TORMAC
PUMPS

SOLAR SUBMERSIBLE PUMPS - TS SERIES

GENERAL DATA

SOLAR SUBMERSIBLE PUMPS › TS SERIES

Our world is full of energy. Tormac is passionate about meeting the most challenging technical demands and environmental conditions of the world's energy users with efficient solutions. With pioneering technology, Tormac offer's innovative systems that improve performance and return on investment while reducing operational and maintenance cost.

Tormac Solar Submersible pumps are ingeniously designed and developed employing latest engineering software's, high-tech machineries, tools and cutting edge of pump technology to deliver the best possible hydraulic efficiency. The integrated and most modern quality assurance systems used at every stage of the production and flawless workmanship ensure sustained and consistent operation.

Applications

- Livestock
- Agricultural
- Recreational
- Residential applications

Features

- Tried & Trusted
- Highly efficient
- Corrosion free parts for hygiene
- Perfectly and aesthetically designed
- Water lubricated bearings
- Brushless DC motor
- Stainless Steel (AISI 304), POM, Rubber, Cable Drinking water approved.

Note: The company reserves the right to modify the technical specifications and illustrations without prior notice.

Model Classification :

Sizing of Solar Pumps :

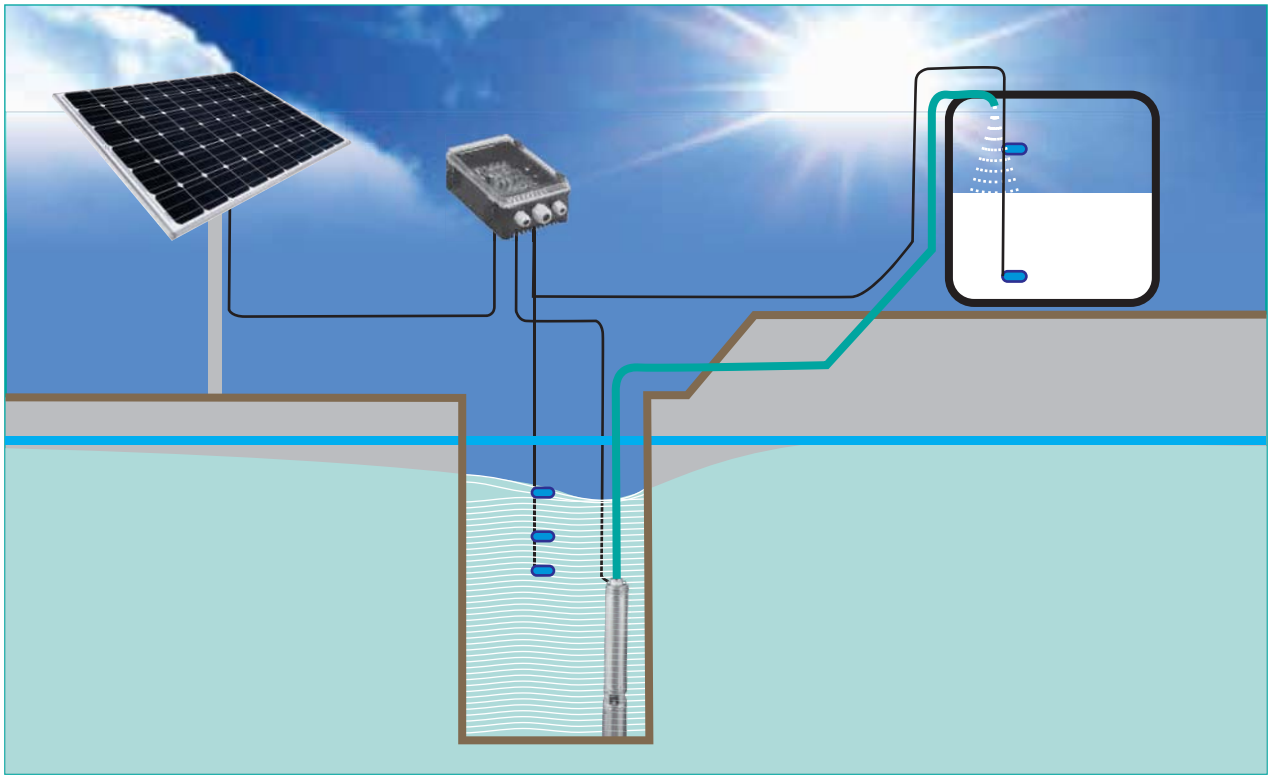
The hydraulic energy required(kWH/Day) = Volume required (m^3/day) X Head (m) X Water Density X Gravity (3.6 X 10^6)

