



Balance in Nature Lda
Incubadora de Empresas - Zona Industrial
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Thursday, November 16, 2017

Boomland - Good Mood

Solar pumping project

Note: DNH between Tipi Camp and Ferro ciment tank = 35m
Furo = 60m
Total DNH = 100m Standalone PV array of 2 rows - 9 SW 280dual

Parameter

Location:	Portugal, Idanha-A-Nova (39° North; 8° West)	Water temperature:	18 °C		
Required daily output:	45 m³; Sizing for July	Dirt loss:	5,0 %	Motor cable:	100 m
Pipe type:	plastic, drawn/pressed, new: 0,007 mm	Static head:	100 m	Pipe length:	300 m

Products

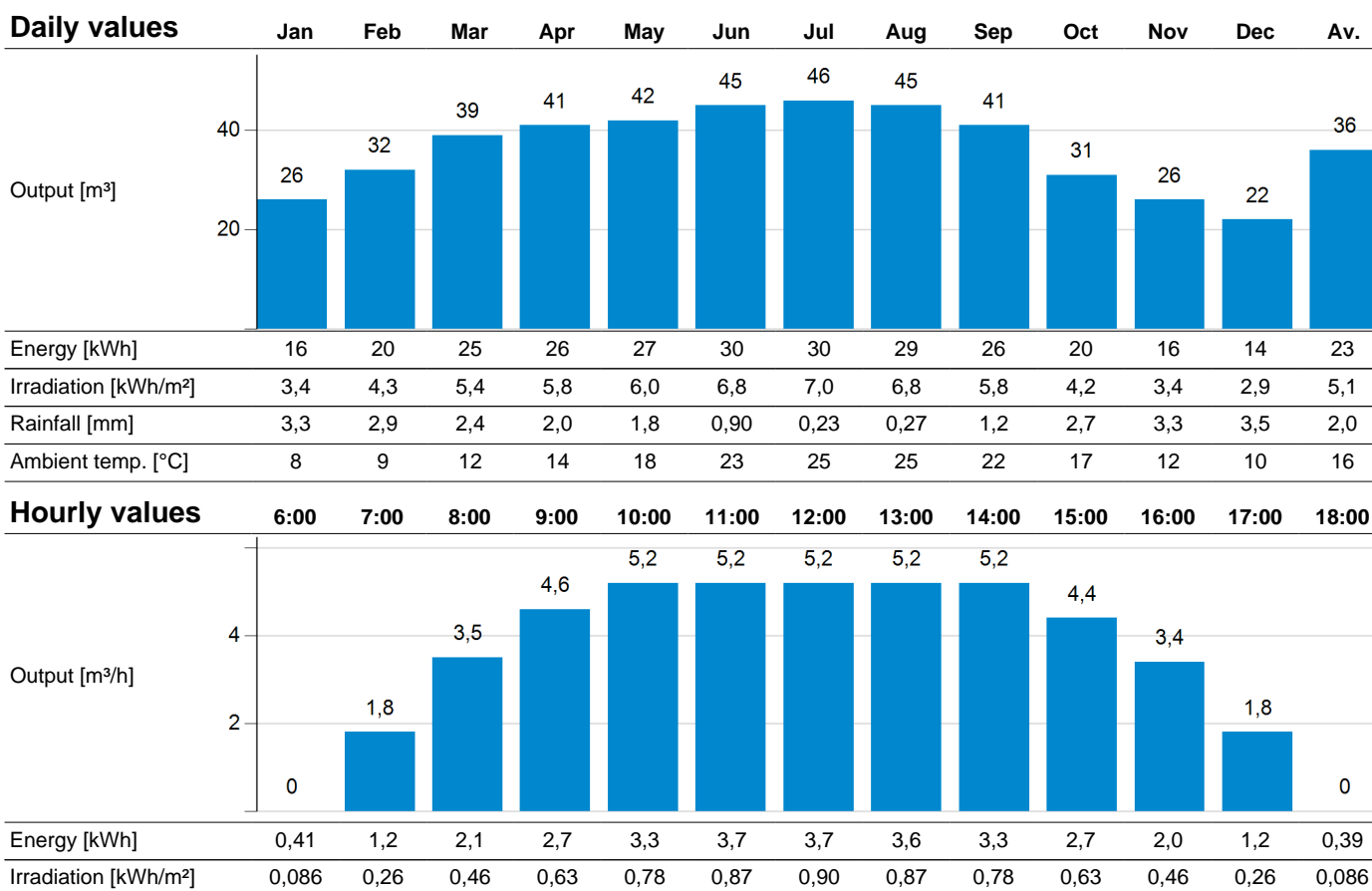
Quantity	Details
PS2-4000 C-SJ5-25 -D	1 pc. Submersible pump system including controller with DataModule, motor and pump end
SW PT 280 mono 5BB	18 pc. 5 040 Wp; 9 x 2 modules; 34 ° tilted
Motor cable	100 m 6 mm² 3-phase cable for power and 1-phase cable for ground
Pipeline	300 m 50 mm (inner diameter) Pipeline
CONNECTED products	1 set PS Communicator, LC20-12M for PS Communicator application, External Antenna for PS Communicator
Accessories	1 set Well Probe, Float Switch, Liquid Pressure Sensor, Water Meter, Surge Protector, PV Disconnect 440-40-6, Stilling Tube for C Pump

