

TSP SERIES 2000 RANGE PHOTOVOLTAIC PUMPING SYSTEMS



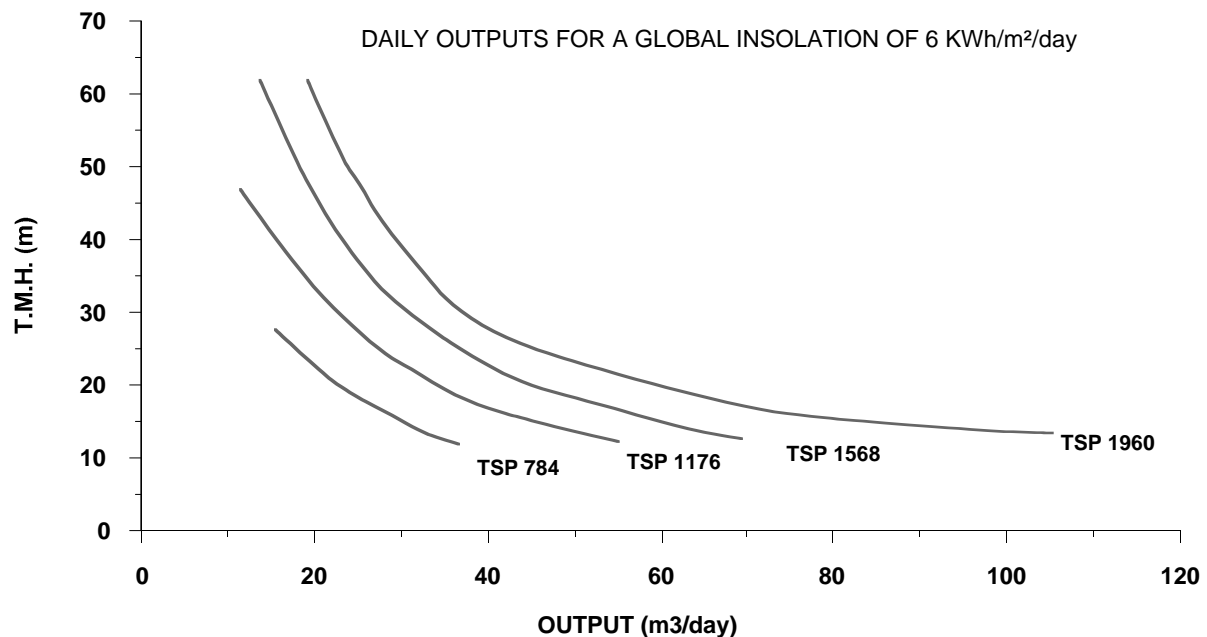
Village of Niamana Bankouma, Mali - The excess of water flows into a fish breeding lake

PRESENTATION

The TSP 2000 pumping systems are designed to operate from bore-holes or wells with complete autonomy. Their reliability, low maintenance requirements and simple installation make them extremely well adapted for operation in remote areas especially for drinking water supply, domestic needs and castle watering. The power of the 2000 series generators ranges from 600Wp to 2000Wp.

For more powerful PV arrays, **TOTAL ENERGIE** offers standard versions up to 4kWp (4000 series). The TSP systems operate directly from sunshine without any battery storage : the more the sun shines, the higher the current and the larger the quantity of water delivered. During the day the water is stored in a tank.

PERFORMANCES



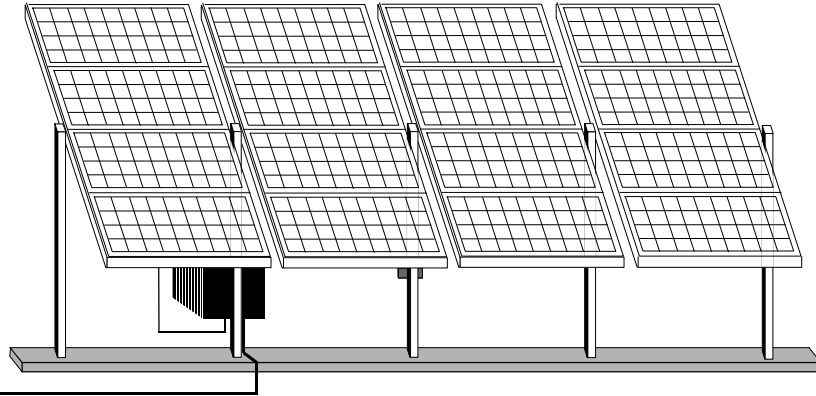
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SCOPE OF THE SYSTEM

