

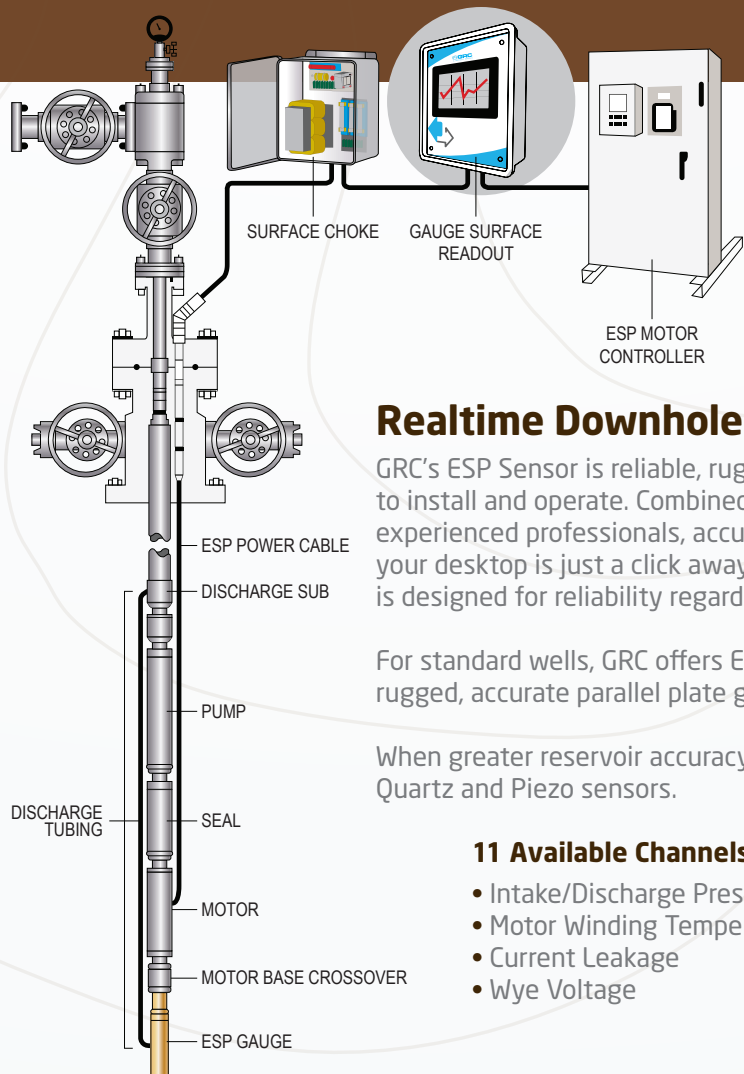
# ESP Monitoring



## PROTECT YOUR PUMP MAXIMIZE YOUR PRODUCTION

The value of data acquired through the use of downhole sensors has been well documented in the industry. Motor/Pump control based on downhole conditions increases revenue, reduces cost, optimizes production, and prolongs equipment life. Sercel-GRC offers a full line of highly reliable, accurate, real-time communication downhole gauges that are adaptable for use with any manufacturer's electric submersible pumping equipment (ESP).

[www.sercel-grc.com](http://www.sercel-grc.com) | [grc.global@sercel.com](mailto:grc.global@sercel.com)  
tel: (1) 918-834-9600 | fax: (1) 918-838-8846



### Realtime Downhole Data Acquisition

GRC's ESP Sensor is reliable, rugged, durable and easy to install and operate. Combined with a service team of experienced professionals, accurate data from your well to your desktop is just a click away. GRC's broad product offering is designed for reliability regardless of the environment.

For standard wells, GRC offers ESP sensor systems using rugged, accurate parallel plate gap capacitance transducers.

When greater reservoir accuracy is needed, GRC offers ESP Quartz and Piezo sensors.

