

# SOLAR PUMPING SYSTEMS

## GENERAL INFORMATION

C.R.I. Pumps with 5 decades of engineering expertise in the pump industry, understanding the importance of usage of Green energy and the current need across the world and has extended comprehensive range of solar pumping systems both in deepwell submersible and surface pump ranges. These product ranges ensure that even in areas where there is little or no power distribution, the need for water is met. It is also part of the Company's initiatives to promote green energy powered by the sun. C.R.I. Solar Pumping systems are designed & developed using the most advanced technologies suitable for various applications and giving more thrust on high performance and durability in both AC & DC versions.

DC Solar Pumps are available with both Screw & Centrifugal impellers suitable for different head and flow ranges. The DC Submersible Solar Pumps are powered by C.R.I. Oil filled permanent magnet, brushless DC motors and the Surface Pumps are coupled to specially designed dry type brushless DC motors. With regard to AC Pumps, C.R.I. Solar Pump Controller is used to convert DC Power generated by PV modules to 3Phase AC Power and drive these pumps.

### SOLAR PV MODULE FUNCTIONALITY

PV Modules collect solar radiation from the sun and actively convert that energy to electricity. PV Modules are comprised of several individual solar cells and function similarly to large semiconductors and utilize a large-area p-n junction diode. When the solar cells are exposed to sunlight, the p-n junction diodes convert the energy from sunlight into usable electrical energy.

The energy generated from photons striking the surface of the PV Module allows electrons to be knocked out of their orbits and released, and electric fields in the solar cells pull these free electrons in a directional current (D.C.), from which metal contacts in the solar cell can generate electricity. The more solar cells in a PV Module and the higher the quality, the more total electrical output the PV Module can produce. The conversion of sunlight to usable electrical energy is otherwise known as the Photovoltaic Effect. The photovoltaic effect arises from the properties of the p-n junction diode, as such there are no moving parts in a PV Module.

### PV MODULE OUTPUT

Factors that affect the output of PV Modules are weather conditions, shade caused by obstructions to direct sunlight, and the angle and position at which the PV Module is installed.

PV Modules delivers the best output when placed in direct sunlight, away from obstructions that might cast shade, and in areas with high regional solar insolation ratings.

PV Module efficiency can be optimized by using dynamic mounts that follow the position of the sun in the sky and rotate the PV Module to get the maximum amount of direct exposure during the day as possible.

### SOLAR ENERGY STORAGE SYSTEM

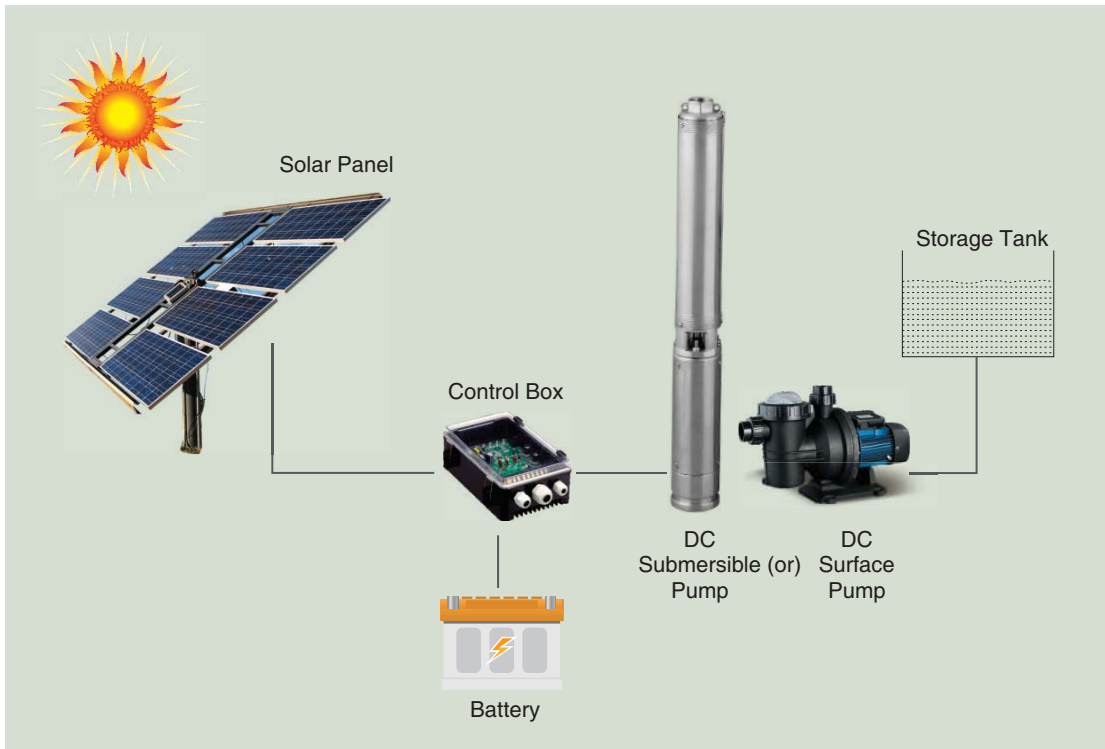
In our system the collecting device is lead acid battery which collect and stores DC energy Generated from PV Modules. This battery power storage option is available in DC solar pumps ranging upto 500W. The D.C. Power stored in the battery can be used to operate the pump directly. This process is usually integrated into solar photovoltaic system where energy collected and stored almost instantaneously.

