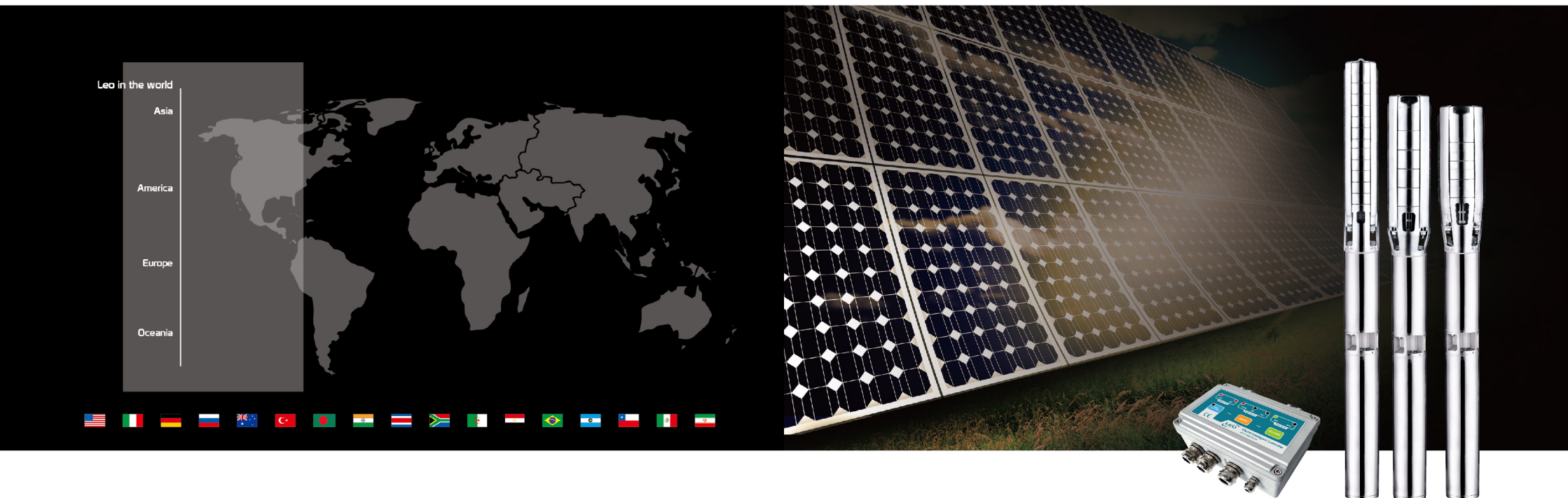




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Solar Submersible Pump Systems

LPS Hybrid AC/DC

Index for Hybrid AC/DC solar pump

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Product Introduction

LPS Hybrid AC/DC Solar Submersible Pumps are fitted with a permanent magnet, brushless motor, Which enables the efficient use of energy from a wide range of supply options. The pump system offers the perfect water supply solution in remote areas where water is scarce and the power supply is non-existent or unreliable. The structure of motor with double shields poses no pollution risk to drinking water. The integrated control system is built inside the motor to make it more compatible and reliable, while offering the MPPT function-Maximum Power Point Tracking, maximizing the utilization of power generated from the photovoltaic generator.

Characteristic

- Water-cooled motor, safe and poses no pollution risk to drinking water.
- Advanced brushless dc motor, saving energy and offering maximum efficiency
- Motor-Built-in, integrated controller, with MPPT and DSP Technology, offering the easiest and simplest installation.
- Intelligent frequency conversion algorithm, maximizing efficiency and saving energy
- A high degree of flexibility with regards to power supply and power range, offering a wide range of power sources to choose from,
- Can be powered from the mains and/ or power generators, guaranteeing operation day or night.
- Patented technology.
- Two years warranty

Suitable for a wide range of power supply

- Solar PV generators
- Electrical Mains supply
- Storage batteries
- Diesel Generators (Genset)

Supply voltage

Flexibility with regards to power supply and power range. the motor can be supplied with either DC or AC voltage:

- AC voltage range: 1 x 60 - 300 VAC, 50-60Hz
- DC voltage range: 60 - 400VDC
- Open circuit voltage: 60-410VOC
- Output power range: 0.37 - 3.0Kw for DC
- Output power range: 0.37 - 2.2Kw for AC

Pump Structure

Pump:

- Made of 100% stainless steel AISI 304
- Single shaft and impeller design removing any imbalance
- Minimal pump vibration and noise
- Long service lifetime of the motor.

Motor

- Made of 100% stainless steel AISI 304
- Double outer and inner shielding structure
- Internal coil made from high-temperature tolerant, copper wire
- Efficiently protecting the motor under high-temperature environment
- Extended motor's service lifetime.
- Water - filling lubricated rotor with top and bottom graphite-made bearing and thrust bearing made with high precision
- Co-axial rotation efficiently reduces motor's vibration and noise and extend its service lifetime.
- Built-in, integrated Variable Frequency Converter with intelligent-speed control algorithm with a maximum speed 3780 RPM.

Built-in Intelligent controller

The intelligent controller designed for LPS pump, offers high flexibility towards power supply source and range.

- Can be powered with either DC or AC voltage
- MPPT & DSP technology
- Intelligent parameter detection
- Soft start running
- Long system's lifetime.

Main protection functions:

- Dry-running protection
- Over-current protection
- Over-voltage protection
- Overload protection
- Phase loss protection

Application

LPS is designed for continuous, as well as intermittent operation, making it especially suitable for water supply applications in remote locations, such as: Villages, schools, hospitals, single-family houses, etc.