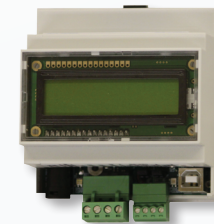
#### 11 Available Channels:

- Intake/Discharge Pressure
- Motor Winding Temperature
- Current Leakage
- Wye Voltage
- Intake Temperature
- Vibration (X, Y, Z)
- Water Ingress



#### Data Pro

Power Requirements	100 to 240 vac (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



#### SPS-1500

Power	12-26vdc, 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



# ESP Monitoring Downhole Specifications

## Key Benefits:

- uCommand High Speed Data Update
- Field-Proven, Rugged, Accurate, and Reliable
- Reduces Dry Pumping

- Prevents Premature Pump Failure
- Provides Real-Time Downhole Monitoring
- Increases Run Life of Equipment
- Maximizes Production
- World-Wide Service and Support

	<b>SPY PRO</b> The Most Data Channels Available Anywhere		<b>CAPACITANCE</b> Field Proven, with Over 35,000 Sold		<b>QUARTZ</b> Unsurpassed Accuracy	
<b>SPECIFICATIONS</b>	<b>SPY PRO 10</b>	<b>SPY PRO 11</b>	<b>ESP-1500</b>	<b>ESP-2500</b>	<b>ESP-3500</b>	<b>QESP-3500</b>
<b>INTAKE PRESSURE</b>						
Range*	*0 - 5,000 psi	*0 - 5,000 psi	*0 - 5,000 psi	*0 - 5,000 psi	*0 - 5,000 psi	*0 - 5,000 psi
Pressure Accuracy	+/- 0.1% FS	+/- 0.1% FS	*** - 0.2% FS	**+/- 0.5% FS	**+/- 0.5% FS	+/- 0.032% FS
Pressure Resolution	+/- 0.1 psi	+/- 0.1 psi	+/- 0.1 psi	+/- 0.1 psi	+/- 0.1 psi	+/- 0.1 psi
<b>DISCHARGE PRESSURE</b>						
Range*	N/A	*0 - 5,000 psi	N/A	N/A	*5,000 psi	*5,000 psi
Pressure Accuracy	N/A	+/- 0.1% FS	N/A	N/A	**+/- 0.5% FS	+/- 0.32% FS
Pressure Resolution	N/A	+/- 0.1 psi	N/A	N/A	+/- 0.1 psi	+/- 0.1 psi
<b>INTAKE TEMPERATURE</b>						
Range	25-150° C	25-150° C	25-125° C	25-177° C	25-177° C	25-150° C
Temperature Accuracy	1° C	1° C	2° C	2° C	2° C	0.5° C
Temperature Resolution	0.1° C	0.1° C	0.1° C	0.1° C	0.1° C	0.1° C**
<b>MOTOR TEMPERATURE</b>						
Max Temperature	260° C	260° C	260° C	260° C	260° C	260° C
<b>VIBRATION</b>	<b>X,Y,Z AXIS</b>	<b>X,Y,Z AXIS</b>	<b>X,Y AXIS</b>	<b>X,Y AXIS</b>	<b>X,Y AXIS</b>	<b>X,Y AXIS</b>
Range	0-16g	0-16g	0-18g	0-18g	0-18g	0-18g
Vibration Accuracy	1%	1%	1%	1%	1%	1%
Vibration Resolution	0.01g	0.01g	0.01g	0.01g	0.01g	0.01g
<b>CURRENT LEAKAGE</b>						
Range	0-50mA	0-50mA	0-50mA	0-50mA	0-50mA	0-50mA
Accuracy	1%	1%	1%	1%	1%	1%
Resolution	10 µA	10 µA	50 µA	10 µA	10 µA	10 µA
<b>VOLTAGE</b>						
Imbalance Voltage	3000V	3000V	1500V	3000V	3000V	3000V
<b>ELECTRICAL CONDITIONS</b>						
Wye Point Voltage	0-1000 VAC	0-1000 VAC	N/A	N/A	N/A	N/A
Gauge Input Voltage	0-100 VDC	0-100 VDC	N/A	N/A	N/A	N/A
<b>WELL FLUID INGRESS</b>						
Range	0- 4095 Ω	0- 4095 Ω	N/A	N/A	N/A	N/A
Resolution	1 Ω	1 Ω	N/A	N/A	N/A	N/A
<b>MECHANICAL</b>						
Diameter	9.5 cm (3.75")	9.5 cm (3.75")	9.5 cm (3.75")	9.5 cm (3.75")	9.5 cm (3.75")	9.5 cm (3.75")
Length	53.3 cm (21")	53.3 cm (21")	63.5 cm (25")	96.5 cm (38")	124 cm (49")	124 cm (49")
Housing Material	Carbon Steel or Stainless Steel	Carbon Steel or Stainless Steel	Carbon Steel or Stainless Steel	Carbon Steel or Stainless Steel	Carbon Steel or Stainless Steel	Carbon Steel or Stainless Steel

\*Other pressure ranges available upon request (1.5K psi, 6.5K psi, and 10k psi). \*\*0.1% FS Pressure and 0.01% FS Temperature available upon request. Available high speed update except ESP-1500. Bottom Connection - 2 3/8 eve, Connection Load - 10,000 lb. max, Connection Torque - 800 ft. lb. max.

