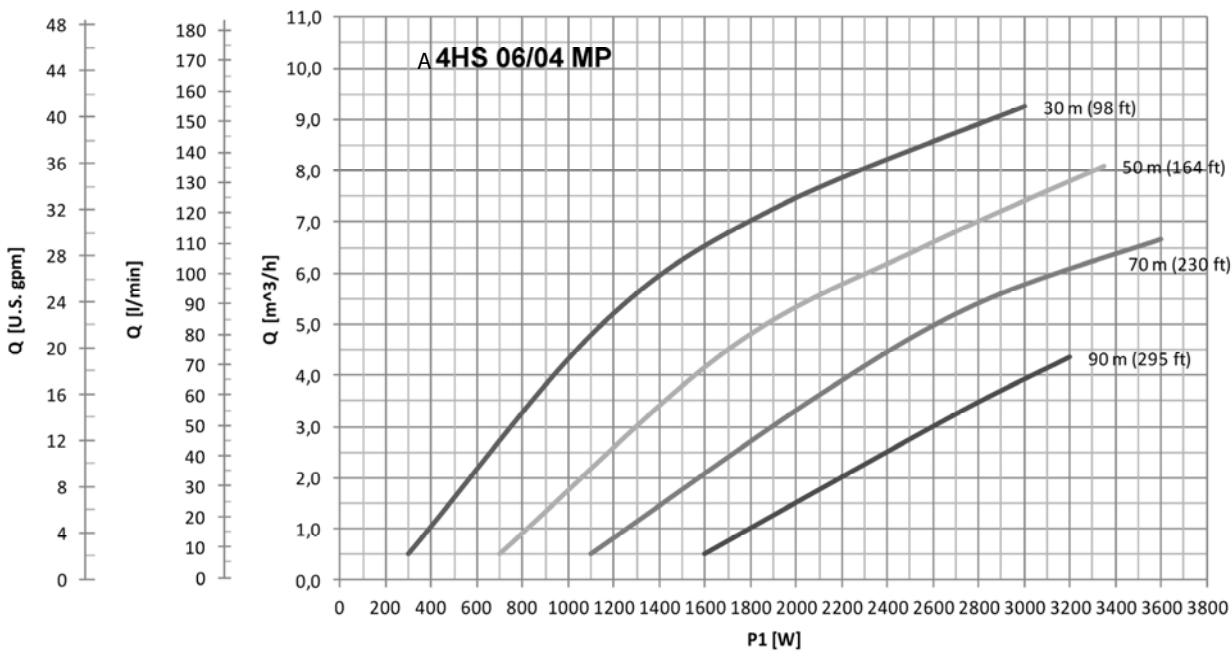
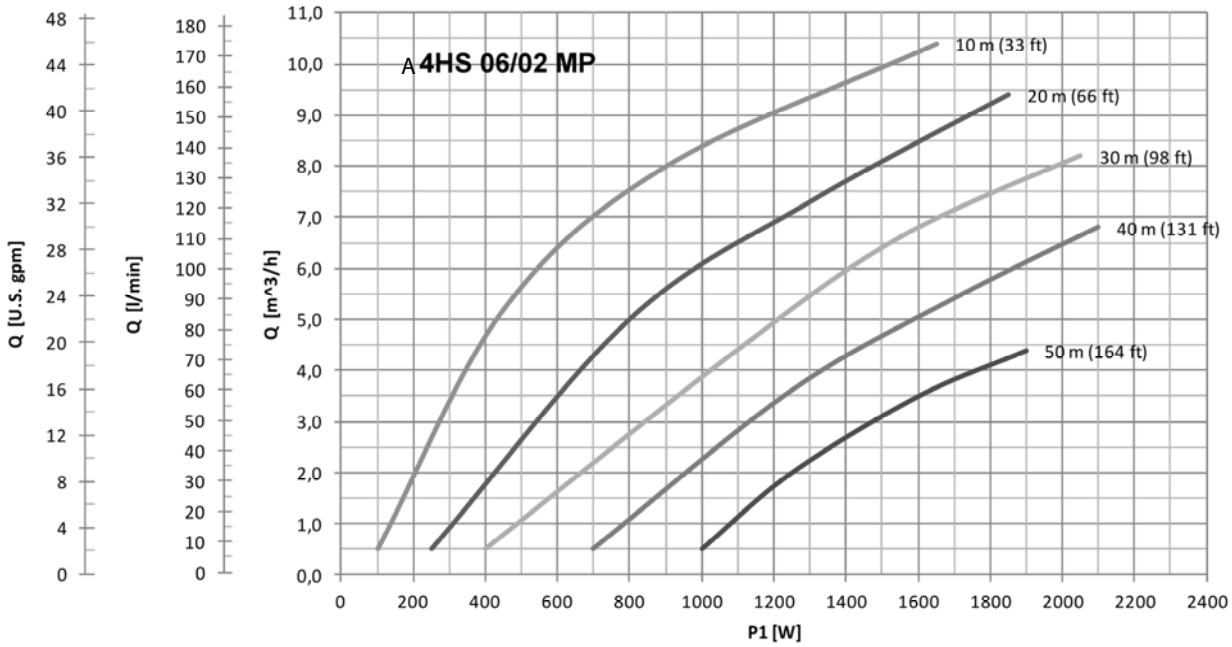
Manufactured for