Sun Sensor setting in PumpScanner

min. 150 W/m²

Daily output in July

46 m³





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Ambient temp. [°C]	20	20	21	23	25	27	29	30	30	30	30	29	29
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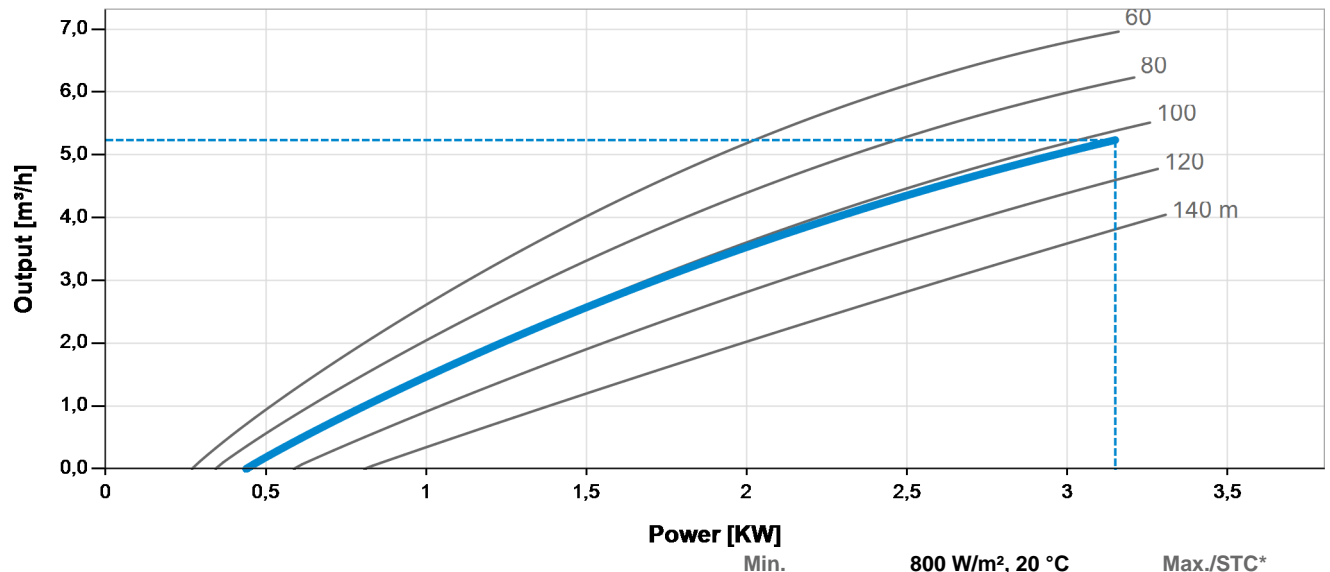
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Solar pumping project

System characteristic



			Min.	800 W/m², 20 °C	Max./STC*
PV generator	Cell temperature	[°C]		46	25
	Temperature loss	[%]		9,0	-
	Dirt loss	[%]		5,0	-
	Pmax	[Wp]		3 485	5 040
	Vmp	[V]		256	281
	Imp	[A]		14	18
	Voc	[V]		326	356
	Isc	[A]		15	19
	Pout	[W]		3 290	-
	Vout	[V]		273	-
	Iout	[A]		12	-
Motor cable	Power loss	[%]	1,2	3,6	3,6
Pump systems	Motor power	[W]	439	3 150	3 150
	Motor voltage	[V EC]	148	225	225
	Motor current	[A]	3,0	14	14
	Motor speed	[rpm]	2 375	3 090	3 090
	Flow rate	[m³/h]	0	5,2	5,2
	Efficiency	[%]	0	45	47
Pipeline	Flow speed	[m/s]	0	0,74	0,74
	Friction loss	[m]	0,000	3,8	3,8

