



# PSk2

The complete solar water pumping solution with SmartSolution hybrid power support



**PSk2 is an integrated solar water pumping system for larger applications.**

With our new SmartSolution, PSk2 provides a true hybrid pumping system which automatically can blend grid power and generator power with the core solar power supply.

Whether your need is to reduce operational costs, improve water security, or be more sustainable, PSk2 provides the right solution.

**LORENTZ**   
*The Solar Water Pumping Company*

# The complete solution

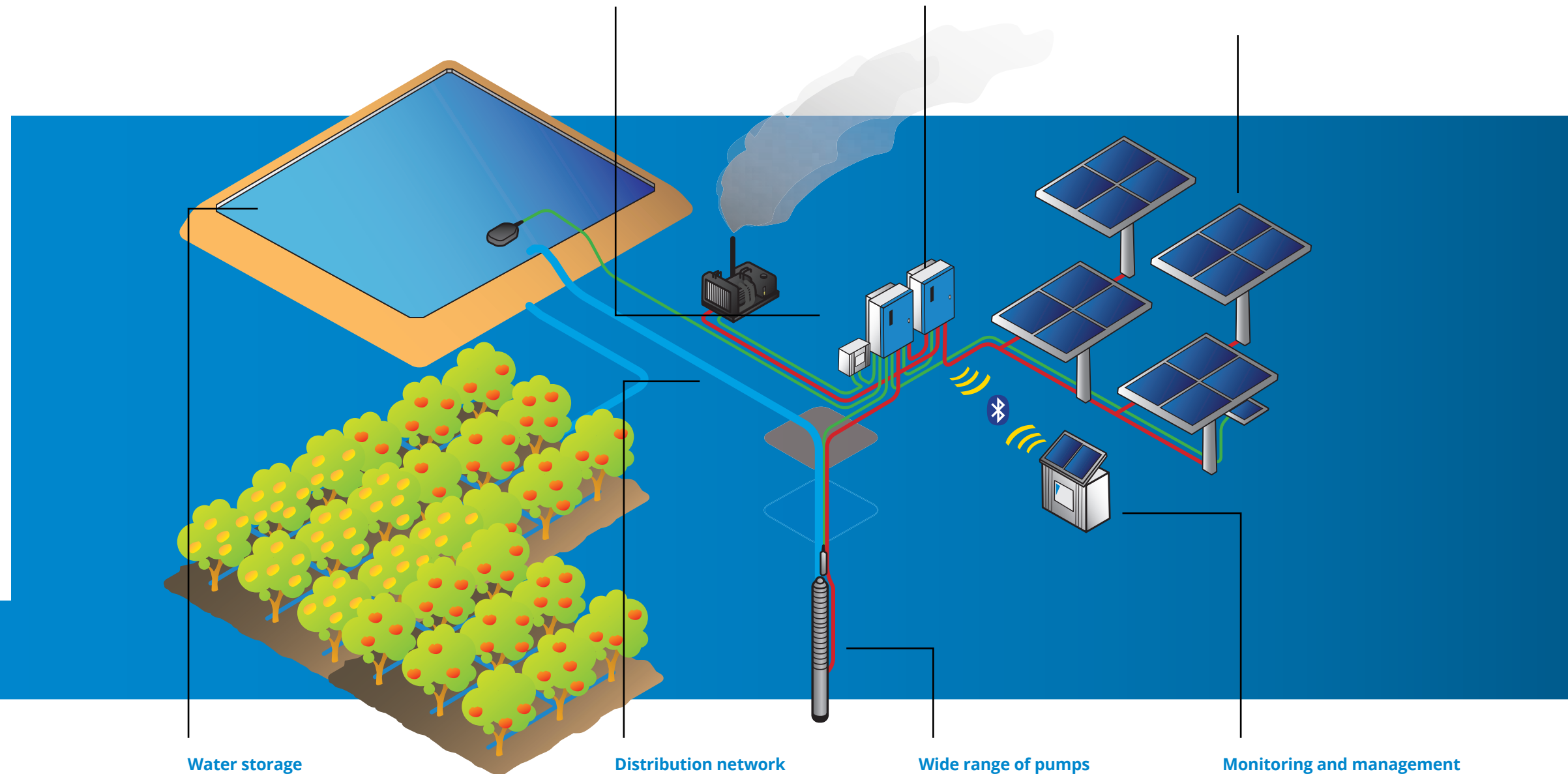
Pumping water uses a significant amount of power. The sun provides us with an almost infinite energy source that, with the right planning and equipment, means we can pump water anywhere without the needs for power infrastructure.

