


Enriching Lives



Kirloskar 
SOLAR Pumping
system
Right idea at the right time

The case for solar energy

The gap between demand and supply of electricity in India is not only huge, but widening by the day. Add to this, the grim facts that power and fuel prices are inexorably climbing and power supply, when available, is also very erratic.

Against this backdrop, renewable energy comes as the perfect answer. It is derived from natural processes that are replenished constantly, and are sustainable in the sense that they can never run out. And solar energy, the mother of all renewable energies, is the ideal solution. It is a perfect combination of the 3 Es:

- **Energy:** Solar energy is plentiful and virtually inexhaustible. Studies show

that the energy needs of our entire planet can be addressed by the power of the sun alone.

- **Ecology:** Solar energy is clean, silent and generates no waste. Thus it does not contribute to global warming or create any environmental hazard. It allows compliance under the Kyoto Protocol and also, where required, enables users to qualify for carbon credits with reduced carbon footprint.

- **Economy:** Being free of cost, solar energy always has an attractive payback from the perspective of life cycle cost. At best, it is a fixed

cost that is insulated against increasing energy costs.

It is all these reasons that made Kirloskar Brothers Limited (KBL) choose solar energy as the fulcrum for their new breakthrough in pumping systems.



The solar pump explained

A solar pump uses power derived from sunlight that is converted into electrical power by Solar Photo Voltaic (SPV) modules, which give higher power output in the afternoons and lower power output in the mornings and evenings. As a result, a solar pump works on varying power input and gives varying water output at a given pump head. On the other hand, a grid powered/ diesel operated pump set, while working at a particular pump head, works with constant power input from the grid/ diesel engine and provides constant water output at the given pump head.

E.g. a standard 5 HP pump working on grid power/ diesel engine for, say 2.5 hours a day, may give the same water output in a day as a solar pump of 3 HP working for 8 hours using sunlight. This is an important fact to keep in mind for appropriate solar pump selection and application engineering.

The most important parameters to select a solar pump are: how much daily water is needed, at what pump head, and at which location. The location is important because solar energy varies from region to region, and sizing of solar panels depends on the solar energy of a region.



*Kirloskar Solar Pumps...
spreading smiles*



KBL Solar Team - driven by a vision

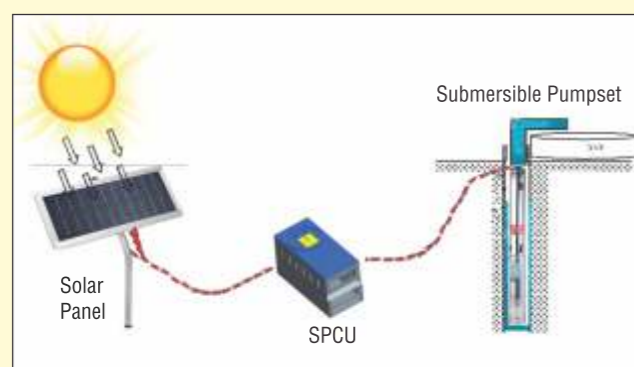
“KBL will be known globally for state-of-the-art solar pumping systems which will be ahead of the competition in solar offerings and spread smiles.”



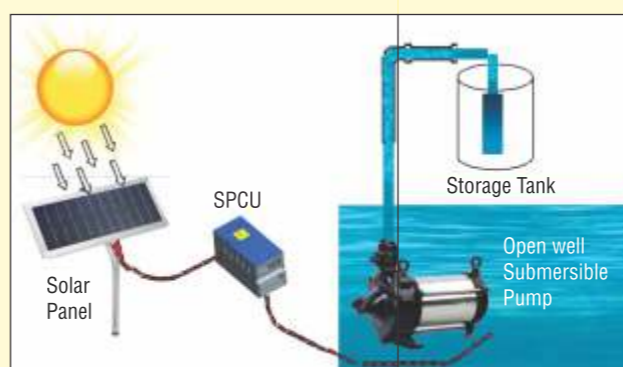
Components of a typical solar pumping system