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





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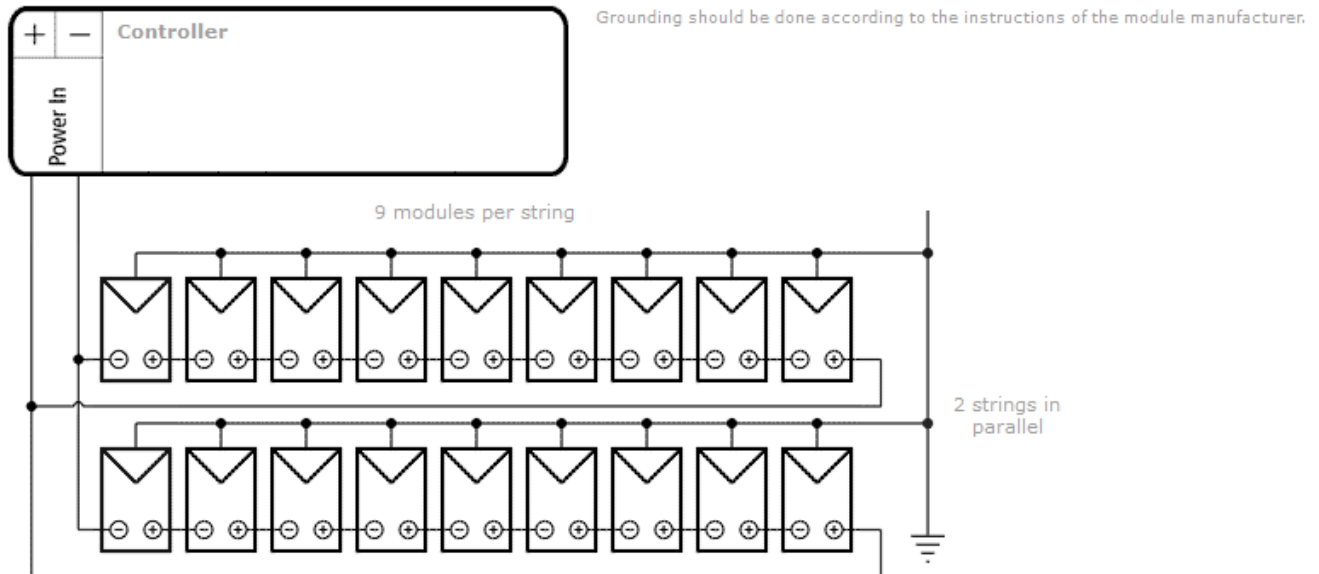
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Wiring diagram





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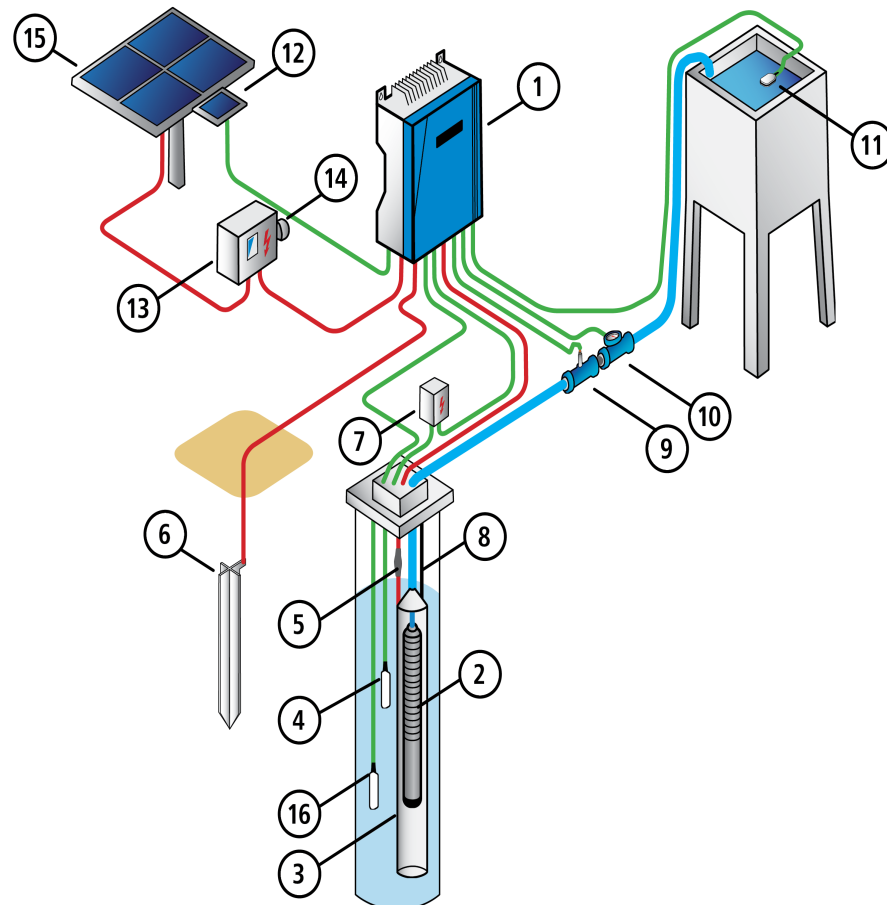
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Solar pumping project

System Layout



1: PS2 Controller

2: Submersible Pump

3: Stilling Tube

4: Well Probe

5: Cable Splice Kit

6: Grounding Rod

7: Surge Protector*

8: Safety Rope

9: Water Meter

10: Pressure Sensor

11: Float Switch

12: Sun Switch

13: PV Disconnect

14: Lightning Surge Protector

15: PV Generator

*It is recommended to install a Surge Protector at each controller sensor input.





