

## ESP Downhole Monitoring System



### Optimize ESP performance to maximize production

The SPECTRUM Downhole Monitoring System is an Electrical Submersible Pump (ESP) gauge that provides fast, reliable and continuous data on reservoir and pump performance.

Dynamic well conditions require fine-tuning of the ESP to ensure the pump remains at the best efficiency point, realizing power savings, longer run life and ultimately reduced operational expenditure, in terms of both workover and deferred production costs.

### Flexible configuration options

Installed at the base of the ESP, directly or via a motor adapter, all sensors are housed in a 13 chrome stainless steel body and rated to 302°F (150°C) and 5,800 PSI.

Alarms can be set for each measured parameter and are configurable based on application.

The SPECTRUM ESP gauge is compatible with other monitoring and control technologies and is SCADA ready with an industry standard Modbus protocol terminal (RS232 and RS485).

### APPLICATIONS

- High workover cost ESP installations
- Offshore/Remote ESP installations
- ESP installations requiring reservoir information
- ESP installations requiring optimization/troubleshooting

### BENEFITS

- Long term trending of equipment and reservoir performance
- Optimize ESP
- Optimize reservoir recovery
- Prevent dead heading (against closed chokes/valves)
- Prevent ESP motor overheating
- Monitoring of insulation degradation

### FEATURES

- Rigorously tested at 165°C, 5,800PSI
- 13 chrome metallurgy
- Compatible with existing SCADA Modbus Maps
- Configurable data update rate
- Calibrated during manufacturing
- 5KV high voltage interface
- Flexible surface package options
- 2GB data logger

SERIES  
400

## APPLICATIONS

Measured parameter	Monitoring uses	ESP protection
Intake pressure	<ul style="list-style-type: none"> <li>Free Gas breakout</li> <li>Well Productivity</li> </ul>	<ul style="list-style-type: none"> <li>Closed loop response from VSD to maintain higher FLOP</li> <li>Trip/Alarm to protect against Pump Off condition</li> </ul>
Intake temperature	<ul style="list-style-type: none"> <li>Changing fluid properties</li> <li>Indication of stress on insulation</li> <li>Diagnose recirculation</li> </ul>	<ul style="list-style-type: none"> <li>Protect from increasing gauge temperatures</li> </ul>
Motor oil/winding temperature	<ul style="list-style-type: none"> <li>Calculate operating temperature rise</li> <li>Indication of fluid property changes</li> <li>Indication of system electrical imbalance</li> <li>Diagnose low flow, overloading, mechanical wear, high friction losses in ESP system</li> </ul>	<ul style="list-style-type: none"> <li>Protect from motor overheating</li> </ul>
Discharge pressure	<ul style="list-style-type: none"> <li>Evidence of pump operating point</li> <li>Protect from dead heading, incorrect rotation</li> </ul>	<ul style="list-style-type: none"> <li>Protect against pump operating out of range</li> <li>Protect from producing against closed valve</li> </ul>
Vibration (Vx, Vy, Vz)	<ul style="list-style-type: none"> <li>Indication of pump bend, mechanical wear, abrasives, gas slugging</li> <li>Evidence of resonant frequency</li> </ul>	<ul style="list-style-type: none"> <li>Set frequency avoidance bands</li> </ul>
Current leakage	<ul style="list-style-type: none"> <li>Indication of insulation degradation across ESP system</li> </ul>	<ul style="list-style-type: none"> <li>Trend over time, increasing value indicative of impending ground fault</li> </ul>

## APPLICATION SPECIFICATIONS

Measurement	Range	Resolution	Accuracy
Intake pressure, psi (kPa)	0 - 5,800 (0 - 39,989)	0.1	0.2%
Discharge pressure, psi (kPa)	0 - 5,800 (0 - 39,989)	0.1	0.2%
Intake temperature, °F (°C)	32 - 302 (0 -150)	0.1 (0.1)	0.01%
Motor oil or winding temperature, °F (°C)	32 - 482 (0 -250)	0.1 (0.1)	0.01%
Vibration, (Vx, Vz) g	0 - 30	0.01	0.1%
Current leakage, mA	0 - 25	0.001	0.04%

## SPECTRUM DOWNHOLE MONITORING SYSTEM SPECIFICATIONS

Length, in (cm)	20.00 (50.80)
OD, in (cm)	4.50 (11.43)
Weight, lbs (kg)	50.70 (23.0)
Max. environmental pressure, psi (kPa)	6,500 (44,815)
Rated temperature, °F (°C)	302 (150)
Tested insulation rating, V DC	Reverse polarity to 5,000V DC for 10 seconds
Material	13 chrome stainless steel
Bottom connection, in (cm)	2-3/8 (6.033) 8RND EUE box
Maximum load, lbs (kg)	2,645.5 (1,200)