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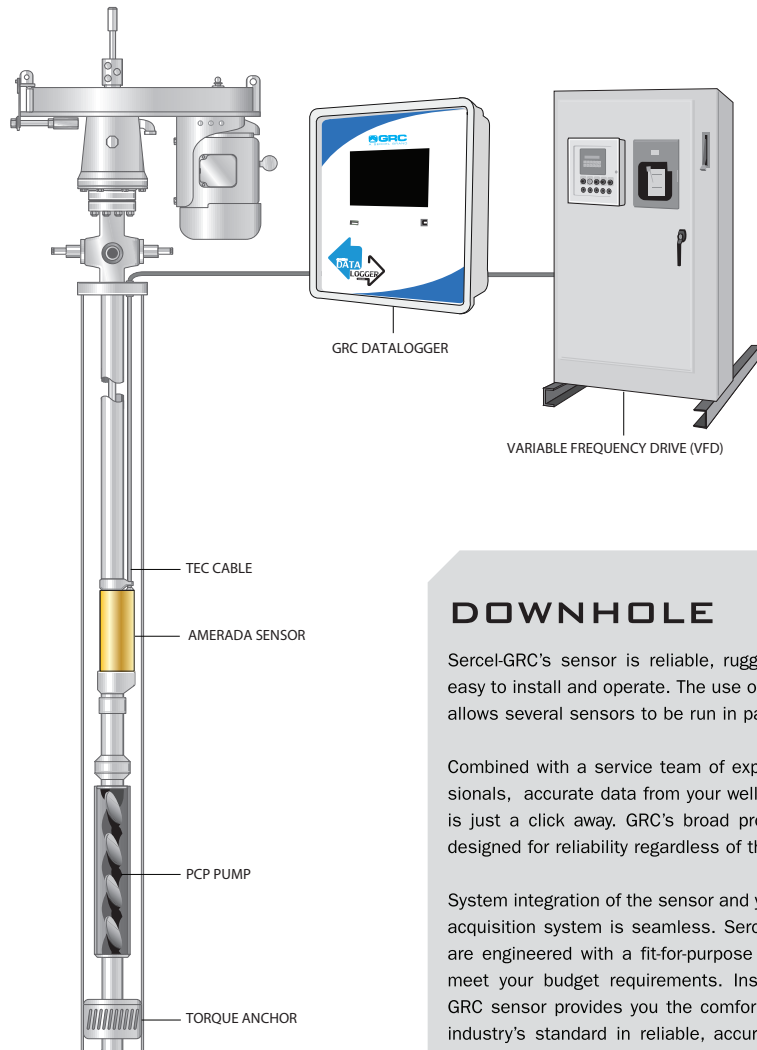


# AMERADA DOWNHOLE MONITORING



**MAXIMIZE YOUR PRODUCTION.**

For **progressive cavity pump, sucker rod pump and gas lift applications**, Sercel-GRC offers a full suite of monitoring solutions. Sercel-GRC's sensors are compatible with all types of completions. Our sensors incorporate Sercel-GRC's proprietary transducer technology, deliver superior reliability and ease of operation, helping safeguard your valuable investment and maximize your production for years to come.



## DOWNHOLE

Sercel-GRC's sensor is reliable, rugged, durable and easy to install and operate. The use of FSK technology allows several sensors to be run in parallel.

Combined with a service team of experienced professionals, accurate data from your well to your desktop is just a click away. GRC's broad product offering is designed for reliability regardless of the environment.

System integration of the sensor and your current data acquisition system is seamless. Sercel-GRC products are engineered with a fit-for-purpose design that can meet your budget requirements. Installing a Sercel-GRC sensor provides you the comfort in knowing the industry's standard in reliable, accurate, artificial lift monitoring at lowest total cost of ownership technology is at work for you 24/7.

## SURFACE DATA ACQUISITION

**Sercel-GRC Datalogger™ remote terminal monitoring and data acquisition system** is a unit designed to interface with our suite of downhole sensors.