Farms

- Watering cattle and livestock
- Irrigation of fields and greenhouses
- Game parks and game farms
- Conservation areas
- Surface water pumping
- Floating pump installations for pumping water from ponds and lakes

Usage environment

LPS Hybrid AC/DC Solar Submersible Pumps are used for clean, non explosive liquids, not containing solid particles or longer fibers than grains of sand PH 5-9
liquid temperature: 0°-30° C (0°F - 92°F)
Pump maximum operating temperature: 55° (131 °F)

Sand content

Using the pump for liquids with greater sand content than permitted will greatly shorten the service lifetime of pump
Maximum sand content:50ppm

Saltiness

Stainless steel material have a high ability to resist corrosion particularly from chloride-containing salts

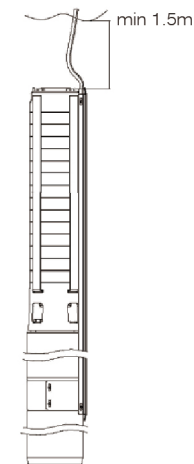
Features and Benefits

Dry-running protection

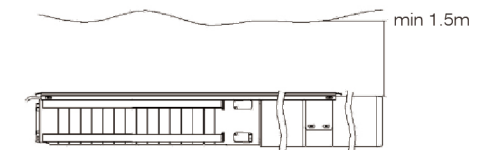
In order to prevent the pump running dry (without water), The LPS pump's built-in controller offers intelligent detection function of water level. When water level drops below water inlet, the pump's controller will automatically cut off power supply. The controller will then try to test-start again after 20-30 seconds. This function protects the motor from damage caused by over-heating due to dry run.

If the pump runs dry more than 4 times, the controller will shift into long-time protection state for 30mins before re-starting again. To disable the long-term protection function: cut off power supply manually, wait 2 minutes then manually re-start the pump.

Vertical liquid level installation graph



Horizontal liquid level installation graph



High efficiency

LPS models are especially equipped with permanent magnet DC brushless motors, as opposed to asynchronous motors; offering more efficient and stable output power. Internal motor winding enables a more stable magnetic field. Intelligent frequency conversion controls the motor's speed according to the power input and load.

Motor parameters are as follows:

- Speed range: 500-3780 RPM
- power range : 370- 3000 w
- maximum current: 9A
- AC/DC hybrid power input

Features and Benefits

Over-voltage & under-voltage protection

Under unstable power supply conditions, the intelligent controller cuts-off the power due to its interference-protection components. It is recommended to install a lightning arrester if operating under thunder storms environment.

Over-load & over-current protection

When voltage surges, overload protection contactor in the controller opens, cutting-off power. The controller then tries self-start several times every 20 seconds until voltage is stabilized.

High temp protection.

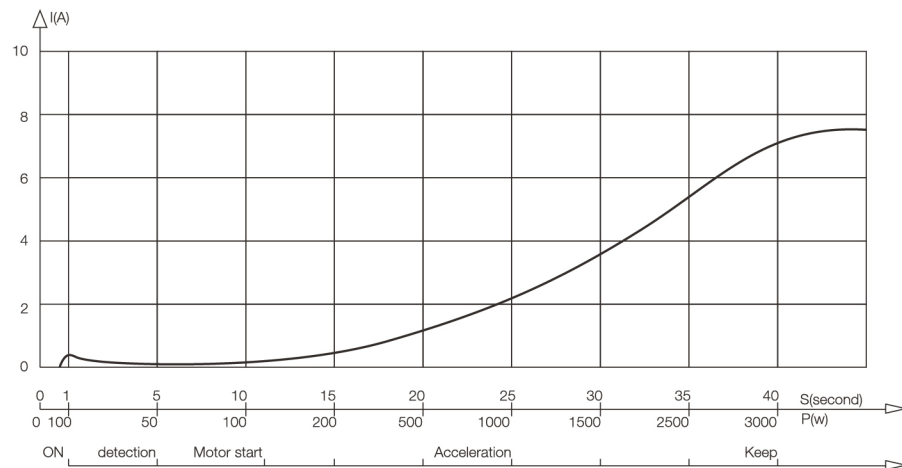
To avoid extreme motor heating, the control system inside LPS will cut-off power when motor temp reach 120° C (248°F). The controller then restarts when the temp drops to below 120°C (248°F)..

MPPT function

The Maximum Power Point Tracking algorithm used in LPS pumps ensures maximum extraction and utilisation of generated power from PV generators.

Motor soft start

The motor used in LPS models is equipped with an intelligent variable frequency converter/ soft starter program. At start, the power required is less than 100W and the current is below 0.15A. That means any external contactors, power disconnectors and sensors/ switches must be rated 100W or less. As the motor operation continues, operating power is gradually increased until motor reaches its maximum speed. As a result, service lifetime of both the motor as well as MCBs, contactors and protection switchgear are prolonged.

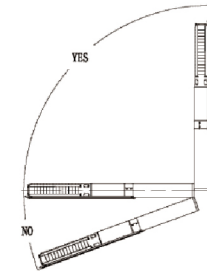


Pump Installation



Make sure the power supply is disconnected during installation.

