

BADU Top 12 Solar / Battery

Solar operated, surface centrifugal pump with a flow rate up to 15 m³/h

Field of Application

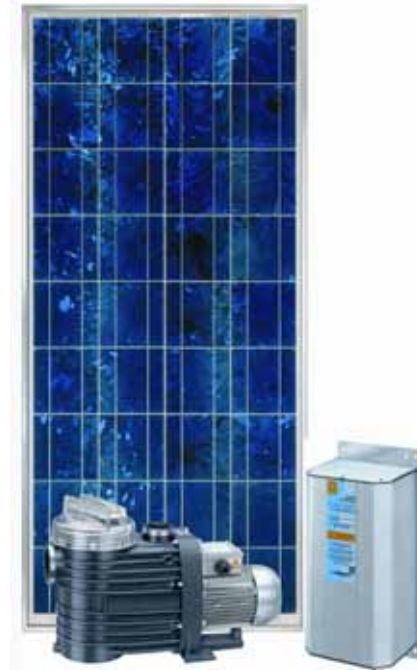
Swimming pool water circulation through a filter system and thermal collectors

Pond management

Irrigation

Aquariums

etc.



Design

Pump system	PS 600 BADU Top 12
article no.	2921
controller	PS 600
motor	ECDRIVE 600 BADU Top
pump end (PE)	BADU Top 12 (manufacturer Speck Pumpen)
source of energy (not contained in the delivery)	Solar generator (340 – 900 WP) / battery / DC source

Pump BADU Top 12 (manufacturer Speck Pumpen)

Monoblock-type pump with integrated strainer tank

The bellow mechanical seal is mounted on a plastic shaft protected sleeve

Motor/pump shaft has no contact with the fluid

Total electrical separation

Strainer capacity approx. 3 l

Strainer basket mesh size approx. 3,2 x 2,6 mm

Material used

Pump casing, strainer basket

Flange, gland housing, diffuser

Impeller

Lid

Mechanical seal

Bolts

PP

PP TV 40

PA 66 GF 30 / PC

PC, transparent

carbon / ceramic / NBR

steel, galvanized

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Motor ETADRIVE BADU Top

Brushless, maintenance-free DC motor

Controller PS 600

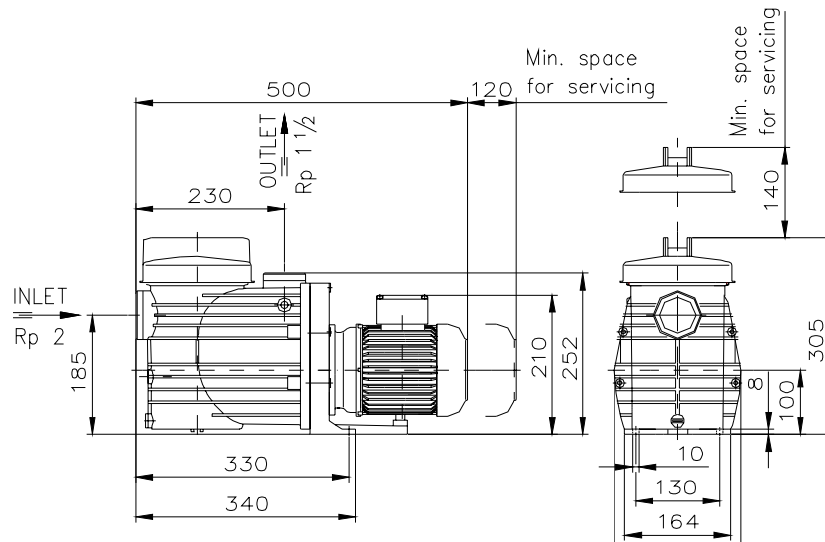
- controlling of the pump system and monitoring of the operating states
- mounted at surface (no submerged electronic parts)
- two control inputs for well probe (dry running protection), float or pressure switches, remote control etc.
- automatic reset 20 minutes after well probe turns pump off
- protected against reverse polarity, overload and high temperature
- speed control, max. pump speed adjustable to reduce flow rate to approx. 30%
- solar operation: integrated MPPT (Maximum Power Point Tracking)
- battery operation: low voltage disconnect and restart after battery has recovered
- max. efficiency 92% (motor + controller)