1. Pump and motor set
2. Solar power conditioning unit (SPCU)
3. Solar PV modules
4. Solar panel (for fixing solar modules)
5. Pipes and cables
6. Foundation set (consisting of foundation bolts, structure and civil construction material - cement, sand, stones, etc.)
7. Earthing kit

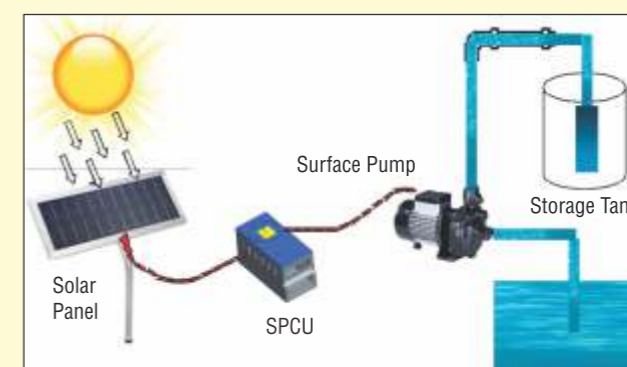
The KBL range of offerings



Solar Borewell Submersible Pumping System



Solar Open Well Submersible Pumping System



Solar Surface Pumping System

Product & performance range

Parameters	Solar Borewell Submersible	Solar Surface	Solar Open Well Submersible
Water output @ 5.5 kWhr/ sq.m./ day solar insolation incident	2,500 to 750,000 litres per day	5,000 to 1,200,000 litres per day	35,000 to 600,000 litres per day
Total Dynamic Pump Head	5 to 200 meter	10 to 150 meter	8 to 40 meter
Solar Modules Wattage	500 to 30,000 Wp	500 to 28,000 Wp	500 to 10,000 Wp

Motors for the solar pump sets :

- Up to 2 HP rating: 120 V, 3-phase AC, 50 Hz induction motors as standard, which work with varying frequencies according to varying sun intensity. (customized motors, with voltages ranging from 90 V – 230 V and frequencies varying up to 85 Hz, can also be supplied to meet special requirements of customers).
- From 3 to 30 HP ratings: 415 V, 3-phase AC, 50 Hz standard motors. (customized motors, with voltages other than standard rating voltage and frequencies varying up to 85 Hz, can also be supplied to meet special requirements of customers).



Kirloskar solar pumps - advantages unlimited

In a global first, KBL, India's largest manufacturer and exporter of pumps, introduces automatic solar electric technology to drive a standard induction motor AC pump set, with a triple mode maximum power point tracking (MPPT) feature. Under this, the pump, motor and solar modules are all made to run in the best efficiency zone automatically, as the pump operates under field conditions.

It is this feature that also helps Kirloskar solar AC pumps surpass on-site performances of many contemporary solar DC pumps. Even when it comes to comparing real live field performances, extraction of solar power from SPV modules is also better achieved by Kirloskar AC solar pumps than other DC

solar pumps in the market. This is facilitated by the Kirloskar Solar Power Conditioning Unit (SPCU), designed to meet IEC 61683 requirements and tested by NABL/BIS accredited laboratory as specified by Ministry of New and Renewable Energy, Govt. of India (MNRE) under Jawaharlal Nehru National Solar Mission (JNNSM). This SPCU takes as input the solar power that is converted into varying DC power by solar PV modules, depending on changing sun intensities during the day.

Using pioneering technology, the varying DC power is converted into 3-phase Space Vector Pulse Width Modulated (SVPWM) AC

power that drives an AC induction motor pump set directly. As a result, battery and battery charger are both eliminated. Also, solar DC to 3-phase AC conversion efficiency is one of the highest in the world at 95%. What's more, for motor power output range from 0.5 to 30 HP, the Kirloskar SPCU's efficiency remains constant.



