

# ESP Downhole Sensor Systems

Predict ESP motor and cable run life by measuring ESP insulation resistance

ACE™ sensors are specifically designed to be re-installed multiple times without the need for repair and their smart circuitry assures exceptional reliability.



### Downhole sensors

- Standard, Mid-Range, Xtreme and Dual-Pressure models available
- 2 3/8-in. 8 RND EUE thread on the bottom of the sensor to mount any additional downhole components



**9k+**

ACE Downhole sensors installed worldwide.



### Downhole sensor adaptors

- Most common sizes available for various ESP motor brands
- Available in carbon steel or stainless steel

**2**  
**YEAR**

warranty,  
unmatched by  
any competitor

**20+**

the number of trips  
ACE sensors have  
been re-run.



### Surface readout units

- SRU2i includes ethernet and USB connectivity
- SRU3i connects directly to a Baker Hughes Advantage/GCS drive and provides WiFi



### High-voltage interface

- Rated to 5,000 VAC and tested at 7,000 VAC
- NEMA 4, 4X, 12, 13 enclosure

### Benefits

- Lower costs by re-running ACE sensors without the need for service or repair
- Predict and extend ESP run life by monitoring ESP insulation resistance
- Sustain uninterrupted downhole data in applications with unstable power



### Installation and testing

- Hydraulic pressure test unit to enable system verification at surface before sensor re-installation
- Portable surface readout unit enables sensor testing without connecting to a power source
- ACE Spooler monitors ESP while running in hole and sends an alarm to personnel on the wellsite the moment ESP cable gets damaged

### Product highlights

- Completely sealed and dry design
- Patented smart circuit to protect the sensor from high voltage, current overloads, and ground fault related failures

## DOWNHOLE SENSORS

	ACE Standard	ACE Mid Range	ACE Xtreme	ACE Xtreme Dual
<b>Intake Pressure Range</b>	0-3000 psi & 0-5000 psi	0-3000 psi & 0-5000 psi	0-6000 & 0-8000 psi	0 – 6000 psi & 0-8000 psi
<b>Intake Pressure Accuracy</b>	+/- 0.25% BFSL 1% FS	+/- 0.25% BFSL 1% FS	+/- 0.1% Typical 0.2% FS	+/- 0.1% Typical 0.2% FS
<b>Intake Pressure Resolution</b>	1psi SRU, 0.1psi SRU2, 0.01 psi Spooler & SRU3i	1 psi SRU, 0.1psi SRU2, 0.01psi Spooler & SRU3i	1 psi SRU, 0.1psi SRU2, 0.01 psi Spooler & SRU3i	1 psi SRU, 0.1psi SRU2, 0.01 psi Spooler & SRU3i
<b>Transducer Type</b>	Silicon Strain Gauge	Silicon Strain Gauge	Digital Strain Gauge	Digital Strain Gauge
<b>Discharge Pressure Range</b>	N/A	N/A	N/A	0-6000 & 0-8000 psi
<b>Discharge Pressure Accuracy</b>	N/A	N/A	N/A	+/- 0.1% Typical 0.2% FS
<b>Discharge Pressure Resolution</b>	N/A	N/A	N/A	1 psi SRU, 0.1psi SRU2, 0.01psi Spooler & SRU3i
<b>Intake Temperature Range</b>	32 - 275°F, 0 - 125°C	32 - 302°F, 0 - 150°C	32 - 350°F, 0 - 177°C	32 - 350°F, 0 - 177°C
<b>Intake Temperature Accuracy</b>	3.5°F, 2°C	3.5°F, 2°C	3.5°F, 2°C	3.5°F, 2°C
<b>Intake Temp Resolution</b>	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
<b>Motor Winding Temp Range</b>	32 - 600°F, 0 - 316°C	32 - 600°F, 0 - 316°C	32 - 600°F, 0 - 316°C	32 - 600°F, 0 - 316°C
<b>Motor Winding Temp Accuracy</b>	3.5°F, 2°C	3.5°F, 2°C	3.5°F, 2°C	3.5°F, 2°C
<b>Motor Winding Temperature Resolution</b>	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
<b>Vibration Range</b>	N/A	0 – 10G	0 – 10G	0 – 10G
<b>Vibration Accuracy</b>	N/A	0.50%	0.50%	0.50%
<b>Vibration Resolution</b>	N/A	0.01G	0.01G	0.01G
<b>ESP Insulation Resistance</b>	50kOhms-60MOhms	50kOhms-60MOhms	50kOhms-60MOhms	50kOhms-60MOhms
<b>Maximum Motor Voltage</b>	4160 VAC	4160 VAC	4160 VAC	4160 VAC
<b>Physical Diameter</b>	3.72 in.	3.72 in.	3.72 in. or 3.94 in.**	3.94 in. **
<b>Physical Length</b>	18.5 in.	18.5 in.	18.5 in.	23.0 in.
<b>Physical Weight</b>	35 lbs, 16 kG	35 lbs, 16 kG	42 lbs, 19 kG	44 lbs, 20 kG
<b>Material</b>	1020 CS, 316 SS	1020 CS, 316 SS	316 SS	316 SS

\*\* Downhole sensors with 3.94 in. OD are rated to the maximum pressure of 11,000 PSI

## SURFACE READOUT UNITS

	SRU	SRU2i and SRU2i-DC	SRU3i and SRU3i-DC
<b>Power</b>	115VAC +/- 15% 50/60Hz	115 VAC for SRU2i 10-28 VDC 1A for SRU2i-DC	115 VAC for SRU3i 10-28 VDC 1A for SRU3i-DC
<b>Display Type</b>	6 digit Alpha Numeric LED	8 digit Alpha Numeric LED	-
<b>Motor Controller Connection (Isolated)</b>	iCON Series Interface, Support for legacy controllers (F3/F5 Commander series)	iCON Series Interface, Support for legacy controllers (F3/F5 Commander series) plus additional RS-485 Modbus port	Supports GCS Legacy CITibus & Advantage CITibus
<b>Modbus RS-485 (Isolated)</b>	3 wire standard	3 wire standard	3 wire standard
<b>Modbus RS-232 (Isolated)</b>	3 wire, no handshaking required	3 wire, no handshaking required	3 wire standard
<b>USB Modbus (Isolated)</b>	-	Standard USB 'B'	Standard USB-A
<b>Ethernet Modbus (Isolated)</b>	-	Standard CAT5E 8 Pin connector	-
<b>WiFi Interface</b>	-	-	Standard worldwide, license free 802.11 b/g/n
<b>Analog Outputs (Isolated)</b>	-	4x 0-20mA User configurable (SRU2 sources power)	-
<b>Relay Outputs (Isolated)</b>	-	2x Form C User configurable 240VAC / 8 Amps	-
<b>SD Datalogger</b>	-	Up to 32 GByte (SDHC mode supported)	-
<b>Internal Memory (SRU2i version)</b>	-	32 GByte	-
<b>Operating Temperature</b>	0 - 158°F, -18 - 50°C	0 - 158°F, -18 - 50°C	0 - 158°F, -18 - 50°C
<b>Insulation Resistance</b>	No	Yes	Yes
<b>Dimensions</b>	6.00 in. x 5.25 in. x 2.25 in.	9.50 in. x 5.75 in. x 1.75 in.	7.38 in. x 5.75 in. x 1.75 in.
<b>Weight</b>	1.5 lbs	2 lbs	2 lbs
<b>UL Certification</b>	Conforms to UL Std. 61010-1	Conforms to UL Std. 61010-1	Conforms to UL Std. 61010-1
<b>CSA Certification</b>	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

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