Turn-Key Project d.o.o.
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Solar pumping project

Parameter

Location:	Serbia, Pozarevac (44° North; 21° East)	Water temperature:	15 °C		
Required daily output:	40 m³; Sizing for custom season	Dirt loss:	5.0 %	Motor cable:	20 m
Pipe type:	-	Total dynamic head:	35 m	Pipe length:	-

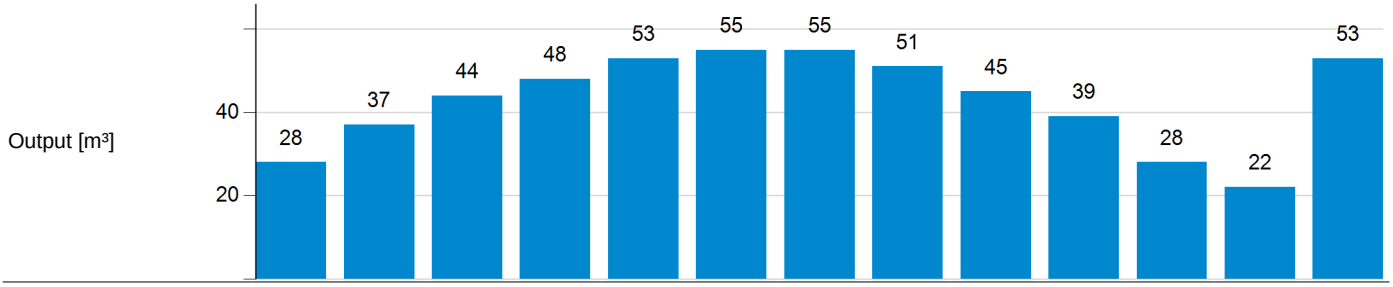
Products

	Quantity	Details
PS2-1800 C-SJ5-12	1 pc.	Submersible pump system including controller with DataModule, motor and pump end
Luxor LX -160M	18 pc.	2,880 Wp; 6 x 3 modules; 25 ° tilted
Motor cable	20 m	2.5 mm² 3-phase cable for power and 1-phase cable for ground
Accessories	1 set	Well Probe, Liquid Pressure Sensor, Surge Protector, PV Disconnect 440-40-3, PP2000 AC PowerPack

Sun Sensor setting in PumpScanner — min. 150 W/m²

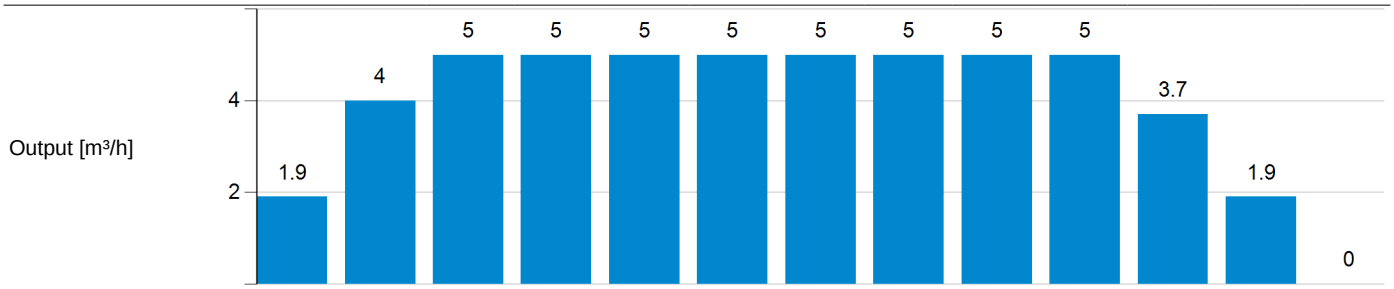
Daily output in custom season (May, June, July, August) — 53 m³

Daily values



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Av.
Energy [kWh]	5.6	8.4	11	13	14	15	15	14	11	8.7	5.5	4.4	15
Irradiation [kWh/m²]	1.9	2.9	4.0	4.6	5.4	5.8	6.0	5.7	4.4	3.2	1.9	1.5	5.7
Rainfall [mm]	1.4	1.4	1.4	1.9	2.4	2.8	2.3	1.8	1.7	1.5	1.6	1.8	1.8
Ambient temp. [°C]	0	1	5	11	16	20	22	22	18	12	6	1	11