## DC Solar Pumps

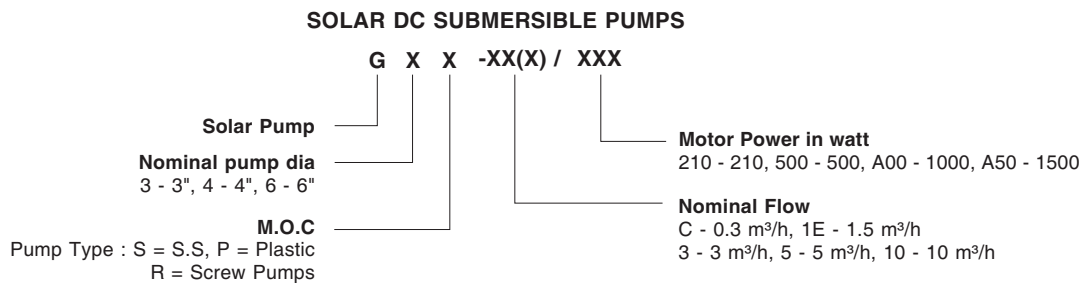
C.R.I. Solar D.C. Pump & Motor are supplied with necessary accessories like control box, level sensor probes, spare impeller, power cable to connect control box & panel & cables splicing kit as a complete set in a single carton packing.

**Features :** • Eco friendly • More Longevity & Hygiene • Uses only solar energy • Easy to dismantle & Repair • Rigid construction • Highly durable • Can handle upthrust load • Dry run protection • NEMA Mounting Standard (4") • Water level sensors for storage tank • Extremely hardwearing water lubricated bearings • Powered by brushless DC Motor for long life.

**Applications :** • Residential • Irrigation • Live stock farms • Small farms • Public water supply • De-watering • Industries • Golf course.

