



SOLAR PUMPS

DC OPENWELL



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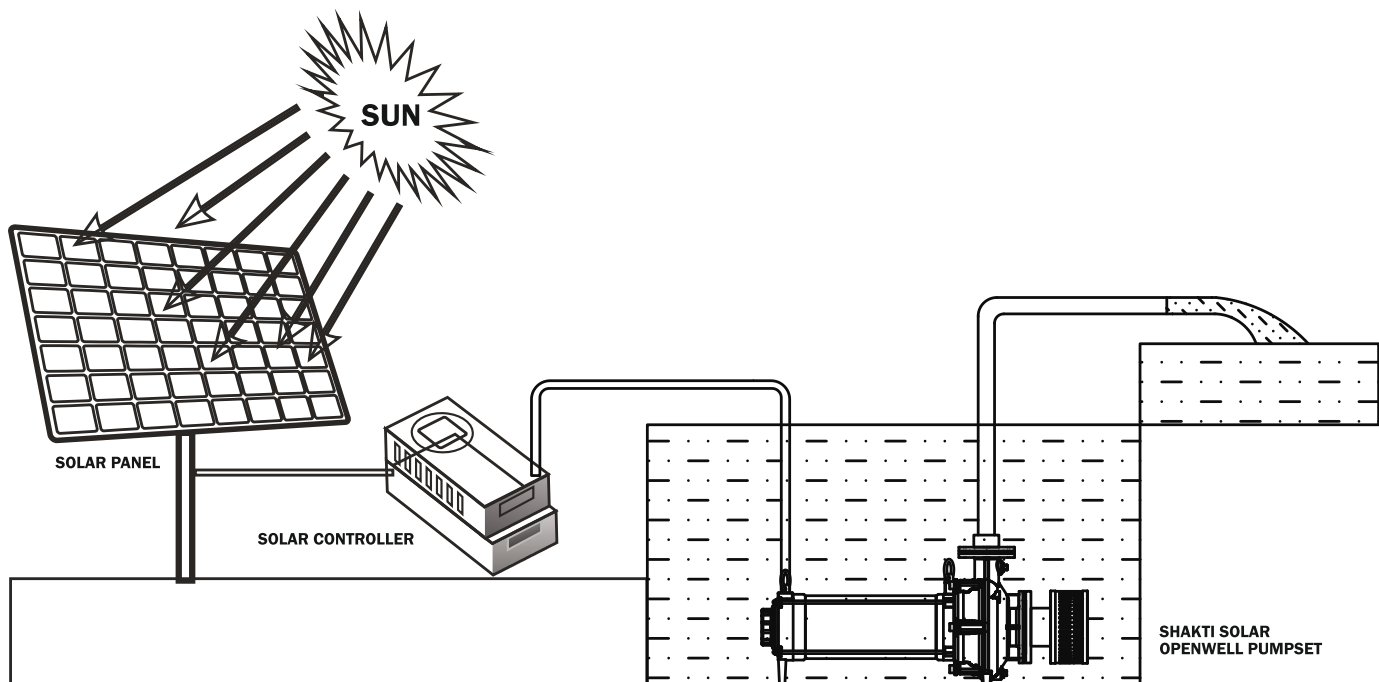
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INTRODUCTION OF SOLAR POWERED WATER PUMPING SOLUTIONS

1. INTRODUCTION

Nowdays Solar pumping system is becoming more and more popular, it is being applied to daily use (underground water), agriculture irrigation, forestry irrigation, desert control, pasture animal husbandry, water supply for islands, wastewater treatment engineering, and so on. In recent years, with the promotion of the utilization of non conventional energy resources, solar pumping systems are being used more and more in municipal engineering, city center squares, parks, tourist sites, resorts and hotels, the landscapes and fountain systems in the residential areas. This system is composed of a solar array, a pump and a pump controller. Based on the design philosophy that it is better to store water than electricity, there is no energy storing device such as battery in the system.

SOLAR OPENWELL PUMPING SYSTEM



STRUCTURE OF SOLAR PUMPING SYSTEM

The solar array, an aggregation of many solar modules connected in series and/ or parallel. This array absorbs radiation from sunlight and converts it into electrical energy thus help in providing dynamical water as a whole system. The pump controller controls and adjusts the system operation, according to the variation of intensity of sunlight to realize the maximum power point tracking (MPPT). The pump is able to draw water from the deep wells or rivers and lakes to pour into the storage tank or reservoir, or directly connect to the irrigation system, fountain system, etc. According to the actual system demand and installation conditions, different types of pump such as centrifugal pump, axial flow pump, mixed-flow pump or deep-well pump may be used.

INTRODUCTION OF SOLAR POWERED WATER PUMPING SOLUTIONS

APPLICATIONS

- Ground water lowering
- Irrigation systems
- Industrial Application
- Drip irrigation & sprinkler
- Tank / Cistern filling
- Wildlife refuge
- Rural water supply for ranches, cabins, and cottages
- Fountains

FEATURES

- High flow system for faster tank filling and significant water output.
- Proven motor and pump technology for long-term reliability
- Pumpset can start at low radiations.
- Clean and pollution free energy, Eco-friendly.
- Ideal for remote areas, where electricity is not available or availability is capital intensive.
- Suitable for day time irrigation, Continuous supply for 6-8 hours in a day.
- MPPT – Max Power Point Tracking for maximizing efficiency of input power
- Soft start feature prevents water hammer and increases system life & easy to operate.
- Simple installation and maintenance free.

ALL-IN-ONE PACKAGE

The Solar controller is used as a solution for specific pumping requirements of the solar pumping system. Using Shakti components, our technical expertise in groundwater pumping, and innovative thinking based on global market inputs, we have developed a rugged, high-output system which tackles the challenges of remote and harsh environments. No other system delivers the features, benefits, and reliability of solar controller in just one package!

THE SOLAR WATER PUMPING SYSTEM INCLUDES

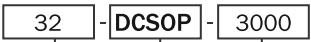
- Shakti High Efficient Submersible Openwell motor
- Shakti Openwell pump
- Solar Panel and its mounting structure
- Solar controller
- Cable
- Pipes
- Variety of flow rates available in: 30 to 215 m³/hr
- Motor and controller ratings available in: 3000 to 9000 Watt

INTRODUCTION OF SOLAR POWERED WATER PUMPING SOLUTIONS

IDENTIFICATION

DCSOP SERIES

Type designation



Disc. (m³/hr.)

Solar Openwell pump

Input Power (Watts)

- * Note: 1. Input Power at Motor End.
- 2. Do not operate pump above its recommended duty head,

The high Efficient Motor is designed according to the permanent magnet principle with separate electronics unit. The Motor speed range is 1000-3600 RPM depending on pump load. The permanent magnet motor featuring a consistent higher efficiency within power range compared to a conventional asynchronous motor.

INTRODUCTION OF SOLAR POWERED WATER PUMPING SOLUTIONS

SOLAR PUMP CONTROLLER SPECIFICATION

OVERVIEW

The controller starts the pumps slowly and adjust it speed according to pumping load and power available from solar array.

Power output from the solar array is optimally matched to the load by maximum power point tracker(MPPT) throughout all conditions.

The Shakti Solar controller is designed with the high standard of reliability expected of Shakti products. The controller attempts to controller the pump and motor to deliver water even under adverse conditions, reducing output as necessary to protect the system components from damage, and only shutting down in extreme cases.

Controller		Power (HP)	VFD Volatge range (VDC)	VFD Maximum current (Amp.)	Efficiency %
9600000096	SIMHA UNIVERSAL DRIVE 3Ø 12 A	3	30 - 425	12	92
9600000088	SIMHA UNIVERSAL DRIVE 3Ø 14A	5	200 - 720	12	96
9600000094	SIMHA UNIVERSAL DRIVE 3Ø 20A	7.5-10	200 - 720	20	96

DESCRIPTIONS AND FEATURES

The Shakti Solar controller controller continuously monitors system performance and incorporates a number of features for pump system protection. In the event of a fault, the Shakti Solar drives will indicate the type of fault through the displays.

The Shakti Solar drives system is optimized for pumping under adverse input power conditions unique to solar arrays.

- Internal diagnostics will tolerate a lower input voltage.
- Whenever possible, the controller attempts to regulate the pump load in a manner that optimizes for maximum power transfer from the solar array.

An easy to use interface is provided to enhance configurability and enable remote system monitoring.