### GENERAL

User Interface:	Touch-screen LCD
Display:	7-inch Color LCD, resolution 840x480
Status/Fault Indicators:	Internal LEDs for Power/Comm/Fuse status
Temperature Range:	-20°C to 70°C ( @ +12VDC)
Enclosure Rating:	Nema 4
Enclosure Dimensions:	13.56" x 11.43" x 5.21" (344mm x 291mm x 132mm)

### DATA ACQUISITION

Modbus Communication:	2X RS-485 or RS-232 (Modbus slave) one channel galvanically isolated one channel non-isolated
Analog Inputs:	3X 0-15VDC or 0-60mA 18-bit resolution
Analog Outputs:	2X 4-20mA 12-bit resolution
Alarm/Relay Outputs:	2X SPDT dry contacts 5A @ 240VAC
Removable Data Storage:	FAT12, FAT16, or FAT32 formatted USB flash drive with 512-byte sector size

USB:	One Spare Port
Ethernet:	2x Non-isolated

### POWER

AC Operating Voltage:	90VAC - 240VAC 50 Hz - 60 Hz
DC Operating Voltage:	+12VDC to +24VDC
Operating Current:	750mA @ 12VDC typical 450mA @ 24VDC typical



**Ahead of the Curve<sup>SM</sup>**

# AMERADA DOWNHOLE MONITORING

www.sercel-grc.com | sales@sercel-grc.com | tel: (1) 918-834-9600 | Fax: (1) 918-838-8846  
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## AMERADA C-SERIES

## Q-SERIES

	C-4000T/S	C-4500T/S	C-5000	C-5500	C-6000	C-6500	QTIEG-4000***	QPG-820
<b>SPECIFICATIONS</b>								
<b>INTAKE PRESSURE</b>								
<b>PRESSURE</b>	5,000 psi*	5,000 psi*	5,000 psi*	5,000 psi*	5,000 psi*	5,000 psi*	16,000 psi*	16,000 psi*
<b>PRESSURE ACCURACY</b>	0.1% FS**	0.1% FS**	0.1% FS**	0.1% FS**	0.1% FS**	0.1% FS**	0.02% FS**	0.02% FS**
<b>PRESSURE RESOLUTION</b>	±0.1 psi	±0.1 psi	±0.1 psi	±0.1 psi	±0.1 psi	±0.1 psi	±0.1 psi	±0.1 psi
<b>DISCHARGE PRESSURE</b>								
<b>MAX PRESSURE</b>	N/A	N/A	5,000 psi*	5,000 psi*	5,000 psi*	5,000 psi*	N/A	N/A
<b>PRESSURE ACCURACY</b>	N/A	N/A	0.1% FS**	0.1% FS**	0.1% FS**	0.1% FS**	N/A	N/A
<b>PRESSURE RESOLUTION</b>	N/A	N/A	±0.1 psi	±0.1 psi	±0.1 psi	±0.1 psi	N/A	N/A
<b>INTAKE TEMPERATURE</b>								
<b>MAX TEMPERATURE</b>	150° C	150° C	150° C	150° C	150° C	150° C	150° C	150° C (177° C Peak)
<b>TEMPERATURE ACCURACY</b>	1.0° C	1.0° C	1.0° C	1.0° C	1.0° C	1.0° C	0.2° C	0.2° C
<b>TEMPERATURE RESOLUTION</b>	0.1° C	0.1° C	0.1° C	0.1° C	0.1° C	0.1° C	0.01° C	0.01° C
<b>DISCHARGE TEMPERATURE</b>								
<b>MAX TEMPERATURE</b>	N/A	N/A	150° C	150° C	150° C	150° C	N/A	N/A
<b>TEMPERATURE ACCURACY</b>	N/A	N/A	1.0° C	1.0° C	1.0° C	1.0° C	N/A	N/A
<b>TEMPERATURE RESOLUTION</b>	N/A	N/A	0.1° C	0.1° C	0.1° C	0.1° C	N/A	N/A
<b>VIBRATION (X &amp; Y AXIS)</b>								
<b>VIBRATION RANGE</b>	N/A	0-18g	N/A	0-18g	N/A	0-18g	N/A	N/A
<b>VIBRATION ACCURACY</b>	N/A	1%	N/A	1%	N/A	1%	N/A	N/A
<b>VIBRATION RESOLUTION</b>	N/A	0.055g	N/A	0.055g	N/A	0.055g	N/A	N/A
<b>MECHANICAL</b>								
<b>TRANSDUCER</b>	GAP CAPACITANCE	GAP CAPACITANCE	GAP CAPACITANCE	GAP CAPACITANCE	GAP CAPACITANCE	GAP CAPACITANCE	Quartz	Quartz
<b>GAUGES IN PARALLEL CONFIGURATION</b>	Up to 6 Above or Below Pump	Up to 3 Above or Below Pump	Up to 3 Above or Below Pump	Up to 2 Above or Below Pump	Up to 3 Above or Below Pump	Up to 2 (4 for Twin TEC) Above or Below Pump	Up to 8	One at a time Run with single conductor e-line
<b>HOUSING MATERIAL</b>	17-4 PH/inconel	17-4 PH/inconel	17-4 PH/inconel	17-4 PH/inconel	17-4 PH/inconel	17-4 PH/inconel	Inconel	Inconel