Photovoltaic array

TSP pumping systems operate with 8 polycrystalline modules in series, assembled in panels of 4, mounted on aluminium supports. The tilt angle of the panels is adjustable from 10 to 60°. The photovoltaic modules transform sun radiation direct to DC current. The power of the array is designed according to the daily volume of water required, the total manometric head and the geographical characteristics of the site.



Variable frequency three phase inverter, TSP 2000

The **TOTAL ENERGIE** inverter converts the DC current coming from the modules into three phase AC current for the pump motor.

Its operation frequency, and thus the speed of the motor, varies along with the sunshine. This allows use of all the power given by the photovoltaic array instantaneously.

The inverter also gives the generator a fixed operating voltage which corresponds to its maximum power point. It also ensures protection against temporary electric disturbances, short-circuits, lack of water and full tank (optional floatswitch).

Pumping unit

Multistage centrifugal pump, 4 or 6". Type and number of stages are defined by **TOTAL ENERGIE** according to the hydraulic data of the project (delivery output and TMH required).

4" submersible motor 80V 3 phase AC, made of stainless steel, powered by the photovoltaic array through the inverter.

The motor is directly fitted to the pump end; the pumping unit is then installed in the bore-hole and connected to the inverter.

Variable Input voltage :	105 à 120VDC
Max. voltage :	170VDC
Max. current :	17A
Max. power :	2000W

Output voltage (RMS) :	8 / 86V tri
Frequency :	6 / 60 Hz
Efficiency :	95%

Cabinet :	black anodized aluminium
Protection level :	IP 55
Weight :	9 kg
Dimensions (mm) :	310 x 240 x 240

Impellers made of	Noryl reinforced with fibre glass, or stainless steel.
Shaft, body and all static parts made of	stainless steel.
Non- return valve	
Sand acceptance :	25 g / m3

Power :	550/950W
Voltage range :	7 to 80 V three phase
Speed range :	0 to 3480 rpm
Cooling fluid :	water
Stainless construction	
Protection :	IP 68

THE TSP 2000 RANGE

	TSP 784	TSP 1176	TSP 1568	TSP 1960
PV modules	16	24	32	40
*Array power	720 Wp	1080 Wp	1440 Wp	1800 Wp
Supports	SSU	SSU	SSU	SSU
Inverter	2000	2000	2000	2000
Motor	950 W	950 W	950 W	950 W