- A three-digit seven-segment display provides a detailed indication of system status.
- A small keypad offers flexibility for selection of user options.
- A continuous data connection for remote telemetry is made available via an RS-485 port. (Optional)

PROTECTION FEATURES

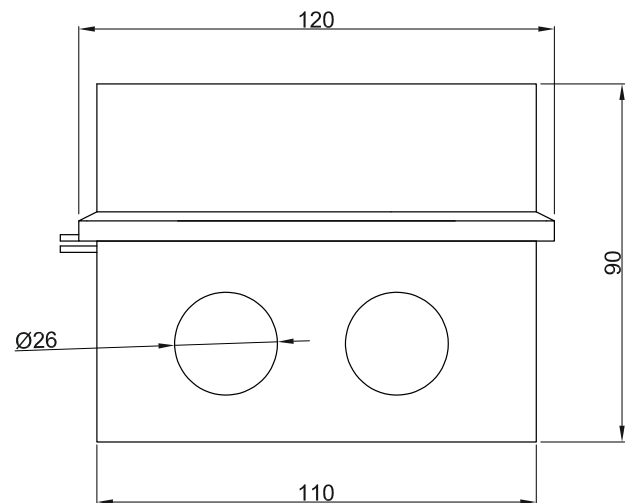
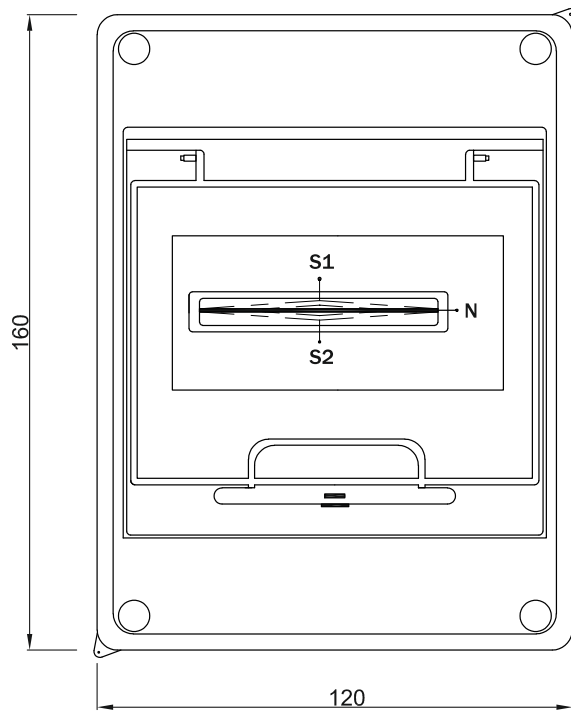
- Dry run Protection
- Overload Protection
- Open Circuit Protection
- Short Circuit Protection
- Over Heat
- Ingress protection IP65

INTRODUCTION OF SOLAR POWERED WATER PUMPING SOLUTIONS

CHANGE OVER SWITCH

A change-over switch is a dual input single output device, which is used to change the input power source to the controller. It is generally used with controllers/drives which have options to run from solar as well as from grid. There are three operative positions in change-over switch corresponding to S1, S2, (Up and Down) & N (Middle). In case of S1 and S2 positions the corresponding sources are connected to output whereas and in N position none of the sources are connected to output. Conventionally the name of the sources is marked in S1 and S2 position for convenience of the user. These change-over switches are provided in a dust and rainproof boxes.

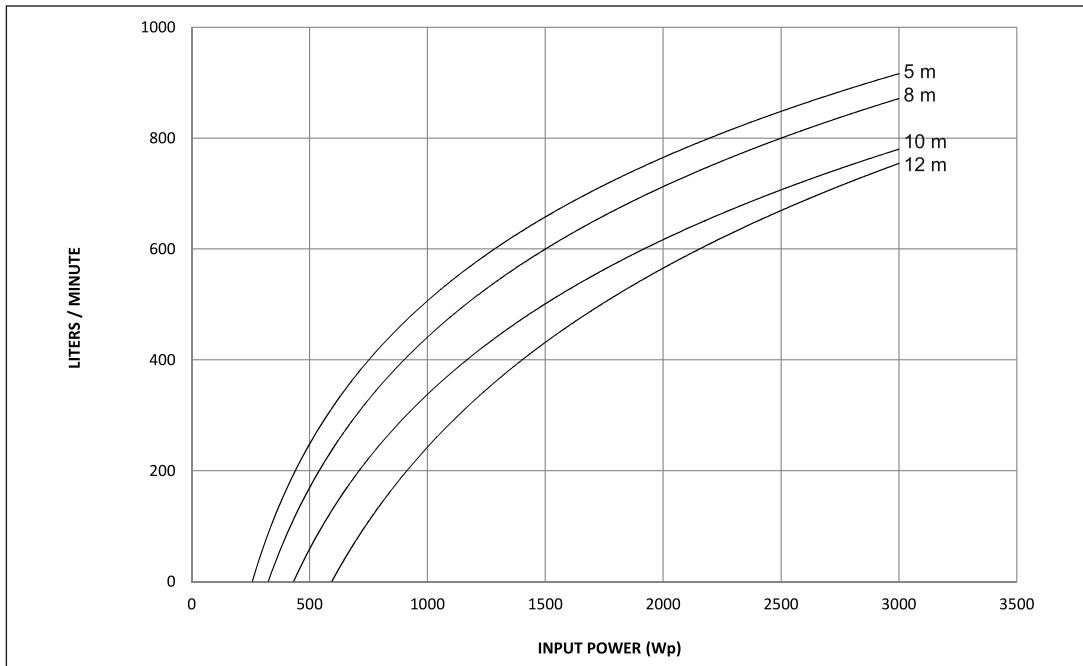
Note: It should be noted that while changing the power source through changeover the N position should be used until the display of the controller turns off. This intermediate use of N position avoids inrush currents through the changeover switch & improves its life.



INTRODUCTION OF SOLAR POWERED WATER PUMPING SOLUTIONS

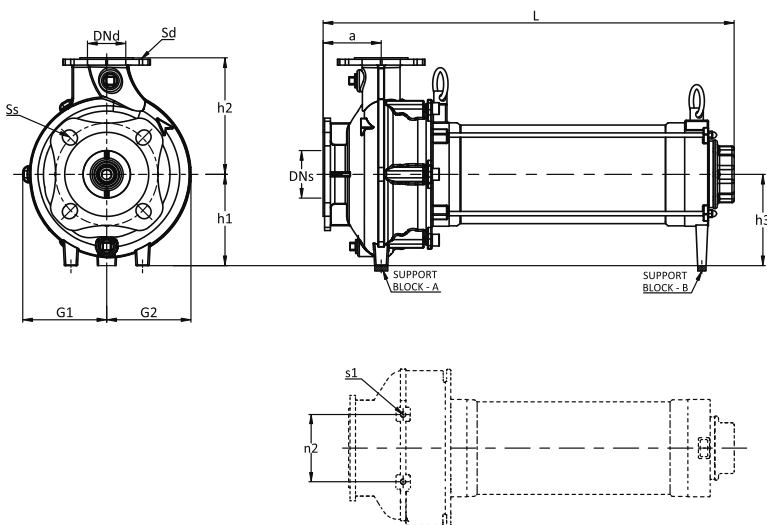
SOLAR 65 DCSOP 3000

PUMPSET CODE : 9500002027
 DISCHARGE (LPD) : 394500
 DISCHARGE (LPW) : 131.5
 DUTY HEAD : 10 METER



HEAD (m)	INPUT POWER (Wp)						
	3000	2700	1800	600	450	300	250
	FLOW IN LPM						
12	745	705	530	0			
10	765	750	575	150	0		
8	870	830	680	250	80	0	
5	900	865	770	330	150	75	0

DIMENSIONAL -

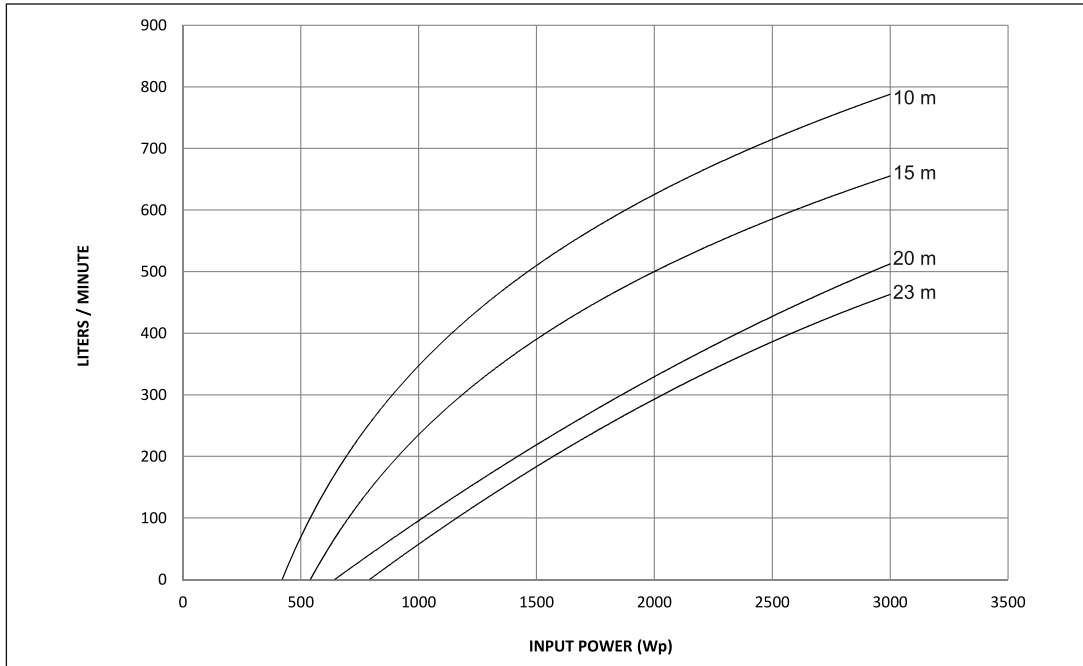


Recommended suction and delivery pipe size	
Suction flange size	Delivery flange size
75 mm	75 mm

