



vector
Energy

Solar pumping with VFD

vectorenergy.com

A COMPLETE SOLUTION

for solar pumping with
Vector and LS Electric
variable frequency drives



VDSmart Connect

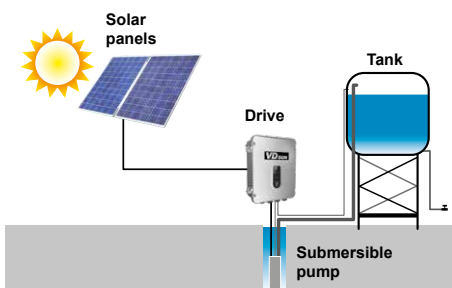


VDSUN



H100

SYSTEM TYPES

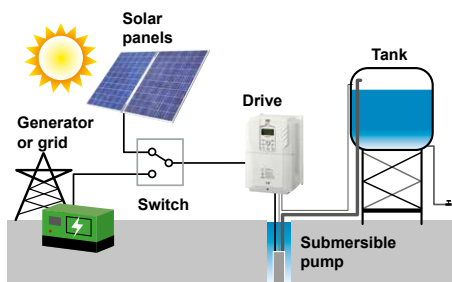


OFF-GRID

PV POWER SUPPLY

Solar photovoltaic energy is
the only source of energy available

- No grid or generator is used.

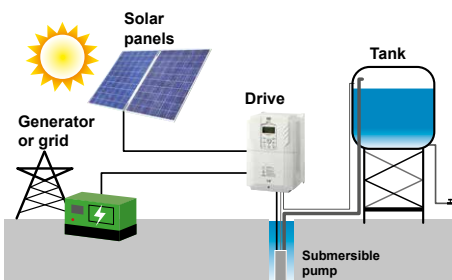


SWITCHED (ON-GRID & OFF-GRID)

PV POWER OR GENERATOR/GRID POWER SUPPLY

Various energy sources available:
PV, generator or grid

- Replaces photovoltaic power by a generator or grid when the system needs it.



HYBRID (ON-GRID & OFF-GRID)

SIMULTANEOUS PV AND GENERATOR/GRID POWER SUPPLY

Various energy sources available:
PV, generator or grid

- Combines PV, generator or grid when the system needs it, so ALL available PV power is used, along with AC and DC simultaneously.

After more than 25 years of experience in the sector, **VECTOR ENERGY** has designed a wide range of solutions for solar pumping.

VDSun is an optimal solution for low-power pumps. Designed to be installed without the need for an electrical panel and with a voltage booster that allows reducing the number of panels needed.

H100 is a high-performance inverter from LS Electric designed and conceived by Vector Energy to work in solar pumping installations. Its wide range of powers (from 0.75 to 500 kW) allows it to provide solutions for all types of pumping installations.

VDSmart Connect is an IoT gateway with which you can have control and monitoring of your installation in the palm of your hand.

Our knowledge of the market has allowed us to implement specific functions for solar irrigation, functions for pump protection and energy optimization in our solutions.



Applications

Irrigation
Rural water supply
Groundwater extraction for human use
Wastewater treatment

Areas

Replace/combine with generators
Areas with no electricity supply
or weak power grids
Systems with high energy costs
Systems for temporary use

Solar pumping with variable frequency drives



VDSUN

0.37 ~ 2.2 kW Input single phase 230V
Output three phase 230V

Easy installation and commissioning

- With a few simple steps you will have your installation up and running. Thanks to the optional IoT module, we can connect via Wi-Fi and completely configure our equipment without the need for cables or a console (VDSUN APP Wifi)

Designed for outdoor installation

The entire casing is made of aluminium, with an IP65 protection rating.

Integrated voltage booster

- 5 photovoltaic panels are enough to power the equipment *
- * Minimum working voltage $V_{mp} = 160$ Vdc.

Maximum efficiency and integrated pumping functions

- MPPT function, pressure control, dry well protections etc.

Cloud remote control via VDSUN APP:

- Allows you to monitor, reset alarms or change parameters. You just need to add a SIM card to the optional IoT module.