\* OTHER PRESSURE RANGES (1.5K PSI, AND 10K PSI) AVAILABLE UPON REQUEST

\*\*CURVE FIT

\*\*\*1/10 SEC. SAMPLE RATE AVAILABLE

C4000T/S & C4500T/S GAUGES CAN BE USED IN MULTI-GAUGE, IN-LINE SETUP

### KEY BENEFITS

Multi-Gauge in-line Setup  
 Provides Real-Time Downhole Monitoring

Field-Proven, Rugged, Accurate and Reliable  
 Increases Run Life of Equipment

Reduces Dry Pumping  
 Maximizes Production

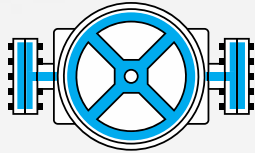
Prevents Premature Pump Failure  
 World-Wide Service and Support



# PROGRESSIVE CAVITY PUMP OPTIMIZATION



PCP



GAS LIFT



SRP



## KEY BENEFITS

- Monitors Pump Efficiency
- Prevents Premature Pump Failure
- Increases Run Life of Equipment
- Provides Real-Time Downhole Monitoring
- Mitigates Damage Caused From Dry Pumping

## SYSTEM SPECIFICATIONS

PRESSURE RANGE INTAKE/DISCHARGE	<b>0-16 KPSI</b>	VIBRATION RESOLUTION	<b>0.055G</b>
PRESSURE ACCURACY	<b>±0.01% FS typ.</b>	SAMPLE RATE	<b>1/10TH SEC.</b>
PRESSURE RESOLUTION	<b>±0.01 PSI typ.</b>	TYPICAL DATA CAPACITY	<b>2 YEARS, SAMPLING EVERY 30 SEC.</b>
MAX TEMPERATURE	<b>165°C / 330°F</b>	CONTROLLER INTEGRATION	<b>MODBUS 485, 232, ANALOG &amp; DIGITAL</b>
TEMPERATURE ACCURACY	<b>±1.0°C</b>	INSTALLATION	<b>ABOVE OR BELOW PUMP</b>
TEMPERATURE RESOLUTION	<b>±0.01°C</b>		
VIBRATION	<b>0-18G</b>		
VIBRATION ACCURACY	<b>±1%</b>		

# PROGRESSIVE CAVITY PUMP OPTIMIZATION

## PROBLEMS FACED IN PCP APPLICATIONS

Insufficient reservoir pressure drawdown

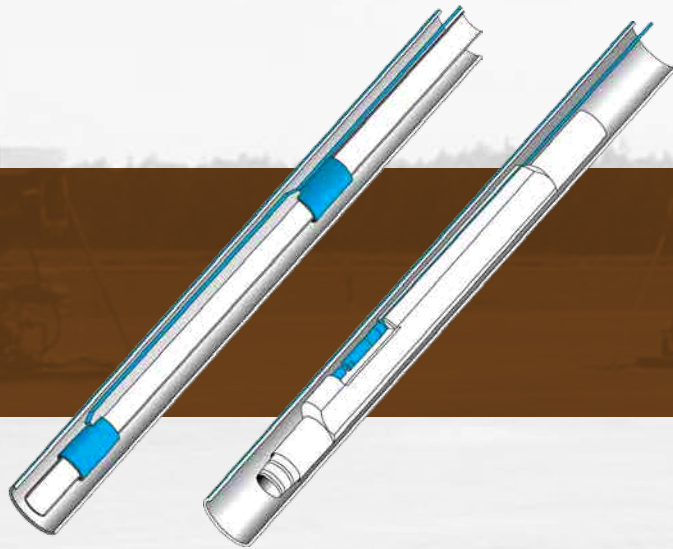
Lack of fluid into pump causing PCP to run dry