INTRODUCTION OF SOLAR POWERED WATER PUMPING SOLUTIONS

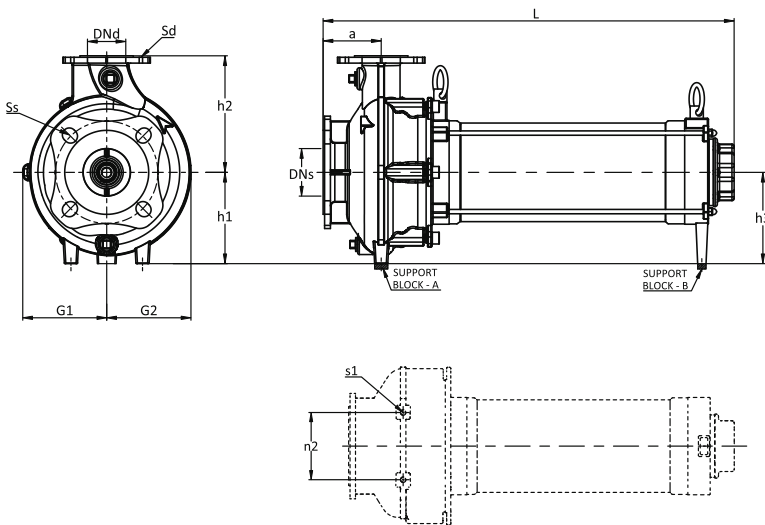
SOLAR 32 DCSOP 3000

PUMPSET CODE : 9500002028
 DISCHARGE (LPD) : 195000
 DISCHARGE (LPW) : 65
 DUTY HEAD : 20 METER



HEAD (m)	INPUT POWER (Wp)						
	3000	2700	1800	800	700	550	400
	FLOW IN LPM						
23	475	400	260	0			
20	515	460	285	60	0		
15	665	610	450	150	110	0	
10	785	750	590	250	200	90	0

DIMENSIONAL -

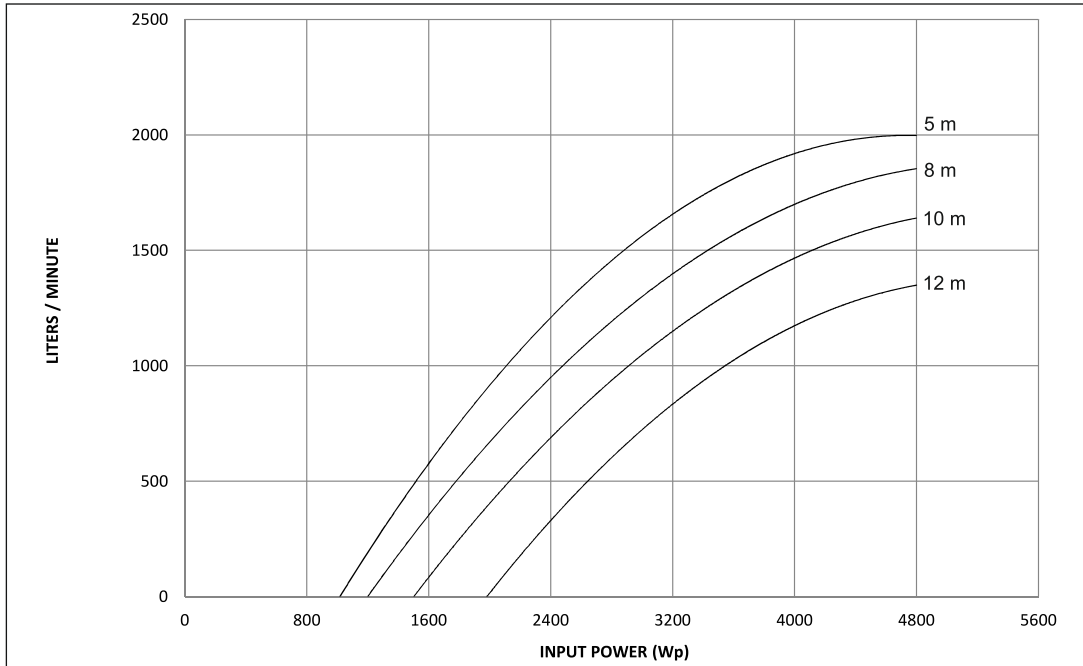


Recommended suction and delivery pipe size	
Suction flange size	Delivery flange size
65 mm	65 mm

INTRODUCTION OF SOLAR POWERED WATER PUMPING SOLUTIONS

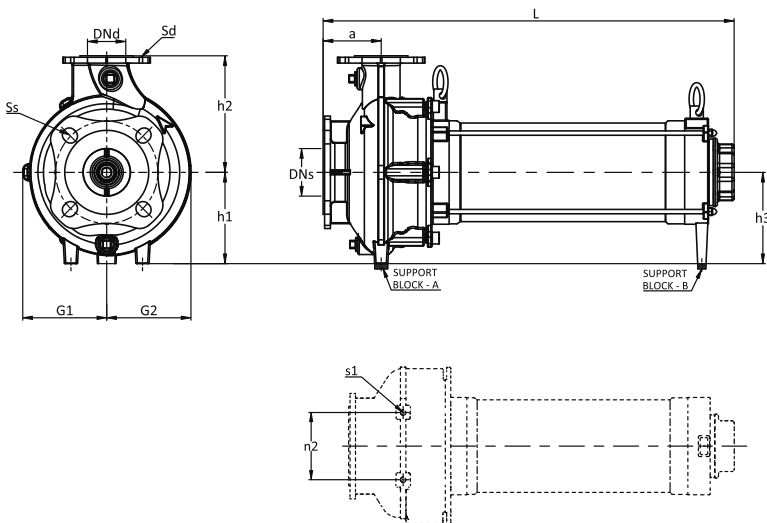
SOLAR 105 DCSOP 4800

PUMPSET CODE : 9500002012
 DISCHARGE (LPD) : 633600
 DISCHARGE (LPW) : 132
 DUTY HEAD : 10 METER



HEAD (m)	INPUT POWER (Wp)						
	4800	4000	3000	2000	1500	1200	1000
	FLOW IN LPM						
12	1370	1120	770	0			
10	1640	1465	1050	400	0		
8	1860	1690	1290	700	250	0	
5	2000	1900	1600	900	450	200	0

DIMENSIONAL -

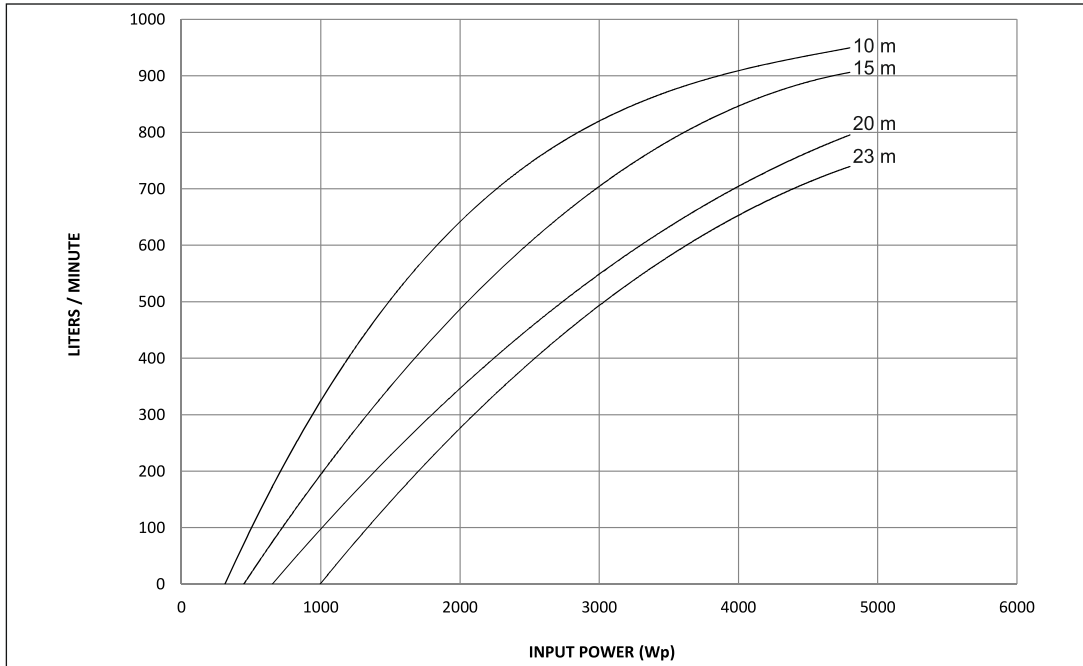


Recommended suction and delivery pipe size	
Suction flange size	Delivery flange size
100 mm	100 mm