Installation diagram



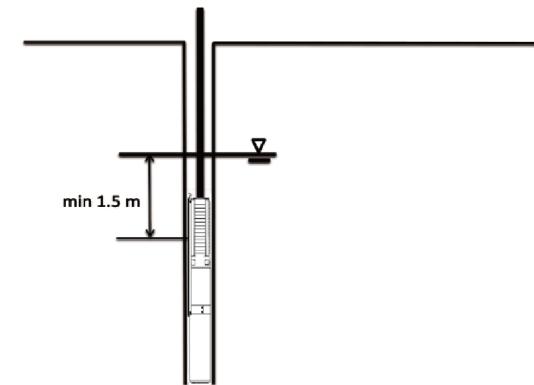
Pump can be installed both vertically and horizontally, but the outlet should never be below the horizontal line. Minimum head of 10% than max pump head must be granted.

Parameters:

- Well diameter must be equal to or greater than 4"
- Submersion Depth must be less than 150m

Installing the pump inside the well

To reduce noise transmission it is advised to use plastic pipes. The pump must always be secured in the well through a special rope attached to loop on the pump head. It is recommended not to drop the pump in the well by using the electric cable, its integrity must be preserved in all steps. In this regard it is recommended to use a cable support or install over the riser pipe. During operation, the pump suction must always remains at least 1.5 meters below the dynamic water level.



Do not drop the pump in the well by using the electric cable. Preserve the electric cable integrity during all the steps. Secure the pump using a stainless steel rope to be tightened to the well head

Pump Installation in DC Power Supply

Options for Pump Installation:

LPS pump can be with or without external controller (optional plug-in).

All overload, overvoltage and dry running protection functions are integrated into the Built-in Intelligent controller
Connecting the pump to a PV solar generator is the simplest way to connect the system

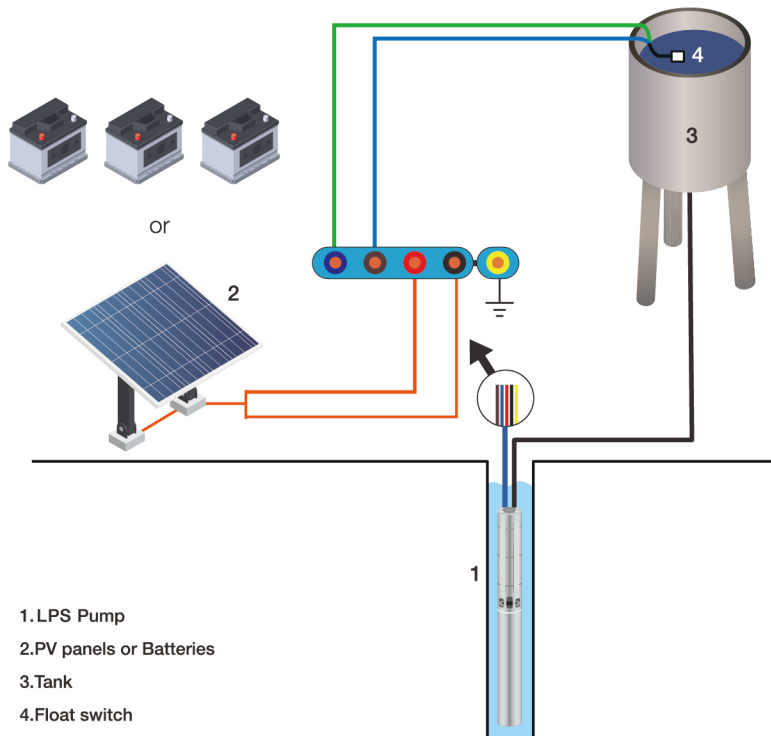
Benefits

- Easy installation
- Easy to maintain, as long as the PV modules are regularly cleaned
- Few and simple components with minimum cost

The protective circuit incorporated in the motor electronic unit cuts out the power in case of dry running or similar situations.

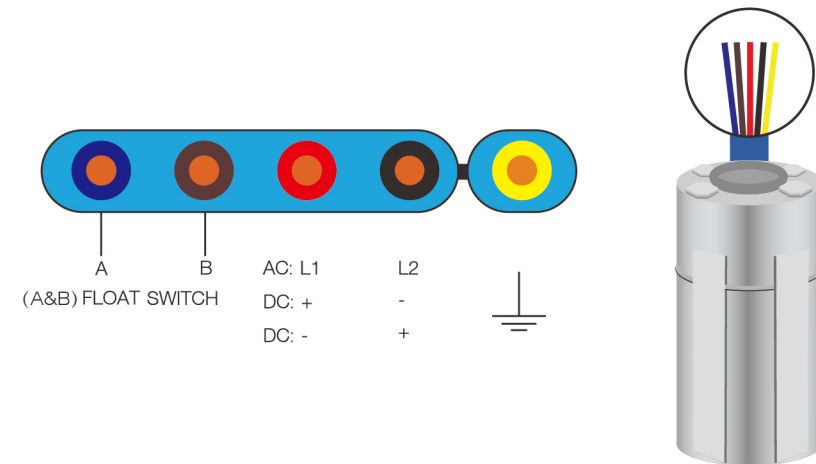
Pump power can be also manually switched off in case of:

- Pump maintenance
- No need for water supply



Pump Installation in DC Power Supply

Wiring Method



Warning:

1. When change the power input of AC and DC, the interval time needs 1 minute.
2. The pump should not take the dry running protection test until the water fully enter the water conservancy and the pump has been soaked, otherwise the pump body will be damaged.
3. The operating temperature of the pump should below 30°C. If the water temperature exceeds, the motor will be damaged. The float signal wire of the pump should not touch the high voltage, otherwise it will cause the pump to be damaged instantaneously.
4. After 4 times of dry running protection, the motor will enter into a 30-minute protection state. You can remove such state by turning the power off for 2 minutes.