Technical data

PS 600 BADU Top 12	Solar operation	Battery operation
flow rate, max.	15 m ³ /h / 4.000 UW gal/h	13 m ³ /h / 3.400 US gal/h
lift, max.	14 m / 46 ft	13 m / 43 ft
ambient temperature	- 30°C to +45°C	
Controller	PS 600	
input voltage	solar generator: nominal voltage 48 V to 72 V DC open circuit voltage max. 150 V DC	battery, DC source: nominal voltage 48 V DC
type of enclosure	IP 54	
dimensions (net / packing)	400 x 180 x 150 mm / 450 x 250 x 250 mm (0,028 m ³)	
weight (net / packing)	4,5 kg / 5,3 kg	
motor	ECDRIVE 600 BADU Top	
power input, max.	600 W	
type of enclosure	IP X4	
Class of insulation	F	
Pump end	BADU Top 12 (manufacturer Speck Pumpen)	
suction / positive inlet lift, max.	3 m	
casing pressure, max.	2,5 bar	
water temperature, max.	max. 60°C	
Motor + Pump end	ECDRIVE 600 BADU Top + BADU Top 12	
dimensions (net / packing)	see dimensioned drawing / 520 x 220 x 350 mm (0,0400 m ³)	
weight, pump + motor (net / gross)	8,7 kg / 9,7 kg	

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Dimensioned drawing

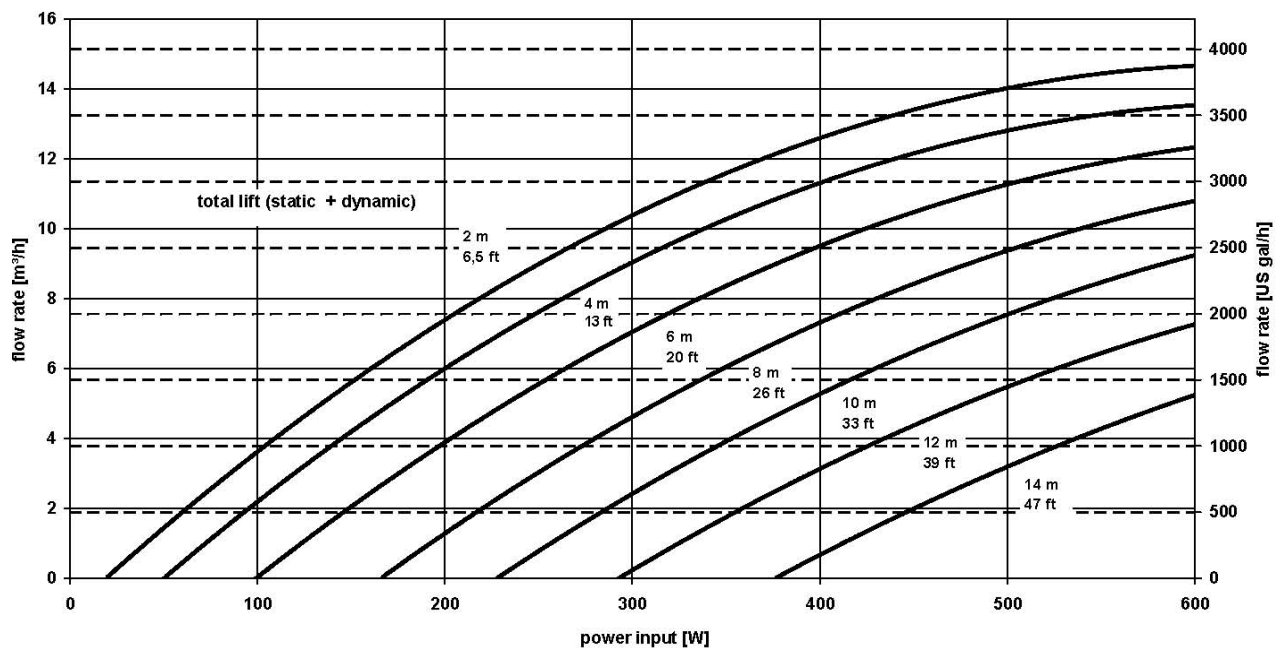


Characteristics

BADU Top 12 Solar

Solar generator: Nominal voltage 48 to 72 V DC, open circuit voltage max. 150 V DC