BUREAU VERITAS
Certification
ISO 9001:2008



Performance A4HS



Model	Voltage	Max. absorbed current	Power factor	Max. absorbed power	Length	Delivery	Pump weight	Max. diameter	Packing size	Total weight
A4HS	[V]	[A]		P1 [W]	[mm]		[kg]	[mm]	[cm]	[kg]
06/02AMP	30-340 VDC 30-265 VAC	16 (130 VDC) 16 (130 VAC)	1	2100	894	1 ½"	19.2	101 **	120x20x29	20
06/04AMP	30-340 VDC 30-265 VAC	16 (225 VDC) 16 (225 VAC)	1	3600	981	1 ½"	21.4	101 **	120x20x29	22

** Max, external diameter including cable and cable cover

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Pump type A4HS -H helical rotor pump has a higher efficiency, requiring lower energy and less PV panels.

The helical rotor pump

The A4 HS-H pumps are equipped with a helical rotor that moves within a double helix rubber stator.

The rotor is made of AISI 316 stainless steel and coated with a hard chromed surface.

During operation, the rotor moves on the rubber surface and it's lubricated by the pumped water.

The flow rate is directly proportional to the pump speed while the pressure supplied is kept almost constant.

In this way, unlike a centrifugal pump, the helical rotor pump provides high head even at low rpm, ensuring water on surface even with very low available power or irradiation.

Moreover, the helical rotor pumps have a higher hydraulic efficiency than centrifugal pumps at the same flow. This results in a reduced number of PV panels to lift the same water volume.

Permanent magnet motor

The A 4HS-H pumps are equipped with an AC permanent magnet motors.

The rotor uses Neodymium magnets coated with thin layers of Copper and Nickel, to ensure, in addition to superior magnetic performance greater reliability and durability.

High motor efficiency and high starting torque create pump rotation even in low light conditions.

The integrated inverter module converts from DC energy into useful electrical energy to drive the engine efficiently and at the same time, adjusts the pump speed in relation to available irradiation, maximizing the power extracted (MPPT).

