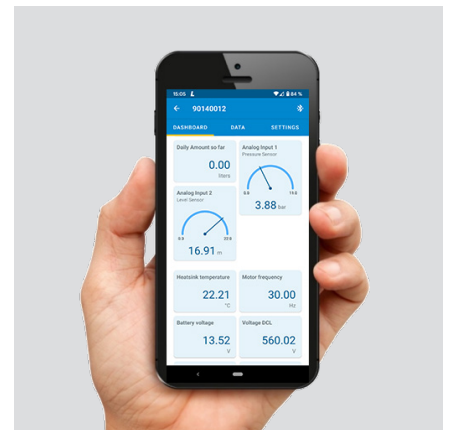# LORENTZ

LORENTZ Energy Oil Portfolio

Solutions for oil production in shallow field applications

- **A better way to manage oil production in shallow and marginal wells**

- **Designed to provide lowest operational costs through minimal maintenance and low power consumption**

- **Robust progressive cavity pumps with high efficiency DC brushless motors and intelligent controls**

- **Inbuilt IO, data logging and remote management**

- **Analog and digital sensors for monitoring and automated system control**

- **Power choices, including solar, to provide solutions anywhere**

A better way to solve your pumping challenges

LORENTZ high efficiency, intelligent oil pumping solutions bring an innovative but well proven approach to the market.

LORENTZ pumps handle a wide range of fluids and remove many of the service challenges associated with traditional pump jacks. Lower costs of operation mean that marginal wells become commercially viable and overall costs of operation are reduced.

The controls and sensor inputs allow for automatic measurement and management of liquid levels and pressures further reducing costs.

The systems are so efficient that it gives you power choices, allowing you to run from small grid, generators or solar power.

The challenge

The only thing that is constant in the oil business is the challenge.

How do you **minimize production costs** to allow maximum profits while prices are high and to extend your viable production time when prices are low.

The solution

Combing a well proven helical rotor pump (progressive cavity pump) with an ultra efficient DC brushless motor and an advanced controller provides the solution.

The HR pump can cope with varying conditions that other pumps can't. This results in significantly less maintenance and service visits. No pulling rods, no replacing rubbers or setting timers.

The motor is so efficient at any speed that you have choices of how to power it, including solar power.

Built in monitoring, not only of the pump, but also external sensors provides you with a ready integrated monitoring and management system for oil production. You can also do this fully remotely.

LORENTZ products differentiate themselves from the competition with the attention to engineering, choice of materials for hostile conditions, integrated management applications, excellent manufacturing standards and exceptional levels of testing of every manufactured product.
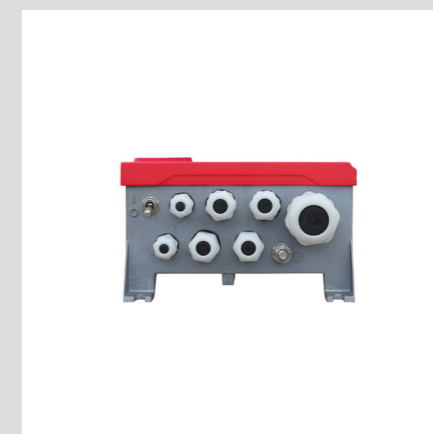
Designed and refined to perform

Since 1993 LORENTZ has been designing and manufacturing pumps for the most demanding of conditions.

Pumping oil has some unique challenges. We have studied the challenges, deisgned our pump systems to overcome these challenges and tested our pumps in the most difficult environments.

Over 15 years we have gained an ever growing reputation that our oil pumps perform where others have failed.

Pumping oil is a complex application due to the wide range of chemical compounds, viscosity, suspended solids and the "unknowns".

The helical rotor design works very well in this application. The mechanism is, to a large extent, self cleaning. The DC brushless motor provides high torque, high efficiency and infinite control over speed.