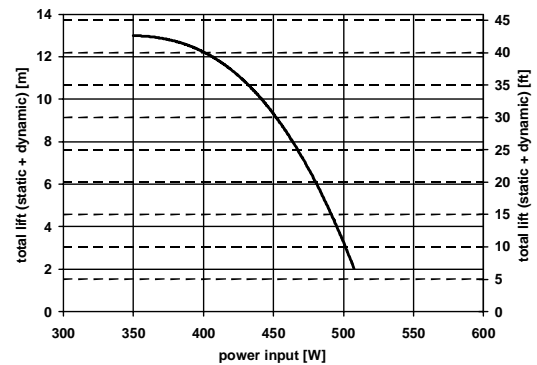
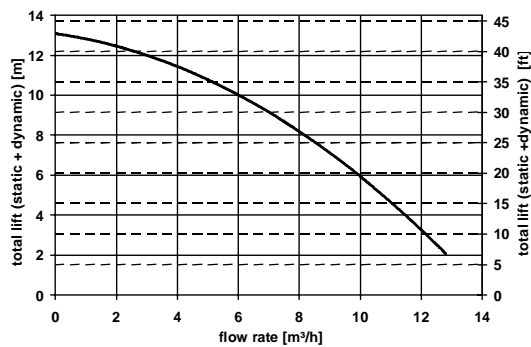
System performance



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Battery operation

Battery, DC power supply: nominal voltage 48 V



Pump system calculation

Basic data

- Location
Country and city or degree of longitude and latitude
- Running time
All year or only certain months
Operation even with no or with insufficient insolation
- Total lift
Static lift
Dynamic lift (friction losses in the filter unit pipes etc.)
- Flow rate per day

Selection of the pump system

Solar operation: We can recommend this system for most applications since operation happens directly at the solar generator, thus the flow rate adjusts automatically according to the insolation.
For applications where the total lift depends on the dynamic head loss, you need 1/8 of the power, i.e. insolation for 1/2 of the flow rate.

Battery operation: Operation independent from insolation.

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Solar generator

The size of the solar generator depends on the basic data and can be calculated by means of sizing tables or by programmes, respectively.

Whether the installation is **fix** or **tracked** is an important factor regarding the generator size.

With a **tracked** generator, flow rate increases by up to 50 % compared to a **fixed** one.

Example of pump system calculation

Application:	Swimming pool water circulation through a filter unit
Installation site:	Spain, Ibiza
Operation time:	Mai till September operation only when the sun is shining
Total lift:	Only dynamic pressure drop, approx. 4 – 6 m
Flow rate:	min. 60 m ³ /day (swimming pool content 60 m ³)
Pump system chosen:	solar operation
Solar generator required:	480 Wp (48 V to 72 V rated voltage, max. 150 V open-circuit-voltage), single axle tracked

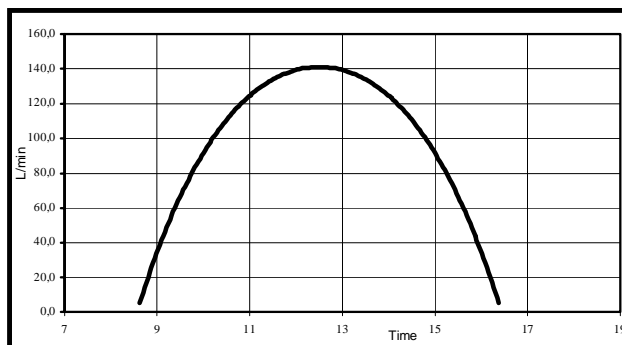
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1. Solar generator, fix installation, total lift (stat. +dyn.) 6 m

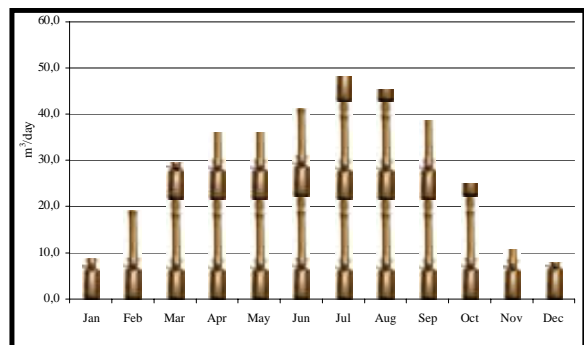
Pump: Badutop 12	Location: Spain, Ibiza tilt 39deg	Perfomace at 1000 W/m ²
Total Lift: 6 [m]	Tilt: 39°	Flow rate 8.185 [L/h]
Array Size: 480 [Wp]	Latitude 39°	136,4 [L/min]
Array type: mono or polycrystallin	Voltage: 48V	Flow rate 38,13 [USG/min]
Tracking: No Tracking	Longitude 1°	Total head 6,1 [m]
Cable: 2,5 [mm ²]	Pipe length: 3 [m]	Cable loss 1,1 [W]
Cable length 3 [m]	Pipe Dia.: 2"	Efficiency 40% System
	Head Loss: 0,1 [m]	Power 345 [W]

