

LUFKIN Well Manager™ 2.0 REGEN™ Variable Speed Drive

REGEN™ Conserving Energy – Improving your ESG impact

REGEN™ field studies realize power savings of over 10% when using the system, potentially saving thousands of dollars annually.

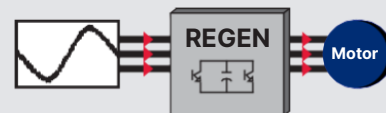
REGEN ensures each well is properly optimized and minimizes any power losses by pushing regenerated power back to the grid, resulting in lower power costs and reduced carbon footprint. REGEN technology mitigates power line harmonic distortion to the IEEE 519-2014 standard.

- ✓ **Returns regenerated energy to power grid.**
- ✓ **Utilizes Active Front End (AFE) technology** reduces harmonics to 5% or less.
- ✓ **Eliminates inefficient braking resistors.**
- ✓ **Automatically diagnoses** well conditions and regulates pump speed accordingly
- ✓ **Features two systems in one integrated interface,** offering a Quick Start activation option that triggers REGEN and LWM 2.0 default operating parameters.
- ✓ **Enables easy field installation** with only one cabinet and display to install.
- ✓ **Compatible with NEMA D, NEMA B, permanent magnet motors.**

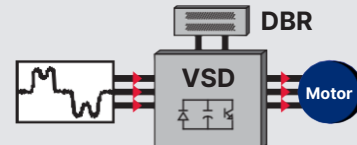
WHAT MAKES REGEN BETTER

Clean Power

REGEN synchronizes active transistors with the incoming line voltage, supplying a clean sinusoidal current of 5% or less harmonics.

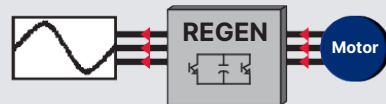


- *Standard VSDs create harmonics back to the grid*

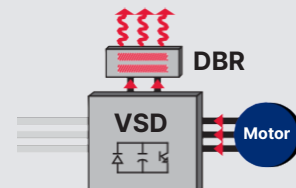


Regenerative Power

REGEN returns usable power from the motor to the power grid.



- *Standard VSDs release regenerative energy as heat through Dynamic Braking Resistors.*



THE POWER OF REGENERATIVE TECHNOLOGY

REGEN's advanced engineering combines proven LUFKIN Well Manager™ (LWM) 2.0 technology for well diagnostics, Variable Speed Drive (VSD) capabilities for pump speed regulation, and Active Front End (AFE) technology to regenerate clean power when overhauling loads occur. The all-in-one system eliminates external Dynamic Braking Resistors (DBRs) by returning usable energy to the system. REGEN is exceptionally efficient when multiple loads connect to a single power meter.

THE IDEAL CHOICE FOR LOCAL POWER GRIDS

REGEN is the right choice when the local power grid requires cleaner power, braking resistors pose a hazard, or external harmonic filters do not meet requirements.

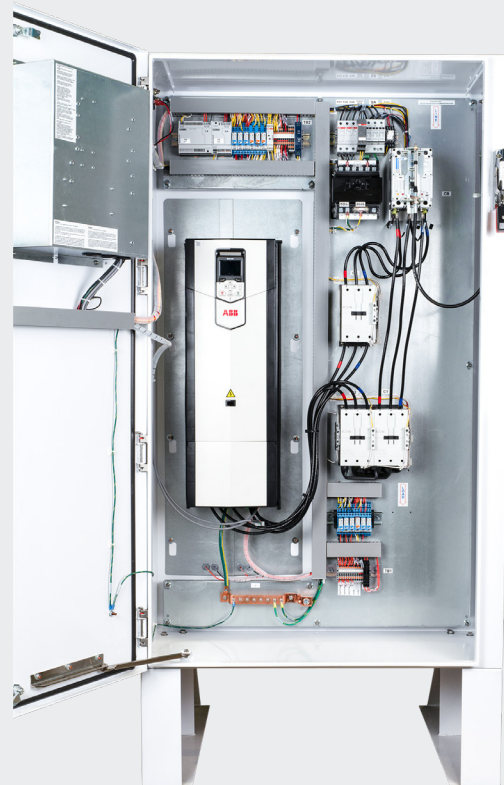
A NEAR-UNITY POWER FACTOR

REGEN's AFE technology provides a near-unity power factor ensuring efficient power use under all conditions. REGEN continuously monitors input power and actively mitigates harmonics, meeting IEEE519-2014 standards.