INTRODUCTION OF SOLAR POWERED WATER PUMPING SOLUTIONS

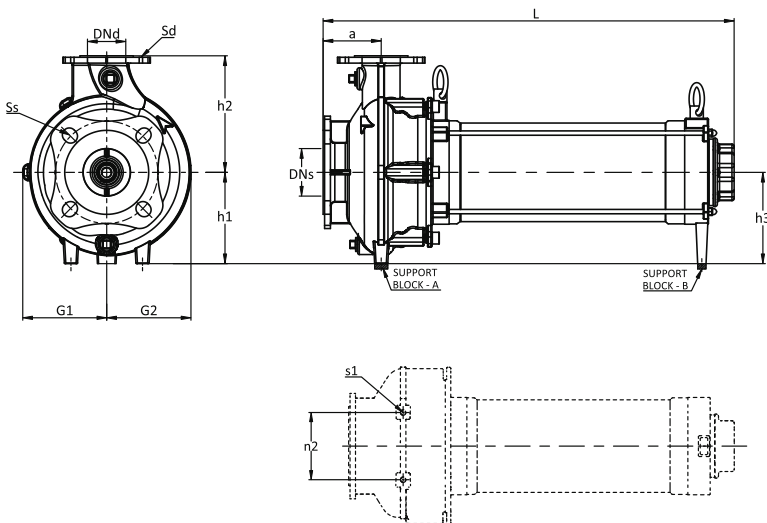
SOLAR 53 DCSOP 4800

PUMPSET CODE : 9500002013
 DISCHARGE (LPD) : 316800
 DISCHARGE (LPW) : 66
 DUTY HEAD : 20 METER



HEAD (m)	INPUT POWER (Wp)						
	4800	3000	2000	1000	750	500	300
	FLOW IN LPM						
23	740	490	280	0			
20	798	538	350	130	0		
15	910	690	490	220	110	0	
10	950	815	650	330	200	100	0

DIMENSIONAL -

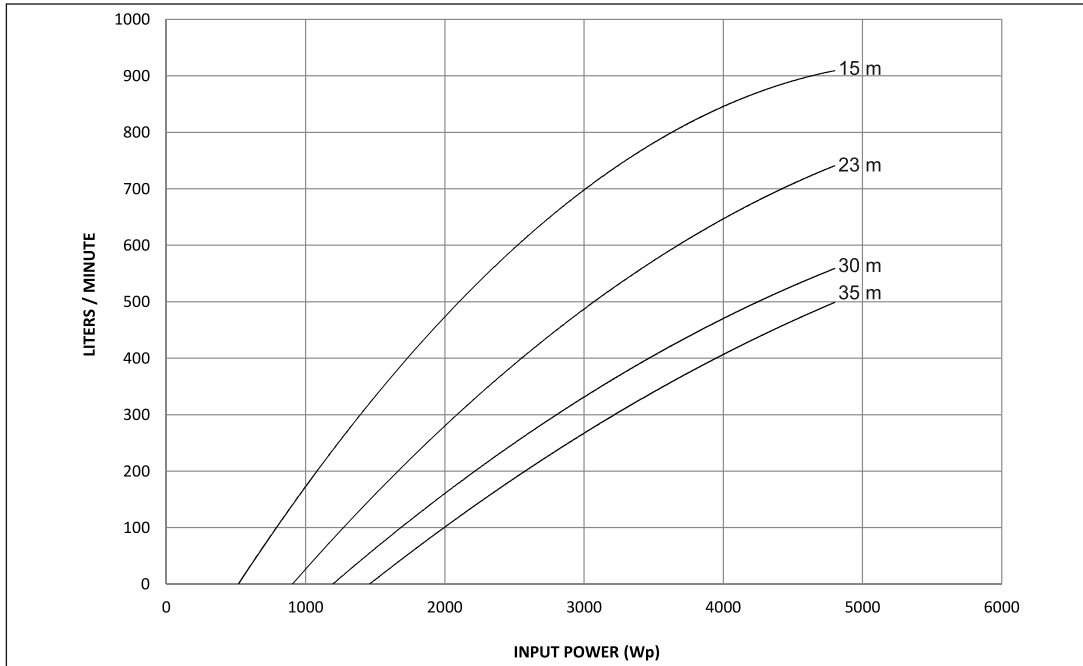


Recommended suction and delivery pipe size	
Suction flange size	Delivery flange size
65 mm	65 mm

INTRODUCTION OF SOLAR POWERED WATER PUMPING SOLUTIONS

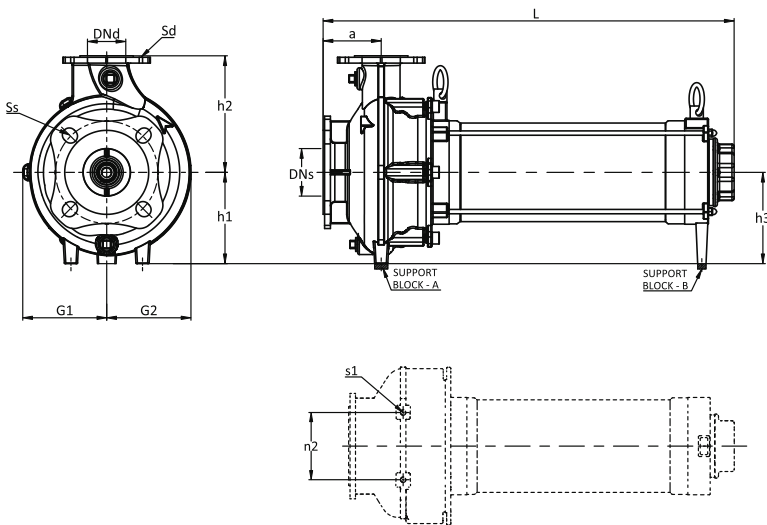
SOLAR 32 DCSOP 4800

PUMPSET CODE : 9500002014
 DISCHARGE (LPD) : 196800
 DISCHARGE (LPW) : 41
 DUTY HEAD : 30 METER



HEAD (m)	INPUT POWER (Wp)						
	4800	3000	2000	1500	1250	900	500
	FLOW IN LPM						
35	500	260	115	0			
30	560	325	165	75	0		
23	740	490	280	150	100	0	
15	910	690	490	330	250	130	0

DIMENSIONAL -

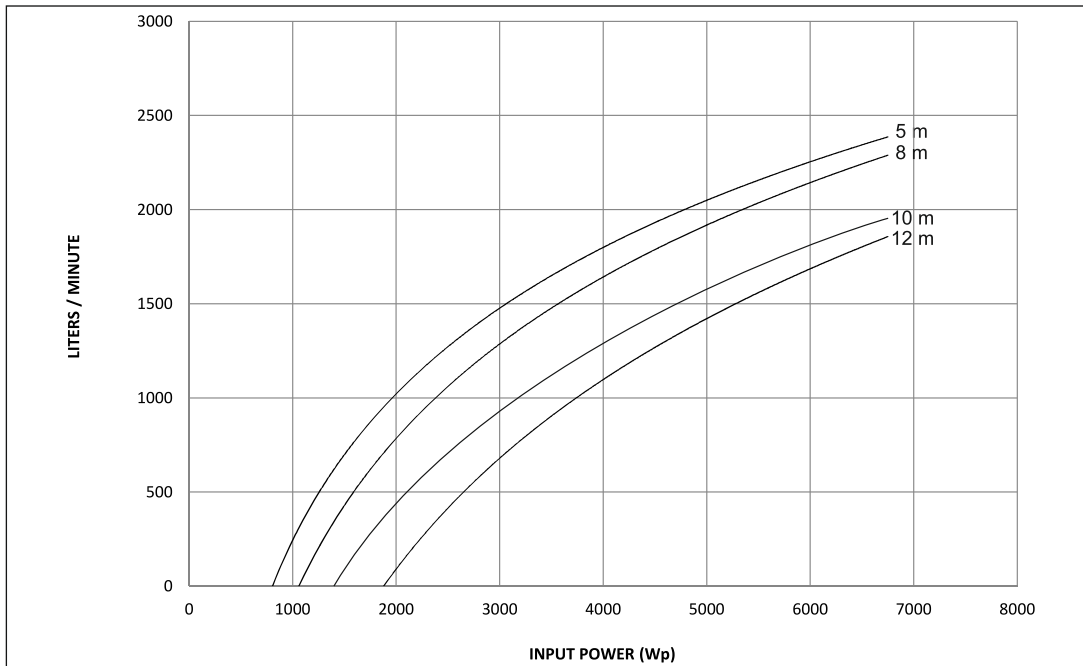


Recommended suction and delivery pipe size	
Suction flange size	Delivery flange size
65 mm	65 mm