PSk2 is an advanced solar water pumping system. The system is designed specifically to use the power of the sun to move water, so replacing the need for grid power or diesel.

As solar power is not consistent through the day then PSk2 constantly changes the pump parameters to optimize the amount of water available.

Being designed as an off-grid solar water pumping system, PSk2 has all of the inputs and outputs needed in an integrated self-managing system.

Where water demands cannot be met by solar power alone the hybrid PSk2 SmartSolution seamlessly blends in external power sources on demand.



**Hybrid operation**

PSk2 can use solar combined with either grid or generator power to provide 24 hour operation. The system seamlessly blends the available solar power with external power sources automatically.

**PSk2 controller**

The controller is at the heart of the system, managing both system operations, power sources and constantly optimizing the system for maximum water output.

**Power source**

Solar power is always the primary PSk2 power source, where the application demands it PSk2 becomes an automated hybrid system, seamlessly blending solar and grid or generator power.

**Water storage**

Introducing water storage to a solar water pumping system allows for increased seasonal demands to be met, or simply for overnight water availability without a generator or grid power.

**Distribution network**

LORENTZ solar water pumping systems are used for drinking water, irrigation and industrial applications. Whatever the PSk2 system is connected to the system will optimize water delivery depending on the power available and inputs from the various sensors.

**Wide range of pumps**

PSk2 has a wide range of submersible and surface pump systems available to meet your water needs. Submersible pumps are available that can pump from 200 m (920ft) depths and surface pumps available for flows of up to 457 m<sup>3</sup>/h (2200 US Gal./min).

**Monitoring and management**

All PSk2 systems have inbuilt data logging and a simple management interface. All systems can also be remotely monitored and managed remotely along with any other LORENTZ systems you have via our pumpMANAGER service.



# Benefits you can realize



## No infrastructure to install

Using solar power means that you can install a pumping system almost anywhere, irrespective of power infrastructure availability and associated costs. PSk2 is designed for the harshest off-grid environments.

## Low operational costs

Operational cost savings are achieved as the system requires no fossil fuels, can be fully remotely managed and is designed to have a long working life. The result is low or even no operating costs.

## “Right sizing”

With infinite smart motor control PSk2 is very gentle on pump motors, this both extends the system life and allows for any generators that are integrated into the system to be much smaller than for conventional pump systems.

## Lowest project risk

As PSk2 is designed to be a complete system, it has all of the needed software and hardware for your water project. The result is that your projects are delivered on time, on budget and without technical risk.

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# How customers are using PSk2

## Drinking Water

**For communities** – PSk2 has been deployed as the primary water delivery mechanism for communities of up to 400,000 people. By utilizing water storage, solar direct PSk2 systems deliver water reliably 24 hours per day.

**For utilities** – PSk2 is providing very economical solutions for both water abstraction, pressure boosting and in water purification applications.

Water utilities are able to lower their operating costs by converting their pump systems from diesel power to solar or solar / diesel hybrid.



## Irrigation

**Solar pumps are a perfect match for irrigation – more sun equals more water.**

PSk2 is being used to transform unused land into productive farms. Bringing water to locations that do not have any existing infrastructure is improving food security and generating significant income for communities.

PSk2 systems provide water into irrigation systems all around the world. Drip, sprinkler, pivot or flood irrigation methods are all fully supported using this system. Most existing irrigation systems can easily be converted to solar power with the LORENTZ system while still maintaining very high flows and high pressures.

## Industry

**Where an industrial process uses high volumes of water then PSk2 can significantly reduce energy costs and provide a reliable solution to water demands.**

Industry in both developed and fast developing countries can suffer from unreliable grid power, or very high peak rate power which has an adverse effect on productivity and competitiveness.

With a PSk2 system, pumps will operate purely using solar power during the daytime with the ability to call for a “top up” of power from the grid or a generator when needed to meet production deadlines or process requirements.

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# What makes PSk2 better for you ?



## Designed for Solar Water Pumping

PSk2 has been designed from the first white board sketches to be a solar pumping system.

The system has been designed and built by an engineering team who only focus on solar water pumping. This experience means they design, test and build systems where operation in the harshest, most remote environments is normal.