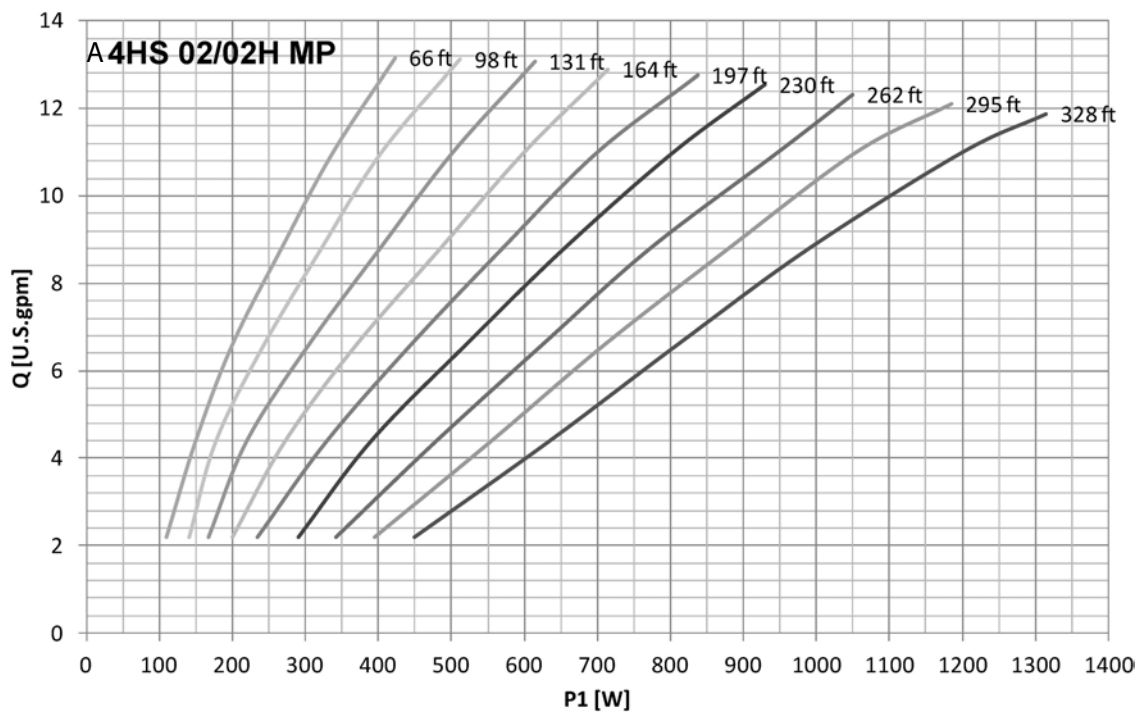
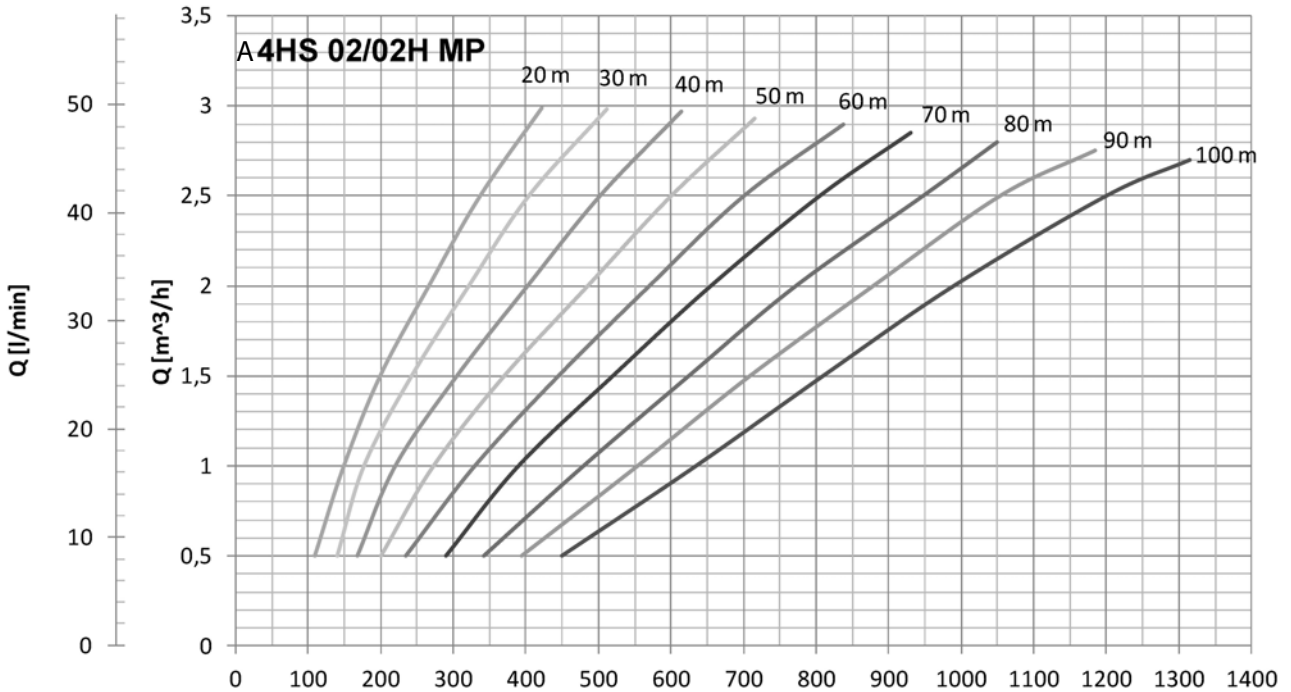
Over-current, over-temperature, lack of water protections are integrated onboard.