'Value add' with unique optional accessories

- **Dual Mode Unit** - This option enables the user to run the same pump with either solar power or grid power, whichever is available.
- **Battery charger cum booster unit** - This enables diverting low solar power input, produced by solar modules in the mornings and evenings (which make it difficult to run a pump), to charge appropriately sized batteries, which can then be used to power CFLs, fans, TVs, etc. in the night
- **Flexible output unit** (3 ph./ 1ph. AC output) - If the pump is not required to be run during some part of daylight hours, the user can turn the rotary switch on the SPCU to the single phase AC position and operate a few CFLs, fans, TVs, computers etc. (This unique optional feature is provided for smaller pumps up to 2 HP)

Unique SPCU - salient features and benefits

1 High operating efficiency on field

- Triple mode automatic MPPT (maximum power point tracking)
 - The motor input power is instantaneously and automatically adjusted by varying the operating frequency to match the maximum output power available from the Solar PV panels at different sun intensities.
 - An appropriately selected pump for given site conditions (i.e. Head) and water needs, is ensured to run within the (Best Efficiency) BE zone of the pump With variation in sun intensity, as motor tends to get underloaded, an electronic correction is applied to ensure maximisation of motor efficiency.
 - Thus, efficiency of (1) solar panels, (2) pump and (3) motor are maximised
- SVPWM technology for solar dc to 3 phase ac conversion ensuring 95% efficiency
- Variable frequency variable voltage operation as per varying sun intensity

2. Reliability - failsafe and fool proof

- Sensor-less Dry run protection
- Under voltage and over voltage protection
- Reverse polarity protection
- Soft start for the ac induction motors

- Output short circuit protection
- Protection from lightning

3. Ease / comfort of operation and maintenance

- Auto start and stop as per solar intensity
 - LED based visual indication of faults
 - Wide network of Kirloskar dealers and authorized service centres
 - Being AC induction motor, service is easy and available anywhere unlike DC motors
 - Optional add on : "Dual mode unit" for operating pump either on solar power or grid power
- #### 4. Versatility and flexibility of use
- Technology is generic and scalable to any power levels based on the requirement of customer
 - While pump not running, single phase ac power can be tapped to run CFLs, fans, TV, Computers (This is for pumps with motors up to 2 HP)
 - Optional tailor-made add on unit of battery charger cum booster, which can be used to charge battery in the morning & evening hours of low sun intensity; and the same battery output can be used at night for CFLs, fans, TV etc.



A wide array of applications

Water supply

- Villages, schools, hospitals, homes etc.
- Adivasi settlements and other remote areas
- Rural schemes (PHED)
- Resorts, hotels and farmhouses
- Tribal welfare departments
- Animal farms and poultries
- Housing societies and apartments - from underground water tanks to overhead reservoirs

Irrigation

- Farms, fields and greenhouses
- Govt. forest departments
- Corporate/ industry parks and gardens (unattended and automatic watering)
- Sprinklers and drip irrigation for agro-based industries

Decorative & leisure

- Fountains
- Water parks
- Swimming pool recirculation pumps, filter inlet pump, dewatering submersible pumps
- Watering of golf courses



Kirloskar Solar Pumps: happiness on tap





Regional Offices

AHMEDABAD

11, Mill Officers Colony, Behind La Gajjar Chambers, Ashram Road, Ahmedabad, Pin: 380 009
Tel : (079) 2658 3739, 2658 0376, 2658 3258, 2658 3615, 2657 4500, 2657 4802
Fax : (079) 26583786
Email: ahmedabad@kbl.co.in

BANGALORE

No. 5, Lakshmi Complex, 2nd Floor, 10th Cross, RMV Extension, C. V. Raman Road, Bangalore Pin: 560 080
Tel : (080) 2361 9914, 2361 9915, 2361 0027, 2361 0028
Fax : (080) 2361 0095
Email: bangalore@kbl.co.in

BHOPAL

E-1, Shankarnagar, 6½ Bus Stop, Opp. Parul Hospital, Bhopal, Pin: 462 016
Tel : (0755) 421 8341
Email: bhopal@kbl.co.in