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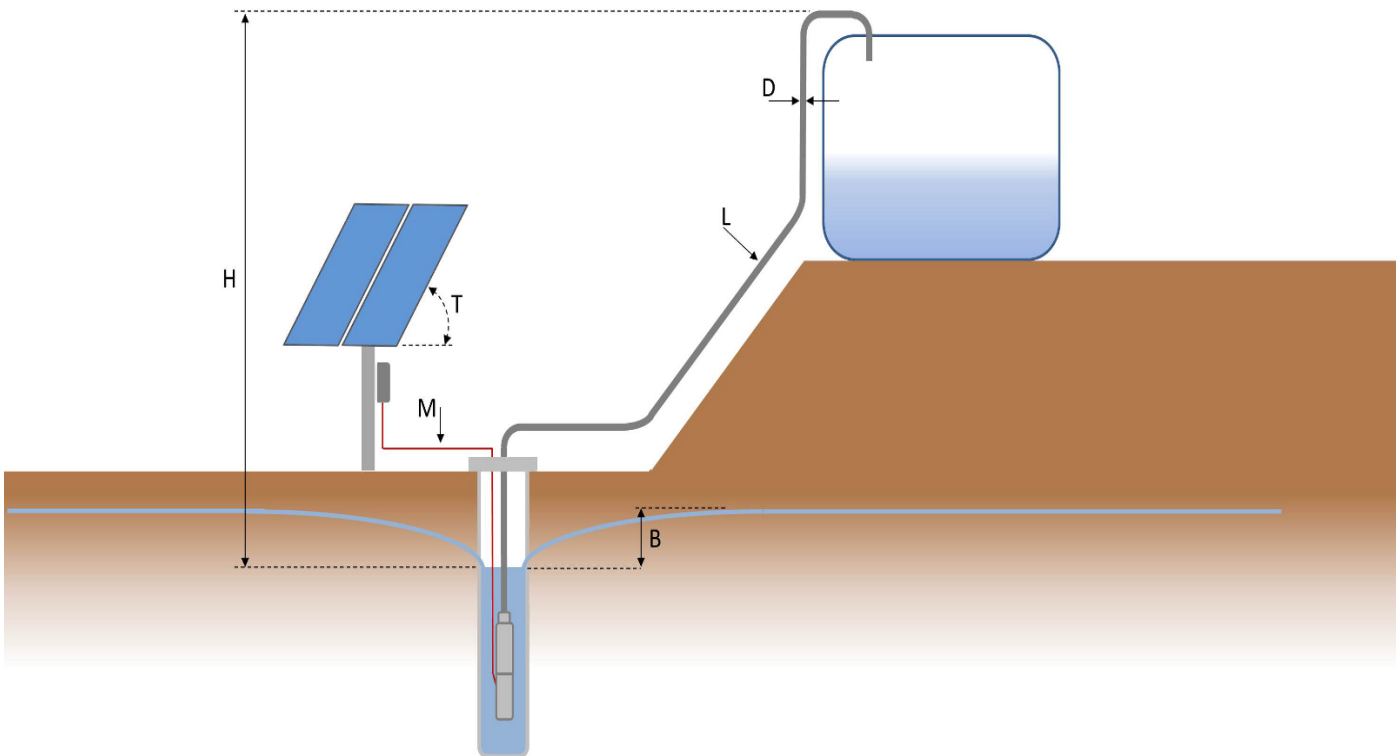
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Sizing Layout



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.



PS2-4000 C-SJ5-25

Solar Submersible Pump System for 4" wells

System Overview

Head	max. 140 m
Flow rate	max. 7,0 m³/h

Technical Data

Controller PS2-4000

- 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)
- Integrated Sun Sensor

Power	max. 4,0 kW
Input voltage	max. 375 V
Optimum Vmp**	> 238 V
Motor current	max. 14 A
Efficiency	max. 98 %
Ambient temp.	-40...50 °C
Enclosure class	IP68

Motor ECDRIVE 4000-C

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

Rated power	4,0 kW
Efficiency	max. 92 %
Motor speed	900...3 300 rpm
Insulation class	F
Enclosure class	IP68
Submersion	max. 150 m

Pump End PE C-SJ5-25

- Non-return valve
- Premium materials, stainless steel: AISI 304
- Optional: dry running protection
- Centrifugal pump



Pump Unit PU4000 C-SJ5-25 (Motor, Pump End)