* Array power of a module : 49 Wp

TSP SERIES

PHOTOVOLTAIC PUMPING SYSTEMS

4000 RANGE



3840 Wp pump in Zigliara (Corsica)

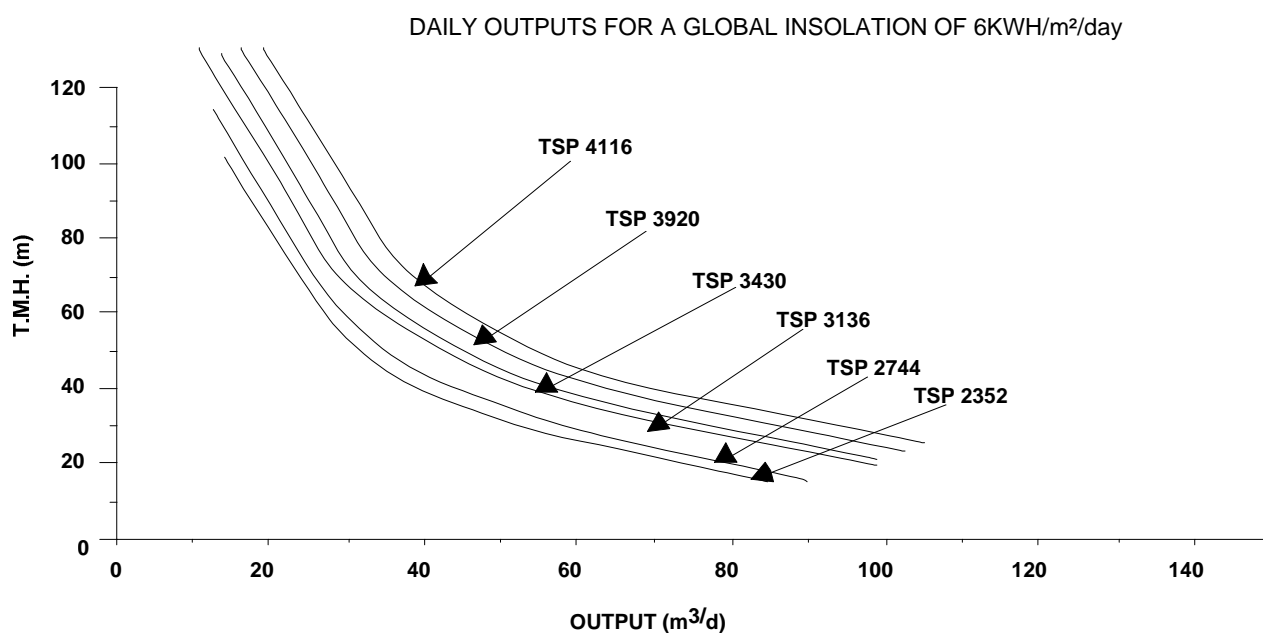
PRESENTATION

The TSP 4000 pumping systems are designed to operate from bore-holes or wells with complete autonomy. Their reliability, low maintenance requirements and simple installation make them extremely well adapted for operation in remote areas especially for drinking water supply, domestic needs and cattle watering...

The power of the 4000 series generators ranges from 2160 Wp to 4000 Wp. For less powerful PV arrays, **TOTAL ENERGIE** offers standard versions from 600 Wp to 2000 Wp (2000 series).

The TSP systems operate directly from sunshine without any battery storage : the more the sun shines, the higher the current and the larger the quantity of water delivered. During the day the water is stored in a tank.

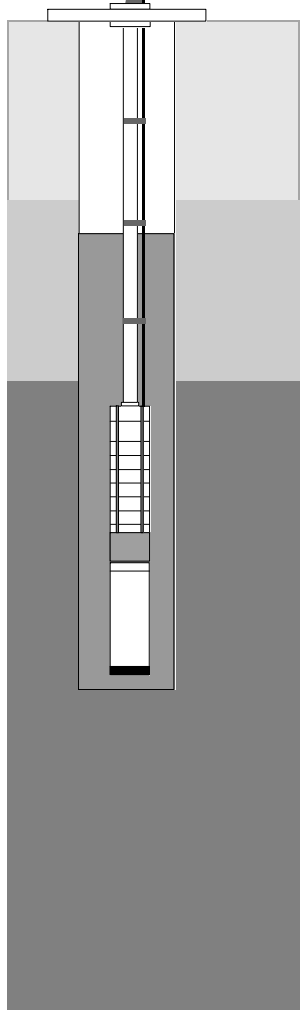
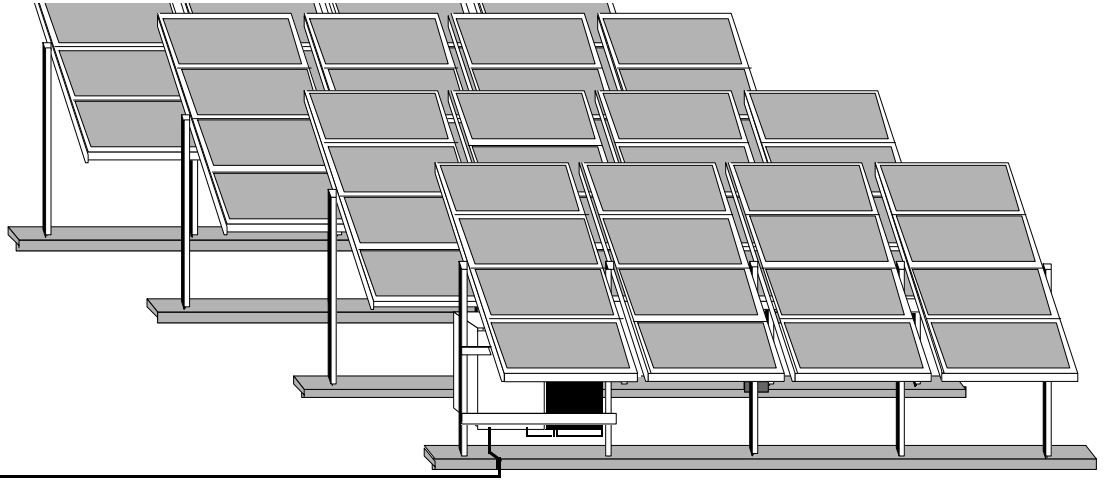
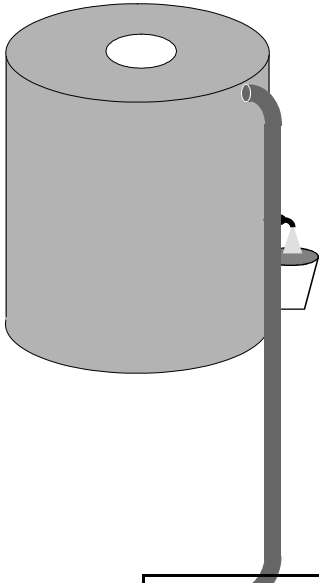
PERFORMANCES