As a fully integrated company we have the mechanical, material, electronic and software engineers in-house to tailor solutions to fit the application and to continuously evolve designs as we overcome new challenges. As we are also manufacturing all of the pumps, motors and controllers in house we are in control of end-to-end quality and are very fast to change. New designs can be implemented, new prototypes built and when proven integrated into the standard product portfolio.

Having a close working relationship with our customers allows for continuous improvement and evolution of our product range. This can be in design change to overcome a specific chemical, temperature or pumping challenge or a new pump model to meet a different operational requirement.
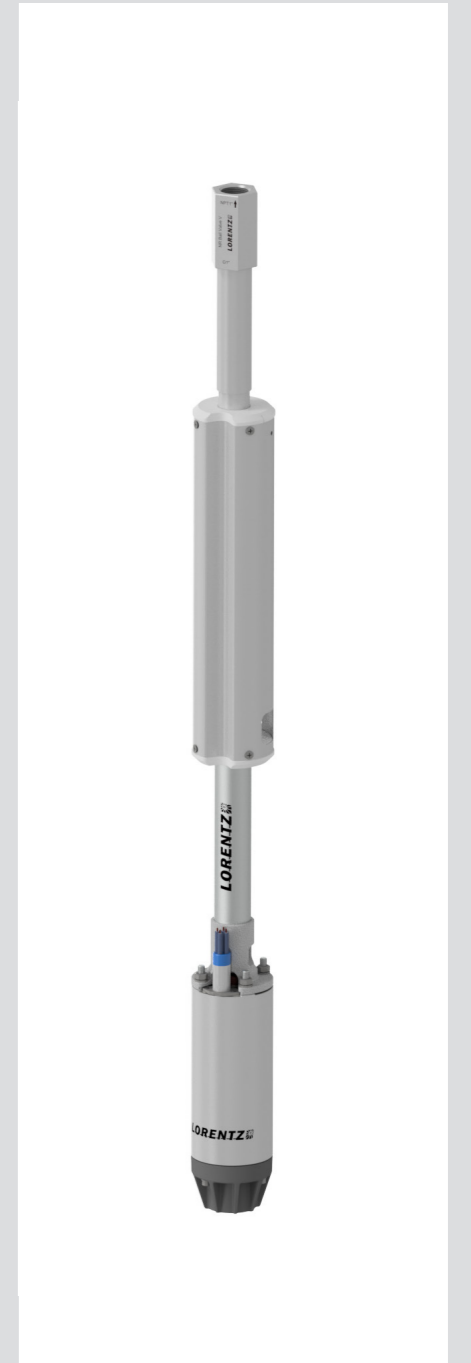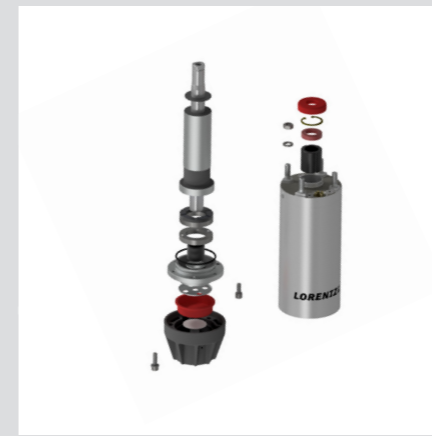
Oil field application example

Oil installation system sketch

In this example five pumps are installed in an oil field. All of the wells are connecting to a central tank. Three of the pumps have solar power and two pumps are powered from the grid. Any combination of grid and solar power is possible. All of the wells are equipped with remote monitoring and management, the systems can all be controlled from anywhere in the world.

The levels of oil in the well is measured by level sensors and the pumps will run automatically based on when oil is available to be pumped.