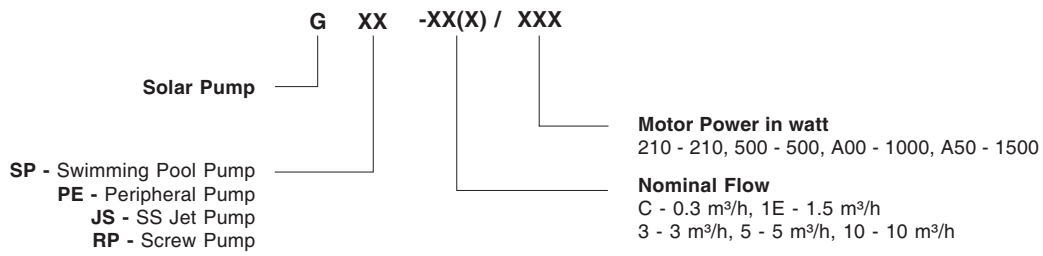


## Model Identification Code



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**SOLAR DC SURFACE PUMPS**



**DC Solar Submersible Pumps**



- 3" Screw type Deepwell Submersible Pumps
- 3" Centrifugal Deepwell Submersible Pumps - Plastic Impeller
- 4" Screw type Deepwell Submersible Pumps
- 4" Centrifugal Deepwell Submersible Pumps - Plastic Impeller
- 4" Centrifugal Deepwell Submersible Pumps - SS Impeller

## G3R Series

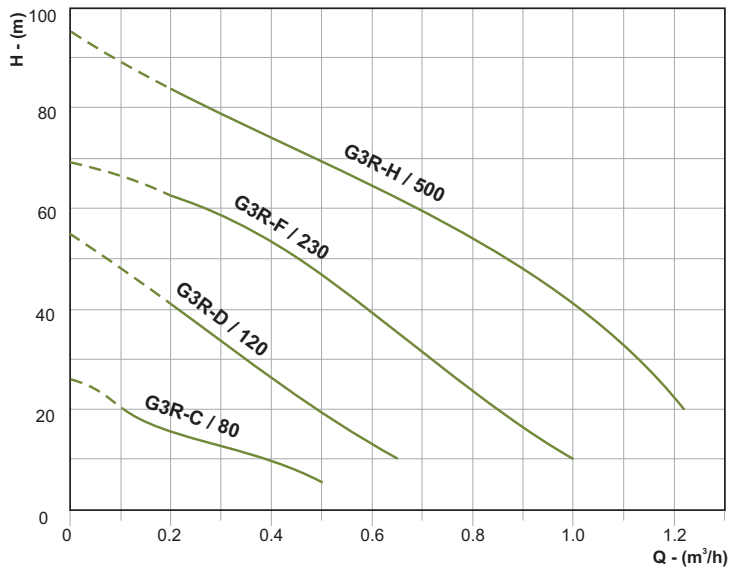
### SPECIFICATIONS

Nominal Dia.	3"
Power range	80 - 500 W
Voltage	12 - 48 V, D.C.
Max. Head	95 m
Max. Discharge	1.2 m <sup>3</sup> /h
Max. Immersion depth	30 m
Motor type	Oil filled DC motor
Impeller	Screw type
Outlet size	¾"

### MATERIALS OF CONSTRUCTION

Outlet	Stainless steel
Pump outer shell	Stainless steel
Motor outer shell	Stainless steel
Impeller	Stainless steel (Screw type)
Bearing	Ball bearing

### PERFORMANCE CURVES



\* Provide Non return valve (NRV) near the pump outlet to avoid water hammering / back flow of water.

### PUMPSET CONSIST OF :

- Pump
- Motor
- Control box
- Level sensor probes
- Spare Screw impeller
- Power cable to connect control box & PV Module
- Cable splicing kit

### PERFORMANCE TABLE

Model	Voltage (V)	Power (W)	Reqd. PV Input Power (W)	Max. Head (m)	Head Range (m)	Flow Range (LPD)*
G3R-C / 80	12	80	105	27	21 - 5	400 - 2000
G3R-D / 120	24	120	160	54	45 - 10	800 - 2600
G3R-F / 230	36	230	300	69	62 - 10	800 - 4000
G3R-H / 500	48	500	650	95	85 - 22	800 - 4800

The above performance curves are plotted under test condition with maximum DC input power.

\* Flow range in LPD is calculated based on 4 hours bright sunny day.

