SALT Well Automation and Control

Sensorless Artificial Lift Technology

SALT™ Well Automation & Control

What is SALT?

Sensorless Artificial Lift Technology (SALT) is the most advanced well automation and control system on the market, outperforming all existing artificial lift control systems.

Designed specifically for oilfield applications, SALT incorporates patented algorithms and built-in pump-off control into a Sensorless Vector Variable Frequency Drive (VFD).

SALT is a versatile technology that offers significant advantages for all types of down-hole pumps, including beam, progressive cavity and submersible. Extensive built-in functionality and highly advanced remote monitoring and control make SALT an ideal oil and gas solution.

SALT simplifies well automation and is the ONLY controller capable of running ALL types of pumping systems.

SALT continuously monitors well conditions and automatically makes adjustments for pump-off, paraffin buildup, gas pockets, failure to recover, load limits, and changes in production level. These and other operating conditions are retained in a thirty day log and include such things as strokes per day, average RPM, inferred production, gas purges and more.

SALT Advantages

Ease of Use

Getting started takes as little as 15 minutes to set system parameters during initial setup procedures. SALT has been designed specifically to begin operating quickly and efficiently, with control and data retrieval available using a variety of onsite and remote access methods. Basic information and control components are displayed prominently on the front of the unit, providing instant access to system status.

SALT ADVANTAGES

- Ease of Use
- Increase Production
- Lower Equipment Costs
- Reduce Mechanical Stress
- Minimize Energy Consumption

Increase Production

SALT maintains minimum intake pressure to the well by varying the speed to match the well's productivity, thereby minimizing the shutdowns that reduce well productivity.

Unlike standard pump-off controllers, which shut off the pump when the fluid is at the optimum level, SALT reduces the pump speed, maintaining and maximizing production while reducing energy consumption and mechanical stress.

SALT automatically adjusts speed to match the variable fluid volumes caused by:

- Changes in reservoir level
- Shutdown of adjacent wells
- Water, Steam, or CO2 injection
- Pump wear

Lower Equipment Costs

SALT replaces the standard pump panel and requires no field end devices, such as load cells, bottom-hole pressure sensors and their related cost and maintenance requirements.

SALT increases system efficiency, allowing the use of smaller motors and transformers. A substantial benefit for progressive cavity pump installations is SALT's DC Braking feature which eliminates the need for a mechanical brake to minimize rod backspin.

Reduce Mechanical Stress

SALT reduces rod overloading and compression by adjusting speed within each stroke and matching overall speed to production. Four-quadrant control further helps reduce rod float and compression.

By slowing rather than stopping, SALT reduces potential for solids to cause a stuck pump and SALT never exceeds load limits while starting, running, or binding downhole.

Unique gas and sand purge algorithms allow the pump to continue to run, reducing rod stress and prolonging pump and motor life.

Minimize Energy Consumption

On Rod Pumps, the patented SALT system eliminates regenerative losses thereby reducing energy cost by 20% or more.

SALT also reduces peak demand charges as much as 50%.

During operation, SALT runs continuously so energy is not wasted getting fluid to surface again and again.

Since Submersible Pump power consumption is proportional to the cube of speed, significant energy savings are realized as SALT automatically reduces centrifugal pump speed to match well productivity.

Dedicated Readouts

Status

- Torque
- Motor Voltage
- Motor Current
- Stroke Position
- Transducer Level
- Day 2 Strokes
- Day 2 Run Hours
- Day 2 Pump-Offs
- Day 2 Underloads
- Pump Fillage
- Speed

Event Log

- Pump-Off Time
- Underload Time
- Waxing Time
- VFD Fault Time

Full 30-day log

- Strokes
- Purges
- Faults
- Pump-Offs
- Underloads
- Running Hours
- Recovery Faults
- Waxing Events
- Stall Events
- Switch Losses
- Daily Average Speed
- Daily Fluid Production

Control Panel & Display

Specialized data tracking

- Categories specific to oilfield applications
- Easy access to relevant information

Active selection indication

- LEDs illuminate active buttons and conditions

Quick Menus

- Provides access to commonly used parameters
- Personal Menu for quick access to essential parameters for Startup and Normal operation
- Changes Made Menu allows user to see and track changes
- Logging Menu provides graphical view of display parameters