All data is recorded in the pump controller. The pump controller provides speed control, on / off or timed cycles, level and pressure control to maximize production.
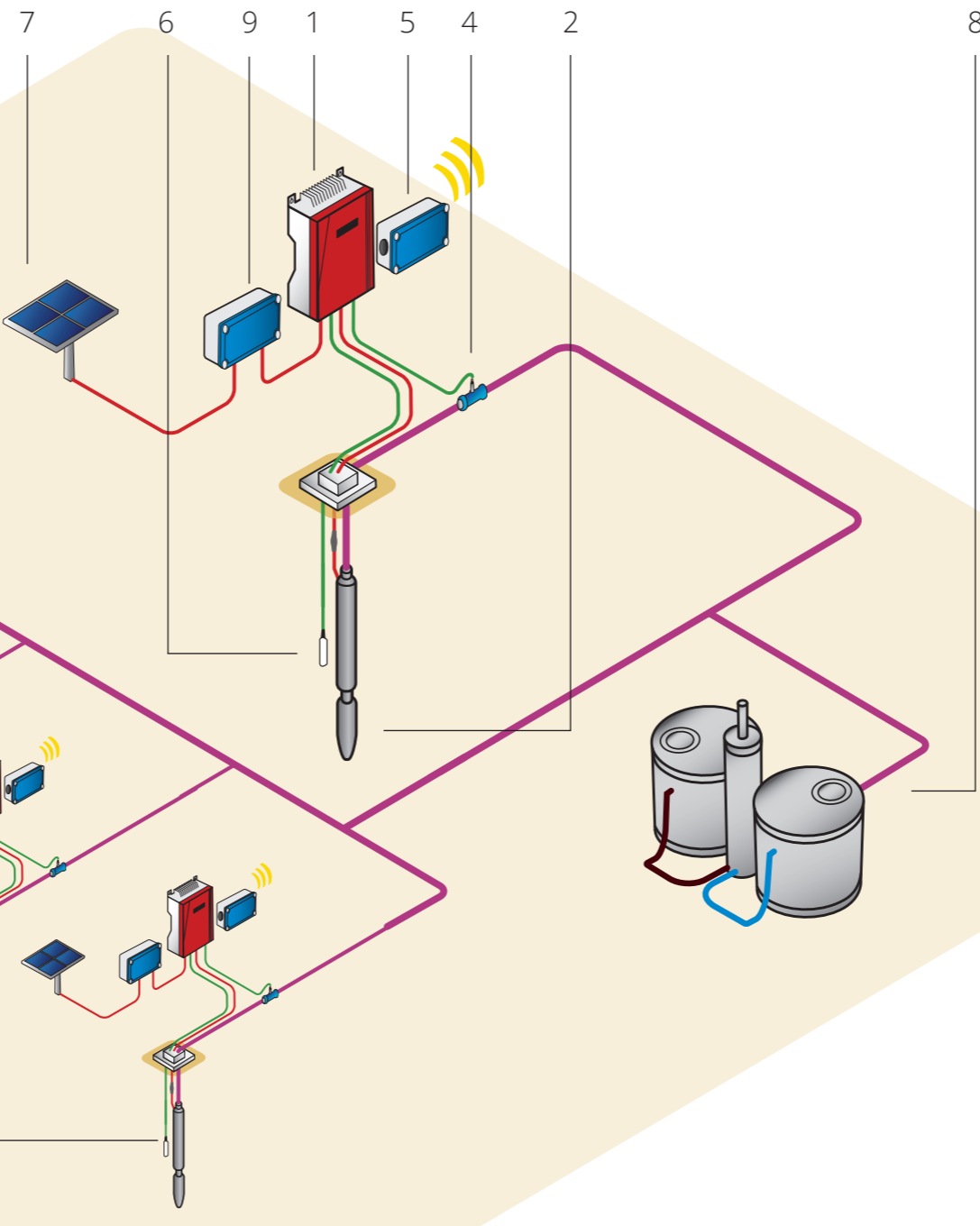
1. LORENTZ PS2 pump controller
2. Submersible progressive cavity pump with brushless DC motor
3. AC to DC Powerpack
4. Pressure sensor for monitoring line pressure
5. PS Commander for remote communication
6. Liquid level sensor - measuring fluid depth
7. PV modules (solar power)
8. Oil storage or separation plant
9. PV Disconnect - DC disconnect switch