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## G3P Series

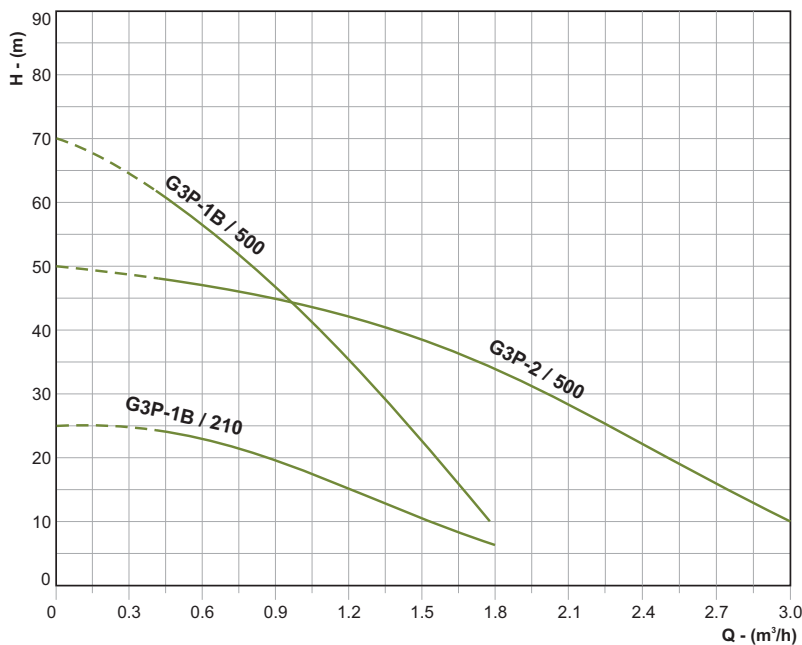
### SPECIFICATIONS

Nominal Dia.	3"
Power range	210 - 500 W
Voltage	36 & 48 V, D.C.
Max. Head	70 m
Max. Discharge	3 m <sup>3</sup> /h
Max. Immersion depth	30 m
Motor type	Oil filled DC motor
Impeller	Multistage Centrifugal
Outlet size	1"

### MATERIALS OF CONSTRUCTION

Outlet	Stainless steel
Pump outer shell	Stainless steel
Motor outer shell	Stainless steel
Impeller	Thermoplastic
Bearing	Ball bearing

### PERFORMANCE CURVES



### PUMPSET CONSIST OF :

- Pump • Motor • Control box • Level sensor probes • Spare Centrifugal impeller • Power cable to connect control box & PV Modules • Cable splicing kit.

### PERFORMANCE TABLE

Model	Voltage (V)	Power (W)	Reqd. PV Input Power (W)	Max. Head (m)	Head Range (m)	Flow Range (LPD)*
G3P-1B / 210	36	210	270	25	23 - 6	1800 - 7200
G3P-1B / 500	48	500	650	70	62 - 10	1600 - 7200
G3P-2 / 500	48	500	650	50	47 - 10	1800 - 12000

The above performance curves are plotted under test condition with maximum DC input power.  
 \* Flow range in LPD is calculated based on 4 hours bright sunny day.