Hourly values



	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00
Energy [kWh]	0.36	0.79	1.2	1.5	1.7	1.8	1.8	1.6	1.4	1.1	0.71	0.35	0.10
Irradiation [kWh/m²]	0.13	0.29	0.46	0.59	0.68	0.73	0.72	0.66	0.55	0.43	0.28	0.13	0.038
Ambient temp. [°C]	17	17	18	20	22	24	26	27	27	27	27	26	26

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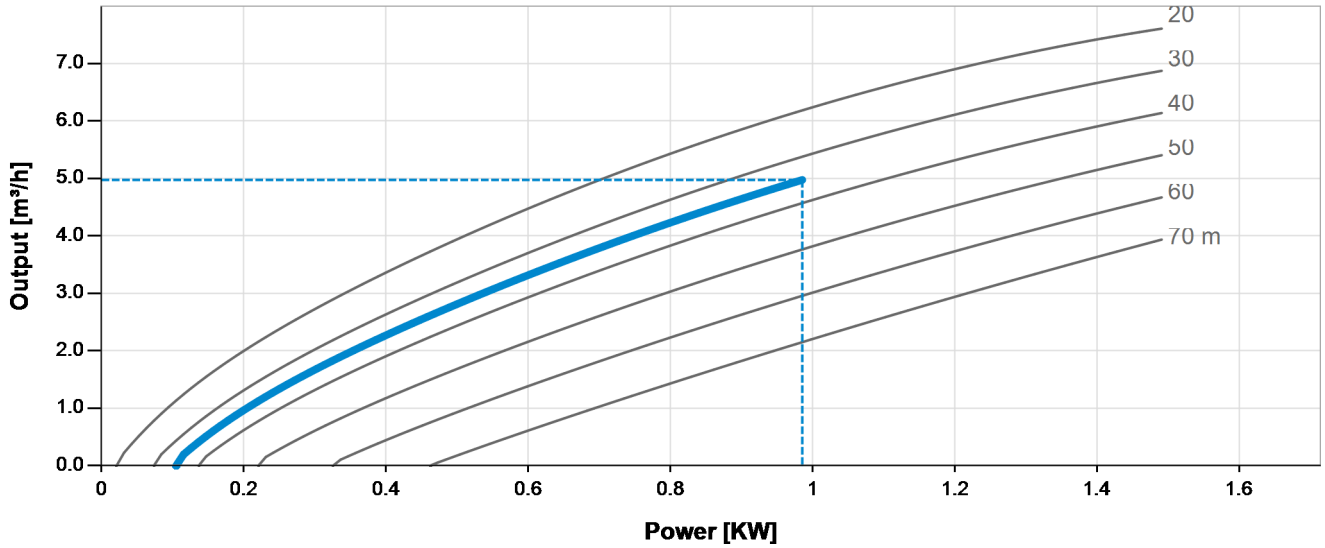
System characteristic



			Min.	800 W/m², 20 °C	Max./STC*
PV generator	Cell temperature	[°C]		46	25
	Temperature loss	[%]		10	-
	Dirt loss	[%]		5.0	-
	Pmax	[Wp]		1,965	2,880
	Vmp	[V]		103	115
	Imp	[A]		19	25
	Voc	[V]		126	139
	Isc	[A]		21	27
	Pout	[W]		1,035	-
	Vout	[V]		121	-
	Iout	[A]		8.9	-
Motor cable	Power loss	[%]	1.1	3.5	3.5
Pump systems	Motor power	[W]	105	985	985
	Motor voltage	[V EC]	57	98	98
	Motor current	[A]	1.8	10	10
	Motor speed	[rpm]	1,985	2,610	2,610
	Flow rate	[m³/h]	0	5.0	5.0
	Efficiency	[%]	0	46	53

*STC: Standard test conditions for photovoltaic modules, 1000 W/m² solar iradiance, 25 °C cell temperature