	PS2-1800 AHRE-03HH Energy-2	PS2-2000 AHRE-03HH Energy-2	PS2-4000 HRE-05HSL Energy-2	PS2-4000 AHRE-017HSL Energy-2	PS2-4000 HRE-017HSL Energy-2B
Controller type	PS2-1800 Energy	PS2-2000 Energy	PS2-4000 Energy	PS2-4000 Energy	PS2-4000 Energy
Controller					
Power	1.8 kW	2.0 kW	4.0 kW	4.0 kW	4.0 kW
Max input voltage	200 V DC	375 V DC	375 V DC	375 V DC	375 V DC
Max motor current	14 A	14 A	14 A	14 A	14 A
Efficiency	98%	98%	98%	98%	98%
Ambient temperature	-40...50 C -40 ... 122 F	-40...50 C -40 ... 122 F	-40...50 C -40 ... 122 F	-40...50 C -40 ... 122 F	-40...50 C -40 ... 122 F
Enclosure class	IP68 (NEMA 6P)	IP68 (NEMA 6P)	IP68 (NEMA 6P)	IP68 (NEMA 6P)	IP68 (NEMA 6P)
Pump					
Max head	500 m 1650 ft	550 m 1800 ft	700 m 2300 ft	900 m 3000 ft	1200 m 4000 ft
Max flow rate	3.0 bbl/h	2.6 bbl/h	5.5 bbl/h	1.0 bbl/h	1.0 bbl/h
Diameter	88 mm 3.46"	88 mm 3.46"	96 mm 3.8"	88 mm 3.46"	96 mm 3.8"
Liquid temperature range	0 to 50 C 32 to 122 F	0 to 50 C 32 to 122 F	0 to 50 C 32 to 122 F	0 to 50 C 32 to 122 F	0 to 50 C 32 to 122 F
Material	Progressive Cavity Pump (PCP), Cast stainless steel stator housing Solid stainless steel rotor, FKM rubber stator Non corrosive materials used throughout		Progressive Cavity Pump (PCP), Cast stainless steel stator housing Solid stainless steel rotor, FKM rubber stator Non corrosive materials used throughout		
Motor					
Rated power	1.7 kW	1.7 kW	4.0 kW	1.7 kW	4.0 kW
Motor speed	900 to 3,300 rpm	900 to 3,300 rpm	900 to 3,000 rpm	900 to 3,300 rpm	900 to 3,300 rpm
Input voltage (PWM)	200 V	300 V	240 V	200 V	320 V
Submersion	500 m 1640 ft	500 m 1640 ft	500 m 1640 ft	500 m 1640 ft	500 m 1640 ft
Material	AISI 304/316	AISI 304/316	AISI 304/316	AISI 304/316	AISI 304/316
Insulation class	F	F	F	F	F
Enclosure class	IP68	IP68	IP68	IP68	IP68
Efficiency	92%	92%	92%	92%	92%
Technology	High efficiency ECDRIVE DC brushless and sensorless motor		High efficiency ECDRIVE DC brushless and sensorless motor		High efficiency ECDRIVE DC brushless and sensorless motor
Hazardous environment	Oil filled, submersible motor with run dry protection		Water filled, resin encapsulated submersible motor with multiple run dry protection methods		Oil filled, submersible motor with run dry protection

LORENTZ pump controller features

System sizing and planning

- Sizing and planning with LORENTZ COMPASS, the industry leading planning and simulation tool
- Fit the right system first time
- Ensure your pumping needs are met

Installation and wiring

- Easy wall or pole mounting
- Ample cable entries and space to work inside for wiring
- Clear terminal labeling and use of spring connectors for reliability
- Full range of power connection accessories such as PV Disconnect / combiner / protection device to manage large PV arrays efficiently