= 0.002725 X Volume (m^3/day) X Head (m)

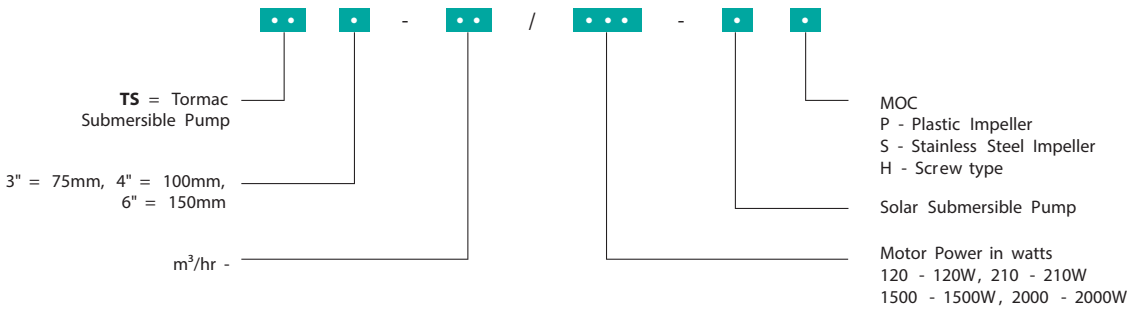
$$\text{The Solar array powered required (kWp)} = \frac{\text{Hydraulic Energy Required (kWH/day)}}{\text{Av. Daily solar irradiation (kW/m}^2\text{/day x F x E}}$$

F = Array mismatch factor = 0.80 on average (a safety factor for real panel performance in hot sun and after 10-20 years)

E = Daily subsystem efficiency = 0.25 - 0.40 typically.



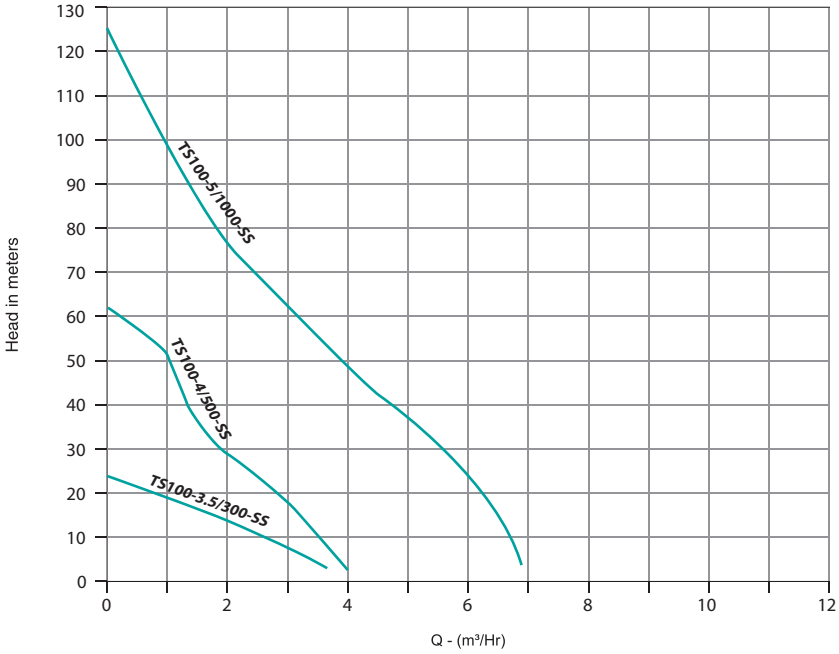
Model Designation > SOLAR PUMPS



TS100-SS - SERIES › Performance Data

Pump set Model	Voltage	Power (W)	Max.Flow (m^3/hr)	Max. Head (m)	Delivery Size in mm
TS100-3.5/300-SS	36	300	3.5	24	32
TS100-4/500-SS	48	500	4.0	62	32
TS100-5/1000-SS	110	1000	5.0	128	32