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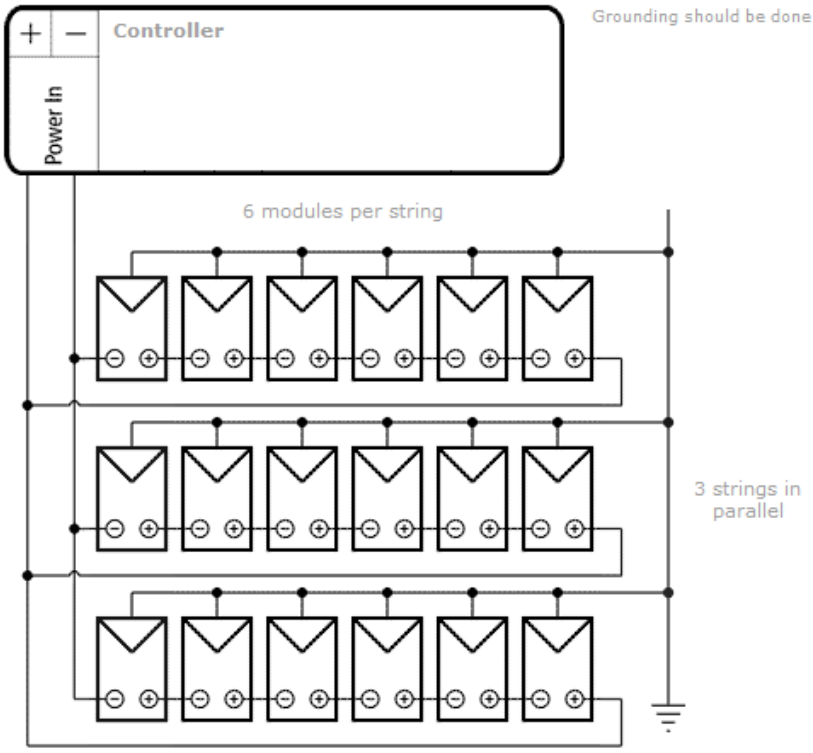
Wiring diagram



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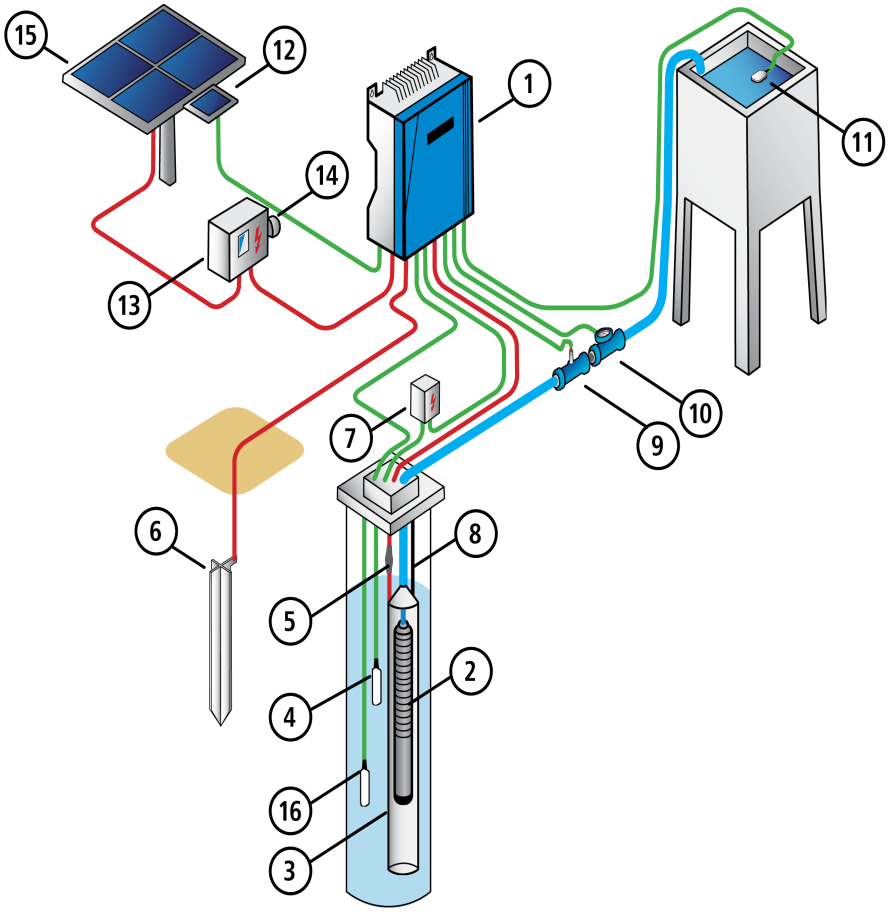
System Layout