Premature equipment failure

## SOLUTION

PUMP INTAKE PSI + VSD OPTIMIZATION = CRUISE CONTROL

- ✓ Monitoring downhole pressure data can be used to increase pump speed to keep reservoir pressure down to allow for optimal production
- ✓ Installing a downhole gauge gives the ability to monitor reservoir fluid level and prevent damage to the downhole equipment caused from dry pumping
- ✓ Gauge parameters can be used to monitor pump efficiency and to act as an early warning system to prevent premature equipment failure.



## RESULTS IMPROVING ECONOMICS BY EMPOWERING OPTIMIZATION

↑ RUNTIME

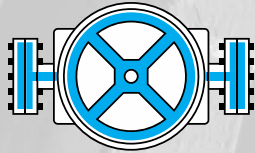
↑ PRODUCTION

↓ COSTS

# DOWNHOLE MONITORING SYSTEM: **SUCKER ROD PUMP OPTIMIZATION**



SRP



GAS LIFT



PCP



## KEY BENEFITS

- Increase production by maintaining the lowest possible fluid level over pump
- Avoid premature pump-off due to inaccurate algorithms
- Improve control over motor speed by monitoring real time bottom hole data
- Enable automated decision making using measurements, not assumptions or calculations
- Verify pump configuration's actual performance and efficiency
- Reduce lifting cost and extend life of pump

## SYSTEM SPECIFICATIONS

PRESSURE RANGE INTAKE/DISCHARGE	<b>0-16 KPSI</b>	VIBRATION RESOLUTION	<b>0.055G</b>
PRESSURE ACCURACY	<b>±0.01% FS typ.</b>	SAMPLE RATE	<b>1/10TH SEC.</b>
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TEMPERATURE ACCURACY	<b>±1.0°C</b>	INSTALLATION	<b>ABOVE OR BELOW PUMP</b>
TEMPERATURE RESOLUTION	<b>±0.01°C</b>		
VIBRATION	<b>0-18G</b>		
VIBRATION ACCURACY	<b>±1%</b>		

## PROBLEMS

FACED IN CONVENTIONAL AND UN-CONVENTIONAL RESERVOIRS

Premature pump-off due to gas locking

Premature pump failure due to frequent control adjustments

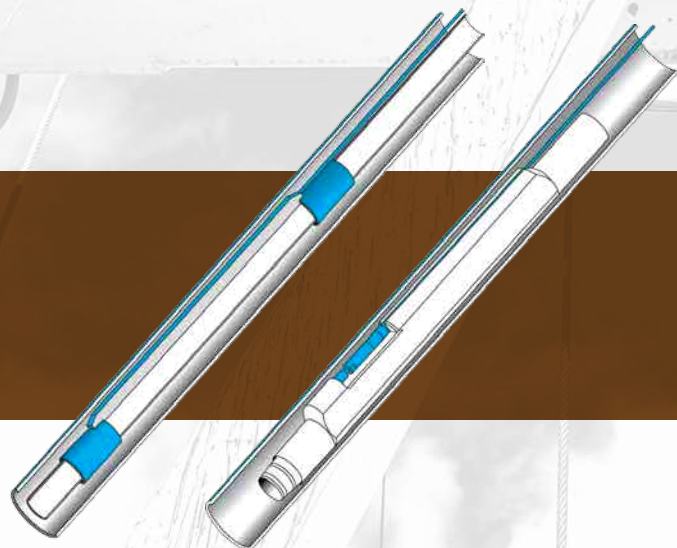
Power inefficiencies from frequent startup events

Energy loss from undiagnosed downhole leakage

## SOLUTION

PUMP INTAKE PSI + VSD OPTIMIZATION = CRUISE CONTROL

- ✓ Load assumptions are replaced by accurate wellbore pressure data
- ✓ PID control logic based on gauge data can modulate pump speed smoothly, avoiding multiple stop/start events
- ✓ High startup current draw is reduced as false pump-off and start-up events decrease
- ✓ Pressure and temperature data can identify tubing leakage not represented on dyno card