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Performance of A4HS-H

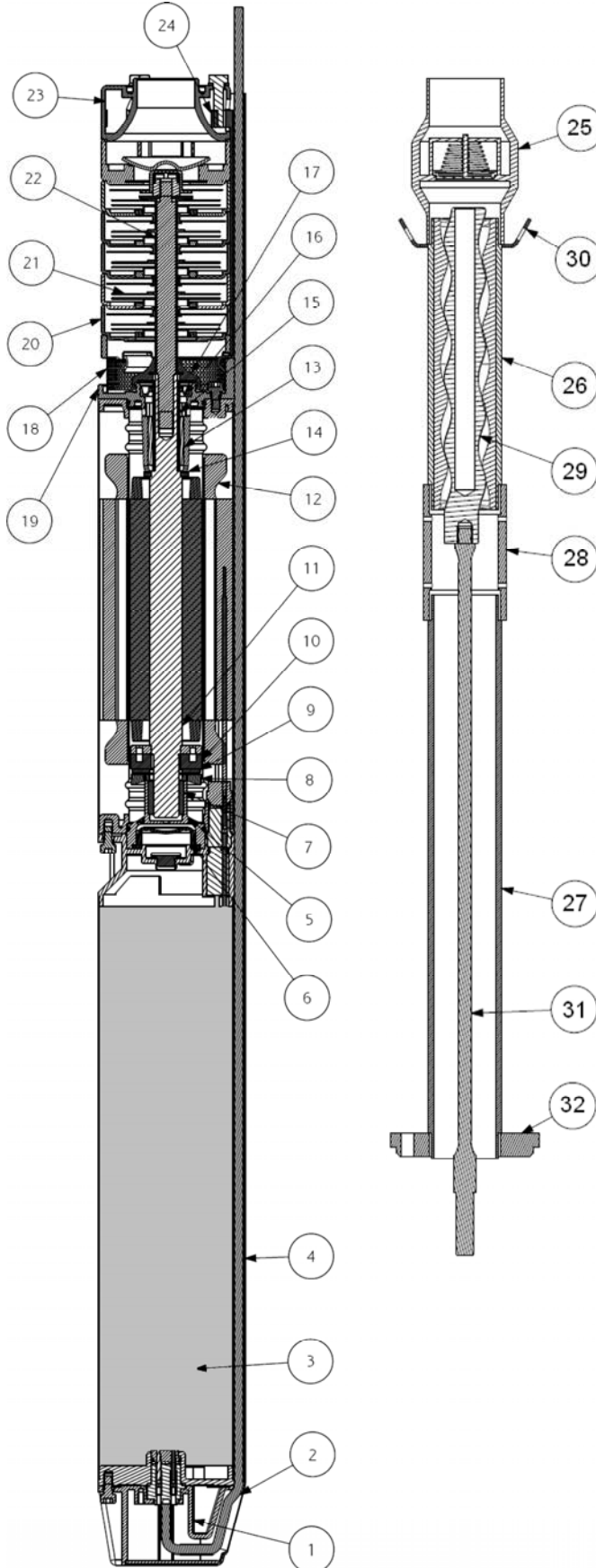


Model	Voltage	Max. absorbed current	Power factor	Max. absorbed power	Length	Delivery	Pump weight	Max. diameter	Packing size	Total weight
A4HS	[V]	[A]		P1 [W]	[mm]		[kg]	[mm]	[cm]	[kg]
02/02H AMP	30-340 VDC 30-265 VAC	10 (130 VDC) 10 (130 VAC)	1	1300	1350	1 1/4"	19.5	101 **	120x20x29	20.5

** Max, external diameter including cable and cable cover

Manufactured for by ISO 9001:2008

Materials



REF	DESCRIPTION	MATERIAL
1	Power supply bracket	AISI 304
2	Cable for drinking water applications	ACS-KTM-WRAS compliant
3	MINT: Electronic Integrated Module	
4	Cable guard	AISI 304
5	Lower thrust bearing	AISI 304
6	Rubber diaphragm	EPDM
7	Lower carbon bush	CTI25
8	Tilting disc	AISI 304
9	Pads	AISI420j
10	Carbon disc	CTI25
11	Shaft with rotor	AISI 431
12	Canned type stator	AISI 304
13	Upper carbon bush	CTI25
14	Upper thrust bearing	Teflon
15	Ceramized sleeve	AISI 304 + Ceramic
16	Lip seal	FKM
17	Rotating sandguard	NBR
18	Pump filter	AISI 304
19	Pump bracket	AISI 304
Centrifugal pump		
20	Diffusers	AISI 304
21	Impellers	AISI 304
22	Pump shaft	AISI 304
23	Discharge	AISI 304
24	Straps	AISI 304
Helicoidal rotor pump		
25	No-return valve	AISI 304
26	Helicoidal stator	EPDM + AISI 304
27	Supporting pipe	AISI 304
28	Junction	AISI 304
29	Helicoidal rotor	AISI 316 cromed