Compatible with three-phase and single-phase pumps *

* Up to 1.1 kW

RS-485/Modbus communication

Suitable for OFF-grid or switched (ON-grid & OFF-grid) systems

Control and monitoring

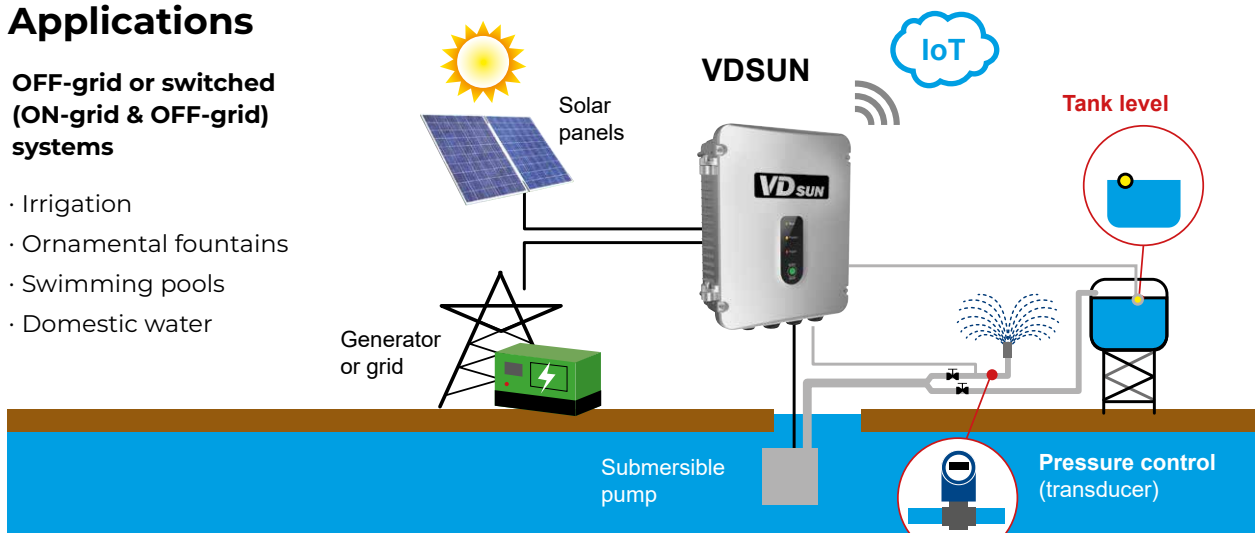


VDSUN APP and VDSUN APP Wifi available for ANDROID OS at vectorenergy.com

Applications

OFF-grid or switched (ON-grid & OFF-grid) systems

- Irrigation
- Ornamental fountains
- Swimming pools
- Domestic water



H100

SOLAR POWERED BY VECTOR

0.75 ~ 18.5 kW Three phase 230V

0.75 ~ 500 kW Three phase 400V



Pumping functions

- Pipe filling
- PID pressure control

Supply types

- OFF-grid (DC)

OFF-grid and ON-grid:

- Switched (AC or DC)
- Hybrid (AC + DC)



**Advanced
LCD Keypad**

Solar start test

- Avoid unnecessary starts when there is not enough power.

Automatic control of the generator

- Intelligent system that starts/stops the generating set, depending on the available solar energy

Integrated time clock

- It is possible to configure start/stop of the drive by time clock.

Easy commissioning thanks to macro programming: *

- Macro for raft filling (MPPT)
- Macro for pressure control (MPPT + PID)

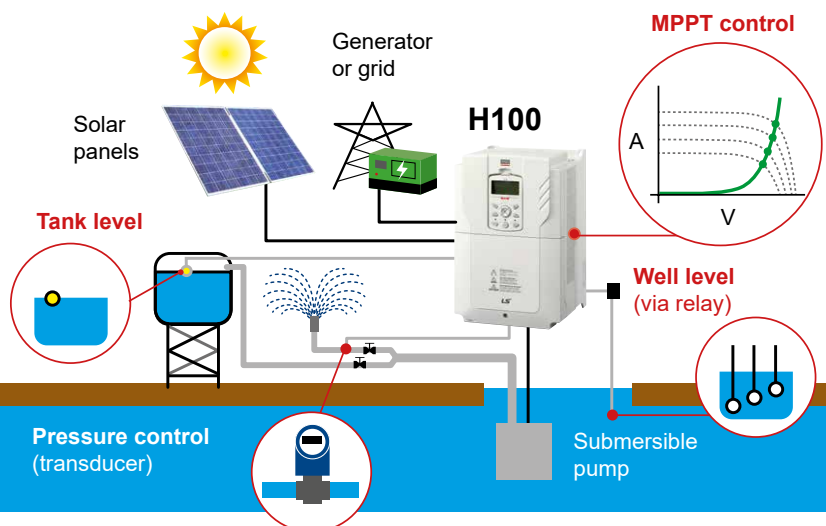
* Using only 1 parameter, the entire drive is preconfigured.

Protections:

- Preload resistance in DC:
It allows you to connect the photovoltaic field safely to the drive without the need to use external systems.
- Automatic dry well
Test on the hydraulic system to improve dry well detection.
- Special starter for submerged pump
- Sleep/wake up
- Tank level

H100 example with MPPT control for solar pumping

MPPT function to find the maximum power point in the voltage-current relationship of the panels. With inputs to detect radiation sensors, tank levels, well level (with relay) and irrigation pressure (transducer)



Full solar pumping
macro setup

PLUG & PLAY IoT GATEWAY

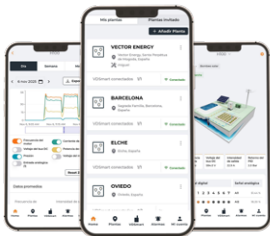
VDSmart connect



VD and LS Electric drives remote monitoring and control

Expand variable frequency drives functionalities and improve its installation performance

Avoids unnecessary travel and allows easy and effective control of equipment from any location