ONE SYSTEM, ONE INTERFACE

REGEN's integrated cabinet and interface makes it very easy to access system information. The user has access to all required information from the front mounted interface, ensuring easy setup and programming.

Quick Start activation can be used to trigger default operating parameters, any of which can be fine-tuned for optimal pump control. If speed or other factors require attention, REGEN can be seamlessly interfaced with remote SCADA systems to allow for access to up to date information and to make on-the-fly adjustments.



INTELLIGENT CONTROLS FOR MORE EFFICIENT OPERATION

REGEN's optimization and variable speed features work together on every stroke to adjust the pump rate to ensure maximum productivity while minimizing maintenance and operating costs.

Direct torque control algorithms offer performance and protection, delivering full torque to the pump at zero speed while operating within strict torque limits to reduce mechanical stress.

Designed to slow a unit just enough to avoid working load violations, REGEN mitigates rod float, fluid pound and min/max rod load issues.

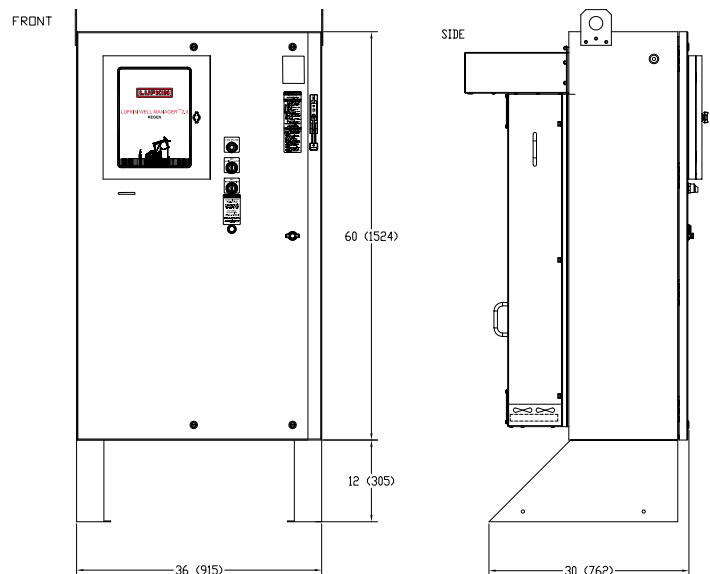
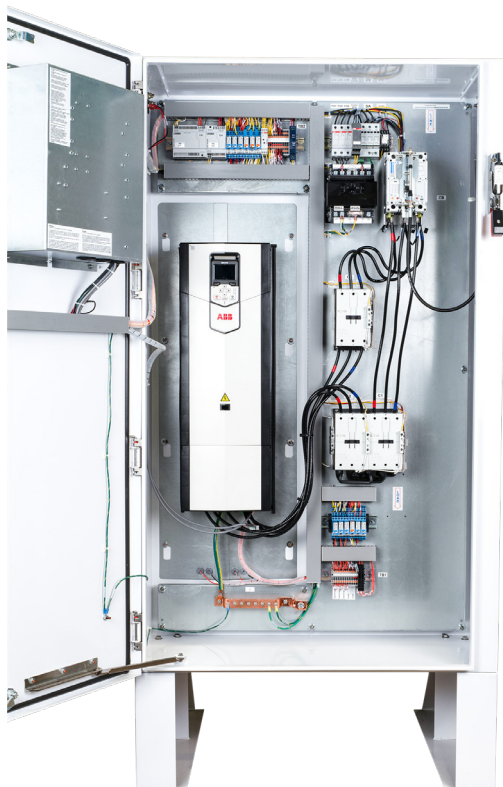


LUFKIN Headquarters
811 Willow Oak Drive
Missouri City, Texas 77489
(281) 495-1100

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REGEN VARIABLE SPEED DRIVE SPECIFICATIONS

Power Rating	30-150 HP (22-110 kW)
Power Supply	
Voltage	380-500 VAC
Frequency	50/60 Hz (±5%)
Phase	Three Phase
Output Rating	
Voltage	0-100% supply voltage
Frequency	0 - 120 Hz
Surge Protection	Built-in surge protection meets UL 1449, Rev 3
Enclosure Type	NEMA 3R, cabinet with internal forced air cooling
Enclosure Dimensions	75.25" (191.14 cm) H x 36" (91.44 mm) W x 34.875" (88.59 mm) D
Ambient Temperature	-40 – 131° F (-40 – 55°C) derated above 122° F/50°C