Performance Curve



Compliance :

Nominal Dia	:	100mm (4")
Outer diameter	:	100mm
Power Range	:	300, 500 & 1000W
Voltage	:	36, 48 &110 V . D.C.
Max. Head	:	128m
Max. Dischar ge	:	7.5m^3/hr
Max. Immersion Depth	:	30m
Motor	:	Oil filled DC motor
Impeller	:	Centrifugal
Outlet Size in mm	:	32

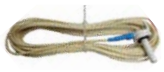
Accessories :


Solar Panel


Control box


Water level sensor


Solar flash light


Cable for solar panel


Cable connector


Stainless Steel Impeller

Constructional Data :

Outlet	:	AISI / Brass
Pump Outer shell	:	AISI
Motor Outer Shell	:	AISI
Impeller	:	AISI
Bearing	:	Ball Bearing

CONTROL BOX TYPES AND CONNECTION DETAILS

- UNSEALED
- ALUMIINIUM COVER AND BOX

Model :	Suitable for :
TCP - 12	12V Pumps

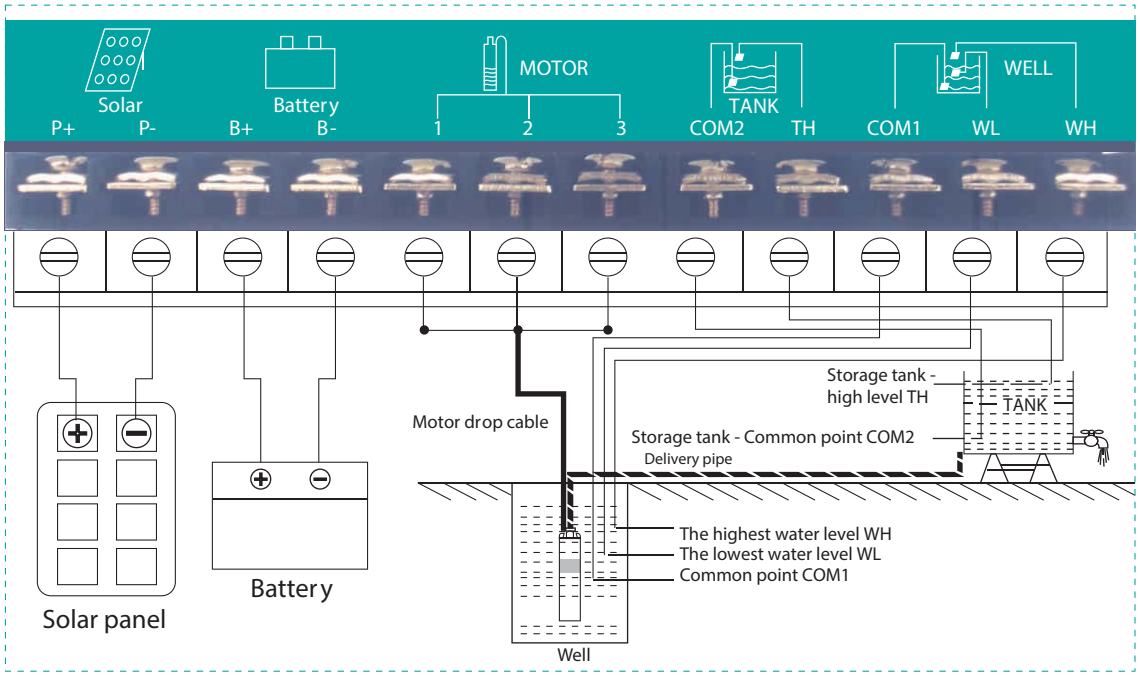
- SEALED
- PLASTIC COVER
- ALUMINIUM BOX