PS2 controller features and protection

- High efficiency pump system controller
- Maximum power point tracking
- Simple LED status and on off switch
- Speed control, timers, constant pressure, constant flow, level and pressure controls
- Under voltage
- Over voltage
- Over current
- Under current
- Short circuit
- Active Temperature Management
- Commutation loss

Simple setup and management via LORENTZ PumpScanner app

- No complex programing
- The system is running with 3 selections
- Oil focused built in applications
- Technicians and customers use the PumpScanner app for different features (rights managed)

Data-logging and connectivity

- Built in Bluetooth for wireless local connectivity
- All system data, operational data and sensor values are recorded
- Historic or real-time data via LORENTZ PumpScanner app
- High customer value in tracking system performance
- High technician value for troubleshooting
- Remote management and monitoring via the LORENTZ Global IoT service, a low cost, professional, cloud based management system unique in the market

I/O, sensors and inbuilt applications

- Inputs for flow meter, analogue (pressure, level, temperature) sensors, digital switches and other sensors
- Built in applications including constant pressure, constant flow and daily amount plus control by pressure, level and flow

- Included SunSensor (to control by solar irradiation level)
- Active temperature management, reduces power when needed to avoid system damage while still delivering oil

Serviceability

- Should the worst happen through accidents, vandalism, external influences or a breakdown, PS2 is designed to be serviced in the field at a very affordable price
- Modular design
- Common spare parts across models
- Fast board changes and low cost spares

Controller supplementary information

Mounting options

- Wall or panel mount using 4 holes
- Pole mounting with optional pole mount kit

Approvals and standards

- IEC/EN 61702:1995
  IEC/EN 62253 Ed.1
  UL 508

Product Content
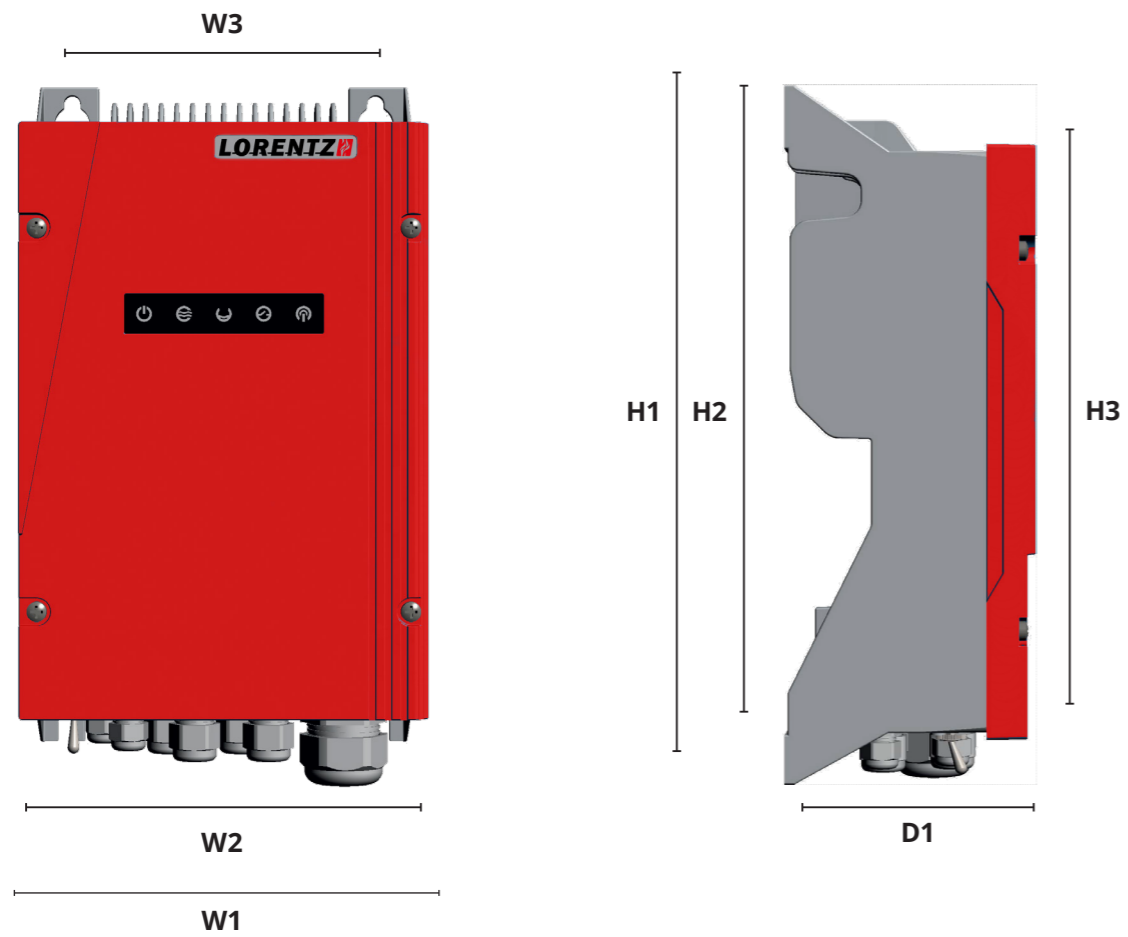
- PS2 Controller
- SunSensor
- Manual for installation and operation