Having a great feature set is only part of being a good solar water pumping system, what really matters is how efficient the system is. Efficiency defines how much water it will pump. PSk2 has class leading efficiency and optimized maximum power point tracking for best performance when conditions are not perfect. The system also has active power management to ensure that high ambient temperatures have minimal impact on water output.

**PSk2 makes the best use of the available power to deliver the most water possible.**

## Hybrid Power

With our SmartSolution PSk2 becomes a hybrid powered system. Hybrid means seamlessly blending solar power with grid or generator power sources.

The PSk2 becomes the brain of your water system, looking at what power is available, using solar power wherever possible and only starting a generator or putting a load on the power grid when there is not enough sun. This function is not a simple switching system, there is active blending of power sources meaning that your solar investment is fully utilized and that the use of expensive, non-renewable power is minimized.

The PSk2 SmartSolution manages all of this for you, including generator auto start and stop, timed starts and also volume based decision making. This flexibility means that the most efficient and effective solutions can be built to meet any water need.

**Automatic blending of power sources based on your water requirements.**

## The Complete Solution

PSk2 is designed to be a complete solar water pumping system comprising of a specialized pump controller and carefully matched pumps.

PSk2 has eight sensor inputs that allow analogue and digital sensors to be connected. This combination of sensors with the powerful inbuilt software applications allows for full pump control and water specific applications.

The system also has an inbuilt Sun Sensor which measures the available irradiation and then makes decisions of what to do based on the available power. The Sun Sensor also avoids unnecessary stop start cycles which increase pump wear.

PSk2 is a complete solution "out of the box" without the need for building additional switching cabinets or PLC units.

**Everything to deliver your projects successfully, on time and with minimal risk.**

## CONNECTED

The PSk2 is part of the LORENTZ CONNECTED software eco system.

The system is configured on site using PumpScanner, an Android™ based App that the installer uses. Common configuration is done with three clicks and there is full access to configure system behavior based on additional sensor inputs.

The PSk2 constantly records operational data and provides access to rich information for both customers and technicians.

The PSk2 can also be connected to our pumpMANAGER managed service. This is a simple, cloud delivered, pay monthly service that takes away the complexity of remote monitoring and management. One low monthly fee means that you can see exactly what the system is doing, make changes to settings and receive alerts irrespective of location.