INTRODUCTION OF SOLAR POWERED WATER PUMPING SOLUTIONS

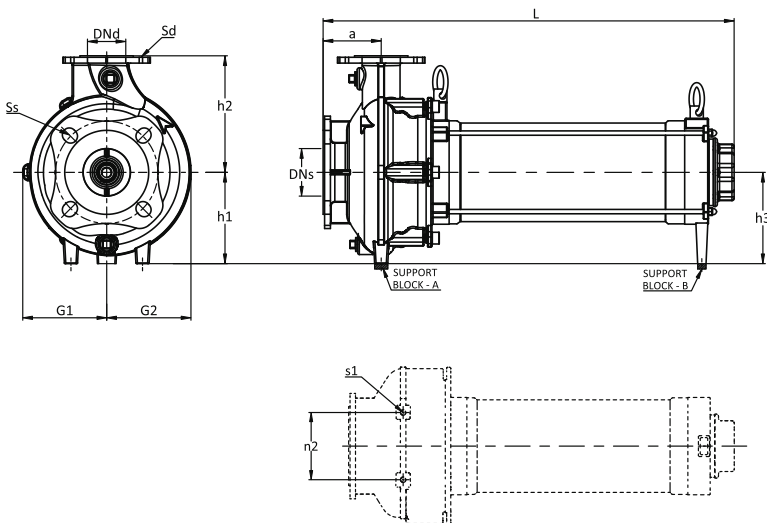
SOLAR 151 DCSOP 6750

PUMPSET CODE : 9500002015
 DISCHARGE (LPD) : 911250
 DISCHARGE (LPW) : 135
 DUTY HEAD : 10 METER



HEAD (m)	INPUT POWER (Wp)						
	6750	5000	4000	1900	1400	1000	800
	FLOW IN LPM						
12	1830	1430	1130	0			
10	1960	1700	1300	400	0		
8	2250	1950	1690	700	250	0	
5	2300	2055	1900	1000	600	200	0

DIMENSIONAL -

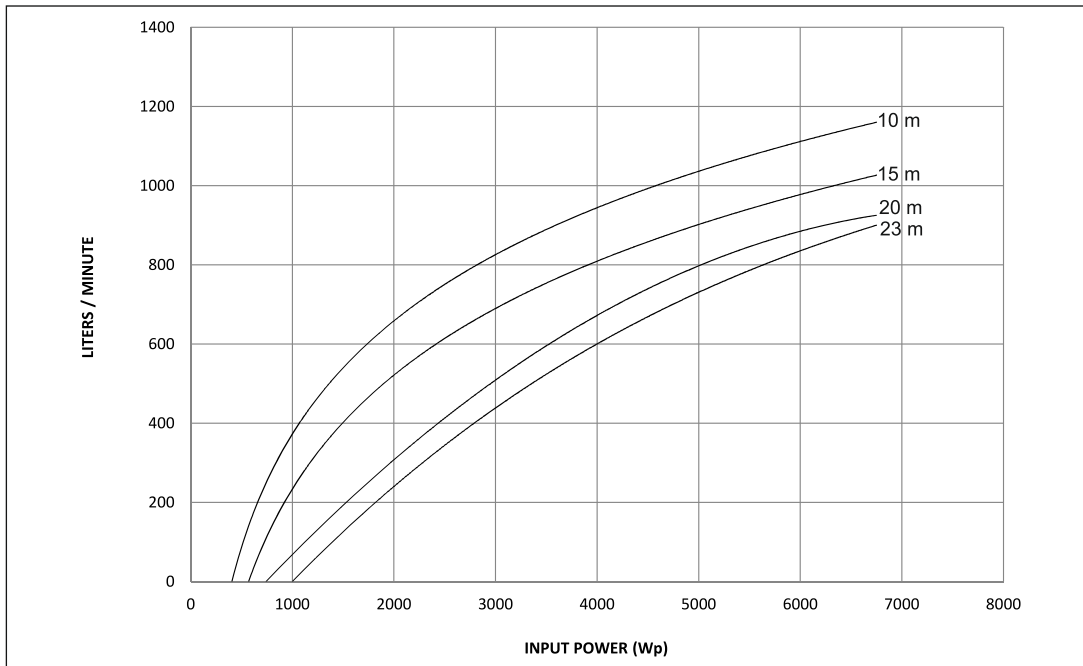


Recommended suction and delivery pipe size	
Suction flange size	Delivery flange size
100 mm	100 mm

INTRODUCTION OF SOLAR POWERED WATER PUMPING SOLUTIONS

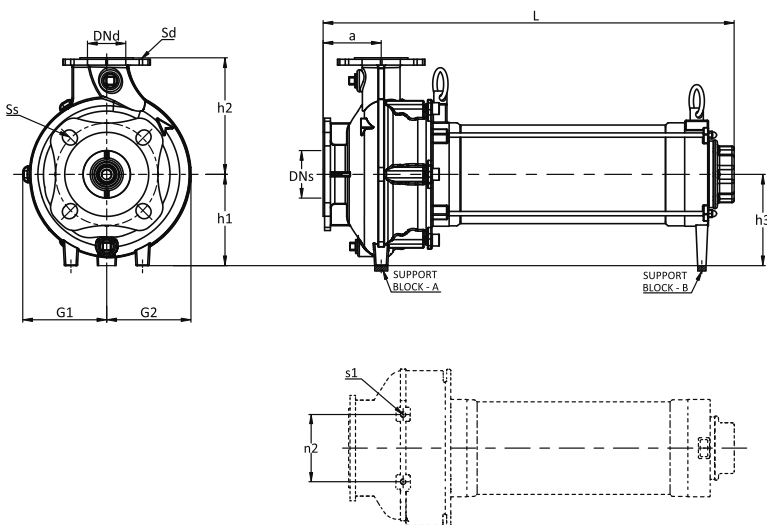
SOLAR 74 DCSOP 6750

PUMPSET CODE : 9500002016
 DISCHARGE (LPD) : 442125
 DISCHARGE (LPW) : 65.5
 DUTY HEAD : 20 METER



HEAD (m)	INPUT POWER (Wp)						
	6750	4000	2000	1000	750	500	350
	FLOW IN LPM						
23	900	600	240	0			
20	930	650	345	50	0		
15	1080	780	480	210	100	0	
10	1185	950	650	340	200	90	0

DIMENSIONAL -

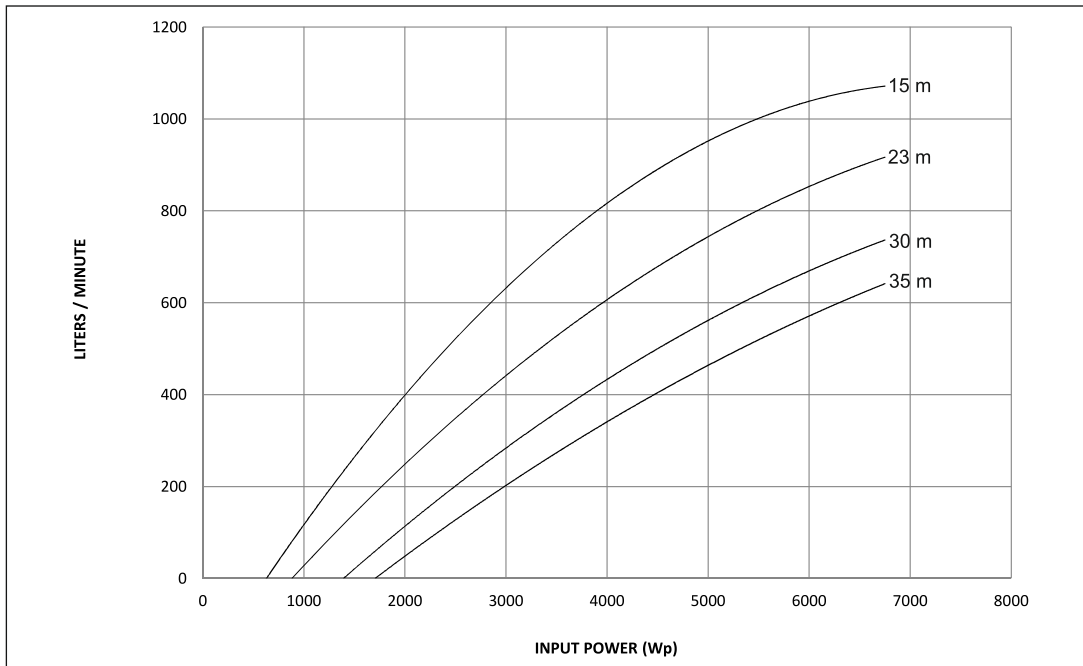


Recommended suction and delivery pipe size	
Suction flange size	Delivery flange size
75 mm	75 mm