1:	PS2 Controller	**11:**	Float Switch
2:	Submersible Pump	**12:**	Sun Switch
3:	Flow Sleeve	**13:**	PV Disconnect
4:	Well Probe	**14:**	Lightning Surge Protector
5:	Cable Splice Kit	**15:**	PV Generator
6:	Grounding Rod		*It is recommended to install a Surge Protector at each controller sensor input.
7:	Surge Protector*		
8:	Safety Rope		
9:	Water Meter		
10:	Pressure Sensor		

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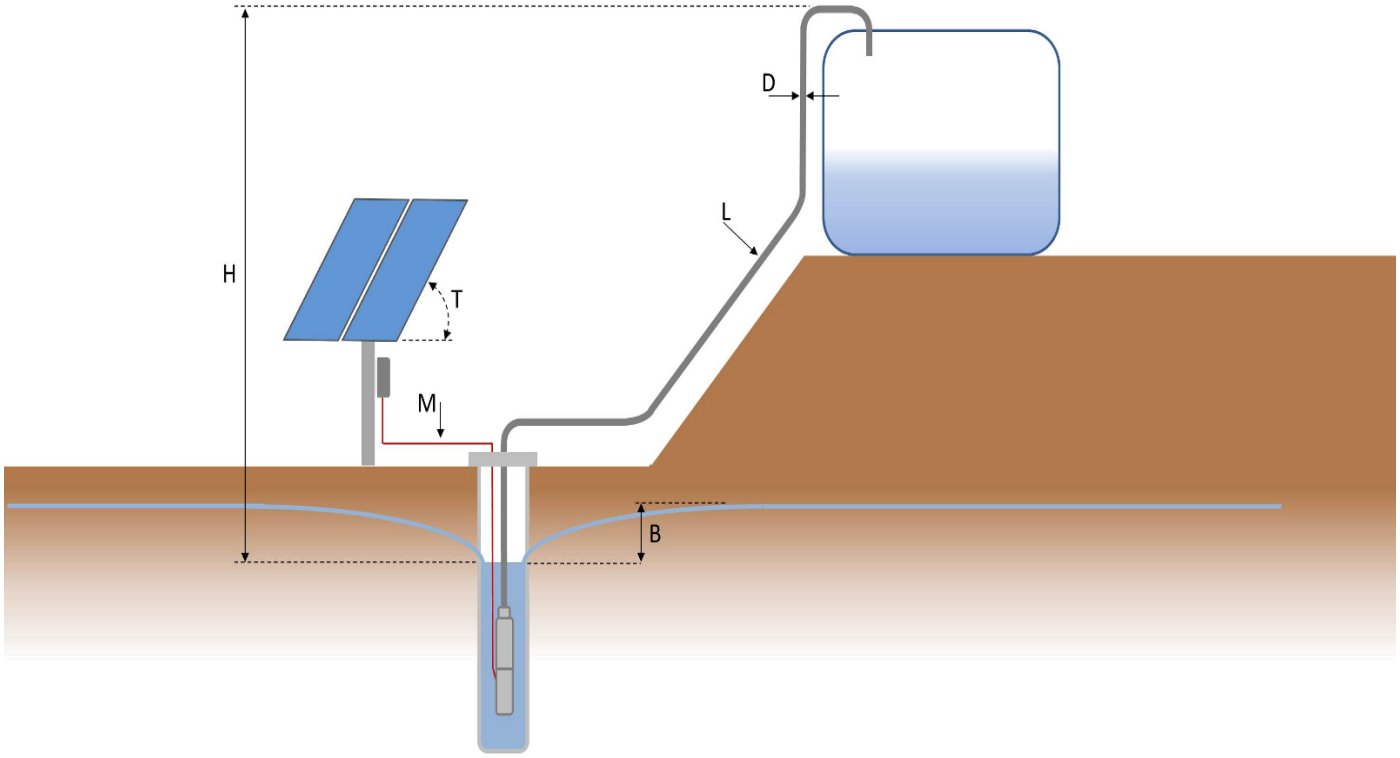
Sizing Layout