Model :	Suitable for :
TCP - 24/48	24V and 48V Pumps
TCP - 36/72	36V and 72V Pumps

- UNSEALED
- STEEL COVER AND BOX

Model :	Suitable for :
TCP - 72/110	72~ 110V Pumps

INSTALLATION PROCEDURE



DWG - 1

Note ;

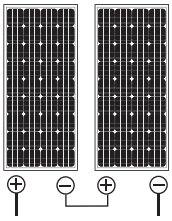
1. Solar mode :
   Switch position to “SOLAR”

2. Battery mode :
   Switch position to “BAT”

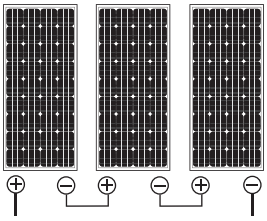
SOLAR PANEL CONNECTION DETAILS

Note : The maximum power voltage of each solar panel is 17.5V

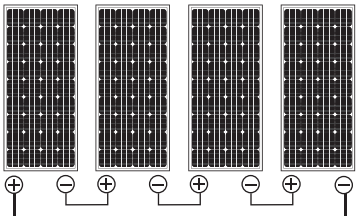
12V pump solar panel connection



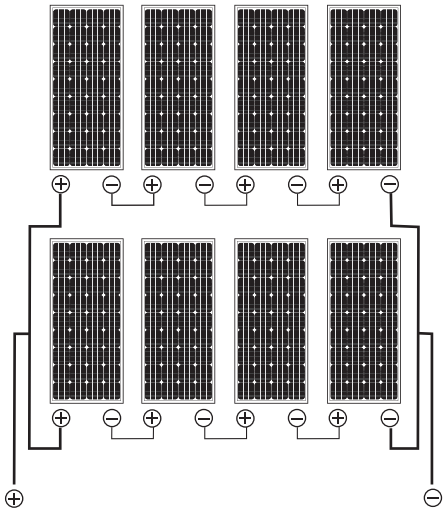
24V pump solar panel connection
(2 nos of 17.5V solar panels in
series connection)



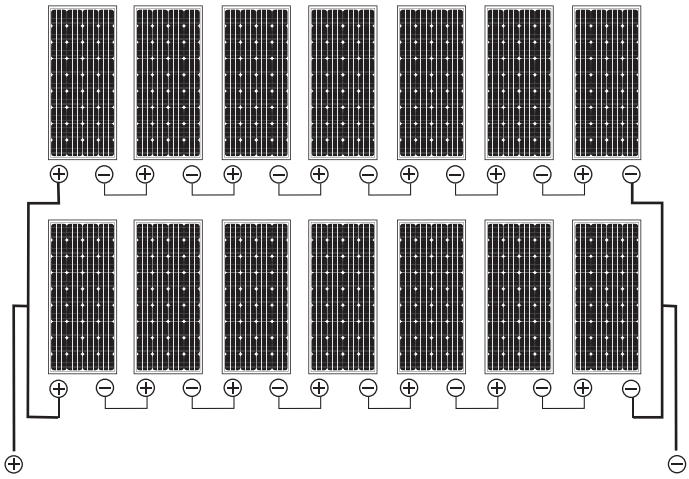
36V pump solar panel connection
(3 nos of 17.5V solar panels
in series connection)



48V pump solar panel connection
for 400W pumps only
(4 nos of 17.5V solar panels in series connection)



48V pump solar panel connection
for 500W pump Make 2 groups of 4 panels
in series connection and
connect them parallel as given above.



110V pump solar panel connection
Make 2 groups of 7 panels in series
connection and connect them parallel
as given above.