**Advanced, but simple monitoring and management of your system locally or remotely.**

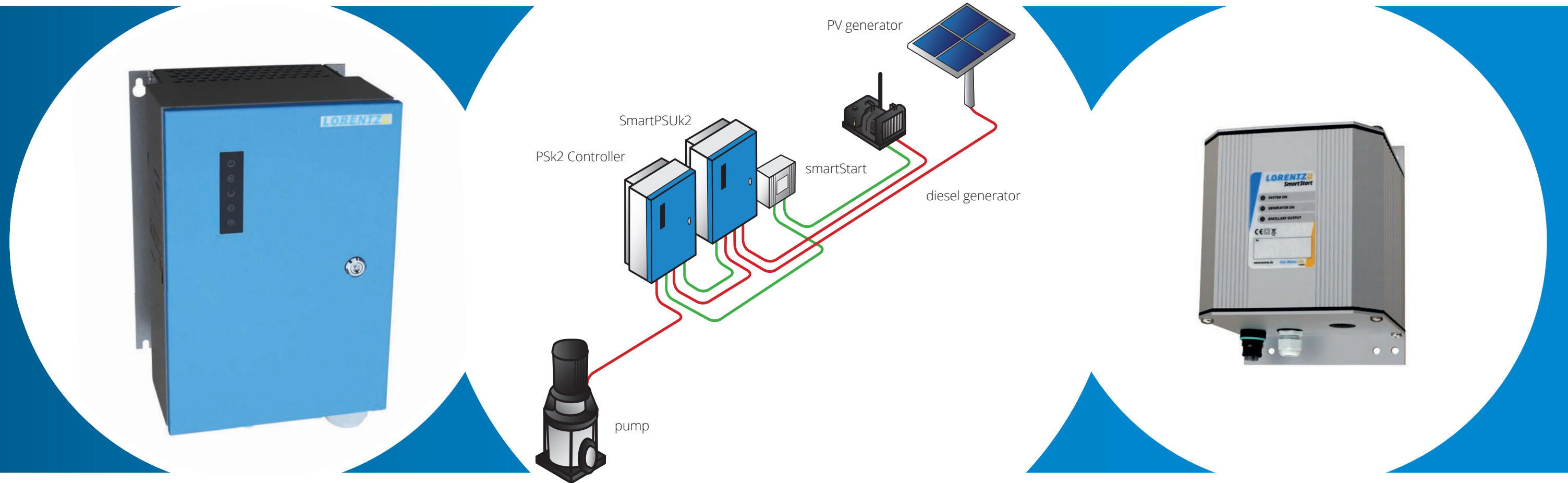
# SmartSolution – Hybrid Power

## SmartPSUK2

SmartPSUK2 runs PSk2 into a hybrid pumping system.

## SmartStart

The SmartStart integrates with the PSk2 and SmartPSUK2 to provide generator control and autonomous power.



There are applications and times when solar power alone is not the most practical or economical solution. SmartPSUK2 provides a way to fully utilize your solar investment while using an alternative power source when solar alone is not enough.

By blending solar with an alternative power source the SmartPSUK2 acts as a top up when the sun cannot meet the water need. PSk2 manages the start and end of day transition from solar to grid or from solar to generator power seamlessly and without the need for any operator intervention.

PSk2 with the SmartPSUK2\* will allow you to deliver your 24 hour water needs and manage seasonal demands simply and cost effectively.

\*SmartPSUK2 is available for PSk2-7 to PSk2-40 pump systems

Adding SmartStart to your system means the PSk2 can make decisions when there is no solar power available. This means that the system is available to start pumping 24 hours per day.

SmartStart is also the interface for connecting an auto start generator. The system will call for the generator when it is required to meet your programmed water needs of flow, volume, pressure, water levels or time.

# A complete system



**An effective solar water pumping system is made up of more than one component. When you choose a LORENTZ system you will get an integrated solution design specifically for solar water pumping from a company with absolute focus on this technology.**

### PSk2 Controller

PSk2 controllers are available from 7 to 100 kW. The controller includes the functions of a highly efficient digital inverter, a variable speed drive, all the inputs you will ever need, data logging plus intelligent control over the whole system to give you the most water possible.

### PSk2 Submersible Pumps

PSk2 6" to 10" submersible multi-stage pumps perform equally well in irrigation projects and for wide area drinking water applications where they reliably meet the most demanding requirements. All LORENTZ pumps are preconfigured in our PumpScanner App with a simple 3 click setup.

### PSk2 Surface Pumps

PSk2 single or multistage surface pumps perform equally well in irrigation projects and for wide area drinking water applications where they reliably meet the most demanding requirements. All LORENTZ pumps are preconfigured in our PumpScanner App for simple 3 click setup of any system.

### SmartSolution Components

The PSk2 SmartSolution enables seamless blending of an AC power source, either from the power grid or a generator, with solar power. Learn more about the SmartPSUk2 and SmartStart for hybrid pumping applications in the SmartSolution – Hybrid Power section.

### Accessories

To complete your PSk2 system LORENTZ provide a wide range of compatible probes, sensors, solar power connection equipment, racking and PV modules. This enables a single source of tested, ready to integrate components to give you a complete solution.

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# PSk2 Features



## Electrical Features

### MPP Tracking

Highly efficient maximum power point tracking with pump system specific algorithms.

### Active power management for temperature

Automatic power management to ensure the system continues to run in even the most extreme temperature conditions. At ambient temperatures up to 50°C (122°F) the system operates on full power and then actively manages power above that temperature.

### Variable frequency output

Variable frequency output to allow maximum water to be pumped based on available power.

### Soft start

Soft start and infinite control of motor speeds for long life and low generator loads.



## I/O Features

### Digital inputs

For connection of well probe, tank full, pressure switches, remote switches and ancillary switching.

### Analogue inputs

For 2x 4-20mA sensors. Applications included for pressure and level monitoring and pump control.

### Sun Sensor function

Sun Sensor module is supplied to measure irradiation and control the pump based on available solar energy.

### Water meter input

Pulse water meter input for accurate collection of flow data.

### Water sensor input

For use with “wet electrodes” when sensing water is present in pipelines.

### Signal output

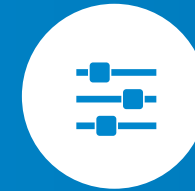
For controlling externally connected devices.