H (Static head):	Vertical height from the dynamic water level to the highest point of delivery.
B (Drawdown):	Lowering of water level depending on flow rate and recovery rate of the well.
D (Pipeline inner diameter)	
L (Pipe length):	Entire pipeline from the pump outlet to the point of delivery. Ellbows and armatures must be added as an equivalent length of pipeline.
M (Motor cable):	The cable between controller and pump unit.
T (Tilt angle):	Angle of the PV generator surface from the horizontal plane.

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PS2-1800 C-SJ5-12

Solar Submersible Pump System for 4" wells

System Overview

Head	max. 70 m
Flow rate	max. 7.6 m³/h

Technical Data

Controller PS2-1800

- Controlling and monitoring
- Control inputs for dry running protection, remote control etc.
- Protected against reverse polarity, overload and overtemperature
- Integrated MPPT (Maximum Power Point Tracking)
- Battery operation: Integrated low voltage disconnect
- Integrated Sun Sensor

Power	max. 1.8 kW
Input voltage	max. 200 V
Optimum Vmp**	> 102 V
Motor current	max. 14 A
Efficiency	max. 98 %
Ambient temp.	-40...50 °C
Enclosure class	IP68

Motor ECDRIVE 1200-C / ECDRIVE 1800-C

- Maintenance-free brushless DC motor
- Water filled
- Premium materials, stainless steel: AISI 304/316
- No electronics in the motor

Rated power	1.7 kW
Efficiency	max. 92 %
Motor speed	900...3,300 rpm
Insulation class	F
Enclosure class	IP68
Submersion	max. 150 m

Pump End PE C-SJ5-12

- Non-return valve
- Premium materials, stainless steel: AISI 304
- Centrifugal pump

Efficiency	max. 65 %

Pump Unit PU1800 C-SJ5-12 (Motor, Pump End)

Borehole diameter	min. 4,0 in
Water temperature	max. 50 °C

Standards

CE 2006/42/EC, 2004/108/EC, 2006/95/EC

IEC/EN 61702:1995

The logos shown reflect the approvals that have been granted for this product family. Products are ordered and supplied with the approvals specific to the market requirements.

**Vmp: MPP-voltage under Standard Test Conditions (STC): 1000 W/m² solar irradiance, 25 °C cell temperature

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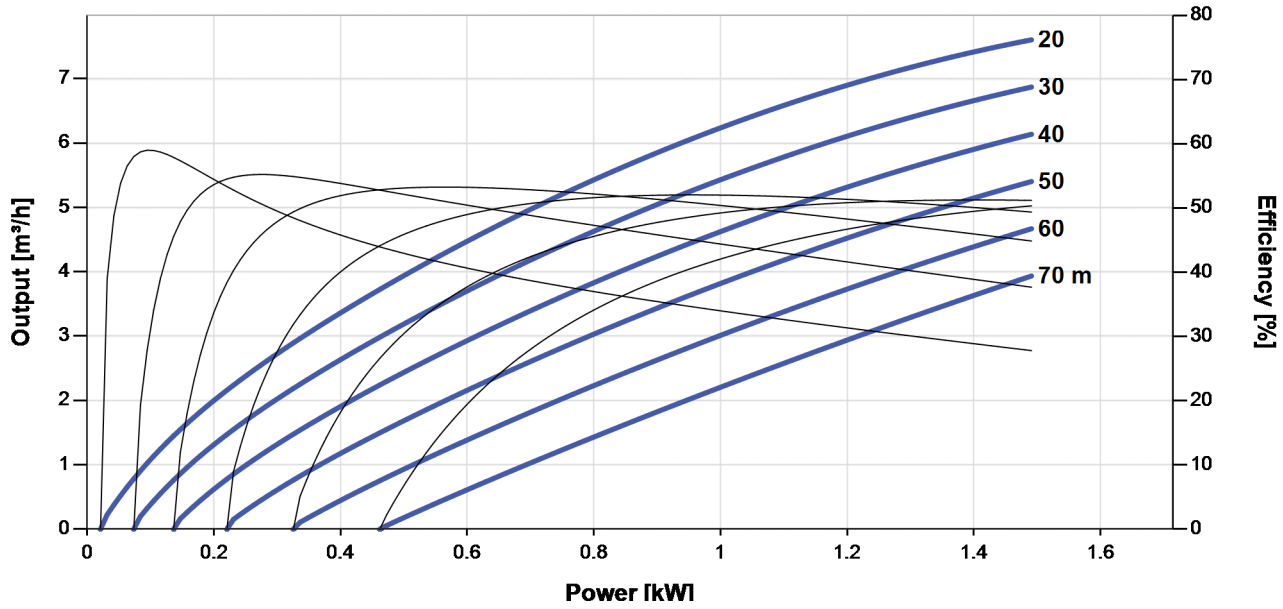
PS2-1800 C-SJ5-12