SOLAR PANEL SELECTION

The power of solar panel = Power of pump x 1.3

Output voltage of solar panel = Pump input voltage

The control box should be suitably selected based on the pump voltage

Note : The storage battery and frames required for solar panel mounting have to be sourced at customer end or contact our authorized dealer.

RECOMMENDED SOLAR PANEL SELECTION CHART

PUMP MODEL	PANEL POWER (Wp)	SOLAR PANEL		MAX. POWER VOLTAGE - VMP (V)	OPEN CIRCUIT VOLTAGE VOC (V)
		CAPACITY	QUANTITY		
TS100-3.5/300-SS	360	120W	3	17-18	21-22
TS100-4/500-SS	660	85W	8	17-18	21-22
TS100-5/1000-SS	1400	100W	14	17-18	21-22

BATTERY SELECTION PROCEDURE

To calculate battery capacity : $AH = \frac{T \times P}{V \times 0.6}$

To find the operating time of the pump : $T = \frac{AH \times V \times 0.6}{P}$

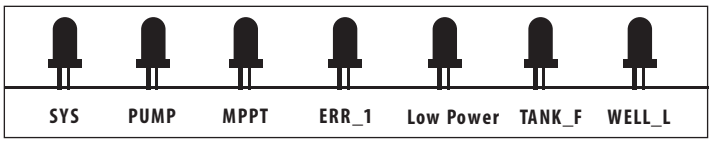
T - Pump running time in hours
P - Pump power in Watts
V - Pump voltage
AH - Amper e hour (Battery capacity)

Example 1 (Pump running time calculation)
If the pump power is 200W , the battery capacity is 100AH , the pump voltage is 12V and when the battery is fully charged, then the pump set running hour is calculated as : 100 x 12 x 0.6 / 200 = 3.6 hours.

Example 2 (Battery capacity calculation)
If the pump power is 200W , the pump voltage is 12V , and the battery need to be used for 3.6 hours, then the battery capacity is calculated as : 3.6 x 200 / 12 x 0.6 = 100AH .

CONTROL BOX INDICATIONS

The control box is provided with set of LED's to indicate the different functions of the solar pumping system and the nature of problem in case of breakdown. Find below the control indicators and its functions for reference.



Indication	Function / Problem
SYS	Power ON
PUMP	Pump operating
MPPT	Pump operating at its best input power
ERR_1	Pump consuming high Amps / Insufficient sunlight
Low Power	Insufficient input voltage
TANK_F	Storage / collection tank is full
WELL_L	Water level in well / sump is low

THE POWER BEHIND THE FORCE

Naargo Industries Private Limited, one of the leading manufacturers of latest state of art, large range of pumps and motors, is managed by veterans who are in the pump industry for almost half a century. The products are employed in various applications like irrigation, domestic, civil construction, de-watering etc; The Company has a strong distribution network in India for sales & service and a strong global presence.

Quality is the key factor in Naargo's products. The expansive infrastructure and environment accredited with ISO 9000 quality certification, latest engineering softwares, high-tech machinery, futuristic pumping technology and high caliber workforce facilitate the production of flawless and efficient products on par with international standards under the brand name of "Tormac". The well equipped R & D wing stays alive to the changing global trends and comes out with viable solutions for innovative product development and upgradation.

The Products currently available include Stainless Steel Submersible Pumps, 4" Thermoplastic Submersible Pumps, 6" & 8" Cast Iron Submersible Pumps, Submersible Motors and Controls, Centrifugal Pumps, Inline Booster Pumps, Jet Self-priming Pumps and Peripheral Pumps.

The power, performance and endurance of the products backed by the uncompromising teamwork and value systems will certainly propel the company's growth towards new horizons in the pump industry.

IB-SPC-I/14-E1

Naargo Industries Private Limited,
No. 2, Gem Garden, Athipalayam Juntion, Ganapathy,
Coimbatore - 641 006, INDIA. Tel : + 91 422 6522622, Fax : + 91 422 2531956
email : tormac@ tormacpumps.com web : www.tormacpumps.com

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