Transport and shipping

- Packed volume in mm [inch]:
  335 [13.2] x 500 [19.7]x 275 [10.8]

Packaging

- Sustainable, environmentally friendly pulp packaging

Dimension in mm [in]							
W1	W2	W3	H1	H2	H3	D1	Weight in kg [lbs]
207	170	164	352	333	300	124	4.5
[8.15]	[6.69]	[6.46]	[13.86]	[13.11]	[11.81]	[4.88]	[9.9]

Remote monitoring and management

LORENTZ Global provides a simple and cost effective solution to manage and monitor your LORENTZ oil systems from anywhere in the world!

The platform serves a wide range of customers from a single pump on a site to a global network of pumping systems and storage tanks.

Performance and compliance data is recorded and can be automatically exported to external systems for incorporation into other platforms.

LORENTZ Global is an easy to use, cloud based, pay monthly service that takes away the complexity of remote monitoring and management. Access to real-time data and configuration settings allows you to get the most out of any application while at the same time reducing maintenance trips and improving customer service.

Full consolidation of data across sites is provided to complement the detailed information on fluid levels, pressures, pumped volumes, power consumption, temperatures and other critical application information.

Use the dashboard view to monitor your systems in real time

- Access all of your systems, pump status and performance conveniently on one dashboard.
- Drill down to see what each system is doing.
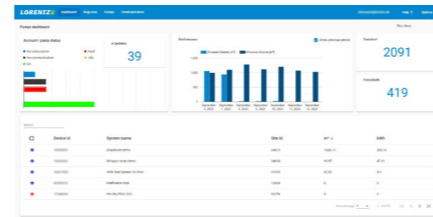
Data at your fingertips to monitor system performance

- Access system information including live pump status, liquid pumped, power generated, hours active and much more.
- All status events are tracked and it is easy to compare data across time periods.
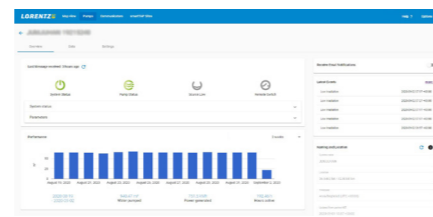
Get into the details when you need to

- You can see values and trends for system voltages, current, power, temperature, irradiation and levels from pressure and level sensors.
- Full system configuration is available remotely.
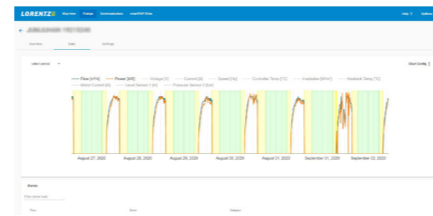
Active alerts and a map view