Pump Installation in AC Power Supply

Options for Pump Installation:

LPS pump can be with or without external sensor (optional plug-in).

All overload, overvoltage and dry running protection functions are integrated into the Built-in Intelligent controller

Connecting the pump to a PV solar generator is the simplest way to connect the system

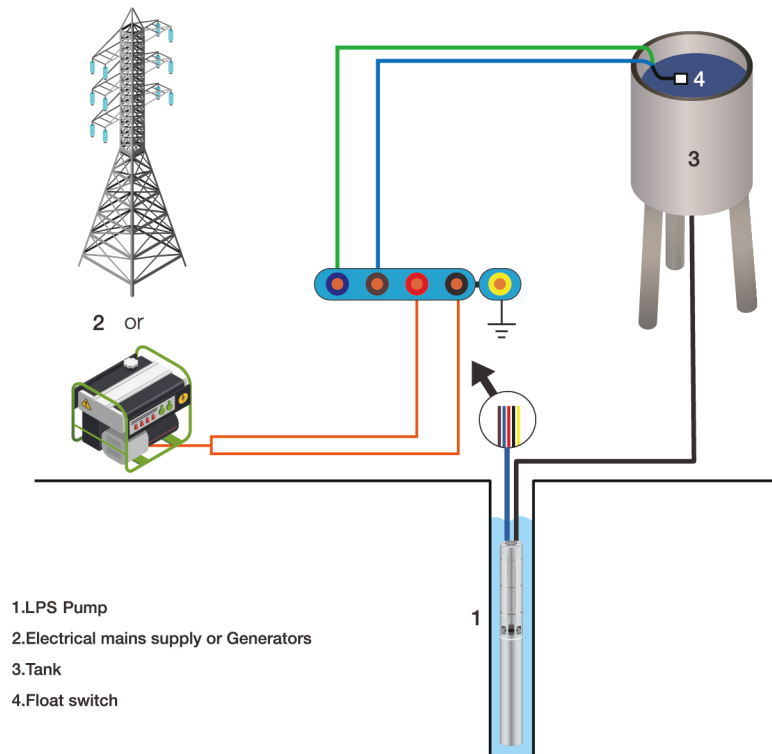
Benefits

- Easy installation
- Easy to maintain, as long as the PV modules are regularly cleaned
- Few and simple components with minimum cost

The protective circuit incorporated in the motor electronic unit cuts out the power in case of dry running or similar situations.

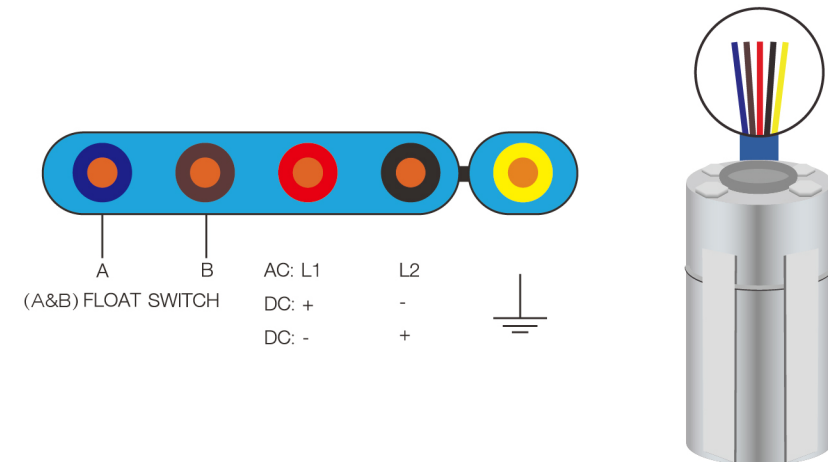
Pump power can be also manually switched off in case of:

- Pump maintenance
- No need for water supply



Pump Installation in AC Power Supply

Wiring Method



Warning:

1. When change the power input of AC and DC, the interval time needs 1 minute.
2. The pump should not take the dry running protection test until the water fully enter the water conservancy and the pump has been soaked, otherwise the pump body will be damaged.
3. The operating temperature of the pump should below 30°C. If the water temperature exceeds, the motor will be damaged. The float signal wire of the pump should not touch the high voltage, otherwise it will cause the pump to be damaged instantaneously.
4. After 4 times of dry running protection, the motor will enter into a 30-minute protection state. You can remove such state by turning the power off for 2 minutes.

Pump Installation in Hybrid AC/DC Power supply

Options for Pump Installation:

LPS pump can be with or without external sensor (optional plug-in).