Solar Submersible Pump System for 4" wells

Pump Chart

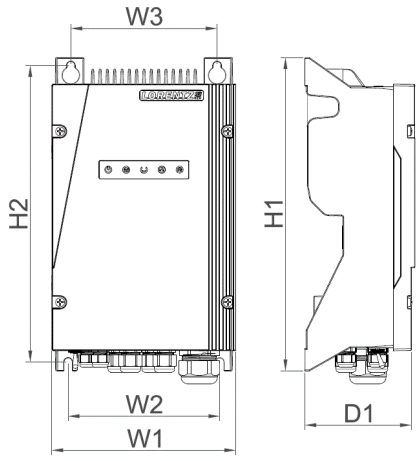
Vmp* > 102 V



Dimensions and Weights

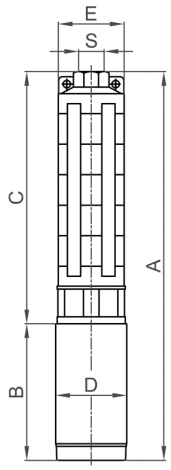
Controller

H1 = 352 mm
H2 = 333 mm
W1 = 207 mm
W2 = 170 mm
W3 = 164 mm
D1 = 124 mm



Pump Unit

A = 611 mm
B = 185 mm
C = 426 mm
D = 96 mm
E = 98 mm
S = 1.5 in



	Net weight
Controller	6.0 kg
Pump Unit	14 kg
Motor	7.0 kg
Pump End	6.5 kg

*Vmp: MPP-voltage under Standard Test Conditions (STC): 1000 W/m² solar irradiance, 25 °C cell temperature

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Well Probe

Mechanically Activated Device for Dry Run Protection in Applications with LORENTZ Solar Pump Systems

The switch can be used to detect the water level within a well. When the water level in the well dropped below the level of the well probe, the LORENTZ Controller will stop the pump and indicates Source Low LED.

ORDER INFORMATION

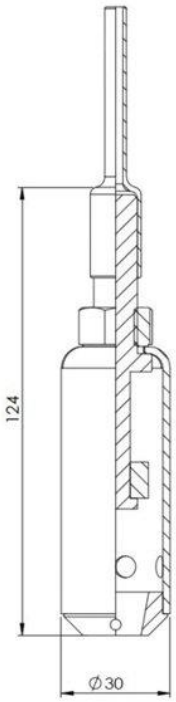
- **Item no.:** 19-000000 **product name:** Well probe sensor

FEATURES

- Reliable dry run protection
- Simple to install
- Trouble free operation
- Corrosion-free
- Splicing kit included

TECHNICAL DATA

- Max. operating temperature 55 °C
- Enclosure class: IP68
  Submersion depth: max 50 m
- Cable length: 1.5m
- Wire size: 2x 0.75mm² or AWG 19, waterproofed
- Mounted in vertical position
- Meets the requirements for CE



DIMENSION/WEIGHT

- Packaging dimensions: 260 x 170 x 40 mm
  10.3 x 6.7 x 1.6 in
- Total weight: 0.1 kg / 0.2 lbs