## RESULTS IMPROVING ECONOMICS BY EMPOWERING OPTIMIZATION

↑ RUNTIME

↑ PRODUCTION

↓ COSTS



### AMERADA C-SERIES TRACK RECORD

Date Sold (Month/Year)	Customer (Region)	Contact (Phone / Email)	PO Number	Qty	Product Type (OD, P & T Spec's)
2016	Servicios Halliburton de Venezuela	Juan Guillermo Schlieff TEL: +1 281-871-7131 Email: <a href="mailto:juanguillermo.schlieff@halliburton.com">juanguillermo.schlieff@halliburton.com</a>	4512293027	103	PCP-5500 Ø1.5", 5K psi, 150 °C
2016 2015	Cameron INTL Corp Magnolia	Andrea Noskrent TEL.: +(832) 934-1729 Email: <a href="mailto:Andrea.noskrent@c-a-m.com">Andrea.noskrent@c-a-m.com</a>	4512293027 4510907183 4510978262	23 8 5	PCP-5500 Ø1.5", 5K psi, 150 °C
2015	State Oil Company Suriname N.V	C.E. White TEL.: +972-966-0550 Email: <a href="mailto:cwhite@idsco.net">cwhite@idsco.net</a>	47997 47908 47909	39 5 5	PCP-2000 Ø2", 1.5K psi, 150 °C
2014	Cameron Venezolana, C.A. Venezuela	Orlando Malpica TEL.: +58 261 4007700 Email: <a href="mailto:Orlando.Malpica@c-a-m.com">Orlando.Malpica@c-a-m.com</a>	4504218412 4510416789 4510519238	20 20 8	PCP-5500 Ø1.5", 5K psi, 150 °C
2014	State Oil Company Suriname N.V	C.E. White TEL.: +972-966-0550 Email: <a href="mailto:cwhite@idsco.net">cwhite@idsco.net</a>	47884	173	PCP-2000 Ø2", 1.5K psi, 150 °C
2013	EOG Resources Inc. USA	Chelsea Gamron Phone: +1 817-344-1208 E-mail: <a href="mailto:Chelsea_gamron@eogresources.com">Chelsea_gamron@eogresources.com</a>	2066778	20	PCP-4000 Ø1.5", 5K psi, 150 °C
2013	State Oil Company Suriname N.V	C.E. White TEL.: +972-966-0550 Email: <a href="mailto:cwhite@idsco.net">cwhite@idsco.net</a>	46699	120	PCP-2000 Ø2", 1.5K psi, 150 °C
2013	Cameron Venezolana, C.A. Venezuela	Orlando Malpica TEL.: +58 261 4007700 Email: <a href="mailto:Orlando.Malpica@c-a-m.com">Orlando.Malpica@c-a-m.com</a>	4503692302	15	PCP-5500 Ø2.55", 5K psi, 150 °C
2013	CAMERON (MALAYSIA) SDN BHD Singapore	Sharon Mikeska Phone: + 1 281 606 6836 E-mail: <a href="mailto:sharon.mikeska@c-a-m.com">sharon.mikeska@c-a-m.com</a>	4503780678	17	PCP-3000 Ø1.5", 5K psi, 150 °C



**Tom MILLAR**  
Global Sales Manager  
SERCEL-GRC Corp

### AMERADA PDHG TRACK RECORD

Date Sold (Month/Year)	Customer (Region)	Contact (Phone / Email)	PO Number	Qty	Product Type (OD, P & T Spec's)
October 2014	PetroEnergy Nigeria	Effiong Ekpenyong Phone: +234-84-461144 Email: petrol_energy@yahoo.com	PEG 015	7	QTIEG Ø1", 10K psi, 150°C
May 2014	Sercel Dubai	Sercel Dubai	4500080520	1	QPG820 1.5", 10K psi, 150°C
February 2014	Time Train New Generation	Christie Xie Phone: 852-2787-3393	5104745-P	5	QPG820 1.5", 16K psi, 177°C
July 2013	BMP USA	Josh Hoffman Phone: +1-979-865-5913 Email: jhoffman@bmpenterprises.com	2121049	5	QTIEG Ø1", 10K psi, 150 °C
June 2013	New Generation China	Time Train Investments Limited Tel: +852-2787 3393 E-mail:nita@timetrainltd.com	5104745-P	10	QPG-820 1.5"OD 16 Kpsi 177 °C
April 2013	Bell Oilfeild Services Pte Ltd Singapore	Mr Mohd Syed Phone: +65 9641 1475 www.bospl.sg	000421	1	QPG-820 1.5"OD 16 Kpsi 177 °C
January 2013	SERTECPET Ecuador	Oswaldo Valle Phone: +593-2-2257626 Email:info@sertecpet.com.ec	0017043-1	2	QTIEG Ø1", 5K psi, 150 °C
November 2012	PetroEnergy Nigeria	Effiong Ekpenyong Phone: +234-84-461144 Email: petrol_energy@yahoo.com	PEG 0013	4	QTIEG Ø1", 10K psi, 150 °C