All overload, overvoltage and dry running protection functions are integrated into the Built-in Intelligent controller

Connecting the pump to a PV solar generator is the simplest way to connect the system

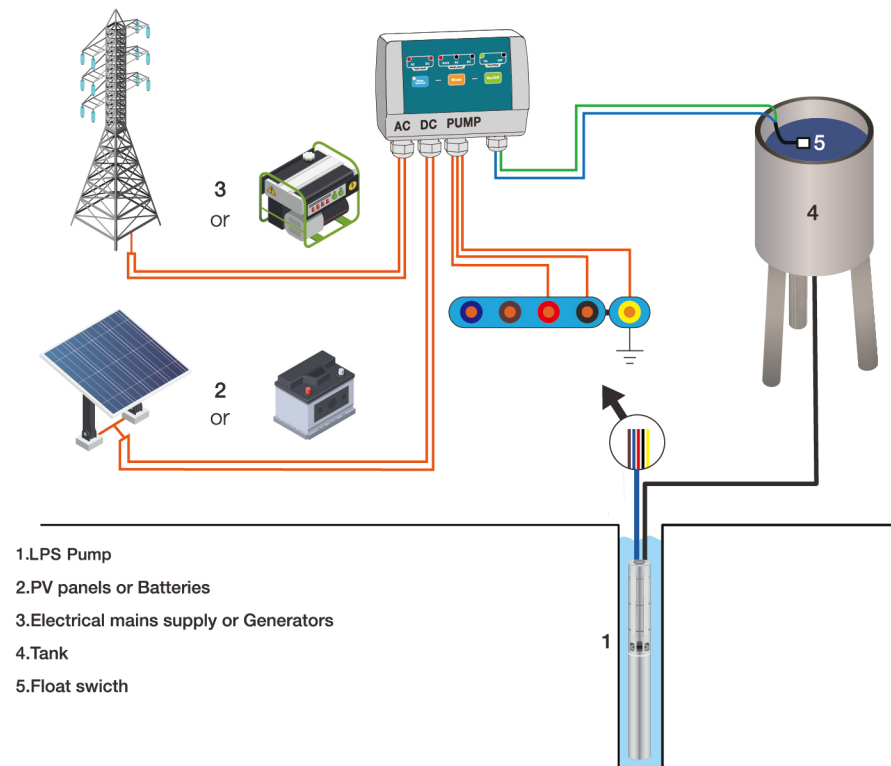
Benefits

- Easy installation
- Easy to maintain, as long as the PV modules are regularly cleaned
- Few and simple components with minimum cost

The protective circuit incorporated in the motor electronic unit cuts out the power in case of dry running or similar situations.

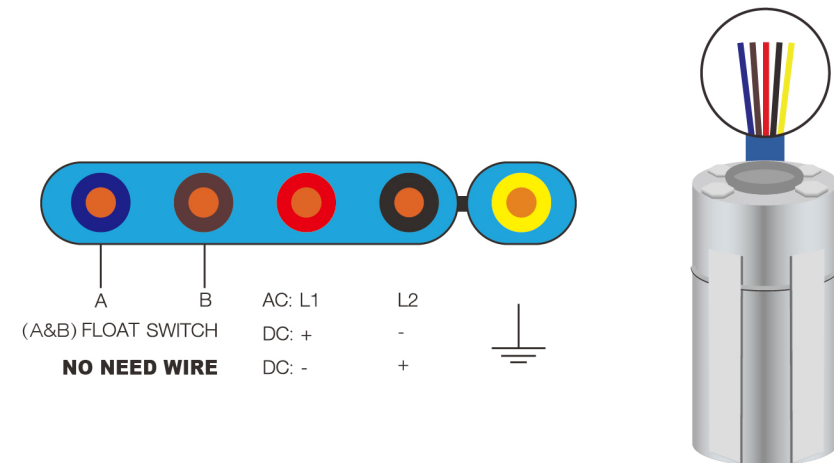
Pump power can be also manually switched off in case of:

- Pump maintenance
- No need for water supply



Pump Installation in Hybrid AC/DC Power supply

Wiring Method



Warning: The wire of float switch A&B can not connect power cord (L1,L2), otherwise the pump will be broken!



Warning:

1. When change the power input of AC and DC, the interval time needs 1 minute.
2. The pump should not take the dry running protection test until the water fully enter the water conservancy and the pump has been soaked, otherwise the pump body will be damaged.
3. The operating temperature of the pump should below 30°C. If the water temperature exceeds, the motor will be damaged. The float signal wire of the pump should not touch the high voltage, otherwise it will cause the pump to be damaged instantaneously.
4. After 4 times of dry running protection, the motor will enter into a 30-minute protection state. You can remove such state by turning the power off for 2 minutes.

PV Generator Size and Configuration

The power rating of the selected pump (P1) defines the total power of the PV system to be adopted.

The photovoltaic panels are characterized by:

- Max power (Pmax)
- Voltage Max power point (Vmpp)
- Current max power point (Impp)
- Open circuit voltage (Voc)

P1/Pmpp will determine the number of panels needed.

The panels are connected in series until the total open circuit voltage (Voc x n. Panels) does not exceed the voltage limit of the pump (410 V). Beyond this limit the panels are connected in parallel. The panels are connected in parallel as long as the current does not exceed the current limit of the pump (13 A).

