



Electrical Submersible Pump (ESP) Downhole Sensor Systems

Fight your decline curve with the most reliable downhole ESP sensor

CUSTOMER BENEFITS

- ▶ Reduce well workovers with the most reliable ESP sensor
- ▶ Extend production with sensor data you can trust
- ▶ Lower LOE by re-running sensors
- ▶ Reduce safety risks with smaller and more reliable device over costs

PRODUCT HIGHLIGHTS

- ▶ World's only ESP sensor with two-year warranty
- ▶ Patented electronics that withstand high voltage and current overloads
- ▶ Completely sealed and welded device
- ▶ Half the size and weight of competing units
- ▶ UL/CSA certified surface

Fighting production decline curves and reducing lease operating expenses, all while improving safety performance, is a constant challenge for any oil and gas operator. Any oilfield service company delivering artificial lift services should be focused on supporting their clients continuous improvement in each of these areas. Selecting the industry's most reliable downhole ESP sensor is a sure way to improve all three areas.

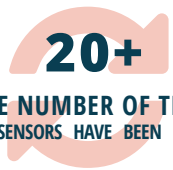
PROVEN RELIABILITY + COST EFFECTIVENESS



7K+
ACE DOWNHOLE SENSORS
INSTALLED WORLDWIDE



2
YEAR WARRANTY
NO OTHER BRAND COMES CLOSE



20+
THE NUMBER OF TRIPS
ACE SENSORS HAVE BEEN RE-RUN

The ACE Downhole ESP sensor system has four main components. Two are installed at surface and two are mounted below the ESP motor. Optional testing units are available to verify signal and system integrity.



DOWNHOLE SENSORS:

- ▶ No serviceable parts inside
- ▶ Industry standard threads that mount to any additional downhole components that may be used
- ▶ Standard pressure, Xtreme temperature, and Dual pressure models available



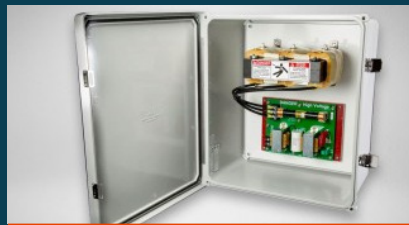
DOWNHOLE SENSOR ADAPTERS:

- ▶ Stock one sensor and run on any size system with low cost adapters
- ▶ Six most used sizes available in metric or english
- ▶ Available in carbon steel or stainless steel pressure models



SURFACE READOUT UNITS:

- ▶ Provides downhole data to downhole device, verifies encrypted data, and displays results on LED display
- ▶ SRU2 includes ethernet and USB connectivity
- ▶ SRU3i connects directly to a Baker Hughes/ GE Advantage or GCS drive, plus provides WiFi



HIGH-VOLTAGE INTERFACE:

- ▶ Provides a protective safety interface between the high-voltage 3-phase ESP power and the surface readout unit
- ▶ NEMA 4, 4X, 12, 13 enclosure



INSTALLATION/TESTING

- ▶ Hydraulic pressure test unit to enable system verification at surface
- ▶ Portable surface readout unit enables testing from the wellhead to the variable speed drive
- ▶ The ACE Spooler provides live readings via WiFi to any personnel near wellsite

DOWNHOLE INSTRUMENTS (WITHOUT MOTOR ADAPTER)