- LORENTZ Global will send fully configurable pro-active alerts via email.
- The map view complements this to let you visualize the status of your systems.
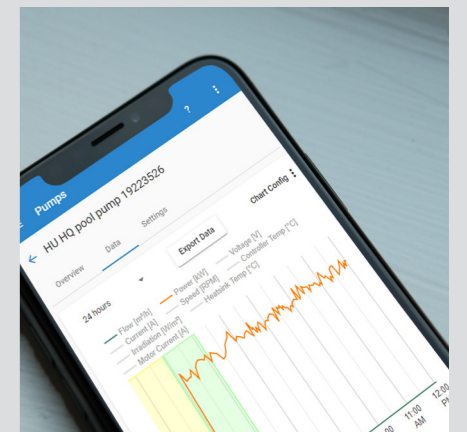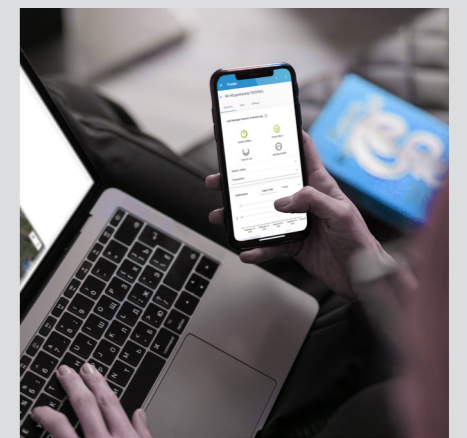
Sensors and accessories

The complete solution

To complement the range of oil pumping systems LORENTZ provide an extensive range of accessories and ancillary equipment.

All accessories have been developed for use with LORENTZ oil pumps to offer the most flexibility in application design and for high reliability.

Sensors and measurement

Liquid level sensor
- Measures the level of liquid in a well, pipe or vessel relative to atmospheric pressure

Liquid pressure sensor
- Measures the pressure in a pipe or vessel

Combination sensors
- Sensors to measure level and temperatures in liquid

Accessories for LORENTZ Global monitoring

PS Commander
- Cellular communication device for collecting data from pump controllers and sensors

PV Module for PS Commander

External antenna

Installation accessories
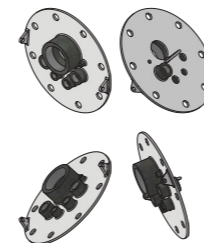
Splice kits
- To join submersible cables

Riser pipe and cable
- A range of pipes, cables and ancillaries designed for oil applications

Well head

Pole mount accessory bracket
- To mount pump controller to a pole

Accessories for solar power

PV Modules
- Wide range of PV modules to fit local market conditions

PV disconnect
- For connecting multiple PV modules together and to provide safety isolation

PV mounting systems
- Range of mounting options to meet oilfield installation requirements

Accessories for grid power

PowerPack
- To convert AC power to DC to run the LORENTZ pump systems

Accessories for additional lightening protection and isolation

Accessory Surgeprotector
- To provide galvanic separation between the pump controller and any sensors or switches

Lightning surge protection (PV)
- Surge protection to manage external voltage spikes on the incoming solar power supply

LORENTZ Smart Pump Jack Solution
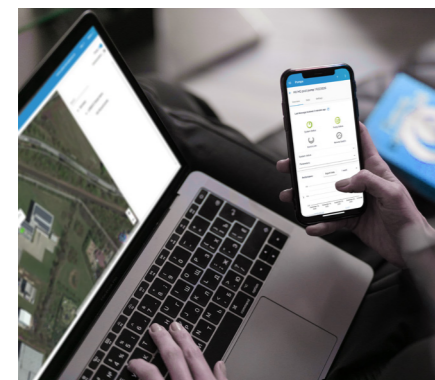
The solution

The LORENTZ smart pump jack is a retrofit solution which replaces the motor with a very efficient variable speed DC brushless motor combined with an intelligent controller for managing the pumping system.