Model	Power		ECO PV Panel Qty		RCD PV Panel Qty		Rated Current		PV Panel Configuration	
	Rated Power (HP)	Max Input Power (Kw)	ECO Qty (PCS)	VOC (V)	RCD Qty (PCS)	VOC (V)	A	Connection	Watt	
4LPS2/7	0.5	1.3	5	187	7	261	<9	In series	270	
4LPS3/3	0.5	0.65	2	75	4	149	<9	In series	270	
4LPS5/3	0.5	0.9	3	112	5	187	<9	In series	270	
4LPS8/2	0.5	1.1	4	149	6	224	<9	In series	270	
4LPS2/9	1	1.5	6	224	8	298	<9	In series	270	
4LPS3/6	1	1.2	4	149	7	261	<9	In series	270	
4LPS5/6	1	1.8	7	261	10	373	<9	In series	270	
4LPS8/3	1	1.5	6	224	8	298	<9	In series	270	
4LPS14/1	1	1.1	4	149	6	224	<9	In series	270	
5LPS20/1	1	1.2	4	149	7	261	<9	In series	270	
5LPS25/1	1	1.6	6	224	9	336	<9	In series	270	
6LPS17/1	1	1.1	4	149	6	224	<9	In series	270	
6LPS20/1	1	1.4	5	187	8	298	<9	In series	270	
4LPS2/11	1.5	1.9	7	261	11	410	<9	In series	270	
4LPS3/8	1.5	1.6	6	224	9	336	<9	In series	270	
4LPS5/8	1.5	2.6	10	373	11	410	<9	In series	270	
4LPS8/4	1.5	2.1	8	298	11	410	<9	In series	270	
4LPS2/13	2	2.2	8	298	11	410	<9	In series	270	
4LPS3/11	2	2.2	8	298	11	410	<9	In series	270	
4LPS5/10	2	3	11	410	11	410	<9	In series	270	
4LPS8/5	2	2.5	9	336	11	410	<9	In series	270	
4LPS14/2	2	2	7	261	11	410	<9	In series	270	
5LPS10/3	2	2.4	9	373	11	410	<9	In series	270	
5LPS15/2	2	2.1	8	298	11	410	<9	In series	270	
5LPS20/2	2	2.2	8	298	11	410	<9	In series	270	
5LPS25/2	2	2.6	10	373	11	410	<9	In series	270	
6LPS17/2	2	2.6	10	373	11	410	<9	In series	270	
6LPS20/2	2	2.6	10	373	11	410	<9	In series	270	
4LPS2/16	2.5	2.8	10	373	11	410	<9	In series	270	
4LPS5/12	2.5	2.5	9	373	11	410	<9	In series	270	
4LPS8/7	2.5	2.8	10	373	11	410	<9	In series	270	
4LPS14/3	2.5	2.8	10	373	11	410	<9	In series	270	
4LPS8/8	3	3	11	410	11	410	<9	In series	270	
4LPS14/4	3	3	11	410	11	410	<9	In series	270	
5LPS10/4	3	3	11	410	11	410	<9	In series	270	
5LPS15/3	3	3	11	410	11	410	<9	In series	270	
5LPS20/3	3	3	11	410	11	410	<9	In series	270	
5LPS25/3	3	3	11	410	11	410	<9	In series	270	
5LPS30/2	3	3	11	410	11	410	<9	In series	270	
6LPS17/3	3	3	11	410	11	410	<9	In series	270	
6LPS20/3	3	3	11	410	11	410	<9	In series	270	

270 watt PV Panel Configuration

Model	270 Watt PV Panel
Pmax	270 W
VMPP	30.69 V
IMPP	8.8 A
VOC	37.3 V
ISC	9.32A
Operating temperature	-40°C to 85°C
Dimensions	1640mm × 992mm × 35mm

Warning:

1. When change the power input of AC and DC, the interval time needs 1 minute.
2. The pump should not take the dry running protection test until the water fully enter the water conservancy and the pump has been soaked, otherwise the pump body will be damaged.
3. The operating temperature of the pump should below 30 °C. If the water temperature exceeds, the motor will be damaged. The float signal wire of the pump should not touch the high voltage, otherwise it will cause the pump to be damaged instantaneously.
4. After 4 times of dry running protection, the motor will enter into a 30-minute protection state. You can remove such state by turning the power off for 2 minutes.

PV Generator Size and Configuration

The power rating of the selected pump (P1) defines the total power of the PV system to be adopted.

The photovoltaic panels are characterized by:

- Max power (Pmax)
- Voltage Max power point (Vmpp)
- Current max power point (Impp)
- Open circuit voltage (Voc)

P1/Pmpp will determine the number of panels needed.

The panels are connected in series until the total open circuit voltage (Voc x n. Panels) does not exceed the voltage limit of the pump (410 V). Beyond this limit the panels are connected in parallel. The panels are connected in parallel as long as the current does not exceed the current limit of the pump (13 A).