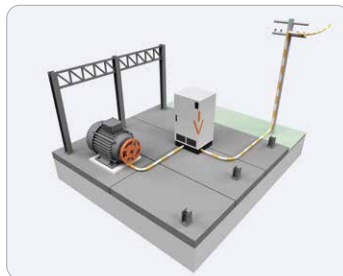


Available in web platform and Android/iOS APP



- Each VDSmart can connect and manage up to 8 drives on the cloud
- Wifi / LAN / Modem built-in (SIM card)
- All your facilities in a single account
 - Easy view of all plants registered in your account
 - User level control (monitoring only, partial/full control, etc.)
- Operational history and reports, access to parameters, remote start and stop, real-time alarm notification

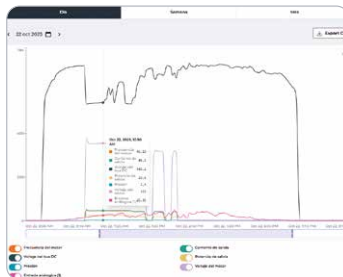
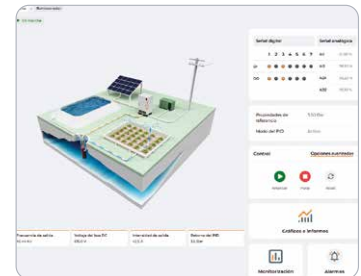
Industrial plants



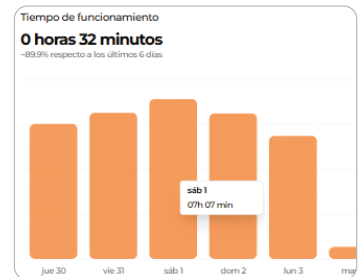
Pumping stations



Solar pumping



Parámetros	
0x100	DRV-02 Consigna de frecuencia (0.00 - 400.00)
0x101	DRV-02 Dirección Marcha Teclado
0x102	DRV-02 Tiempo de aceleración (0.00 - 60.00)



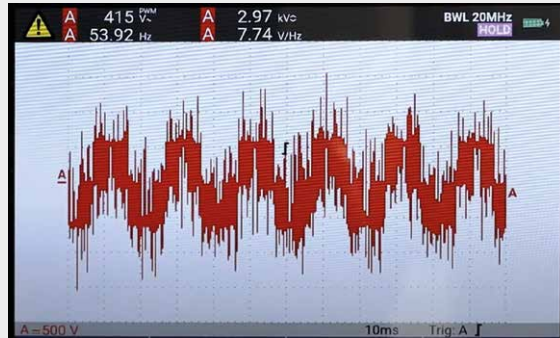
Priorización	
0x100	DRV
0x101	DRV-01
0x102	DRV-02
0x103	DRV-03
0x104	DRV-04
0x105	DRV-05
0x106	DRV-06
0x107	DRV-07
0x108	DRV-08

Filters for motor protection

The drives use pulse width modulation (PWM) to change the power supply frequency of the motors, being able to regulate their speed and other parameters.

Although the introduction of VFDs has led to greater energy savings and more precise control of the motors, the length between the VFD and the motor results in possible overvoltages at the motor terminals.

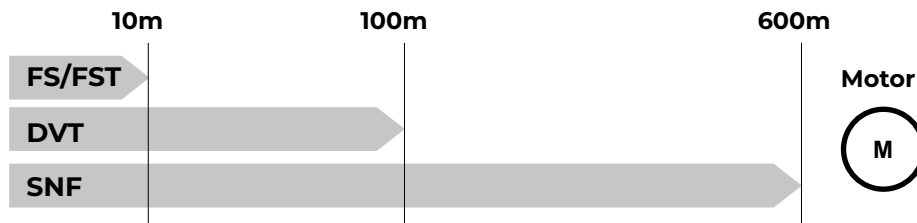
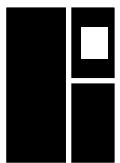
To avoid this, the correct choice and use of filters at the output of the VFD extend the life of the motor and reduce maintenance costs.



Problems in engines without filter:

- Damage to the electrical insulation of the motor due to high dv/dt, overvoltage and overheating
- EMI interference in wiring
- Damage to bearings

Variable frequency drive



NOTE: The maximum length may vary depending on factors inherent to each installation.

FS/FST



Magnetic ferrites necessary to comply with EMC directive. They absorb EMI interference.

Motor power:

FS: 0,4 ... 45 kW
FST: 45 ... 350 kW

DVT



dv/dt filter designed to reduce the voltage peaks received by the motor.

Motor power: 1,5 ... 1200 kW (400 V)
Voltage: up to 480 V
Frequency: 0 ... 120 Hz (with derating)
Insulation class: H (+180 °C)

SNF



Converts the rectangular PWM signal into a sinusoidal one.

Motor power: 1,5 ... 630 kW (400 V)
 37 ... 500 kW (690 V)
Frequency: 0 ... 120 Hz (with derating)
Insulation class: H (+180 °C)



vector Energy

C/ Montcada, 7 - Pol. Ind. Les Pereres
08130 Santa Perpètua de Mogoda
BARCELONA (SPAIN)

Tel. (+34) 935 748 206

e-mail: info@vectorenergy.com



vectorenergy.com

PHOTO: JAVIER MONTAÑA