Helpful buttons

- Info (on-board HELP)
- Cancel (undo)
- Alarm log (quick access)

Other benefits

- Removable
- Save all parameters to the display for a permanent record of settings

Keypad

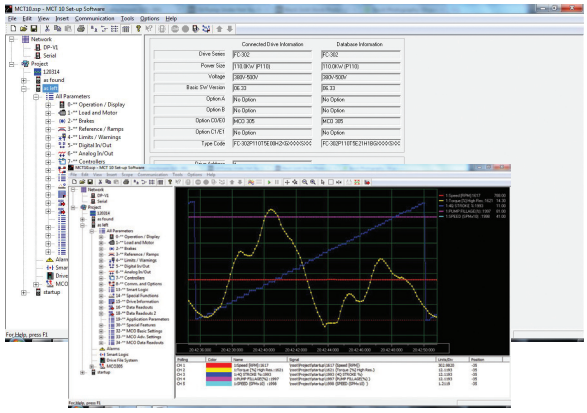
PC Software

Remote Communication

MULTIPLE LEVELS OF CONTROL

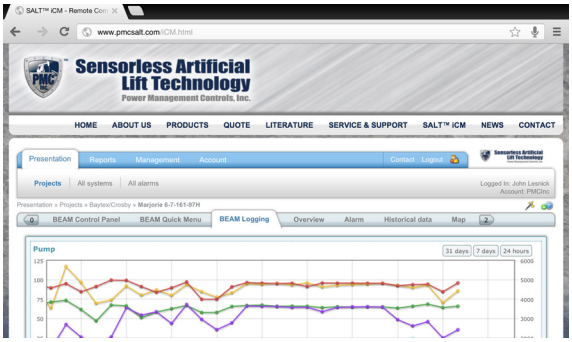
Keypad

With an onboard HELP program and an intuitive menu structure, the SALT keypad provides graphical information and access to all parameter settings. These settings can be uploaded to and downloaded from the keypad, which greatly simplifies restart procedures and minimizes downtime in service situations. LED indicators provide basic status information and dedicated buttons enable one-touch access to commonly used functions.



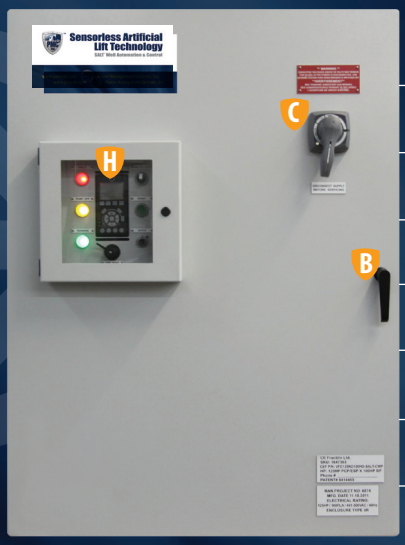
PC Software

PC software provides access to all parameter settings via the built-in USB port. The Windows-based interface provides extensive access for both commissioning and servicing. Users can program both on and off line, save settings, compare with saved settings, view the complete fault log in one display, and scope and graph parameters.



Remote Communication

SALT includes as standard the Modbus RTU protocol, which allows wired and wireless access through the PMC iCM or any other system to configure, monitor and control from remote locations.



- A Outdoor Rated Enclosure
- B Easy Access Enclosure
- C Disconnect Switch
- D Surge Arrestor
- E SALT VFD
- F Optional Cold Weather Kit
- G Exterior Ground Lug
- H Operator Control Panel