INTRODUCTION OF SOLAR POWERED WATER PUMPING SOLUTIONS

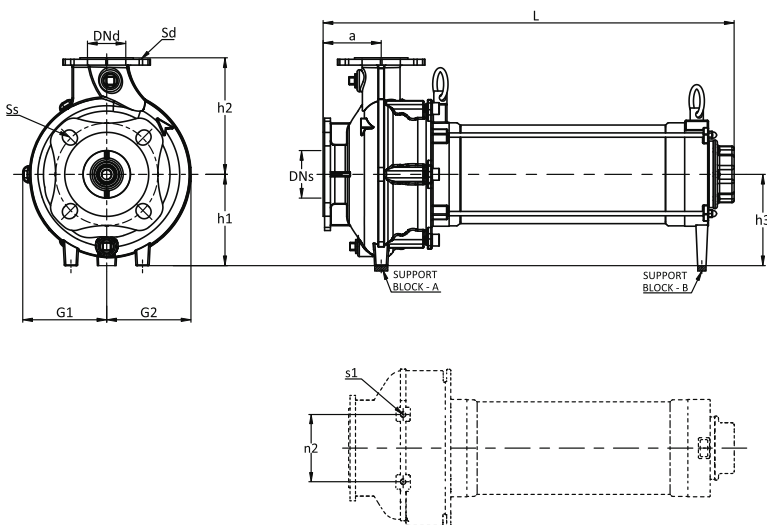
SOLAR 49 DCSOP 6750

PUMPSET CODE : 9500002025
 DISCHARGE (LPD) : 297000
 DISCHARGE (LPW) : 44
 DUTY HEAD : 30 METER



HEAD (m)	INPUT POWER (Wp)						
	6750	5000	4000	1700	1500	950	600
	FLOW IN LPM						
35	640	470	335	0			
30	740	550	440	80	0		
23	920	740	600	200	150	0	
15	1070	950	825	320	250	100	0

DIMENSIONAL -

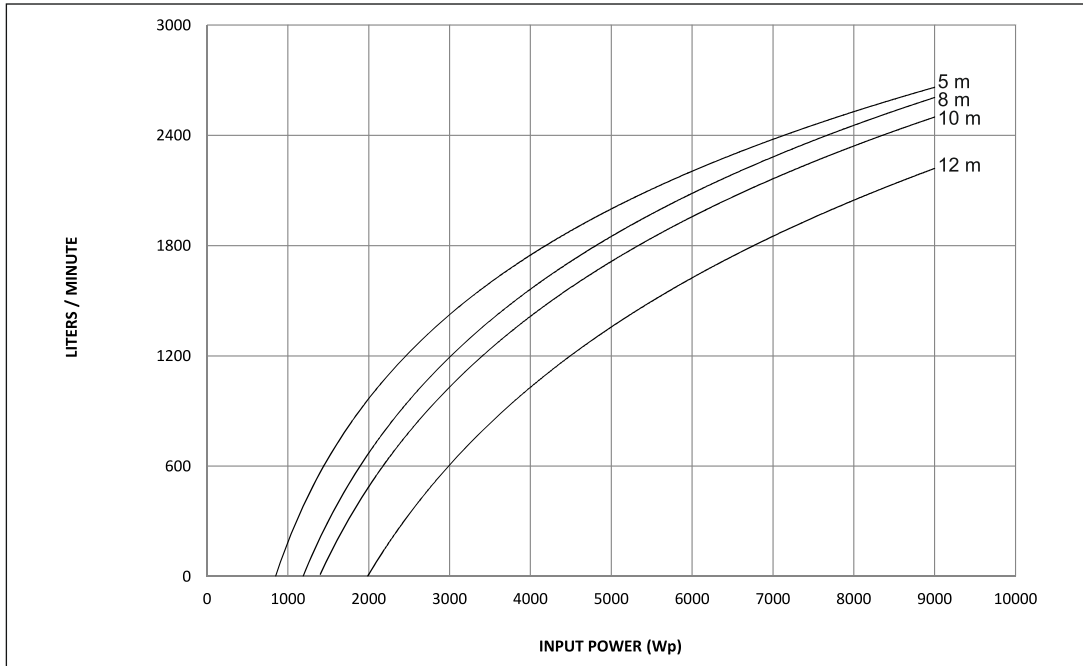


Recommended suction and delivery pipe size	
Suction flange size	Delivery flange size
65 mm	65 mm

INTRODUCTION OF SOLAR POWERED WATER PUMPING SOLUTIONS

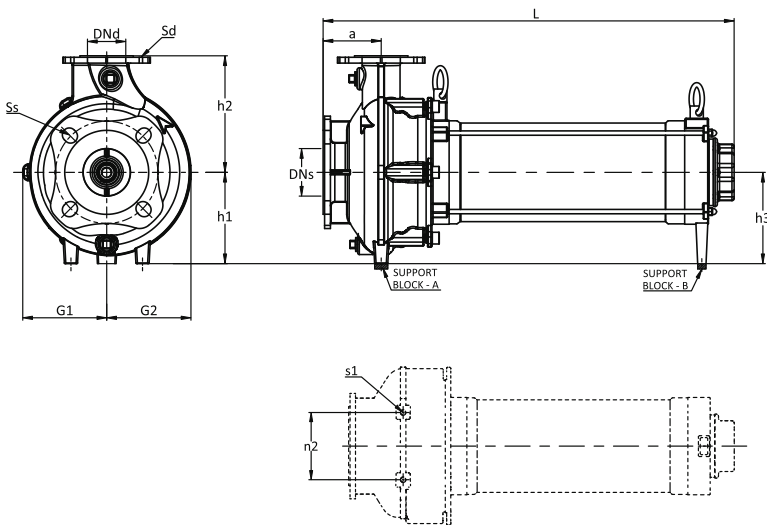
SOLAR 217 DCSOP 9000

PUMPSET CODE : 9500002022
 DISCHARGE (LPD) : 1305000
 DISCHARGE (LPW) : 145
 DUTY HEAD : 10 METER



HEAD (m)	INPUT POWER (Wp)						
	9000	7500	5500	2000	1400	1250	850
	FLOW IN LPM						
12	2230	1900	1550	0			
10	2500	2245	1850	500	0		
8	2550	2400	2000	700	250	0	
5	2600	2450	2150	1100	600	300	0

DIMENSIONAL -

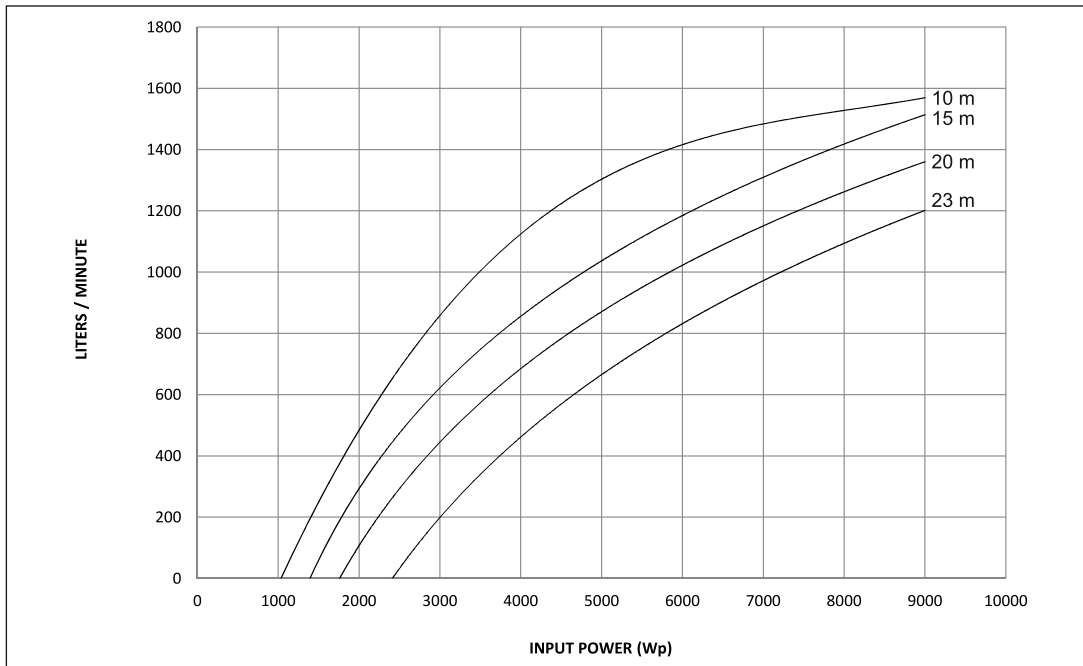


Recommended suction and delivery pipe size	
Suction flange size	Delivery flange size
100 mm	100 mm

INTRODUCTION OF SOLAR POWERED WATER PUMPING SOLUTIONS

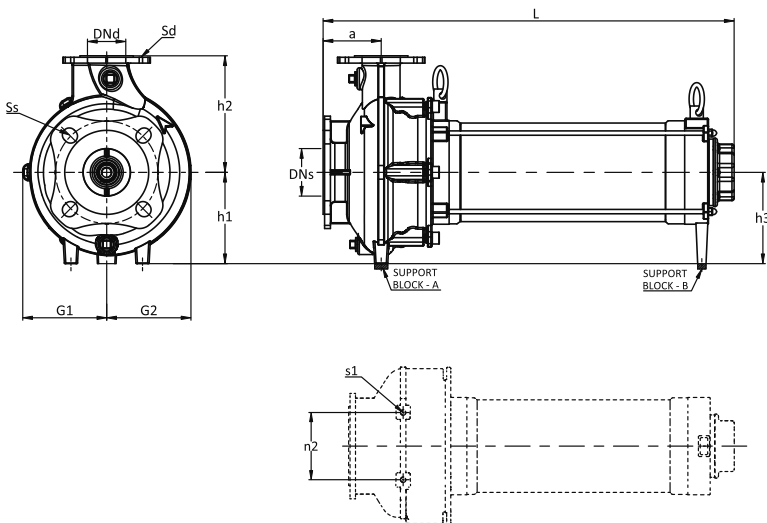
SOLAR 98 DCSOP 9000

PUMPSET CODE : 9500002023
 DISCHARGE (LPD) : 585000
 DISCHARGE (LPW) : 65
 DUTY HEAD : 20 METER



HEAD (m)	INPUT POWER (Wp)						
	9000	5500	3000	2500	1700	1350	1000
	FLOW IN LPM						
23	1200	745	240	0			
20	1365	955	450	250	0		
15	1530	1100	630	450	150	0	
10	1570	1360	900	650	350	150	0