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## G4R Series

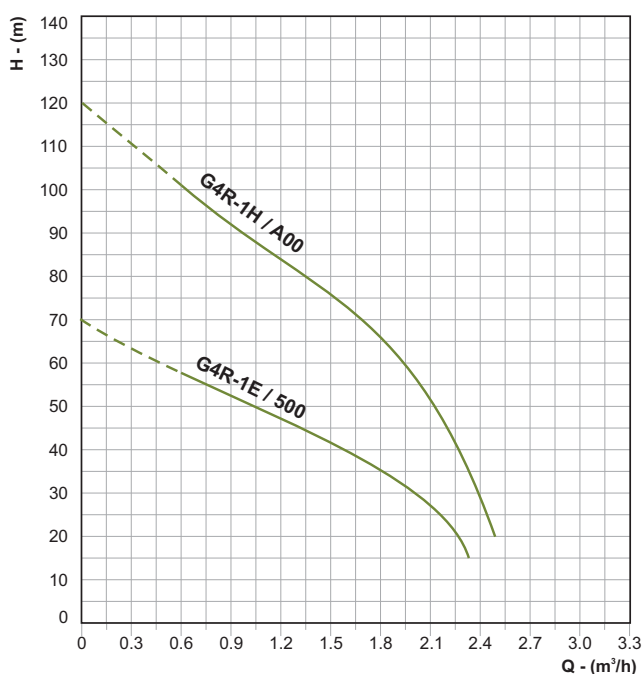
### SPECIFICATIONS

Nominal Dia.	4"
Power range	500 - 1000 W
Voltage	48 & 110 V, D.C.
Max. Head	120 m
Max. Discharge	2.5 m <sup>3</sup> /h
Max. Immersion depth	30 m
Motor type	Oil filled DC motor
Impeller	Screw type
Outlet size	1"

### MATERIALS OF CONSTRUCTION

Outlet	Stainless steel
Pump outer shell	Stainless steel
Motor outer shell	Stainless steel
Impeller	Stainless steel (Screw type)
Bearing	Ball bearing

### PERFORMANCE CURVES



\* Provide Non return valve (NRV) near the pump outlet to avoid water hammering / back flow of water.

### PUMPSET CONSIST OF :

- Pump
- Motor
- Control box
- Level sensor probes
- Spare Screw impeller
- Power cable to connect control box & PV Modules
- Cable splicing kit.

### PERFORMANCE TABLE

Model	Voltage (V)	Power (W)	Reqd. PV Input Power (W)	Max. Head (m)	Head Range (m)	Flow Range (LPD)*
G4R-1E / 500	48	500	650	70	58 - 15	2400 - 9000
G4R-1H / A00	110	1000	1400	120	100 - 20	2400 - 10000

The above performance curves are plotted under test condition with maximum DC input power.

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# G4P Series

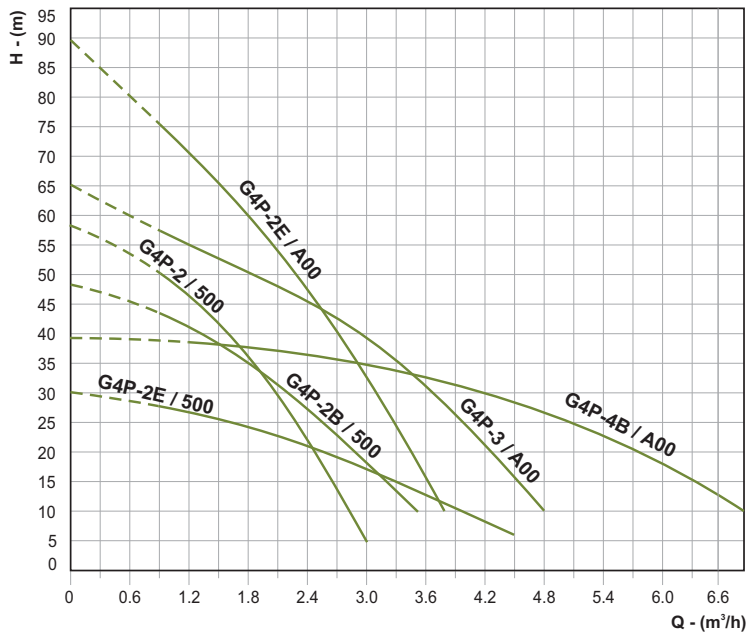
## SPECIFICATIONS

Nominal Dia.	4"
Power range	500 - 1000 W
Voltage	48 & 110 V, D.C.
Max. Head	89 m
Max. Discharge	7 m <sup>3</sup> /h
Max. Immersion depth	30 m
Motor type	Oil filled DC motor
Impeller	Multistage centrifugal
Outlet size	1¼" & 2"

## MATERIALS OF CONSTRUCTION

Outlet	Stainless steel
Pump outer shell	Stainless steel
Motor outer shell	Stainless steel
Impeller	Thermoplastic
Bearing	Ball bearing