Configuration & Options

	Standard Configuration	Options
Enclosure	• Outdoor Rated Enclosure (NEMA 3R/4, IP 55/66) • Wall Mounting (< 125HP) • Floor Mounting (> 150HP) • Lifting Eyes • Easy access Main Door with Door Stop • Padlocking Provision	• IP21 Enclosure • UL , cUL, CSA Certification • Sun/Snow Shield • Wall Mounting Stand • Floor Mounting Base
Environment	• Ambient Temperature -20°C to +50°C • Relative Humidity 5%-95%	• Cold Weather Kit -40°C to +50°C • Heat Trace Kit ◦ Transformer, GFI Breaker, Terminal Blocks
Input	• Three phase, 380-500 VAC input • Main Power Circuit Breaker with door operator • Surge Arrestor	• Power Terminal Kit • Single phase, 380-500 VAC input • Single/Three phase, 200-240 VAC input • Single/Three phase, 525-690 VAC input • Harmonic Filter
VFD	• SALT VFD with Well Automation and Control ◦ PMC Patent# 6414455 • 1 - 1800 HP • Through-Panel Heatsink Mounting Kit (< 125HP) • Back-channel Heatsink Cooling Kit (> 150HP) • Modbus RTU Communication port • Standard I/O, 1AI, 1AO, 10DI, 4DO, 2RO	• Single phase input, 380-500 VAC input • Single/Three phase input, 200-240 VAC input • Single/Three phase input, 525-690 VAC input • Fieldbus Networks • General Purpose I/O, 3DI, 2DO, 2AI, 1AO • Relay Option, 3RO, 240Vac, 2A • 24 V External DC Supply Connector
Output	• Clear conduit entry area • VFD motor terminals	• Motor Terminal Kit • Sine Filter

Operation	• Easy access Operator Control Panel with:
	  ◦ Viewing window
	  ◦ Graphical Display
	  ◦ Fault Light (Red)
	  ◦ Pump-off Light (Yellow)
	  ◦ Running Light (Green)
	  ◦ H-O-A Switch
	  ◦ Start Pushbutton
	  ◦ Speed Pot
	  ◦ USB PC Port
		• iCM - Internet Control Module
		• Chart Recorder

Remote Access: iCM - Internet Control Module

- Remote Communication via Wireless (GPRS) or Ethernet connection to the Internet.
- Simple to use internet based data center collects and stores equipment and site data 24/7.
- Powerful tool that automatically gathers and stores your site/equipment data and provides Visualization, Monitoring, Control, Alarm management, Diagnostics, Trending, and Well/Field/Company-wide reporting.
- iCM brings the status and control to the user wherever they may be. On-site, at the office, or at home, iCM provides instant Well Automation and Control access as if you are there.
- Additionally iCM, provides unique Service and Support functionality that allows PMC, Inc. and their Certified Partners, to assist and support the user with startup and troubleshooting without extensive downtime or service charges.

Service and Support

Training

Classroom or Field training includes system operation, application specific programming/troubleshooting, PC tools, and Internet Communication & Control.

Self Training provided through easy to use, simple Quick Start Guides, Instruction Manuals, Startup Videos, and Instruction Notes.

Internet based training.

Service

Field Startup services include inspection of the installation, programming for the application and performance of a functional test of the system.

Internet based startup and troubleshooting support.

Warranty

Drive Protection is the quickest, easiest, worry-free warranty in the business.

This warranty provides complete replacement coverage for two (2) years. It protects against all failures including lightning, excluding product neglect or misuse. The unit is simply replaced and returned without shipping or repair charges.

Coverage can be renewed prior to expiration and/or extended for up to six (6) years.

Spares

With Drive Protection, there's no need for stocking of components or repair expenses. Simply replace the failed unit with a refurbished unit and the failed unit is picked up, repaired, and returned without additional charge and ready for replacement use in case of a failure elsewhere.

Sensorless means less components and less to go wrong. No additional components are required with Drive Protection.

Repair

Flat Rate Repair prices for units beyond warranty coverage take the guess work out of whether to repair or replace failed units.

A proven leader in unique technology solutions for the oil field industry, PMC, Inc. has demonstrated superiority with their products and services for over thirty years. SALT represents the most sophisticated, yet simplest to use, Artificial Lift System (ALS), Well Automation and Control in the industry. After many years of ALS innovation, SALT was developed at the request of Energy Companies who wanted reduced operating costs and increased production. Work on SALT began in the 1980's, was patented in 2000 and has since gone through several unique enhancements that make it the true leader in ALS Automation and Control.

SALT Well Automation and Control

- Engineered to improve performance and profitability
- Easy to install and simple to operate; Designed with the user in mind
- Energy efficient and Environmentally Friendly
- Sustainable operation through enhanced life cycle programs

Sensorless Artificial Lift Technology

SALT™ Well Automation & Control

Power Management Controls, Inc.
515 Nevada
South Houston, TX 77587
Phone & Fax: +1 888 998 SALT (7258)
www.pmcsalt.com