Model	Power		ECO PV Panel Qty		RCD PV Panel Qty		Rated Current		PV Panel Configuration	
	Rated Power (HP)	Max Input Power (Kw)	ECO Qty (PCS)	VOC (V)	RCD Qty (PCS)	VOC (V)	A	Connection	Watt	
4LPS2/7	0.5	1.3	4	181	6	271	<9	In series	330	
4LPS3/3	0.5	0.65	2	90	3	136	<9	In series	330	
4LPS5/3	0.5	0.9	3	136	4	181	<9	In series	330	
4LPS8/2	0.5	1.1	3	136	5	226	<9	In series	330	
4LPS2/9	1	1.5	5	226	7	316	<9	In series	330	
4LPS3/6	1	1.2	4	181	5	226	<9	In series	330	
4LPS5/6	1	1.8	5	226	8	362	<9	In series	330	
4LPS8/3	1	1.5	5	226	7	316	<9	In series	330	
4LPS14/1	1	1.1	3	136	5	226	<9	In series	330	
5LPS20/1	1	1.2	4	181	5	226	<9	In series	330	
5LPS25/1	1	1.6	5	226	7	316	<9	In series	330	
6LPS17/1	1	1.1	3	136	5	226	<9	In series	330	
6LPS20/1	1	1.4	4	181	6	271	<9	In series	330	
4LPS2/11	1.5	1.9	6	271	9	407	<9	In series	330	
4LPS3/8	1.5	1.6	5	226	7	316	<9	In series	330	
4LPS5/8	1.5	2.6	8	362	9	407	<9	In series	330	
4LPS8/4	1.5	2.1	6	271	9	407	<9	In series	330	
4LPS2/13	2	2.2	7	316	9	407	<9	In series	330	
4LPS3/11	2	2.2	7	316	9	407	<9	In series	330	
4LPS5/10	2	3	9	407	9	407	<9	In series	330	
4LPS8/5	2	2.5	8	362	9	407	<9	In series	330	
4LPS14/2	2	2	6	271	9	407	<9	In series	330	
5LPS10/3	2	2.4	7	316	9	407	<9	In series	330	
5LPS15/2	2	2.1	6	271	9	407	<9	In series	330	
5LPS20/2	2	2.2	7	316	9	407	<9	In series	330	
5LPS25/2	2	2.6	8	362	9	407	<9	In series	330	
6LPS17/2	2	2.6	8	362	9	407	<9	In series	330	
6LPS20/2	2	2.6	8	362	9	407	<9	In series	330	
4LPS2/16	2.5	2.8	8	362	9	407	<9	In series	330	
4LPS5/12	2.5	2.5	8	362	9	407	<9	In series	330	
4LPS8/7	2.5	2.8	8	362	9	407	<9	In series	330	
4LPS14/3	2.5	2.8	8	362	9	407	<9	In series	330	
4LPS8/8	3	3	9	407	9	407	<9	In series	330	
4LPS14/4	3	3	9	407	9	407	<9	In series	330	
5LPS10/4	3	3	9	407	9	407	<9	In series	330	
5LPS15/3	3	3	9	407	9	407	<9	In series	330	
5LPS20/3	3	3	9	407	9	407	<9	In series	330	
5LPS25/3	3	3	9	407	9	407	<9	In series	330	
5LPS30/2	3	3	9	407	9	407	<9	In series	330	
6LPS17/3	3	3	9	407	9	407	<9	In series	330	
6LPS20/3	3	3	9	407	9	407	<9	In series	330	

330 watt PV Panel Configuration

Model	330 Watt PV Panel
Pmax	330 W
VMPP	37.38 V
IMPP	8.83 A
VOC	45.23 V
ISC	9.38A
Operating temperature	-40°C to 85 °C
Dimensions	1956mm × 992mm × 40mm

Warning:

1. When change the power input of AC and DC, the interval time needs 1 minute.
2. The pump should not take the dry running protection test until the water fully enter the water conservancy and the pump has been soaked, otherwise the pump body will be damaged.
3. The operating temperature of the pump should below 30 °C. If the water temperature exceeds, the motor will be damaged. The float signal wire of the pump should not touch the high voltage, otherwise it will cause the pump to be damaged instantaneously.
4. After 4 times of dry running protection, the motor will enter into a 30-minute protection state. You can remove such state by turning the power off for more 2 minutes.



CN200 Intelligent Controller

Safety Instructions

We strongly suggest to reading carefully this operation manual before using and installing its products.

Any operation (installation, maintenance and repair) must be carried out by trained, skilled and qualified personnel.

Failure to observe and follow the instruction of this manual may result fatal in dangerous electric shock.



The unit must be connected to the power supply by a switch granting the complete visual disconnection (separation) from the line before any operation.

Disconnect the unit from the power supply before any operation.

Do not remove for any reason, the cover of the CN200 and the cable guard without having visually disconnected the unit from the power supply and having waited at least 5 minutes.



LPS Hybrid AC/DC Solar Submersible Pumps and pump system must be grounded properly before operation.

Do not start the pump for any reason if not completely immersed in water.

Avoid any shock or serious impact during transportation.

Check the LPS Hybrid AC/DC Solar Submersible Pumps immediately upon delivery and check for damage and/or missing parts. In either case, immediately notify the supplier.

Damages due to transportation, incorrect installation, or improper use of the device will null and void the warranty.