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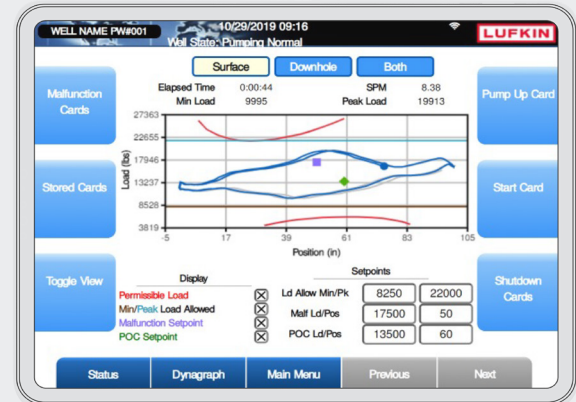
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LWM 2.0 SPECIFICATIONS

Applications	Rod Pump Control with and without VSD. Conventional, linear, and hydraulic pumping units. Compatible with DH pressure gauge input.
Operator Interface	640 x 480 TFT Color Wi-Fi, Web Server for remote access. High resolution color screen, keypad w/ dynamic menu.
I/O	8 AI, 2 AO, 8 DIO, 2 PDI (Exp.to 8 AI, 4 AO, 16 DIO, 4 PDI)
Memory	512MB DDR3 RAM, 1GB on Board Flash
Temp. Rating	-40 to +158° F (-40 to +70° C)
USB for additional storage	Yes (Micro SD, future)
Ingress Protection	POC: NEMA 4X/IP66 VSD: IP56
Power Input	100 – 240VAC, 50/60 Hz 12VDC
Certification/ Standard	cULus, IEC
Communications	RS232, RS485, Ethernet, Wi-Fi Web Server compatible with any standard internet browser, including Apple Safari, Google Chrome, and Microsoft Internet Explorer. Compatible with smart phone Internet browsers.

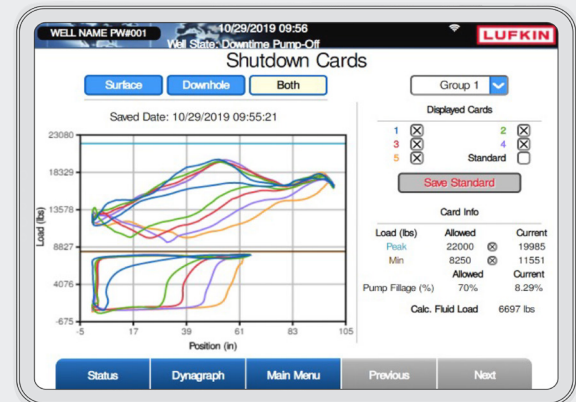
OPTIMIZING OUTCOMES WITH SEAMLESS SERVICE

At LUFKIN, service is synonymous with solutions. The LUFKIN team is committed to providing the best technical expertise in design, installation, optimization, troubleshooting, and training to maximize automation operational efficiencies and protect critical control equipment.



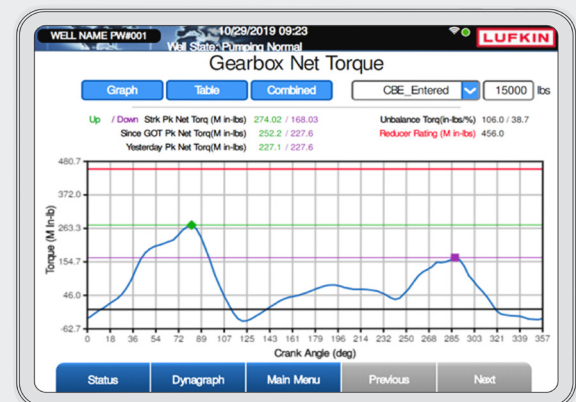
VSD Control function

Intuitive dynagraph setup with permissible loads



Shutdown cards

Multiple 5-card shutdown buffers, critical for diagnostics and Root Cause Analysis (RCA)



Gear Reducer Torque

For every stroke, the LWM 2.0 calculates gear reducer torque per 15 deg. Crank Angle intervals utilizing actual Polished Rod Load utilizing the API RP11E method.

A VFD is not required to generate the torque plots!



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