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

Standards



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

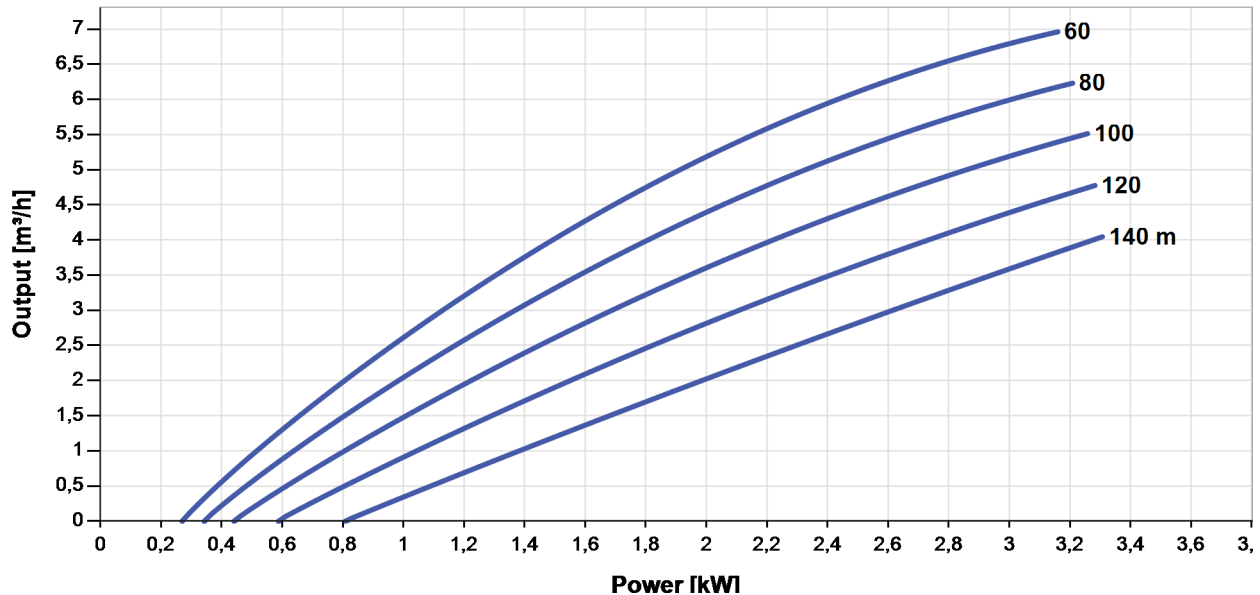


PS2-4000 C-SJ5-25

Solar Submersible Pump System for 4" wells

Pump Chart

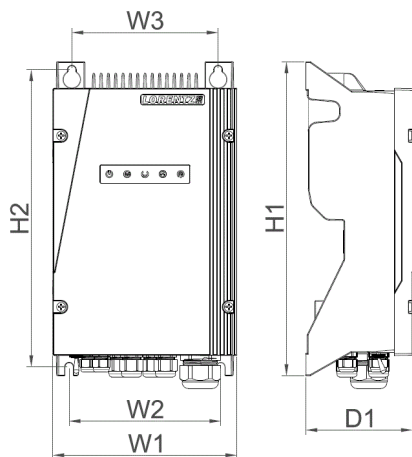
V_{mp}* > 238 V



Dimensions and Weights

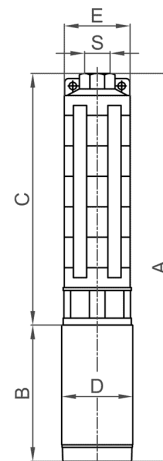
Controller

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



Pump Unit

A = 941 mm
B = 245 mm
C = 696 mm
D = 96 mm
E = 98 mm
S = 1,5 in



	Net weight
Controller	6,1 kg
Pump Unit	18 kg
Motor	10 kg
Pump End	8,0 kg

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

PS Communicator

Communication device for remote monitoring and management of
LORENTZ Pump Systems

ORDER INFORMATION

- Item no.: 19-000295 product name: PS Communicator without battery

FEATURES

- Self-contained controller and GPRS/cellular modem
- Automatically pairs with up to eight pumps that are in Bluetooth range, pumps must have PS DataModule installed
- Connects to each pump in turn and sends current running data and status via mobile Internet to a central LORENTZ server
- All data is encrypted and secure
- Only for use in combination with LORENTZ pumpMANAGE cloud based service**, which provides:
 - Remote monitoring configuration and management of LORENTZ pumps
 - Active reporting of any alerts or problems
 - Ability to switch on, switch off, monitor external sensors and control pump speed remotely
 - Inclusive monthly fee for cellular data access, application updates and web service



PRODUCT CONTENT

The required battery and PV module must be ordered separately. Locally purchased parts must meet the following characteristics.

Battery:

- Sealed 12V AGM lead acid battery
- Min. capacity: 5Ah
- Max. dimensions (LxWxH): 151 x 70 x 100 mm

PV module:

- Max. V_{oc} : 40 V
- Max. I_{sc} : 2.5 A

Accurate local irradiation measurement only with LORENTZ module LC20-12M.

TECHNICAL DATA

- Global SIM card preinstalled
- Enclosure class: IP54
- Ambient temperature: -15 to 50°C
- Bluetooth standard: class 1
- GPRS terminal standards needed
- Manual with further information is available in PartnerNet
- Meets the requirements for CE

DIMENSION/WEIGHT

- Packing dimensions: 270 x 250 x 230 mm
10.6 x 9.8 x 9.1 in
- Weight: 2.8 kg / 6.2 lbs

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LC20-12M for PS Communicator application

PV module LC20-12M, pre-wired, with fixture, for power supply and irradiation measurement of the PS Communicator

ORDER INFORMATION

- **Item no.:** 23-000255 **product name:** LC20-12M, PV-Module, Pre-wired, with Fixture
can be ordered in connection with PS Communicator only

FEATURES

- **Only for use in combination with PS Communicator:**
 - Reliable battery charging
 - Accurate irradiation measurement
- Sturdy, clear-anodized aluminum frame
- Pre-wired cable for easy installation
- Fixture device included

TECHNICAL DATA

Peak Power	20 Wp
Max. power current	1.2 A
Max. power voltage	17.2 V
Short circuit current	1.3 A
Open circuit voltage	21.6 V