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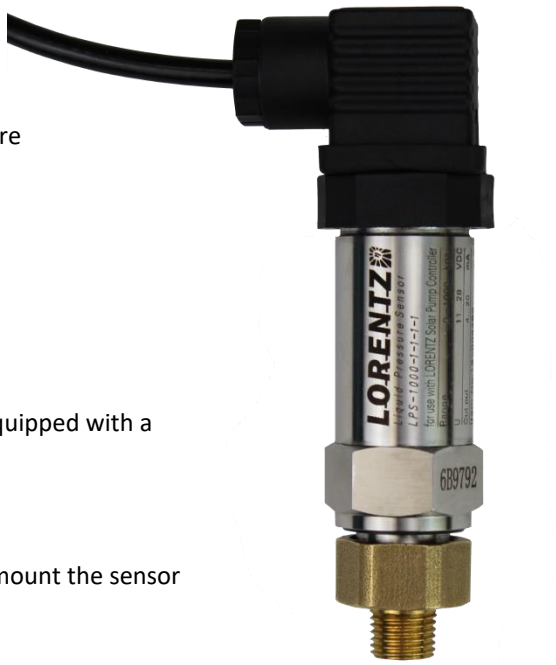
V150528

Liquid Pressure Sensor

Sensor for measuring the pressure of liquid in a pipe or vessel

USE / PURPOSE

The sensors are commonly used to measure the pressure in the delivery pipeline or in a vessel. The pressure signal is used with a suitable LORENTZ pump controller to measure pressure and for pressure switching or constant presure applications. The liquid pressure sensor must be used with a compatible LORENTZ Controller (see requirements).



FEATURES

- Gauge pressure sensor, pressure measurement relative to atmosphere
- For measuring pressure in a pipe or vessel
- Accurate, robust sensor
- For use with LORENTZ PumpScanner and pumpMANAGER

REQUIREMENTS

- LORENTZ PS2 controller, LORENTZ PSk2 controller or PS Controller equipped with a licensed PS DataModule
- Care must be taken to position the sensor without turbulent water to ensure accurate measurement
- G1/4” or G1/2” female threaded filling / air vent hole is required to mount the sensor

TECHNICAL DATA

- Sensor type: 2 wire gauge sensor
- Enclosure class: IP65
- Sensor housing : stainless steel
- Connects to LORENTZ PS DataModule
- 5m/10m (16ft/33ft) cable length
- Overpressure: 1.5x full scale
- Output signal : 4-20 mA
- Voltage : 11-28 VDC
- Application temp.: -30 to 80°C
  -22 to 176°F
- Accuracy class : 0.5% full scale
- Thread type: G1/2” male (G1/4” with adapter)
- Meets the requirements for CS

ORDER INFORMATION

Item #	Product	Pressure range
19-004450	Liquid Pressure Sensor, LPS-500	0-500 kPa 0 to 5 bar / 0 to 72.5 psi
19-004460	Liquid Pressure Sensor, LPS-1000	0-1000 kPa 0 to 10 bar / 0 to 145 psi
19-002760	Liquid Pressure Sensor, LPS-2000	0-2000 kPa 0 to 20 bar / 0 to 290 psi

DIMENSION/WEIGHT

- Packing dimensions: 190 x 180 x 80 mm
  7.5 x 7.1 x 3.2 in
- Weight: 0.6 kg / 1.3 lbs

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V181608

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Surge Protector

Device to Protect LORENTZ Pump Accessories from Voltage Spikes

ORDER INFORMATION

- **Item no.:** 19-000280 **product name:** Surge Protector

FEATURES

- Reliable surge protection for all LORENTZ pump accessories
- Can be installed inside the PS Controller

TECHNICAL DATA

- Max. voltage: 14 VDC
- Max current 8/20µs: 500 A
- Enclosure class: IP65
- Ambient temperature: max. 50°C
- Wire size: 2x 1.5mm² or AWG 16
- Meets the requirements for CE

DIMENSION/WEIGHT

- Packing dimensions: 70 x 45 x 20 mm
  2.8 x 1.8 x 0.8 in
- Total weight 0.1 kg / 0.2 lbs