## PERFORMANCE CURVES



## PUMPSET CONSIST OF :

- Pump
- Motor
- Control box
- Level sensor probes
- Spare Centrifugal impeller
- Power cable to connect control box & PV Modules
- Cable splicing kit

## PERFORMANCE TABLE

Model	Voltage (V)	Power (W)	Reqd. PV Input Power (W)	Max. Head (m)	Head Range (m)	Flow Range (LPD)*
G4P-2 / 500	48	500	650	57	50 - 5	3600 - 12000
G4P-2B / 500	48	500	650	48	44 - 10	3600 - 14000
G4P-2E / 500	48	500	650	30	27 - 6	3600 - 18000
G4P-2E / A00	110	1000	1400	89	75 - 10	3600 - 15000
G4P-3 / A00	110	1000	1400	65	57 - 10	3600 - 19000
G4P-4B / A00**	110	1000	1400	39	37 - 10	5000 - 27600

The above performance curves are plotted under test condition with maximum DC input power.  
\* Flow range in LPD is calculated based on 4 hours bright sunny day.

\*\* 2" Outlet

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# G4S Series

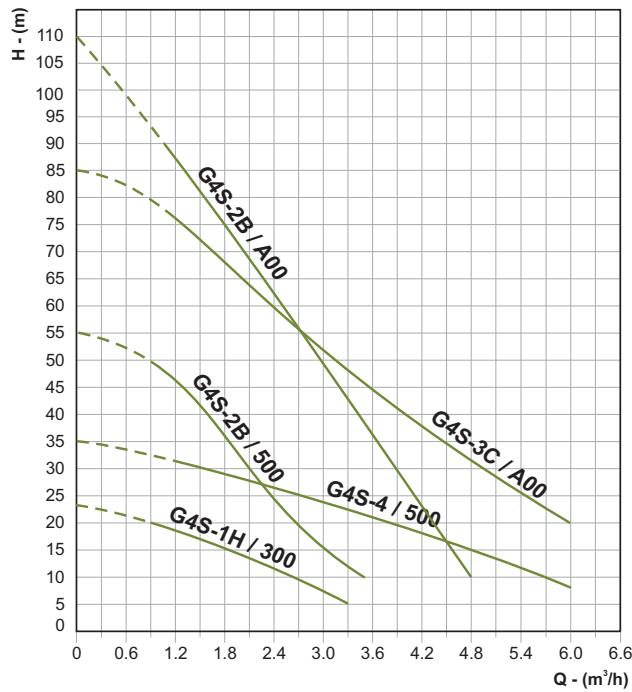
## SPECIFICATIONS

Nominal Dia.	4"
Power range	300 - 1000 W
Voltage	36 & 110 V, D.C.
Max. Head	110 m
Max. Discharge	6 m <sup>3</sup> /h
Max. Immersion depth	30 m
Motor type	Oil filled DC motor
Impeller	Multistage centrifugal
Outlet size	1¼" & 1½"

## MATERIALS OF CONSTRUCTION

Outlet	Stainless steel
Pump outer shell	Stainless steel
Motor outer shell	Stainless steel
Impeller	Stainless steel
Bearing	Ball bearing

## PERFORMANCE CURVES



## PUMPSET CONSIST OF :

- Pump ● Motor ● Control box ● Level sensor probes ● Spare Centrifugal impeller ● Power cable to connect control box & PV Modules ● Cable splicing kit

## PERFORMANCE TABLE

Model	Voltage (V)	Power (W)	Reqd. PV Input Power (W)	Max. Head (m)	Head Range (m)	Flow Range (LPD)*
G4S-1H / 300	36	300	390	23	20 - 5	3600 - 13200
G4S-2B / 500	48	500	650	55	50 - 10	3000 - 14000
G4S-4 / 500	48	500	650	35	31 - 8	4800 - 24000
G4S-3C / A00**	110	1000	1400	85	76 - 20	4800 - 24000
G4S-2B / A00	110	1000	1400	110	90 - 10	4400 - 19200

\*\* 1½" Outlet

The above performance curves are plotted under test condition with maximum DC input power.  
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