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Av.
irradiation kWh/m ² /day	4,2	5,2	6,1	6,6	6,6	7	7,5	7,3	6,8	5,7	4,4	4,1	6,0
m³/day	8,8	19,1	29,6	36,0	36,0	41,2	48,2	45,4	38,6	24,8	10,7	7,8	28,9
US GPD x10 ³	2,32	5,06	7,83	9,50	9,50	10,90	12,73	11,99	10,19	6,56	2,84	2,06	7,6

Average Daily Flow rate for July



Average Daily Flow



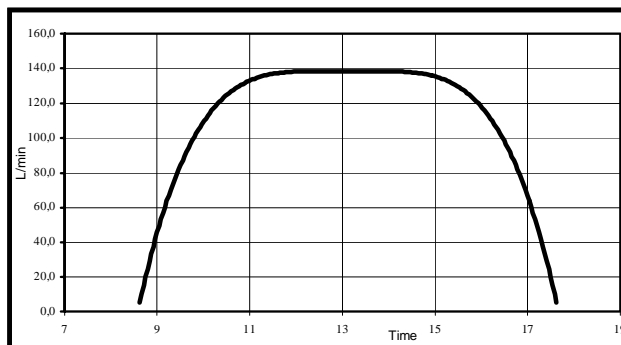
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2. Solar generator, single axis tracked, total lift (stat. +dyn.) 6 m

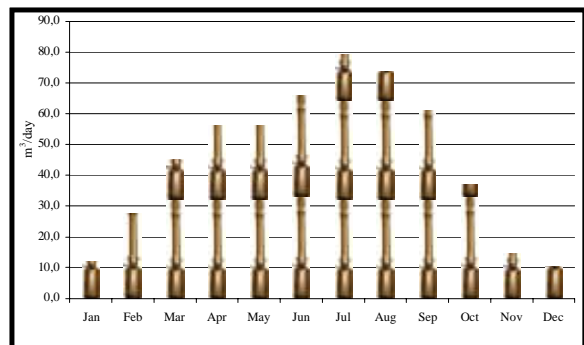
Pump: Badutop 12	Location: Spain, Ibiza tilt 39deg	Perfomace at 1000 W/m ²
Total Lift: 6 [m]	Tilt: 39°	Flow rate 8.185 [L/h]
Array Size: 480 [Wp]	Voltage: 48V	136,4 [L/min]
Array type: mono or polycrystallin	Latitude 39°	Flow rate 38,13 [USG/min]
Tracking: with single axis Tracking	Longitude 1°	Total head 6,1 [m]
Cable: 2,5 [mm ²]	Pipe length: 3 [m]	Cable loss 1,1 [W]
Cable length 3 [m]	Pipe Dia.: 2"	Efficiency 40% System
	Head Loss: 0,1 [m]	Power 345 [W]

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Av.
irradiation kWh/m ² /day	4,2	5,2	6,1	6,6	6,6	7	7,5	7,3	6,8	5,7	4,4	4,1	6,0
m ³ /day	11,9	27,7	45,1	56,3	56,3	66,0	79,1	73,7	61,1	37,0	14,8	10,6	45,0
US GPD x10 ³	3,15	7,31	11,92	14,87	14,87	17,44	20,91	19,48	16,13	9,77	3,91	2,79	11,9

Average Daily Flow rate for July



Average Daily Flow



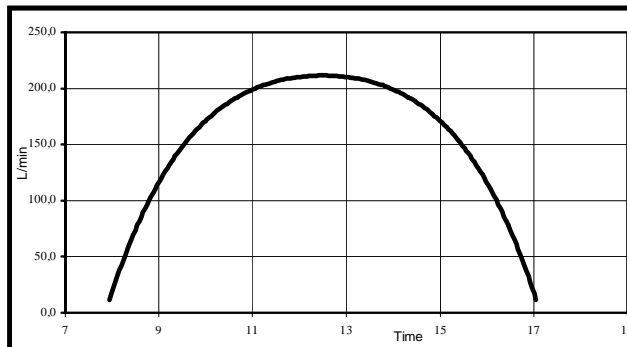
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3. Solar generator, fix installation, total lift (stat. +dyn.) 4 m