This solution improves well productivity by intelligently maximizing the oil extraction without running the well dry.

Efficiency

The motor is designed to run directly from solar power.

Powering pump jacks from solar allows for a long operational life and requires no servicing or maintenance activity other than your normal pump jack service requirements. This results in a system which is predictable, reliable, quiet and very cost effective.

Remote monitoring and management

The entire solution can be programmed and operated via an app or remotely from your office or truck. You can even manage the entire lease pumping operation from the comfort of your desk.

The digital controller has built in applications and sensor inputs which means the system can change the production rate and cycle time. It can also monitor and control the motor speed, motor amps, fluid level, casing pressure, flowline pressure and/or tank levels.

For example, with the liquid level sensor (LLS), the system can be controlled based on the fluid level. With this feature you can start or stop the pump jack at a specific level or change the motor speed to maintain a constant level. The data is collected and stored by the pump controller.

LORENTZ know-how

LORENTZ Energy products are specialized solutions designed for oil pumping. These specialized motors require no servicing, have a long life expectancy, are remotely manageable and are very efficient making them perfect to be powered using solar energy.

Benefits of the LORENTZ smart pump jack solution

- maximize productivity by reducing static head on the reservoir (production increases)
- realtime access to data and stored data e.g. fluid level in the well, set on/off levels
- less maintenance = increased operating time and money saved
- infrastructure independence: reduced fire risk from downed power lines, reduced legal fees from obtaining easements and reduced infrastructure cost by not running power lines long distances
- solar eliminates high costs of diesel generators or casing head gas

Technical information

Power	4kW / 5.4 HP
Input voltage	60-240 V DC
Speed	450 to 1750 rpm
Efficiency	90%
Frame	182T
Physical	Insulation class F, enclosure class IPX4, EN 1.4301/AISI304 stainless steel

LORENTZ Controller

Outdoor rated, wall or pole mounting passive cooled (no fans) controller with speed control, timers and app connectivity. This controller has the ability to connect sensors if any local monitoring is required such as monitoring fluid depths. The controller keeps a log of all performance data.
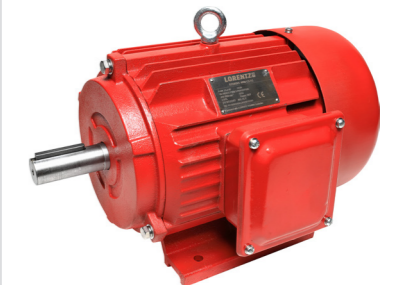
ECDRIVE Brushless DC Motor

The LORENTZ ECDRIVE is a brushless and sensorless DC motor which is 50-100% more efficient than existing pump jack motors. This unique design has been selected for its very high efficiency across a wide load range. The ECDRIVE is perfectly suited to the pump jack application as efficiency is maintained even at times when only low power levels can be yielded from solar modules.

LORENTZ ECDRIVE brushless motor 4000-CS PJ

LORENTZ PS2-4000 Controller

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.

Using LORENTZ experience and engineering excellence, a range of products for specialized pumping applications have been developed. These are marketed under the LORENTZ Energy brand and include pumps for oil pumping, landfill liquid extraction and remediation applications.

LORENTZ Germany	LORENTZ US Corp	LORENTZ China	LORENTZ India Pvt. Ltd.
Siebenstücken 24	710 S HWY 84	No 34 Jiuan Road	Netaji Subhash Place
24558 Henstedt-Ulzburg	Slaton, TX 79364	Doudian Town	Pitampura110034
Germany	USA	Fangshan District	New Delhi
		102433 Beijing	India
		China	
📞 +49 (4193) 8806 700	📞 +1 (844) LORENTZ	📞 + 86 (10) 6345 5327	📞 + 91 (11) 4707 1009

www.lorentzenergy.com