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V150528

PV Disconnect 440-40-3

Box with DC Disconnect Switch and optional lightning surge protection

ORDER INFORMATION

- **Item no.:** 19-000138 **product name:** PV Disconnect 440-40-3
- **Item no.:** 19-002120 **product name:** MNSPD-115
- **Item no.:** 19-002130 **product name:** MNSPD-300
- **Item no.:** 19-002140 **product name:** MNSPD-600

Lightning surge protectors must be ordered separately

FEATURES

- Designed for PS2-150 to PS2-4000
- For professional installation of pumping systems

TECHNICAL DATA

- DC rated disconnect switch enclosed
- Enclosure class IP 54
- Meets the requirements for CE

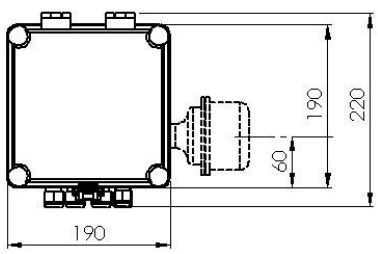
Max. voltage	440 V DC
Max. current per string	15 A
Max. total current	40 A
Max. no. of strings	3
String cable size	2,5 - 4 mm²
Output cable size	4 - 10 mm²

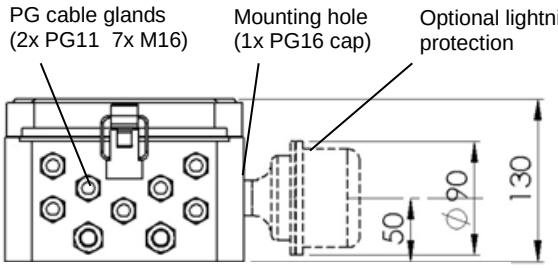
Optional lightning surge protector

- Connects through an existing mounting hole in the PV connect housing
- Proper grounding of the device is mandatory to achieve protection

Controller	MidNite surge protector
PS2 150 – PS2 200	MNSPD115
PS2 600 – PS2 1800	MNSPD300
PS2 4000	MNSPD600

DIMENSION/WEIGHT [mm]





Net. Weight: 1,6kg (+0,35kg)

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V180613

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PP2000 AC Power Pack

AC/DC Converter to Supply PS1200C and specific PS1800 Pump Systems with Backup Power from a Generator or Mains Supply

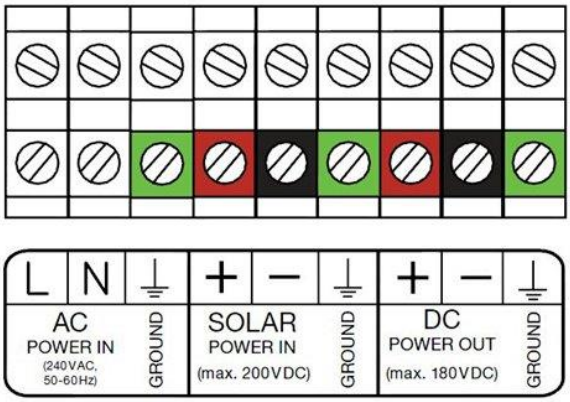
ORDER INFORMATION

- **Item no.:** 19-001050 **product name:** Power Pack 2000, UL
- **Item no.:** 19-001070 **product name:** Power Pack 2000 SS, UL (SS stainless steel enclosure)

TECHNICAL DATA

- AC input: 240V (±15 %), 47 to 63Hz
- AC input current: 6.2A
- PV input voltage: V_{mp}: 110V - 140V DC, depending on pump controller max. voltages
- PV max open circuit voltage: 200V DC depending on pump controller max. voltages
- DC output max.: 180V DC, 1,500W
- Overload protection: internal fuse, 15A
- Enclosure: steel, gasket-sealed, indoor-use, hinged front cover with key-lock
- Must be protected from direct mid-day sun
- Enclosure class: IP22
- Ambient temperature: max. 45°C
- All wires must be #14 AWG (2.5 mm²) or larger
- Manual with further information is available in PartnerNet
- Meets the requirements for CE

Electrical Safety MET LISTED



DIMENSION/WEIGHT

- Packaging dimensions: 450 x 300 x 140 mm
  17.7 x 11.8 x 5.5 in
- Total weight: 23.5kg / 52lbs

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