- Meets the requirements for IEC and CE



DIMENSION/WEIGHT

- Packaging dimensions: 750 x 310 x 40 mm
29.5 x 12.2 x 1.6 in
- Total weight: 3.5 kg / 7.7 lbs

External Antenna for PS Communicator

External antenna for the PS Communicator for areas with weak GSM signal

ORDER INFORMATION

- Item no.: 19-003860 Product name: Antenna, external

FEATURES

- Only in use with the PS Communicator
- Accurate alignment of the antenna with the PumpScanner software

TECHNICAL DATA

- Frequency range: 824-960 / 1710-2170 Mhz
- Connector: SMA-Male
- Cable length/type: 3 m / SYV 75-3
- Outer cable diameter: 5 mm
- Manual with further information is available in PartnerNet
- Meets the requirements for CE

RELATED PRODUCTS

PS Communicator

- Communication device for remote monitoring and management of LORENTZ Pump Systems
Item no.: 19-000295

DIMENSION/WEIGHT

- Packing dimensions: 200 x 180 x 80 mm
 7.9 x 7.1 x 3.1 in
- Weight: 0.5 kg / 1.1 lbs



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

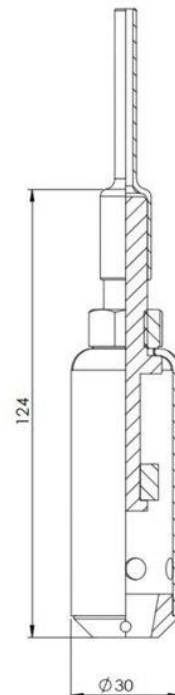
- Reliable dry run protection
- Simple to install
- Trouble free operation
- Corrosion-free
- Splicing kit included

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



Float Switch

Mechanically Activated Device for Water Level Detection in Applications with LORENTZ Solar Pump Systems

The switch can be used to detect the water level within a tank. When the water level in the tank reaches the maximum, the LORENTZ Controller will stop the pump and indicates Tank Full LED.

ORDER INFORMATION

- **Item no.:** 19-000030 **product name:** Float Switch

FEATURES

- **N.O.** (normally open) and **N.C.** (normally closed) function
- Reliable water level detection
- Simple to install
- Trouble free operation
- Not sensitive to rotation
- Corrosion-free

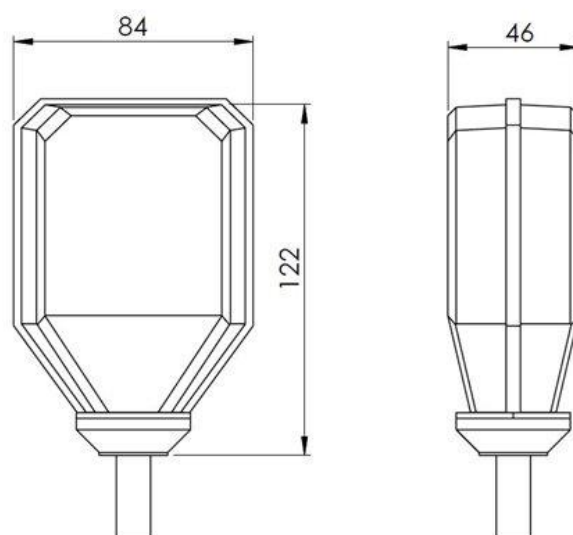


TECHNICAL DATA

- Operating temperature: -10°C to 55°C
- Storage temperature: : -10°C to 55°C
- Enclosure class: IP68
- Cable length: 3m, waterproof
- Wire size: 3x 1.0mm² or AWG 18
- Meets the requirements for CE

DIMENSION/WEIGHT

- Packaging dimensions: 230 x 160 x 55 mm
9.1 x 6.3 x 2.2 in
- Total weight: 0.8 kg / 1.8 lbs



Liquid Pressure Sensor

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

USE / PURPOSE

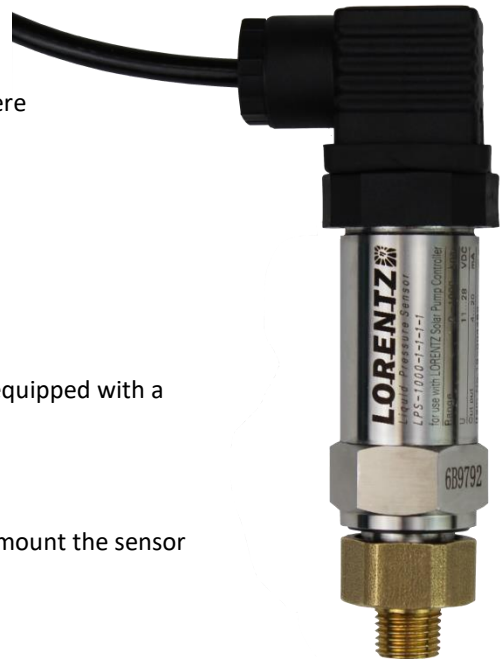
The sensors are commonly used to measure the pressure in the delivery pipeline or in a vessel. The pressure signal is used with a suitable LORENTZ pump controller to measure pressure and for pressure switching or constant pressure applications. The liquid pressure sensor must be used with a compatible 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
- 1m (3 ft) 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 50 m / 0 to 160 ft 0 to 5 bar / 0 to 72.5 psi
19-004460	Liquid Pressure Sensor, LPS-1000	0-1000 kPa 0 to 100 m / 0 to 330 ft 0 to 10 bar / 0 to 145 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