30	Safety hook	AISI 304
31	Flexible shaft	AISI 316
32	Pump adaptor	AISI 304

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General characteristics

A4HS + A4HS-H Multi-Power Pump	
Max. fluid temperature	35 °C (92 F)
Min. coolant flow rate	0.2 m/s
Characteristics of the pumped fluid	Clean, chemically inert, non-explosive, without particles or fibres content, above 50 g/m ³ sand content
Protection grade	IP 68
Max. immersion depth	150 m
Materials	All wetted parts in AISI 304 stainless steel
Cable	Flat cable ACS – WRAS – KTM approved
CM Multi-Power Control Module	
Max. ambient temperature	50 °C (122 F)
Protection grade	IP 55
Materials	Aluminum enclosure, PVC cables, polyamide (PA) cable gland, polyester (PE) display membrane
Analog input	2 inputs 4-20 mA + 2 inputs 4-20 mA or 0-10 V adjustable by the user
Digital input	4 inputs N.O. or N.C. adjustable by the user
Digital output	2 output relays 5A, 250 VAC, N.O. or N.C. adjustable by the user
User display	Display LCD backlit, 16 characters x 2 rows, 5 buttons
Short circuit protection	Fuse
Certifications	
CE, ISO 9001:2008	

A4HS MultiPower pumps can be installed both vertically and horizontally, but the outlet should never be below the horizontal axis.

To ensure a proper cooling when A4HS is not installed in a well, a cooling sleeve must be used to allow sufficient cooling flow with minimum pump speed.

