

# SMARTEN Variable Speed Drive for Rod Lift Wells

## Maximize the return of your rod pumping systems

### APPLICATIONS:

- Rod lift wells with problematic shutdowns, including:
  - Dynamic production rates
  - Gas interference and gas slugging
  - Sanding and pump sticking problems
  - Heavy crude production and steam flood applications

### BENEFITS

- Optimize speed and production
  - Analyzes pump fillage every stroke and adjusts speeds to match target fillage setpoint
  - Provides four programmable speed zones to alter the speed throughout the entire stroke
  - Eliminates the cost, time, and resources required for re-sheaving
  - Simplifies adjustment of speed setting when operating in hand with adjustable speed pot
  - Can run in overspeed mode in non-DBR scenarios, allowing the VSD to outrun the regenerative torque created by the counterweights to protect the VSD's electrical components
  - Limits output torque to prevent excess motor and gearbox loading
  
- Reduce HSE exposure and risks
  - Isolates user from high voltage with removable front-door mounted VSD keypad and display while still providing easy access to complex VSD functionality/serial port when needed
  - Easily integrates with standard wellsite safety shutdowns such as vibration, pressure, spill detection, etc.
  
- Enhance performance with optional hardware kits
  - Keep unit running at peak performance in colder climates (<10°F) with heater kit
  - Reduce harmonics that can disrupt the VSD or grid with harmonic filters
  - Dynamically controlled braking at increased torque and dissipate excess energy in regenerative scenarios with dynamic braking resistor (DBR) kits



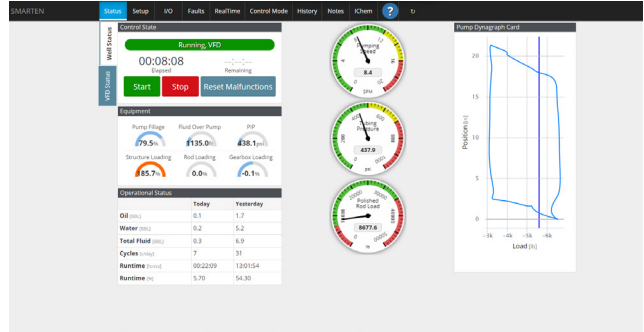
If you are dealing with high solids content, gas slugs, or dynamic production rates, a variable speed drive (VSD) can help you maximize returns from your well. In addition to the benefits of a standard pump off controller (POC), a VSD continually monitors, analyzes, and adjusts the pumping speed to match variations with the well.

The SMARTEN™ VSD helps you reduce failures with less rod compression, fluid pound, and gearbox stress. It also eliminates cycling, resulting in more effective chemical treatments, less potential for collection of solids, and reduced back pressure on inflow of low bottomhole pressure wells. By delivering an automatic response to operations, the SMARTEN VSD eliminates the need for sheave changes, offers quicker stabilization after shut-ins, and easily adjusts to fluctuating volumes.

Our SMARTEN VSD portfolio ranges from 20 to 150 HP to address all your application needs. We offer a fully integrated system, so you can perform all normal drive programming and commissioning through a single easy-to-use touchscreen. It also retains VSD-specific programming to eliminate the hassle of being re-entered in case of inverter failure.

**The SMART choice**

Built on the SMARTEN controls platform, you reap all the benefits of our advanced SMARTEN technology. This includes storage capacity of more than 3,000 dynagraph cards that you can save directly to your computer from the field. You can also take advantage of SMARTEN Live which allows you to access the controller remotely and make operational changes as if you were on location. And the iChem™ chemical optimization logic is now available in our SMARTEN hardware, so you can cost-effectively optimize your chemical injection programs and artificial lift equipment through a single controller.



The SMARTEN VSD dashboard offers an intuitive interface to quickly and easily adjust operating parameters.

To learn how the SMARTEN VSD can extend the productive life of your rod lift wells, contact your local sales representative or visit [ChampionX.com/SMARTEN](http://ChampionX.com/SMARTEN).

**SMARTEN Integrated VSD Technical Specifications**

<b>Power rating</b>	20 to 150 HP
<b>Power supply</b>	<b>Voltage:</b> 380 to 480 V (voltage +10%, -15%) <b>Frequency:</b> 50/60 Hz (±5%) <b>Phase:</b> Three-phase
<b>Rated output</b>	<b>Voltage:</b> 380 to 480 V (maximum output voltage is equal to the input supply voltage) <b>Frequency phase:</b> Setting between 0.01 and 120 Hz; adjustable at 0.01 Hz increments; default maximum frequency is set to 0.01 to 80 Hz; maximum frequency adjustment (30 to 590 Hz)
<b>Overload current rating</b>	150% for one minute, 180% for two seconds
<b>Motor control</b>	Uses sensorless vector control or V/Hz
<b>Protection</b>	Built-in surge protection that meets UL 1449, Rev 3
<b>Built-in filter</b>	460 V 10-150 HP; built-in EMI noise filter (EN5501 Class A, EN61800-3 category 3 compliant)
<b>Built-in DC link reactor</b>	460 V 25 to 100 HP (18.5 to 75 kW); built-in DC reactor 460 V 125 to 150 HP (90 to 112.5 kW); attached DC reactor
<b>Cooling method</b>	Forced air
<b>Ambient temperature/relative humidity</b>	50 to 140°F (10 to 60°C); remove upper cover if >122°F (50°C)
<b>Enclosure</b>	NEMA 1/IP20 with optional conduit box
<b>Altitude</b>	Full output to 3,281 ft (1000 m) elevation; derate 1% for each additional 328 ft (100 m)

Theta Automation and Optimization | 10648 West Little York | Houston, TX 77041

This document is provided on an "as is" basis without warranties of any kind. ChampionX Artificial Lift DISCLAIMS ALL WARRANTIES, EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE OR SUITABILITY FOR ANY PURPOSE, TITLE, AND NON-INFRINGEMENT. While reasonable care has been taken in the preparation of this document, ChampionX Artificial Lift does not represent or warrant that the contents of this document are accurate, complete, reliable, current or error-free.

©2021 ChampionX Artificial Lift, All Rights Reserved. 08032021\_TAO