DIMENSIONAL -

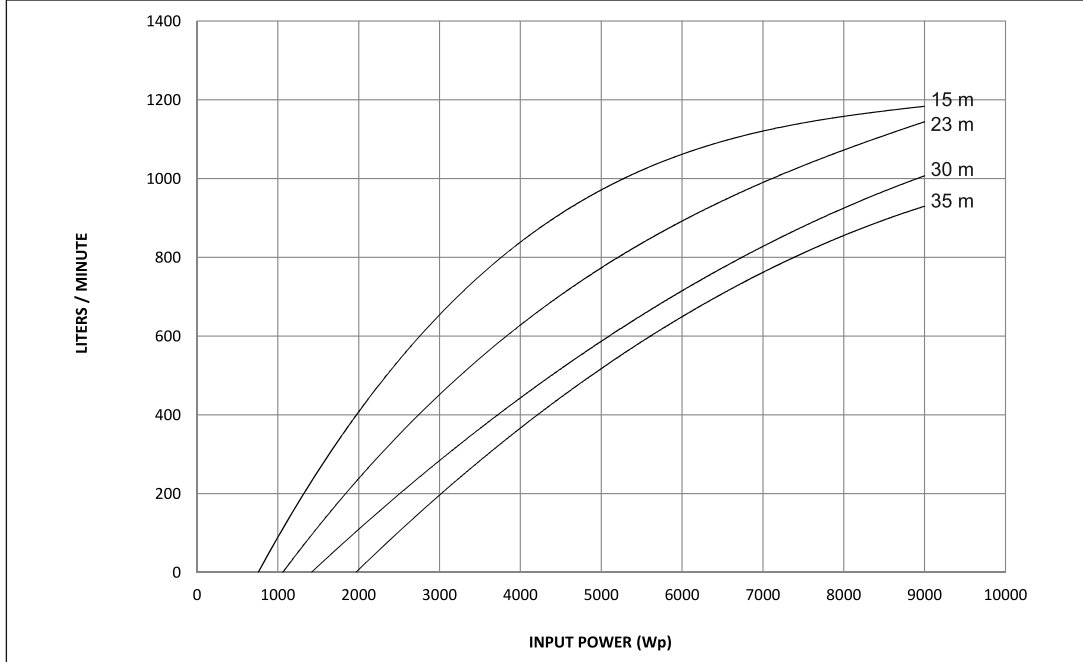


Recommended suction and delivery pipe size	
Suction flange size	Delivery flange size
75 mm	75 mm

INTRODUCTION OF SOLAR POWERED WATER PUMPING SOLUTIONS

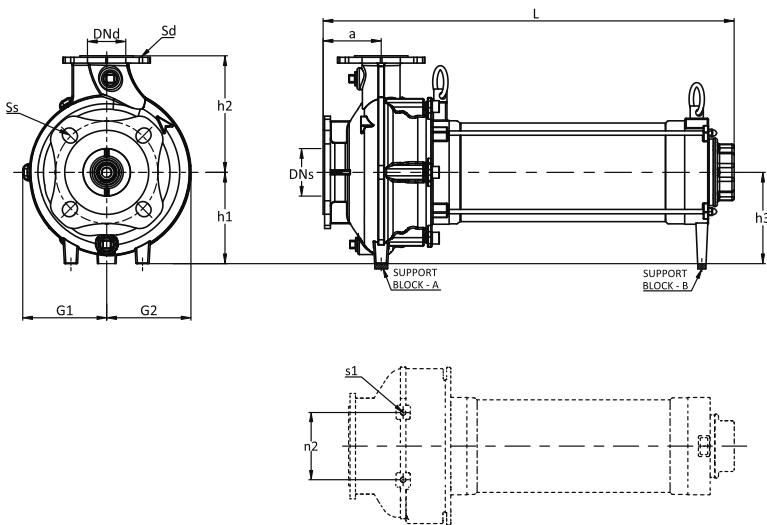
SOLAR 70 DCSOP 9000

PUMPSET CODE : 9500002026
 DISCHARGE (LPD) : 418500
 DISCHARGE (LPW) : 46.5
 DUTY HEAD : 30 METER



HEAD (m)	INPUT POWER (Wp)						
	9000	5500	3000	2000	1500	1000	700
	FLOW IN LPM						
35	931	580	208	0			
30	1010	640	300	120	0		
23	1145	830	475	220	100	0	
15	1185	1010	698	370	250	80	0

DIMENSIONAL -

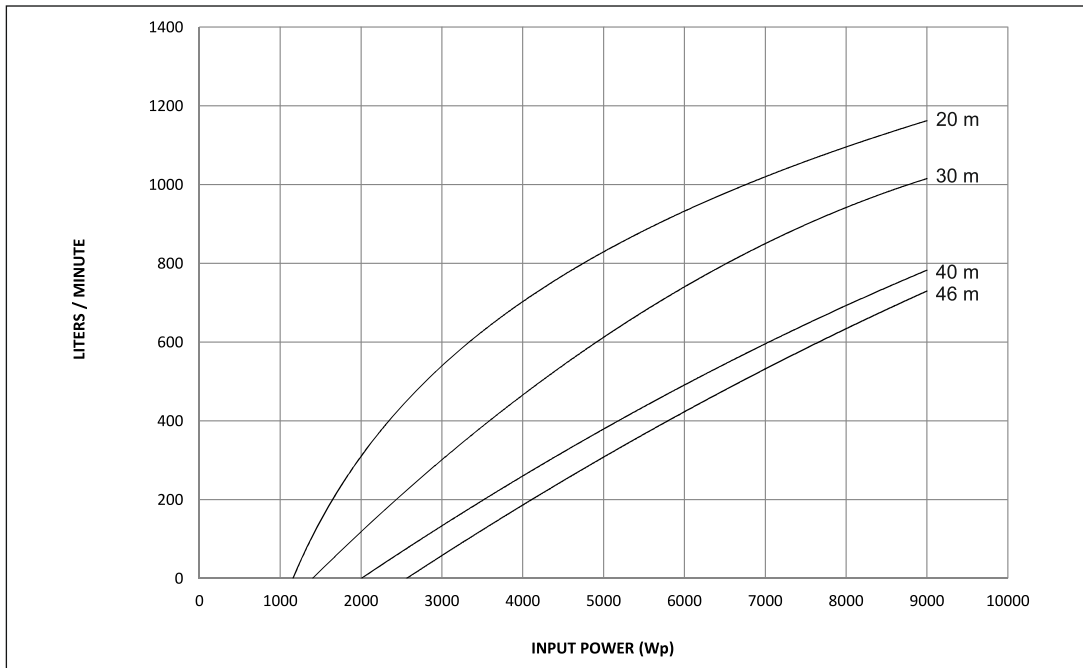


Recommended suction and delivery pipe size	
Suction flange size	Delivery flange size
65 mm	65 mm

INTRODUCTION OF SOLAR POWERED WATER PUMPING SOLUTIONS

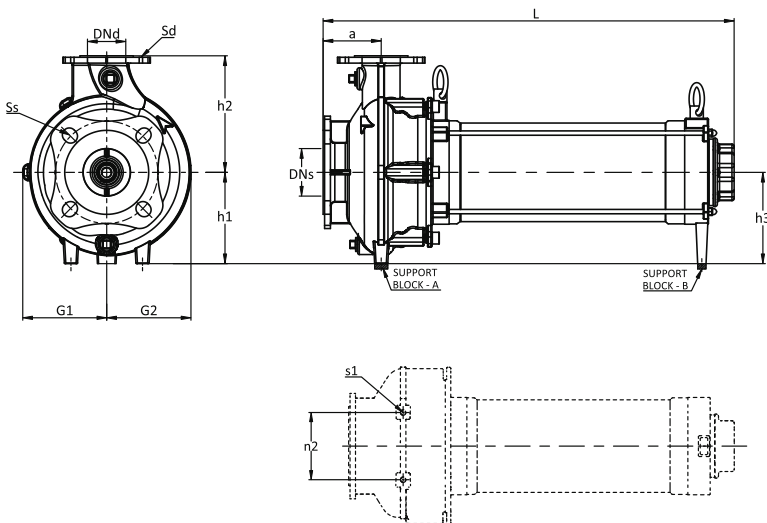
SOLAR 48 DCSOP 9000

PUMPSET CODE : 9500002024
 DISCHARGE (LPD) : 288000
 DISCHARGE (LPW) : 32
 DUTY HEAD : 40 METER



HEAD (m)	INPUT POWER (Wp)						
	9000	5500	3000	2600	2200	1400	1050
	FLOW IN LPM						
46	730	365	64	0			
40	785	425	150	100	0		
30	1015	680	287	250	150	0	
20	1180	905	546	400	330	100	0