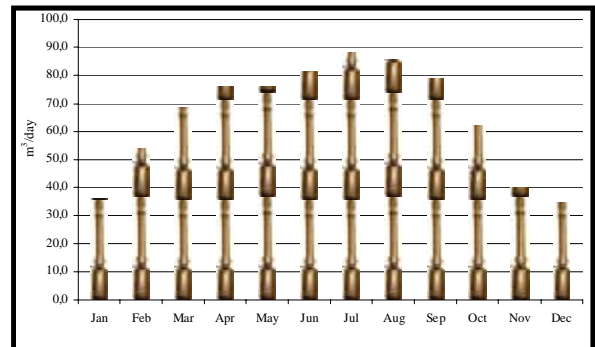
Pump: Badutop 12	Location: Spain, Ibiza tilt 39deg	Performace at 1000 W/m ²
Total Lift: 4 [m]	Tilt: 39°	Flow rate 12.480 [L/h]
Array Size: 480 [Wp]	Voltage: 48V	208,0 [L/min]
Array type: mono or polycrystallin	Latitude 39°	Flow rate 58,13 [USG/min]
Tracking: No Tracking	Longitude 1°	Total head 4,3 [m]
Cable: 2,5 [mm ²]	Pipe length: 3 [m]	Cable loss 1,1 [W]
Cable length 3 [m]	Pipe Dia.: 2"	Efficiency 43% System
	Head Loss: 0,3 [m]	Power 345 [W]

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Av.
irradiation kWh/m ² /day	4,2	5,2	6,1	6,6	6,6	7	7,5	7,3	6,8	5,7	4,4	4,1	6,0
m ³ /day	36,4	54,0	68,4	75,9	75,9	81,6	88,3	85,7	78,8	62,2	40,0	34,6	65,1
US GPD x10 ³	9,62	14,26	18,08	20,05	20,05	21,55	23,33	22,63	20,81	16,43	10,58	9,13	17,2

Average Daily Flow rate for July



Average Daily Flow



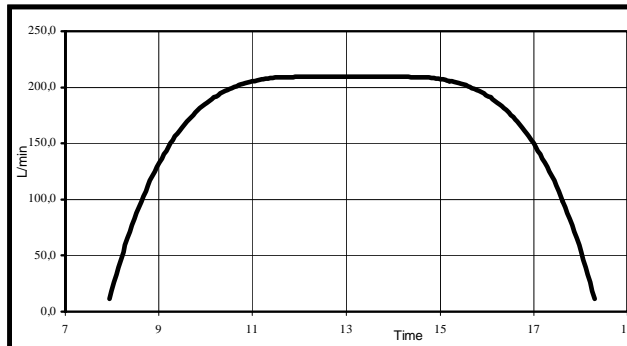
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4. Solar generator, single axis tracked, total lift (stat. +dyn.) 4 m

Pump: Badutop 12	Location: Spain, Ibiza tilt 39deg	Perfomace at 1000 W/m ²
Total Lift: 4 [m]	Tilt: 39°	Flow rate 12.480 [L/h]
Array Size: 480 [Wp]	Voltage: 48V	208,0 [L/min]
Array type: mono or polycrystallin	Latitude 39°	Flow rate 58,13 [USG/min]
Tracking: with single axis Tracking	Longitude 1°	Total head 4,3 [m]
Cable: 2,5 [mm ²]	Pipe length: 3 [m]	Cable loss 1,1 [W]
Cable length 3 [m]	Pipe Dia.: 2"	Efficiency 43% System
	Head Loss: 0,3 [m]	Power 345 [W]

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Av.
irradiation kWh/m ² /day	4,2	5,2	6,1	6,6	6,6	7	7,5	7,3	6,8	5,7	4,4	4,1	6,0
m ³ /day	49,5	78,1	104,2	118,8	118,8	130,5	145,0	139,2	124,7	92,6	55,2	46,7	100,3
US GPD x10 ³	13,08	20,62	27,53	31,39	31,39	34,48	38,32	36,79	32,94	24,45	14,57	12,34	26,5

Average Daily Flow rate for July



Average Daily Flow