	ACE Standard Models	ACE Mid Range Models	Ace Xtreme Temperature	ACE Xtreme Temperature Dual
Intake Pressure Range	0-3000 psi & 0-5000 psi	0-3000 psi & 0-5000 psi	0-6000 & 0-8000 psi	0 - 6000 psi
Intake Pressure Accuracy	+/- 0.25% BFSL 1% FS	+/- 0.25% BFSL 1% FS	+/- 0.1% Typical 0.2% FS	+/- 0.1% Typical 0.2% FS
Intake Pressure Resolution	1 PSI SRU, 0.1psi SRU2, 0.01psi Spooler & SRU3i	1 PSI SRU, 0.1psi SRU2, 0.01psi Spooler & SRU3i	1 PSI SRU, 0.1psi SRU2, 0.01psi Spooler & SRU3i	1 PSI SRU, 0.1psi SRU2, 0.01psi Spooler & SRU3i
Transducer Type	Silicon Strain Gauge	Silicon Strain Gauge	Digital Strain Gauge	Digital Strain Gauge
Discharge Pressure Range	N/A	N/A	N/A	0 - 6000 psi
Discharge Pressure Accuracy	N/A	N/A	N/A	+/- 0.1% Typical 0.2% FS
Discharge Pressure Resolution	N/A	N/A	N/A	1 PSI SRU, 0.1psi SRU2, 0.01psi Spooler & SRU3i
Intake Temperature Range	32°F - 257°F, 0°C - 125°C	32°F - 302°F, 0°C - 150°C	32°F - 350°F, 0°C - 177°C	32°F - 350°F, 0°C - 177°C
Intake Temperature Accuracy	3.5°F, 2°C	3.5°F, 2°C	3.5°F, 2°C	3.5°F, 2°C
Intake Temperature Resolution	1°F SRU, 0.1°F SRU2, 0.01°F Spooler & SRU3i	1°F SRU, 0.1°F SRU2, 0.01°F Spooler & SRU3i	1°F SRU, 0.1°F SRU2, 0.01°F Spooler & SRU3i	1°F SRU, 0.1°F SRU2, 0.01°F Spooler & SRU3i
Motor Winding Temperature Range	32°F - 600°F, 0°C - 316°C	32°F - 600°F, 0°C - 316°C	32°F - 600°F, 0°C - 316°C	32°F - 600°F, 0°C - 316°C
Motor Winding Temperature Accuracy	3.5°F, 2°C	3.5°F, 2°C	3.5°F, 2°C	3.5°F, 2°C
Motor Winding Temperature Resolution	1°F SRU, 0.1°F SRU2, 0.01°F Spooler & SRU3i	1°F SRU, 0.1°F SRU2, 0.01°F Spooler & SRU3i	1°F SRU, 0.1°F SRU2, 0.01°F Spooler & SRU3i	1°F SRU, 0.1°F SRU2, 0.01°F Spooler & SRU3i
Vibration Range	N/A	0 - 10G	0 - 10G	0 - 10G
Vibration Accuracy	N/A	0.50%	0.50%	0.50%
Vibration Resolution	N/A	N/A	0.01G	0.01G
Maximum Motor Voltage	4160 VAC	4160 VAC	4160 VAC	4160 VAC
Physical Diameter	3.72"	3.72"	3.94"	3.94"
Physical Length	18.5"	18.5"	18.5"	23.0"
Physical Weight	35 lbs, 16 kg	35 lbs, 16 kg	42 lbs, 16 kg	44 lbs, 20 kg
Material	1020 CS, 316 SS	1020 CS, 316 SS	316 SS	316 SS

SURFACE READOUT UNITS

	Surface Readout Unit	SRU2i	SRU3
Power	115VAC +/- 15% 50/60Hz	115VAC +/- 15% 50/60Hz	115 VAC +/- 15% 50/60Hz
Display Type	6 digit Alpha Numeric LED	8 digit Alpha Numeric LED	-
Motor Controller Connection (Isolated)	iCON Series Interface. Support for legacy (F3/F5 Commander series) controllers.	iCON Series Interface. Support for legacy (F3/F5 Commander series) controllers plus additional RS-485 Modbus port.	Supports GCS Legacy CITIbus & Advantage CITIbus
Modbus RS-485 (Isolated)	3 wire standard	3 wire standard	3 wire standard
Modbus RS-232 (Isolated)	3 wire, no handshaking required.	3 wire, no handshaking required.	3 wire standard
USB Modbus (Isolated)	-	Standard USB 'B'	Standard USB-A
Ethernet Modbus (Isolated)	-	Standard CAT5E 8 Pin connector.	-
WiFi Interface	-	-	Standard worldwide, license free 802.11 b/g/n
Analog Outputs (Isolated)	-	4x 0-20mA User configurable (SRU2 sources power)	-
Relay Outputs (Isolated)	-	2x Form C User configurable 240VAC / 8 Amps	-
SD Datalogger	-	Up to 32 GByte (SDHC mode supported).	-
Internal Memory (SRU2X version)	-	32 GByte	-
Operating Temperature	0°F - 158°F, -18°C to 50°C	0°F - 158°F, -18°C to 50°C	0°F to 158°F, -18°C to 50°C
Dimensions	6.00" x 5.25" x 2.25"	9.50" x 5.75" x 1.75"	7.38" x 5.75" x 1.75"
Weight	1.5 lbs	2.0 lbs	2 lb
UL Certification	Conforms to UL Std. 61010-1	Conforms to UL Std. 61010-1	Conforms to UL Std. 61010-1
CSA Certification	Certified to CAN/CSA Std. C22.2# 61010-1	Certified to CAN/CSA Std. C22.2# 61010-1	Certified to CAN/CSA Std. C22.2# 61010-1