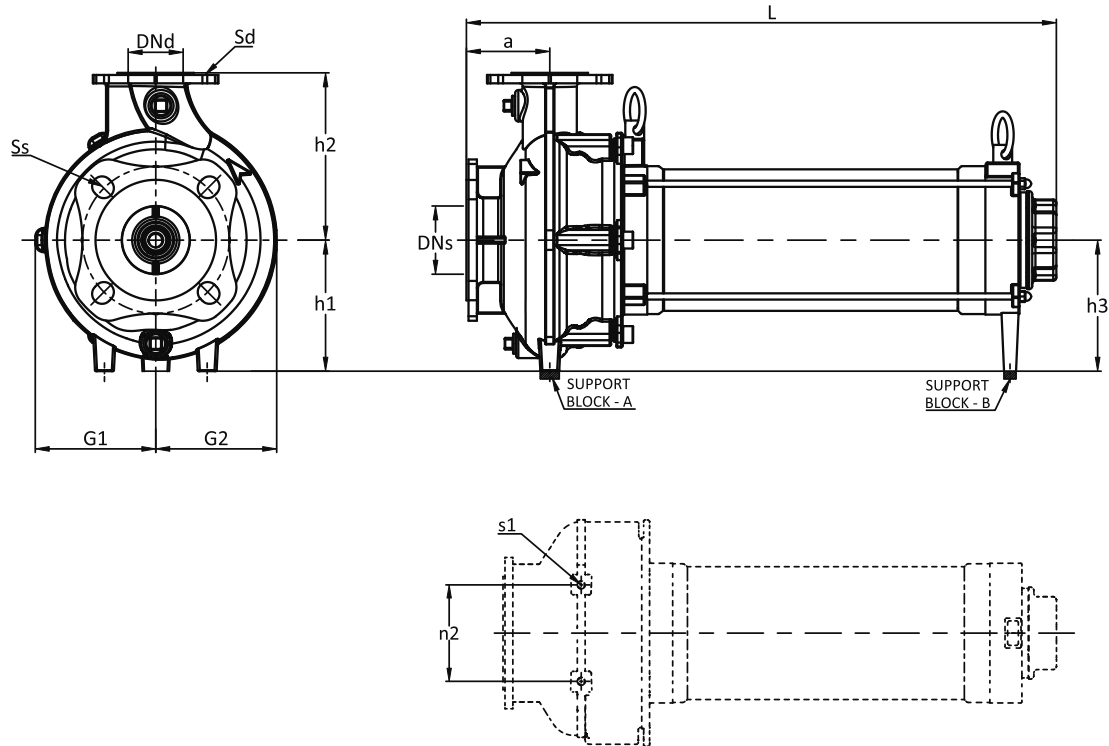
DIMENSIONAL -



Recommended suction and delivery pipe size	
Suction flange size	Delivery flange size
65 mm	65 mm

INTRODUCTION OF SOLAR POWERED WATER PUMPING SOLUTIONS

SOLAR DC OPENWELL GA DRAWING

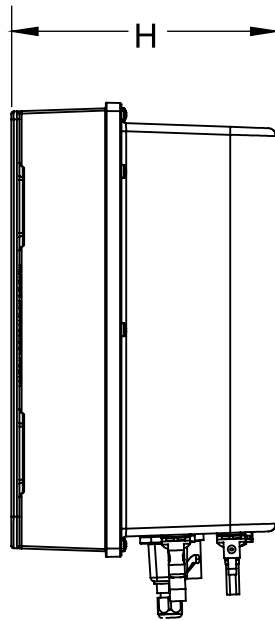


MATERIAL CODE	P ₂ WATT	RECOMM- ENDED SUC. X DEL. PIPE SIZE	PN	DNs	DNd	a	h2	h1	Ss	Sd	G1	G2	n2	s1	h3	L	NET WT. (APX.)	SUPPORT BLOCK (IF REQ.) MAT. CODE	
		[mm]																[bar]	[mm]
9500002027	3000	75 X 75	16	65	40	80	160	125	4x Slot (19x22)	4x Slot (19x25)	113	115	98	2X M8	132	567	37.5	1000012793	N/A
9500002028	3000	65 X 65	16	65	40	80	160	125	4x Slot (19x22)	4x Slot (19x25)	113	115	98	2X M8	132	567	37.5	1000012793	N/A
9500002012	4800	100 X 100	16	92	65	100	180	160	8x Slot (19x21)	8x Slot (19x23)	115	145	98	2X M8	132	585	42	N/A	1000015264
9500002013	4800	65 X 65	16	65	40	80	160	125	4x Slot (19x22)	4x Slot (19x25)	113	115	98	2X M8	132	567	37.5	1000012793	N/A
9500002014	4800	65 X 65	16	65	40	80	160	125	4x Slot (19x22)	4x Slot (19x25)	113	115	98	2X M8	132	567	37.5	1000012793	N/A
9500002015	6750	100 X 100	16	92	65	100	180	160	8x Slot (19x21)	8x Slot (19x23)	115	145	98	2X M8	132	585	42	N/A	1000015264
9500002016	6750	75 X 75	16	65	40	80	160	125	4x Slot (19x22)	4x Slot (19x25)	113	115	98	2X M8	132	567	37.5	1000012793	N/A
9500002025	6750	65 X 65	16	65	40	80	160	125	4x Slot (19x22)	4x Slot (19x25)	113	115	98	2X M8	132	567	37.5	1000012793	N/A
9500002022	9000	100 X 100	16	92	65	100	180	160	8x Slot (19x21)	8x Slot (19x23)	115	145	98	2X M8	132	639	46.5	N/A	1000015264
9500002023	9000	75 X 75	16	70	50	100	180	153	4x Slot (19x22)	4x Slot (19x21)	123	148	98	2X M8	132	638	44.5	1000012793	1000015264
9500002026	9000	65 X 65	16	65	40	80	160	125	4x Slot (19x22)	4x Slot (19x25)	113	115	98	2X M8	132	621	42	1000012793	N/A
9500002024	9000	65 X 65	16	65	40	80	160	125	4x Slot (19x22)	4x Slot (19x25)	113	115	98	2X M8	132	621	42	1000012793	N/A

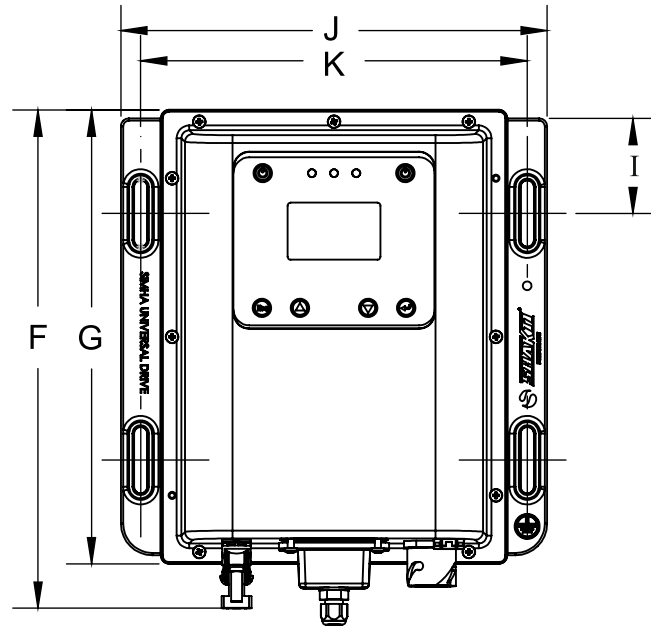
Note: Support blocks & bolt are needed for horizontal alignment of pump housing & motor (if required), All Dimensions are in MM. unless otherwise specified

INTRODUCTION OF SOLAR POWERED WATER PUMPING SOLUTIONS

SOLAR CONTROLLER GA DRAWING



SIDE VIEW



TOP VIEW

CODE	DESCRIPTION	F	G	H	I	J	K
9600000096	SIMHA UNIVERSAL DRIVE 3Ø 12 A	315	286	166	60	270	244
9600000094	SIMHA UNIVERSAL DRIVE 3Ø 20A	315	286	166	60	270	244
9600000088	SIMHA UNIVERSAL DRIVE 3Ø 14A	315	286	270	166	270	244

Note: All Dimensions are in MM. unless otherwise specified



India : Toll Free No. 1800 103 5555

Other Countries : +91-7292 410500

SHAKTI PUMPS (INDIA) LIMITED

Sector - 3, Pithampur - 454774, Dist. - Dhar, (M.P.) - INDIA
Fax: +91-7292 410645, E-mail: info@shaktipumps.com, sales@shaktipumps.com,
Visit us at : www.shaktipumps.com

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