Water Meter

Device to measure the water flow rate

ORDER INFORMATION

- | | |
|-----------------------|--|
| • Item no.: 19-002160 | product name: Water Meter, WP-DN40, 0.1cbm/p |
| • Item no.: 19-002170 | product name: Water Meter, WP-DN65, 0.1cbm/p |
| • Item no.: 19-002180 | product name: Water Meter, WP-DN80, 0.1cbm/p |
| • Item no.: 19-002190 | product name: Water Meter, WP-DN100, 0.1cbm/p |
| • Item no.: 19-002200 | product name: Water Meter, WP-DN125, 0.1cbm/p |
| • Item no.: 19-002210 | product name: Water Meter, WP-DN150, 1cbm/p |
| • Item no.: 19-002202 | product name: Water Meter, WP-DN200, 1cbm/p |

FEATURES

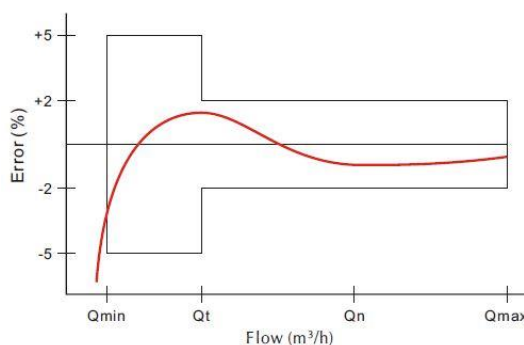
- Dry dial register ensures clear reading
- Low pressure loss, long working life
- Easy to install
- **Only for use in combination with DataModule:**
 - The water meter is equipped with a reed switch assembly which can be connected to the DataModule



TECHNICAL DATA

- Water temperature: max. 40°C
- Water pressure: max. 16 bar
- Meets the requirements for CE

Nominal Diameter	DN	40	65	80	100	125	150	200
Max. flow rate [m³/h]	Q_{\max}	20	50	80	120	200	300	500
Nominal flow rate [m³/h]	Q_n	10	25	40	60	100	150	250
Transition flow rate [m³/h]	Q_t	3.0	5.0	8.0	12	20	30	50
Minimum flow rate [m³/h]	Q_{\min}	0.7	0.75	1.2	1.8	3.0	4.5	7.5



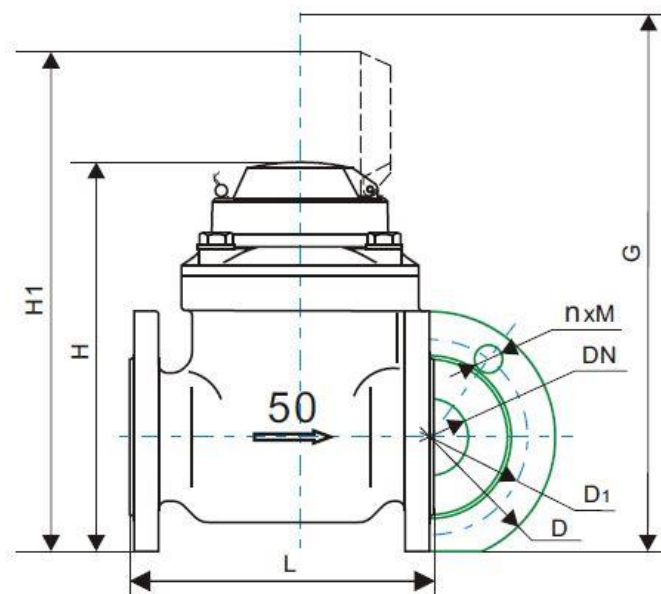
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DIMENSION/WEIGHT

Nominal Diameter	DN	40	65	80	100	125	150	200
Length [mm]	L	260	200	225	250	250	300	350
Height [mm]	H	225	242	252	262	275	325	355
Working height [mm]	H1	303	313	323	333	346	396	426
Height [mm]	G	360	360	360	360	360	420	420
Outside diameter [mm]	D	150	185	200	220	250	285	340
Circle diameter [mm]	D1	110	145	160	180	210	240	295
Connecting bolt quantity		4xM16	4xM16	8xM16	8xM16	8xM16	8xM20	12xM20
Weight [kg]		12	13	16	18	20	42	74



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 8/20 μ s: 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

PV Disconnect 440-40-6

Connection box with DC Disconnect Switch and optional lightning surge protection

ORDER INFORMATION

- Item no.: 19-000136 **product name:** PV Disconnect 440-40-6
- 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 PS150 – PS4000
- For professional installation of pumping systems

TECHNICAL DATA

- Wiring up to 6 PV-strings in parallel
- DC rated disconnect switch enclosed
- Enclosure class IP 54
- Meets the requirements for CE

PV Disconnect 440-40-6

Max. voltage	440 V DC
Max. current per string	10 A
Max. total current	40 A
Max. no. of strings	6
String cable size	2,5 - 4mm ²
Output cable size	4 - 10mm ²



Optional lightning surge protector

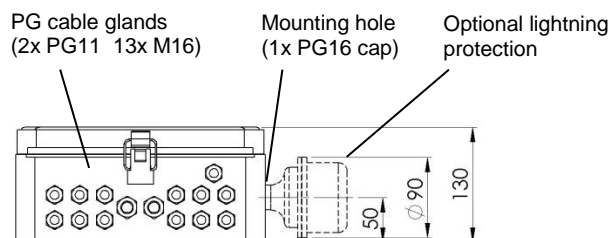
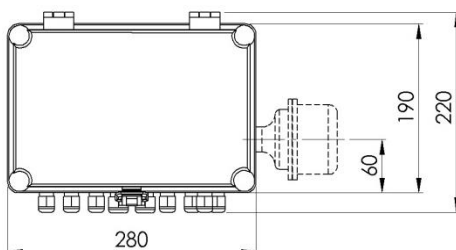
- Connects through an existing mounting hole in the PV connect housing
- Proper grounding of the device is mandatory to achieve protection

Controller

MidNite surge protector

PS150 – PS200	MNSPD115
PS600 – PS1800	MNSPD300
PS4000	MNSPD600

DIMENSION/WEIGHT [mm]



Net. Weight: 2,15kg (+0,35kg)

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Stilling Tube for C Pump

Device to protect the pump from dirt

Where water sources contain sand or have the potential for dirt falling into them (uncapped wells) a stilling tube is recommended to protect the pump from the dirt.

ORDER INFORMATION

- **Item no.:** 19-000230 **product name:** Stilling Tube for Centrifugal Pump
- **Item no.:** 19-000250 **product name:** Stilling Tube Adaptor for Centrifugal Pump

FEATURES

- Due to the large inner diameter of the stilling tube the water rises very slow, the dirt settles down at the bottom of the well
- Pump has to handle less sand, which will increase the pump's life span
- Trouble free installation
- Can be used with PS150-PS4000 C-SJ 4" Pumps
- Min. borehole diameter of 6 in (150mm) needed

SCOPE OF DELIVERY

- (1) 1x stilling tube adapter
- (2) 2x hose clamp
- (3) 2x cable straps
- (4) 1x PVC tube: Ø140x4, 500 mm length

Product can be ordered without the PVC tube, then the tube must be purchased locally

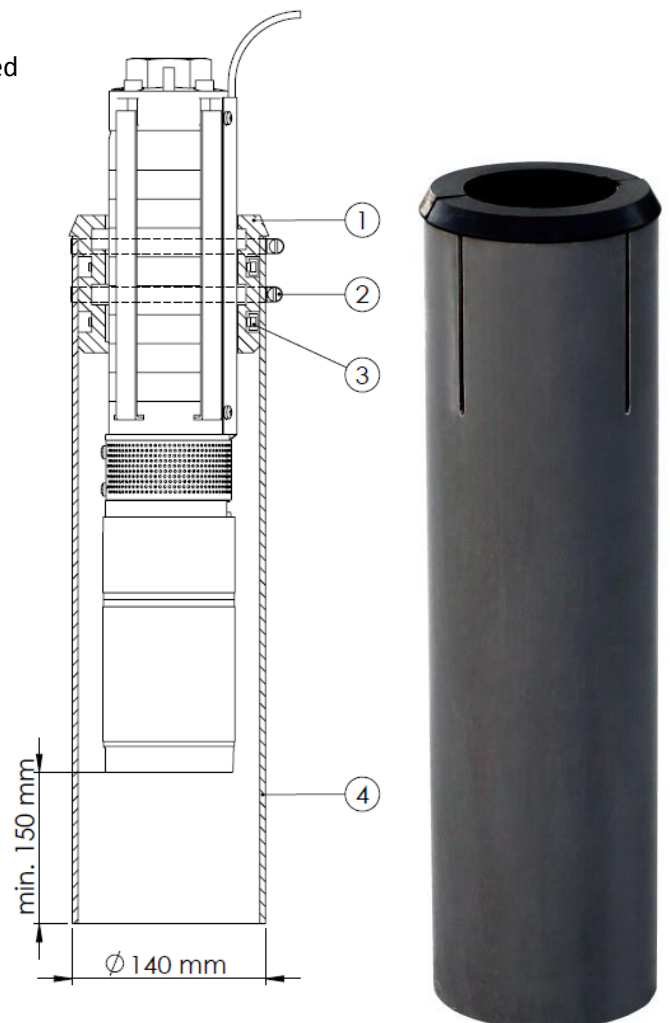
DIMENSION/WEIGHT

Complete Stilling Tube device:

- Packaging dimensions: 650 x 160 x 140 mm
25.6 x 6.3 x 5.5 in
- Total weight: 3.0 kg / 6.61 lbs

Stilling Tube Adaptor (without PVC tube):

- Packaging dimensions: 300 x 160 x 140 mm
11.8 x 6.3 x 5.5 in
- Total weight: 1.0 kg / 2.20 lbs



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