SCOPE OF THE SYSTEM

Photovoltaic array

TSP pumping systems operate with 14 or 16 polycrystalline modules in series, assembled in panels of 4, mounted on aluminium supports. The tilt angle of the panels is adjustable from 10 to 60°. The photovoltaic modules transform sun radiation direct to DC current. The power of the array is designed according to the daily volume of water required, the total manometric head and the geographical characteristics of the site.



Variable frequency three phase inverter, TSP 4000

The **TOTAL ENERGIE** inverter converts the DC current coming from the modules into three phase AC current for the pump motor.

Its operation frequency, and thus the speed of the motor, varies along with the sunshine. This allows use of all the power given by the photovoltaic array instantaneously.

The inverter also gives the generator a fixed operating voltage which corresponds to its maximum power point. It also ensures protection against temporary electric disturbances, short-circuits, lack of water and full tank (optional floatswitch).

Variable Input voltage :	210 à 240V DC
Max. voltage :	340V DC
Max. current :	17A
Max. power :	4000W
Output voltage (RMS) :	16 / 160V tri
Frequency :	6 / 60 Hz
Efficiency :	95%
Cabinet :	black anodized aluminium
Protection level :	IP 55
Weight :	14,9 kg
Dimensions (mm) :	400 x 240 x 240

Pumping unit

Multistage centrifugal pump, 4 or 6". Type and number of stages are defined by **TOTAL ENERGIE** according to the hydraulic data of the project (delivery output and TMH required).

4" submersible motor 160V 3 phase AC, made of stainless steel, powered by the photovoltaic array through the inverter.

The motor is directly fitted to the pump end; the pumping unit is then installed in the bore-hole and connected to the inverter.

Impellers made of Noryl reinforced with fibre glass, or stainless steel.
 Shaft, body and all static parts made of stainless steel.
 Non- return valve
 Sand acceptance : 25 g / m3

Power : 1400 / 2200W
 Voltage range : 16 to 160 V 3 phase
 Speed range : 0 to 3480 rpm
 Cooling fluid : water
 Stainless construction
 Protection : IP 68

THE TSP 4000 RANGE

	TSP 2352	TSP 2744	TSP 3136	TSP 3430	TSP 3920	TSP 4116
PV modules	48	56	64	70	80	84
*Array power	2160 Wp	2520 Wp	2880 Wp	3150 Wp	3600 Wp	3780 Wp
Supports	SSU	SSU	SSU	SSU	SSU	SSU
Inverter	4000	4000	4000	4000	4000	4000
Motor	1400 W	1400 W	2200 W	2200 W	2200 W	2200 W

* Array power of a module : 49 Wp