**Tom MILLAR**  
Global Sales Manager  
SERCEL-GRC Corp

## AMERADA C & Q SERIES GAUGE MANUFACTURING COUNT

Qty of Units Shipped by Year (2004 - DEC 2016)

2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	Total (2004 - 2016)
2	22	15	-	45	22	122	53	136	107	143	88		755
	-	-	-	-	34	105	132	1	34	-			306
	-	-	-	-	-	-	-	-	-	9	17	2	28
	-	-	-	-	-	-	20	6	-	10	2	1	39
							144	158	30	68	12	111	523
2	22	15	-	45	56	227	349	301	171	230	119	114	1,651
2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	Total (2003 - 2016)
	-	-	-	-	-	-	-	2	165	95	34	12	308
	-	-	-	-	-	-	-	2	165	95	34	12	308
2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	Total (2003 - 2016)
	-	-	4	2	10	8	13	9	16	8	5	-	75
	-	-	4	2	10	8	13	9	16	8	5	-	75



**Tom MILLAR**  
Global Sales Manager  
SERCEL-GRC Corp

**ESP SERIES GAUGE MANUFACTURING COUNT**



**Qty of Units Shipped  
by Year (2003 - DEC  
2016)**

<b>FORTRESS ESP DOWNHOLE SENSORS</b>	<b>200 3</b>	<b>200 4</b>	<b>200 5</b>	<b>2006</b>	<b>2007</b>	<b>2008</b>	<b>2009</b>	<b>2010</b>	<b>2011</b>	<b>2012</b>	<b>2013</b>	<b>2014</b>	<b>2015</b>	<b>Dec -16</b>	<b>Total (2003- 2016)</b>
Total ESP-1000 Gauges	-	-	-	-	-	-	-	-	4	2	-	3			9
Total ESP-1500 Gauges	-	-	-	-	-	-	-	-	-	204	740	894	406	522	2,766
Total ESP-1550 Gauges	-	-	-	-	-	-	-	-	-	12	10	-			22
Total ESP-1800 Gauges	-	25	91	407	136	362	128	43	30	40	-	-			1,262
Total High Temperature ESP Gauges	-	-	7	11	4	42	96	203	218	182	140	508	189	140	1,740
Total ESP-2000 Modules & Gauges	7	154	767	1,415	1,462	1,429	1,441	3,361	1,546	2,987	2,917	4,470	912	51	22,919
Total ESP-2500 Modules & Gauges	-	-	-	14	160	179	242	828	816	522	629	891	514	201	4,996
Total QESP-2500 Gauges	-	-	-	-	-	-	4	5	-	-	-	-	-	-	9
Total ESP-3500 Gauges	-	-	-	-	-	-	1		11	112	126	79	86	59	474
Total QESP-3500 Gauges	-	-	-	-	2	64	81	223	76	2	5	3		3	459
<b>Total ESP Gauges</b>	<b>7</b>	<b>179</b>	<b>865</b>	<b>1,847</b>	<b>1,764</b>	<b>2,076</b>	<b>1,993</b>	<b>4,663</b>	<b>2,701</b>	<b>4,063</b>	<b>4,567</b>	<b>6,848</b>	<b>2,107</b>	<b>976</b>	<b>34,656</b>
<b>SCOUT ESP SURFACE MONITORING SYSTEM</b>															
Scout-3000	0	0	0	0	0	0	1	52	32	348	264	398	153	98	1,346
Scout-2200	0	0	0	238	135	213	101	342	78	13	33		1		1,154
SPS-1500									5	195	970	1949	379	439	3,937
SPS-3000									151	110	99	131	47	3	541
<b>Total Scout Readouts</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>238</b>	<b>135</b>	<b>213</b>	<b>102</b>	<b>394</b>	<b>266</b>	<b>666</b>	<b>1366</b>	<b>2478</b>	<b>580</b>	<b>540</b>	<b>6,978</b>



**Tom MILLAR**  
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