BHUBANESWAR

Plot No. 969 (Part - A), Uttam Tower, Block B, 1st Floor, Ashok Nagar, Unit - 2 Bhubaneswar, Pin: 751 009
Tel : (0674) 253 6421, 253 5371, 253 6188
Fax : (0674) 253 4965
Email: bhubaneshwar@kbl.co.in

CHENNAI

Raj Paris Trimeni Towers, 2nd Floor, 147 G. N. Chetty Road, T. Nagar, Chennai, Pin: 600 017
Tel : (044) 2815 7769, 2815 6546/ 7/8
Fax : (044) 2815 6549
Email: chennai@kbl.co.in

DEWAS

Station Road, Dewas, Pin: 455 001
Tel : (07272) 227302/ 03/ 04
Fax : (07272) 228747

JAIPUR

B-8, Durga Das Colony, Behind Neelkanth Tower, Bias Godam Circle, Bhawani Singh Road, Jaipur - 302001 - Rajasthan
Tel : +91-0141 - 2223830
Email: jaipur@kbl.co.in

JAMSHEDPUR

Kirloskar Brothers Limited No.4, 4th Floor, Meghdeep Building Q Road, Bistupur, Beside Hotel South Park Jamshedpur, Pin: 834001
Email: vikrant.kumar@kbl.co.in
Mob : (0) 94309 35888

KOCHI

Veejay Towers, 38/239 A, Salim Rajan Road, Gandhinagar, Ernakulam, Kochi, Pin: 682 017
Tel : (0484) 220 6651, 220 6652,
Fax : (0484) 220 6653
Email: kochi@kbl.co.in

KOLKATA

KCI Plaza, 1st Floor, 23 C, Ashutosh Chowdhary Avenue, Kolkata, Pin: 700 019
Tel : (033) 2461 5065, 2461 5934
Fax : (033) 2461 4519
Email: kolkata@kbl.co.in

LUCKNOW

B-1/7 Sector A, Aliganj, Lucknow, Pin: 226 024
Tel : (0522) 232 6367, 232 6374, 232 6387
Fax : (0522) 232 6365
Email: lucknow@kbl.co.in

MUMBAI

10 Corporate Park, Swastik Mills Compound, Sion - Trombay Road, Chembur, Mumbai, Pin: 400 071
Tel : (022) 2528 9320 - 28
Fax : (022) 2528 9329
Email: mumbai@kbl.co.in

NAGPUR

Flat No. 7, Sagar Palace, Laxmi Nagar, Behind 'Bal Jagar', East High Court Road, Nagpur, Pin: 440 022
Tel : (0712) 223 4275, 223 4276
Fax : (0712) 223 4276
Email: nagpur@kbl.co.in

NEW DELHI

Kirloskar Brothers Limited M-11, 3rd Floor, Middle Circle Connaught Place New Delhi-110 001

PUNE

Udyog Bhavan, Tilak Road, Pune, Pin : 411 002
Tel : (020) 2444 0770
Email: pune@kbl.co.in

SECUNDERABAD

Post Box No. 1580, 403, Jade Arcade 126, MG Road, Paradise Circle Secunderabad, Pin: 500 003
Tel : (040) 66874700, 66874712 to 37, 27816075
Fax : (040) 27894598
Email: secunderabad@kbl.co.in

How
to order
your solar
pump

For the ideal and optimal solution to your solar pump requirement, and prompt response, please ensure that you send the following particulars and details to kblin@kbl.co.in

- Your name, address, tel. no. and email
- Intended location of solar pump installation
- Total requirement of daily water (in litres per day)
- Total pumping head for water to be lifted (in meters)

KIRLOSKAR BROTHERS LIMITED

Distribution Sector

Corporate Office:

'YAMUNA', Survey No. 98 (3-7), Baner Pune 411 045, Maharashtra (India)

Phone: + 91-20-27214444, E-mail: kblin@kbl.co.in



Customer Service & Spare (CSS)

Toll Free: 1800 103 4443



Visit us at : www.kirloskarpumps.com

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