### SmartPSUk2 connection

To automatically control operation of the SmartPSUk2 when in hybrid pumping mode.

### Low voltage input for configuration

Low voltage DC input to allow bench / field configuration when 3 phase power is not available.



## Software Applications

### Constant pressure and flow

In-built applications to limit or to provide minimum pressure and flow.

### Pump control on pressure or flow

Control of pump system using pressure sensors for remote control applications and pressure depended processes.

### System timers

In-built timers for providing time of day or interval timing control.

### Liquid level monitoring

Application software included to use pressure sensors for liquid level monitoring and pump control by level.

### Power choice control

Ability to prioritize water delivery or power type (cost) in hybrid applications.



## Display and Connectivity

### Simple configuration

Simple system configuration and operational control from PumpScanner Smartphone App, for installers and customers.

### Data logging

Automatic logging of all running pump data. Recording frequency is configurable with capacity for up to 10 years.

### Customer display

Simple LED display to indicate system status.

### App enabled (included)

Detailed information and configuration via PumpScanner Smartphone App.

### CONNECTED

Local and remote monitoring and management with the LORENTZ CONNECTED infrastructure.



# Technical Data

## Controller Technical Data

Model	PSk2-7	PSk2-9	PSk2-15	PSk2-21	PSk2-25	PSk2-40	PSk2-100
Power (max)	8 kW	10 kW	15 kW	21 kW	25 kW	37 kW	90 kW
Input voltage	max. 850 V						
Input current	14 A	20 A	27 A	39 A	48 A	70 A	170 A
Optimum $V_{mp}$	> 575 V						
Motor voltage	3 x 380/400/415 V 0 – 60 Hz						
Motor current	max. 3 x 13 A	max. 3 x 17 A	max. 3 x 24 A	max. 3 x 33 A	max. 3 x 40 A	max. 3 x 65 A	max. 3 x 160 A
Efficiency	max. 98 %						
Ambient temperature	-30 ... 50 °C (-22 ... 122°F)					-10 ... 50 °C (14 ... 122°F)	
Enclosure class	IP 54 – stainless steel and powder coated outdoor housing						

## Pump Technical Data

### Submersible pumps

Motor technology	6" high efficiency 3-phase 380 V AC motor – 25 to 55 Hz operation
Speed	1,400 to 3,080 rpm – depending on pump end
Pump ends	Multi-stage centrifugal – premium materials, AISI 304 stainless steel

### Surface pumps

Motor technology	High efficiency air cooled 3-phase 380 V AC motor – 25 to 55 Hz operation	
Speed	700 to 2,905 rpm – depending on pump end	
Pump ends	Vertical multi-stage centrifugal premium materials, AISI 304 stainless steel	Single stage centrifugal premium materials, cast iron body

# Choosing and designing your system

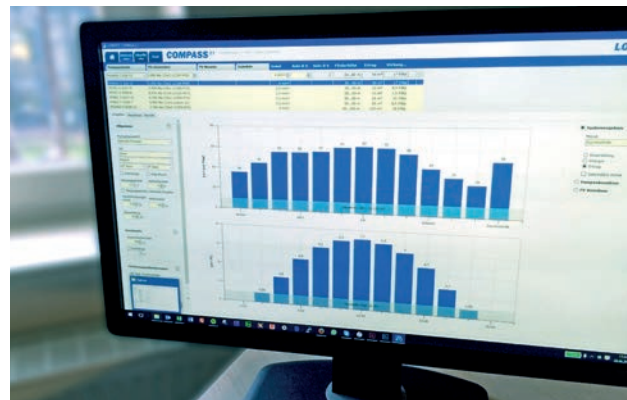
## Partner Network

PSk2 is available from approved LORENTZ partners across 130 countries. Our sales and service partners have the local knowledge, access to the right tools and information to plan a system accurately. This high degree of certainty and real world experience removes risk from your project.