CN200 Installation

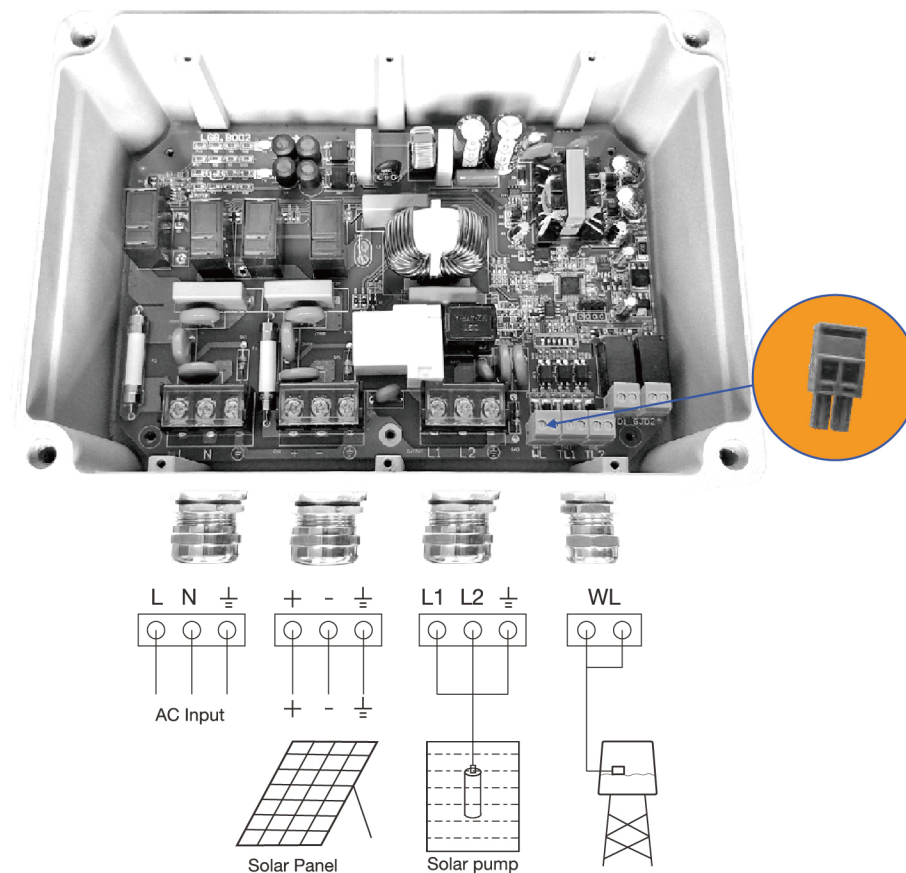
The CN200 can be easily fixed to the wall using 4 screws as the illustration shows.

The IP55 protection degree enables the CN200 installation even in humid and dusty environments.

However it is recommended to protect the CN200 from the direct exposure to weather and sunlight.

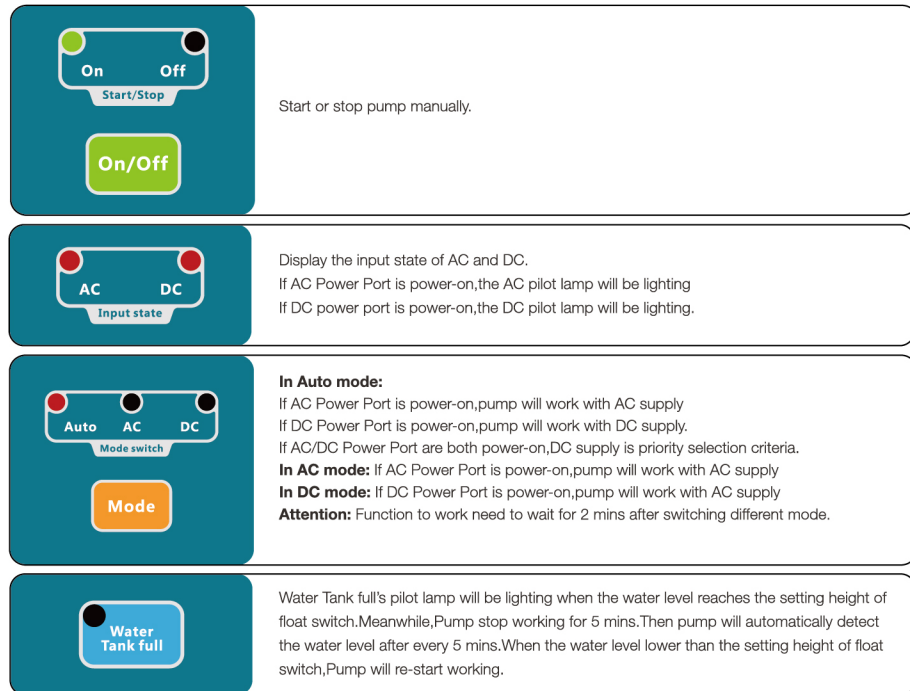
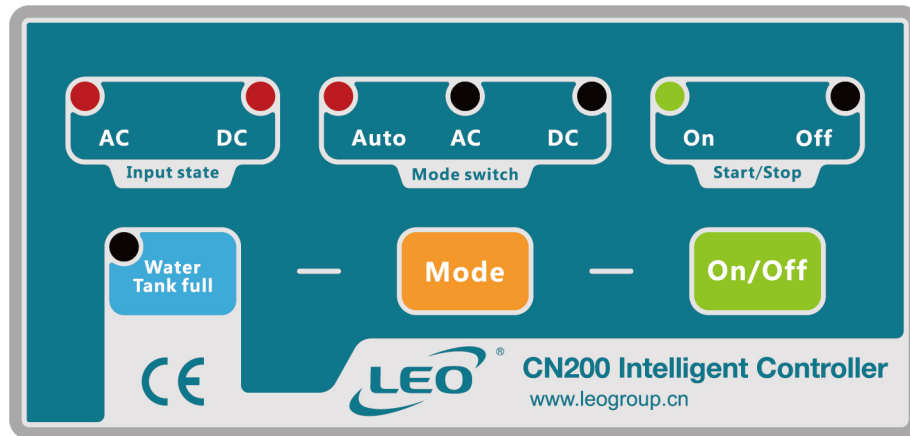


CN200 Electric wiring



Read carefully the Guidelines for safety before installing the device.
At the end of the installation check that no other objects are inside the CN200 or deposited on the electronic board.
It is recommended to tighten screws with washers of the cover before powering the device. Otherwise, you may fail to connect to ground the cover with a risk of electric shock or even death.

CN200 Featured functions



NOTE: