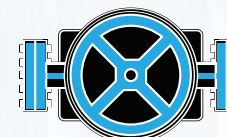


DATA ACQUISITION INSTRUMENTS

FOR EVERY WELL APPLICATION



**ELECTRIC
SUBMERSIBLE
PUMP**



**GAS
LIFT**



**PROGRESSIVE
CAVITY
PUMP**



**SUCKER
ROD
PUMP**



RESERVOIR

GRC Solutions

Since 1925, Sercel-GRC has been applying geophysical methods to oil exploration. Established by Amerada® Petroleum Corporation as Geophysical Research Corporation, the Amerada® Gauge, a mechanical tool developed to measure downhole pressure and temperature, enabled reservoir engineers and geophysicists to determine wellbore and reservoir capacity and performance. Over 130,000 gauges later and Sercel-GRC continues to provide the vital information which ensures health to your downhole assets.

ARTIFICIAL LIFT

Reservoir & Well Testing

Real Time Monitoring

ESP

Gas Lift, PCP, SRP

Spy Pro Series

Piezo Series

Surface Acquisition Units

Surface Acquisition Units

Memory Tubing Conveyed

Gas Lift, Jet Pump, Plunger Lift

GL Side Pocket

Piezo Series

MetroWin Software

RESERVOIR

Drilling, Fracking, Coiled Tubing & Well Testing

Real Time Monitoring

Tubing Conveyed and Thru Tubing:
Reservoir, Build-Up, Drawdown, Interference

Piezo Series

Surface Acquisition Units

Memory

Tubing Conveyed: DTS, Drilling, Gravel Pack
Coiled Tubing: Injections, Foam Lift, Acidizing
Slick Line: Gradient, Build-Up, Drawdown, Interference

Piezo Series

Quartz Series

High P&T

MetroWin Software

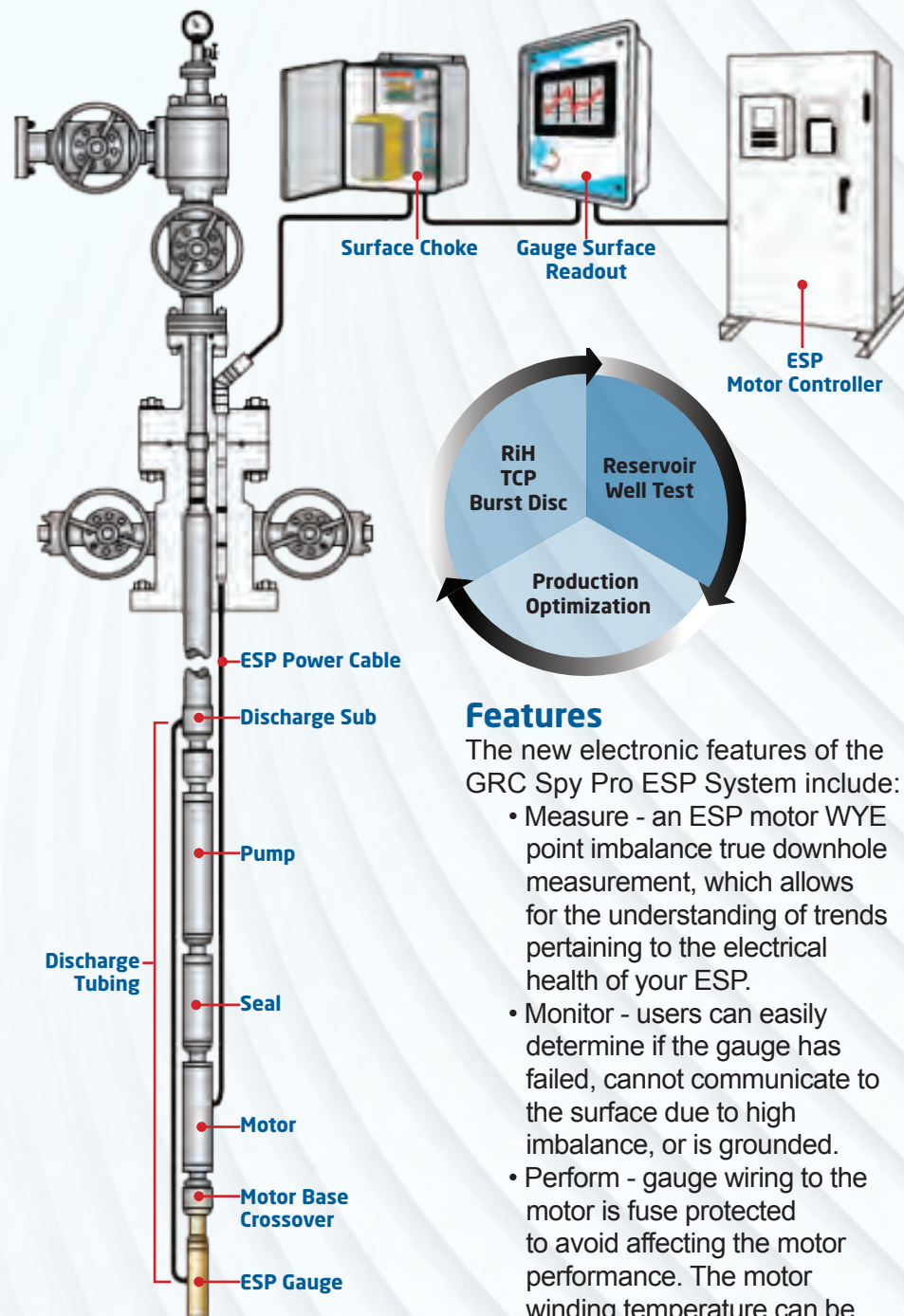
Spy Pro ESP Systems



Monitor/Protect

The Spy Pro ESP monitors and protects your well from:

- decreasing the fluid level at the pump intake (Pi)
- increasing motor temperature (Tm)
- increasing mechanical imbalance (V, xy)
- increasing current leakage (A);
- decreasing pump lifting efficiency (Pd)
- increasing gas locking and sand slugging (Pd, Vz)
- increasing motor WYE point voltage imbalance (V, wye).



Features

The new electronic features of the GRC Spy Pro ESP System include:

- Measure - an ESP motor WYE point imbalance true downhole measurement, which allows for the understanding of trends pertaining to the electrical health of your ESP.
- Monitor - users can easily determine if the gauge has failed, cannot communicate to the surface due to high imbalance, or is grounded.
- Perform - gauge wiring to the motor is fuse protected to avoid affecting the motor performance. The motor winding temperature can be read with RTD and thermocouple options.

Customizable

The Spy Pro ESP System includes channels of customizable fit-for-purpose data: uCommand, High Speeds and Intake Pressure.

- Under VSD energized conditions or RiH, uCommand enables tailored channels of data to be collected, transmitted, and stored at the surface.
- High speeds of data extend the use of the gauge in reservoir and well testing applications, and improves root cause analysis while still in the hole.
- Intake pressure can be read internally from the motor oil, enabling auditing of the integrity of the seals, while remaining contact less with harsh well fluids.

Financial Benefits

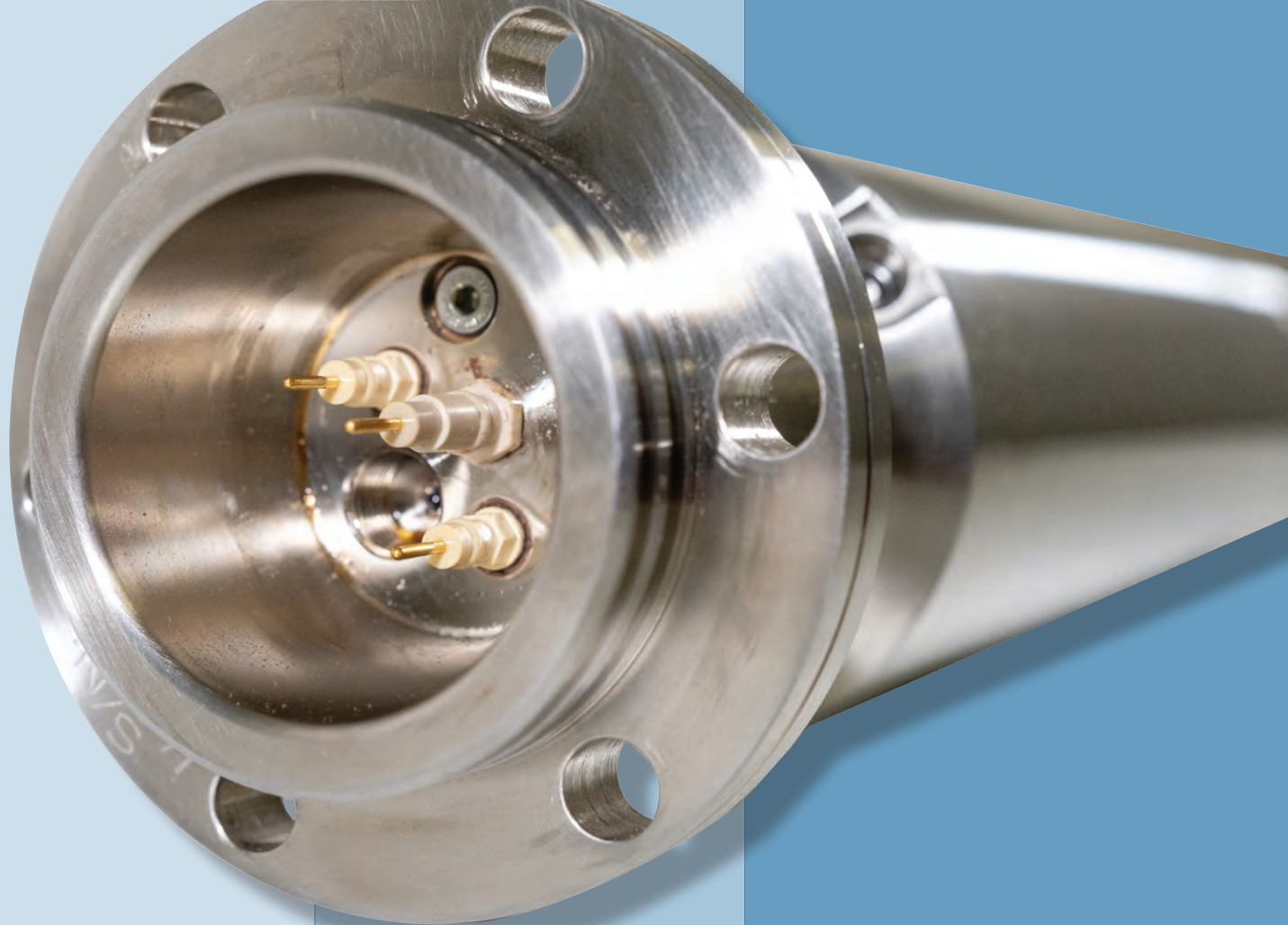
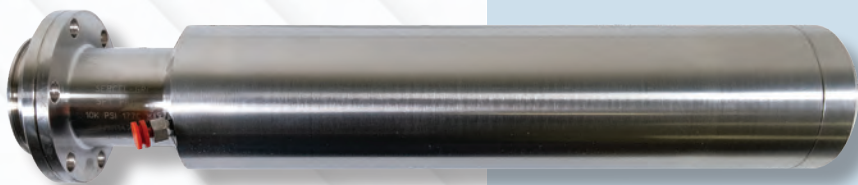
- Reduces well intervention, risk, liabilities and costs for all parties involved.
- Optimizes pump performance, run life and oil production.
- Protect your people, the pump and reservoir.
- Eliminates pump shutdown with sensor troubleshooting.

Unique Mechanical Concept

Sercel-GRC's Spy Pro ESP Systems offer a unique mechanical concept. Its precision welded (sealed) design eliminates the need of re-dressing and contamination. In addition, its shorter, slimline design improves deployment in dogleg severity and rigless applications.

Spy Pro ESP Systems

- RTD or TC Motor Temp
- Internal Pressure Transducer
- WYE Point Voltage Imbalance
- WYE Point Fuse Protector
- Welded & Sealed
- Shorter & Lighter
- 10K psia Pressure
- uCommand
- 177 °C Temperature
- 3.75" Slim OD



Ahead of the Curve Innovations

Lease Proof

- < OPEX
- < Penalties
- > Higher Run Life
- > Increase ROI

Spy Pro ESP Systems



Downhole



Surface SAU & Choke



ESP-Variable Speed Drive



Specifications

Material	Carbon Steel 1026 or 17-4PH Stainless Steel per NACE MR0175
Temperature Rating	125,150 or 177 °C
Max Working Pressure	5,000 or 10,000 psi
Make-up Length & Weight	17.86 in. & 34 lb
Outside Diameter	3.75 in.
Motor Base Connection	375 or 456 Series Flange Universal Motor Base
Sensor Type	Piezoresistive
Tested Insulation Rating	5,000 VDC
High-voltage Coupling Requirement	Surface Choke
Surface Data Acquisition	SPS-1500P RiH, SPS-1500 Interface or Data Pro Stand Alone

Monitoring Options

	Spy Pro 10	Spy Pro 11		Units	Range	Resolution	Accuracy	Data Range
Primary Parameters for Essential Pump and Surveillance and Protection								
Pump Intake Pressure	○	○		psia	0-10,000	0.1	±0.1%FS	40s (2.5s option)
Pump Discharge Pressure		○		psia	0-10,000	0.1	±0.1%FS	40s (2.5s option)
Intake Temperature	○	○		°C	0-177	0.1	1	40s (2.5s option)
Motor Winding Temperature	●	●	RTD or TC	°C	0-260	0.1	1	40s (2.5s option)
Vibration - x Axis	○	○		g	0-16	0.01	1%	40s (2.5s option)
Vibration - y Axis	○	○		g	0-16	0.01	1%	40s (2.5s option)
Vibration - z Axis	●	●		g	0-16	0.01	1%	40s (2.5s option)

Predictive Parameters for Application and User Needs

Current Leakage	○	○		mA	0-50	0.001	0.05%	40s (2.5s option)
Line Voltage	●	●		v	0-80	0.1	1%	40s (2.5s option)
Motor WYE Point Voltage Imbalance	●	●		v	0-400	0.1	1%	40s (2.5s option)

Data Customization for Application and User Needs

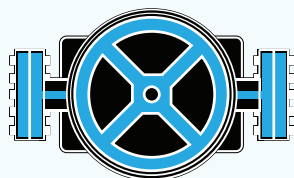
uCommand	●	●
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● Spy Pro Series Market Differentiating Features

Digital FSK Smart Gauge - Welded & Sealed



Permanent Downhole Gauge Systems



GAS LIFT



SUCKER ROD PUMP



PROGRESSIVE CAVITY PUMP

Unique Mechanical Concept

Sercel-GRC's Permanent Downhole Gauge (PDHG) Systems present a precision welded (sealed) design that eliminates the need of re-dressing and contamination. In addition, its dual cable head design provides cable strain relief for superior sealing, using metal-to-metal primary seal, with dual O-ring backup for increased reliability. The carrier nose reduces time and risk of gauge installation.

Features

The new electronic features of the Smart PDHG include:

- Calibration coefficients loaded in-factory, making it a Plug & Play to any GRC surface acquisition unit - without the need of laptops, calibration coefficients or special tools.
- Frequency Shift Key (FSK) enables communication of up to 6 PDHGs (P&T) to a single use GRC surface acquisition unit.
- ASIC technology allows for increased reliability and a reduced number of components.

Capabilities

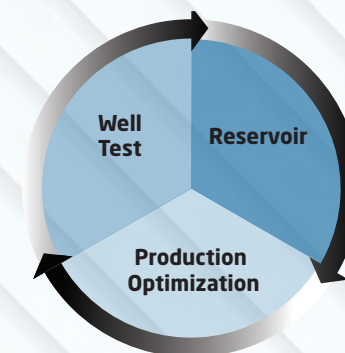
The GRC Permanent Downhole Gauge System extends various monitoring capabilities, including dual pressure on a single assembly; rigless, thru tubing install; reservoir and well testing; and production optimization.

Fit for Purpose

Fit for purpose, the PDHG analyses discharge pressure, which allows monitoring pump efficiency when the gauge is installed above the pump. Annulus and tubing pressure can also both be measured with a single gauge for gas lift applications. Its vibration X and Y axis allows for downhole monitoring of mechanical imbalance.

Financial Benefits

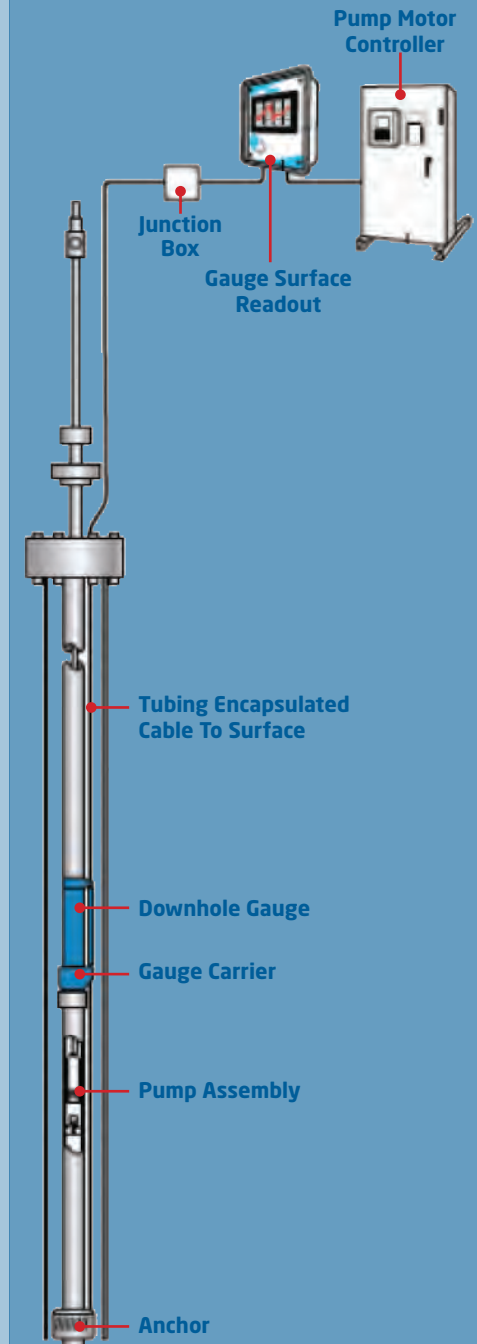
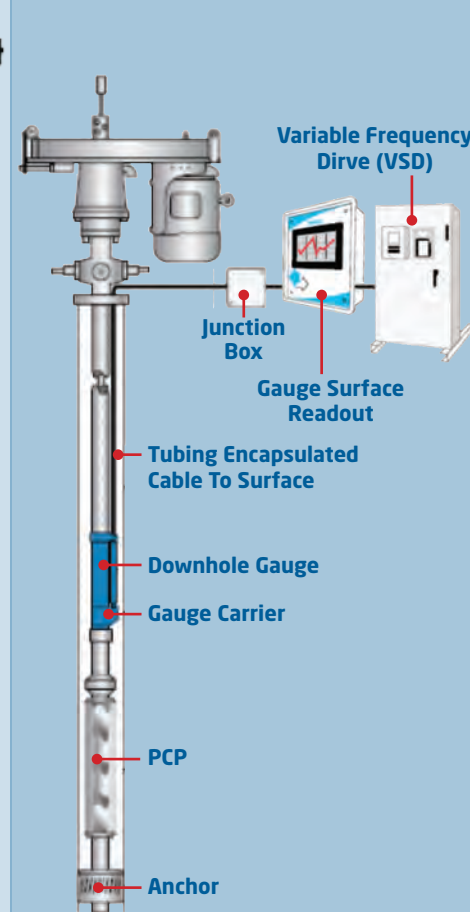
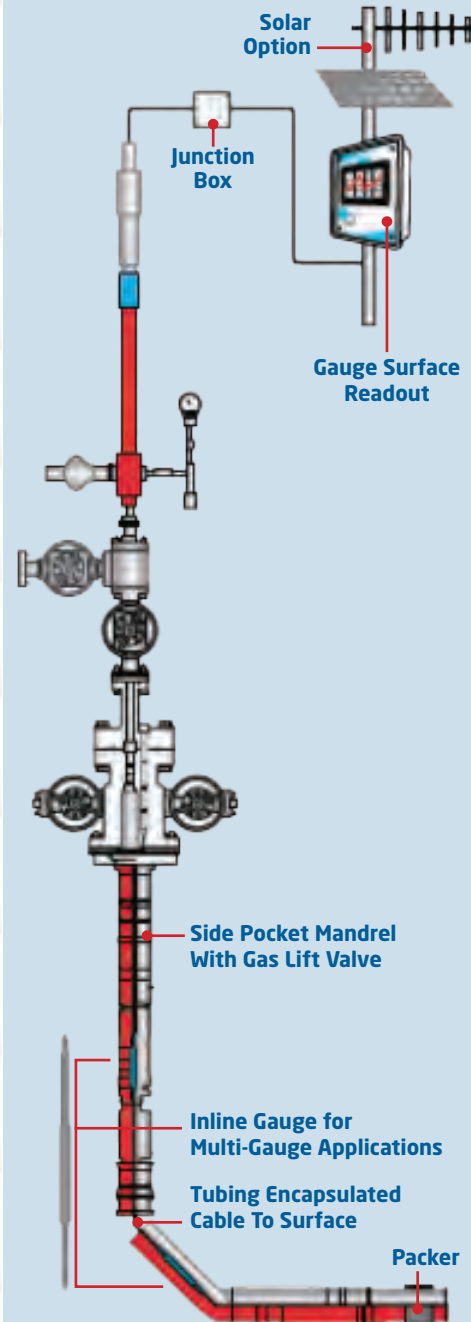
- Reduces well intervention, risk, liabilities and costs for all parties involved, which, in turn, reduces your total operational cost.
- Optimizes pump performance, run life and oil production.
- Protect your people, the pump and reservoir.
- Eliminates pump shutdown due to sensor troubleshooting.



Permanent Downhole Gauge Systems

Monitor, Protect and/or Cruise Control

- Pump Off
- Over Temperature
- Wear and Tear
- Rod Breakage
- Rotor
- Elastomer Damage
- Gas Lift Re-injection
- Bubble-Point & Auto Choke Optimization
- Valve Operation



Permanent Downhole Gauge Systems



GAS LIFT



SUCKER ROD PUMP



PROGRESSIVE CAVITY PUMP



Specifications

Material	17-4PH Stainless Steel per NACE MR0175
Temperature Rating	150 °C
Max Working Pressure	5,000 or 10,000 psi
Make-up Length	27.5 in. w/dual cablehead (single-pressure gauge)
Outside Diameter	1 in. or 1.125 in. (P-5500 only)
Sensor Type	Piezoresistive
Surface Data Acquisition	FIC-1500 or Data Pro

PQ-Series PDHG Measurement

P-4000 P-4500 P-5500 Units Range Resolution Accuracy Data Range

Primary Parameters for Essential Pump and Surveillance and Protection

Pressure, single-pressure gauge Annulus or Tubing	○	○		psi	0-10,000	0.1	0.05%	1s
Pressure, dual-pressure gauge Annulus and Tubing			○	psi	0-10,000	0.1	0.05%	1s
Intake Temperature	○	○	○	°C	0-150	0.01	0.3 °C	1s
Vibration - x axis		○	○	g	0-20	0.055	1.0%	1s
Vibration - y axis		○	○	g	0-20	0.055	1.0%	1s

PQ-series PDHG System Measurement

Rod Pump PCP Gas Lift

Annulus Pressure	na	na	○
Tubing Pressure	na	na	○
Intake Pressure	○	○	na
Discharge Pressure	na	○	na
Tubing and Annulus Temperature	○	○	○
Vibration (two-axis)	○	○	○

Surface Acquisition Units



SPS/FIC-1500P Run in Hole

- ESP or PDHG
- Plug & Play
- Small Footprint
- Tools Free
- Laptop Free
- Programming Free
- WIFI Enabled (SPS only)

Power 12-24VDC, 1.5A
Operating Temp -20 °C to +70 °C
Enclosure Waterproof Case
Display 2x16 character backlit LCD
 USB connector
 Easy access to fuse

Wi-Fi access up to 100ft (SPS Only)



SPS/FIC-1500 Interface Card

- ESP or PDHG
- Plug & Play
- Small Footprint
- Tools free
- Laptop free
- Programming free
- Modbus Map On-Screen

Power 12-26 VDC, 100mA fused
Operating Temp -17 °C to +65 °C
Enclosure Din rail mount, indoor use only
 3.5"W, 3.7"L, 2.3"H
Communication Modbus, 1200 to 19200 baud
Modbus Port RS-485 isolated, usb
Display 2x16 character backlit LCD
Electrical Access 4 post power/gauge terminal
 block
 4 post modbus terminal block

USB connector
Easy access to fuse



Data Pro Stand Alone Panel

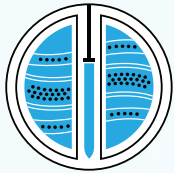
- ESP or PDHG
- Plug & Play
- Compact & Light
- Tools free
- Laptop free
- Programming free
- Multiple I/Os

Power Requirements 100 to 240VAC
 (12 – 24VDC)
UL Temperature -20 °C to +60 °C
Display 7" Touch Screen LCD
 (Res. 800 x 480 px)
Enclosure NEMA 4x Rated
Analog Inputs 3 x 0-15VDC or 0-64mA
Analog Outputs 2 x 4-20mA (15-bit
 resolution)
Alarm 2 x Latching SPDT dry
 contacts
USB Ports 1
Relay Outputs 5A @ 250VDC / 30VDC
Ethernet Ports 2 (Modbus, TCP/IP or
 SFTP)
Modbus Ports 1 x RS-485 (non-isolated)
 2 x RS-232 (non-isolated)
 1 x RS-485 or RS-232
 (isolated)
Storage Capacity 5GB Internal

Memory Gauges



GAS LIFT



RESERVOIR

Sercel-GRC's Memory Gauge has an external communication port that positively leverages its ease of use, and it boasts a smart battery pack. Paired to GRC MetroWin or MetroTrack software, it extends the data management capabilities of a typical memory gauge, leading to technology breakthroughs: direct access to gauge statistics; customizable reports; instant access to gauge status; and easy data importing from the MetroWin software.

Capabilities/Fit for Purpose

Monitoring capabilities of the Memory Gauge include:

- 225 °C
- 30,000 psi
- Reservoir and well testing
- Production Optimization
- Data Integrity is Guaranteed and Fit for Purpose

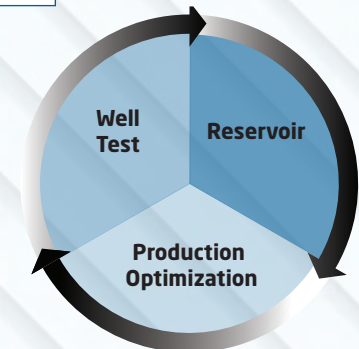
Financial Benefits

- Reduces risk, liabilities and costs for all parties involved, which, in turn, reduces your total operational cost.
- Increases run life.
- Protects your people and the reservoir.



Features

	Piezoresistive PRM5/iGauge5	Quartz Crystal CGM5/iQuartz5
Gradient Survey	●	●
TCP	●	●
Sand Control	●	●
Build Up (short)	●	●
Build Up (long)	●	●
High Pressure	●	●
High Temperature	●	●
Pulse/Interference	●	●
DSt	●	●



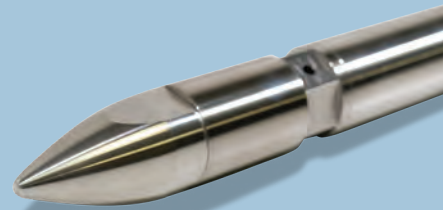
Memory Gauges

The Sercel-GRC's Memory Gauge is offered as a Gas Lift Side Pocket Mandrel; Piezo Series; and Quartz Series - all MetroWin Software, made to last.



Gas Lift Side Pocket Mandrel

- 150 °C
- 5K, 15K psia
- 17-4 PH
- OD 1, 1.5"
- Tubing Annulus



Piezo Series

- 150, 177, 200, 225 °C
- 1.5K, 5K, 10K, 15K psia
- 17-4 PH, 718 Inconel
- OD 3/4, 1-1/4"
- 2.8MM, 4.2MM Data Points
- Smart Battery



Quartz Series

- 150, 177, 200, 225 °C
- 5K, 10K, 15K, 20K psia
- 1718 Inconel
- OD 1-1/4, 1-1/4"
- 4.2MM Data Points
- Smart Battery

MetroWin Software

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 - o Tulsa, OK (Sales & Support)
 - o Midland, TX (Sales, Stock & Support)
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