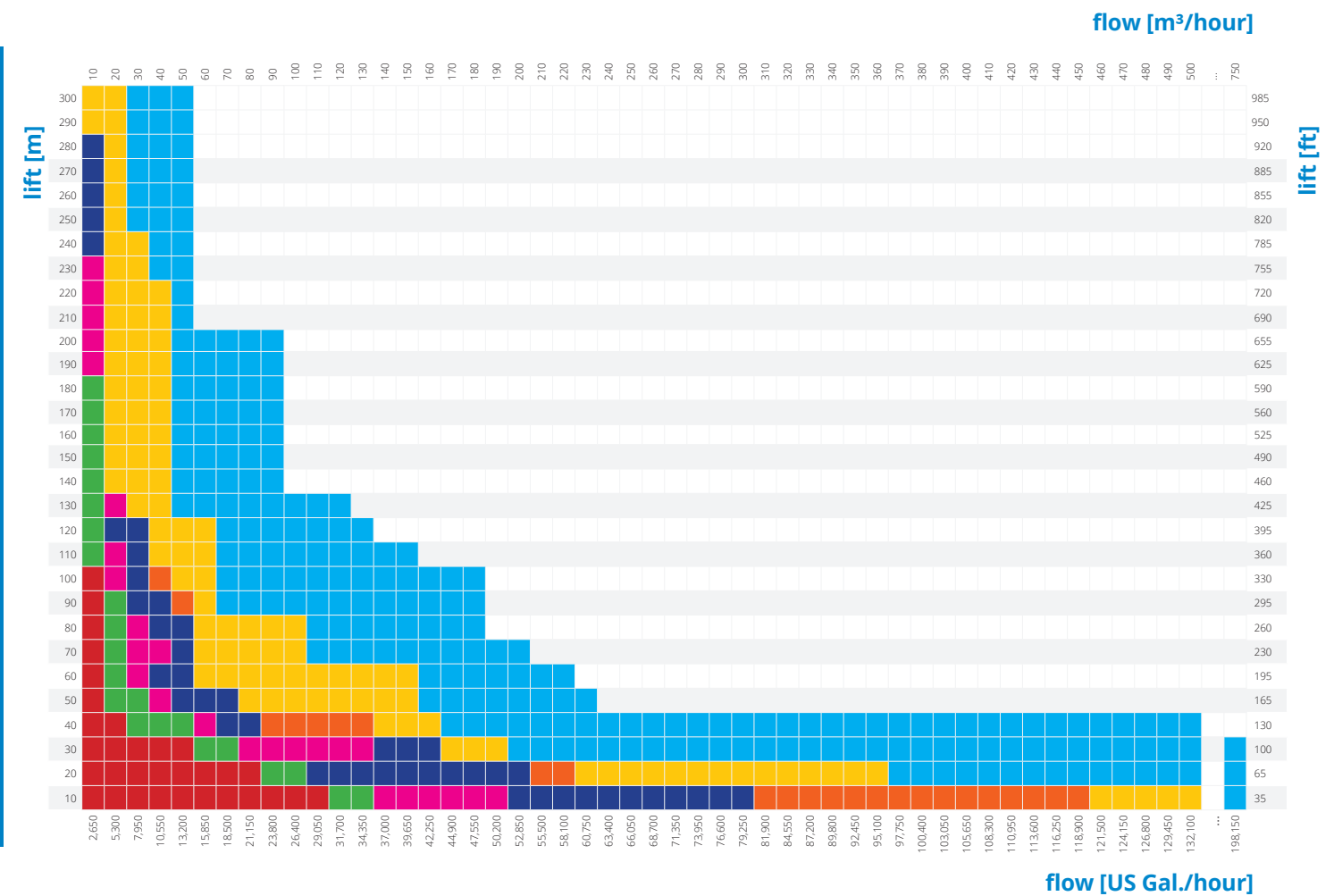
## COMPASS

Our industry leading COMPASS system planning software gives a detailed simulation of the water delivery through the year for your exact site location. This detailed modeling application provides a high degree of confidence that your system will perform as you require it to.



## Performance

The table below provides an indicative view of the system type that would be required to meet a specific flow at a given pumping head. Higher flow water applications are also possible, please speak to a LORENTZ partner about your specific project needs.



To find a partner near you, visit [www.lorentz.de/partners](http://www.lorentz.de/partners)



## About LORENTZ

LORENTZ is the global market leader in solar powered water pumping solutions. Founded in Germany during 1993 LORENTZ has pioneered, innovated and excelled in the engineering and manufacturing of solar powered water pumping. Today LORENTZ is active in over 130 countries through a dedicated network of professional partners. LORENTZ technology uses the power of the sun to pump water, sustaining and enhancing the life of millions of people, their livestock and crops.

Simply – **Sun. Water. Life.**



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