Quickstart Guide - ACE Downhole Gauge

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

STEPS FOR IR TESTING (GAUGE ONLY)

WARNING

DO NOT APPLY ANY VOLTAGE OR ATTEMPT TO MEGGER TEST THE TEMPERATURE TRANSDUCER PIN (SMALLER PIN) AS DAMAGE TO THE INSTRUMENT WILL RESULT.

** An insulation tester rated for 1000 volts DC maximum should be used to test the gauge–preferably one that has a limited 'rise time' for the applied DC test voltage. Using a tester above these ratings will not damage the sensor, but may cause the sensor protection to turn, giving the false impression that the sensor is shorted. For this reason, we recommend using the ACE IR test lead (pictured below) and Fluke 1507 insulation tester.*

1. Connect the ACE IR test lead (ACE Part #: 1170576) (blue) and standard test lead (black) to the insulation tester. The instrument should be tested with -Ve polarity as shown in the picture below.

2. Connect ACE test lead (blue) to the gauge chassis (one of the gauge bolt holes) and connect the 'common' (black test lead) to the large pin on the ACE gauge.

NOTE: DO NOT CONNECT 'COMMON' TO THE SMALL PIN!

3. Press and hold the test button on the insulation tester. Typical IR values will exceed 3 giga Ohms at room temperature.

NOTE: The test voltage should go up to around 1000VDC and the insulation resistance should slowly climb to several giga Ohms.

STEPS FOR IR TESTING (MOTOR ATTACHED)

DANGER

ENSURE THE MOTOR IS DISCONNECTED FROM ANY HIGH VOLTAGE WHILE CONDUCTING THESE PROCEDURES.

** Due to the capacitance of the motor cable, the standalone ACE test lead (blue) will not be required. The insulation tester may be directly connected to the end of the motor cable. When testing installed systems the long length of the motor cable provides a large enough capacitance to slow down insulation tester rise times and will prevent the sensor protection circuit from turning on with any brand of tester.*

NOTE: This test can be done in the shop or at the wellsite (while it is still on the spool or being lowered into the well).

1. Connect the motor cable to insulation tester.
2. Press and hold the test button on the insulation tester. Typical IR values will exceed 50 mega Ohms at room temperature.

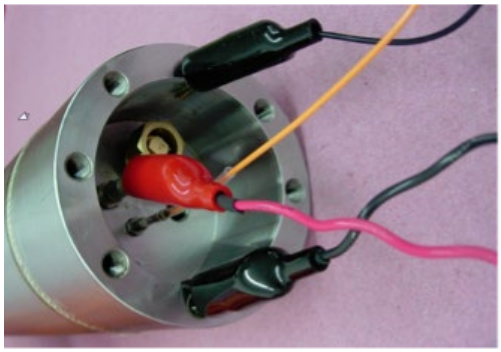
STEPS FOR SYSTEM INTEGRITY TESTING (GAUGE ONLY)

WARNING

DO NOT ATTACH OR REMOVE THE SIGNAL OR GROUND WHILE THE FIELD ELECTRICAL TEST KIT IS POWERED ON AS DAMAGE TO EQUIPMENT MAY RESULT. THERE ARE VERY HIGH INDUCTANCES IN THE SYSTEM, CONNECTING OR DISCONNECTING THE SIGNAL OR GROUND WIRE WITH POWER APPLIED WILL RESULT IN LARGE ARCS THAT MAY DAMAGE EQUIPMENT. TURN OFF THE FIELD ELECTRICAL TEST KIT (ACE Part #: 1170567) BEFORE CONNECTING OR DISCONNECTING THE SIGNAL OR GROUND LEADS.

1. Connect the signal wire (red) from the field electrical test kit to the large pin and ground wire (black) to the gauge chassis (one of the sensor bolt holes).
   NOTE: DO NOT CONNECT 'COMMON' TO THE SMALL PIN!
2. Connect the winding temperature simulator (ACE Part #: 1170589) ground wire (black) to another sensor bolt hole and connect one of the temperature simulator leads to the small pin on the sensor as shown to the right.

   NOTE: Simulator sold separately. Orange lead simulates 500°F and blue lead simulates 100°F



3. Turn on the surface tester.
4. Navigate to menu “9” (sensor type) using the arrows and ensure the reading matches your sensor type. Update menu 9 reading if it does not match.
   Note: Sensor type is engraved on the gauge (ex: 5CHV1400).
   a) If there is an ‘X’ then menu 9 should be “5x”.
   b) If there is an ‘H’ then menu 9 should be “5”.
   c) If there is NOT an ‘X’ or ‘H’ then menu 9 should be “3”.
   d) If there is a ‘D’ (i.e. includes discharge pressure) then menu 9 should be “6”.

   NOTE: Anytime the menu 9 setting is changed it can take up to 3.5 minutes for good data to show up. 2 minutes for IR measurement and 1.5 minutes for 2+ good data packets.
5. Navigate to menu “23” (pressure range) using the arrows and ensure the readings match your sensor pressure range. Update menu 23 reading if it does not match.
   Note: Sensor pressure range correlates to the first number engraved on the gauge.
   a) If there is a ‘3’ then menu 23 should be “3000”.
   b) If there is a ‘5’ then menu 23 should be “5000”.
   c) If there is a ‘6’ then menu 23 should be “6000”.
   d) If there is an ‘8’ then menu 23 should be “8000”.
6. Navigate to menu “12” and make sure you begin to see changes to the current draw.
   a) Standard ranges are from ~600 to ~700. You can see swings ~100 as the sensor sends data.
   b) If you see values greater than 825 there is a short in the system.
   c) If you see values less than 300 there is an open in the system.
7. Navigate to menu “1” to check instrument temperature (°F). Reading should be at room temperature.
8. Navigate to menu “2” to check intake pressure. Reading should be ambient pressure (14 psi at sea level).
   Note: Sensor accuracy is 0.25% FS, so 20 psi for an 8K sensor. At ambient pressure of 14 psi a displayed value of 0 psi is in spec and does not necessarily mean a bad sensor.
9. Navigate to menu “3” and check winding temperature (°F).
   a) If the orange lead of the simulator is used it will read 500.
   b) If the blue lead of the simulation is used it will read 100.
   c) If RTD is used it will read room temperature.
   d) If no lead was placed on small pin it will read 2.

FREQUENTLY ASKED QUESTIONS

Q: What do I do if I see a “0” pressure for the intake pressure?

A: If this occurs in the field verify with your shop that the pressure transducer was tested and showed a value in the shop prior to motor hook-up.
Verify that you are getting intake temperature. If you are getting intake temperature the transducer is working, and pressure readings are most likely going to show up as pressure is increased above ambient. If the intake temperature is close to the temperature reported by the motor winding RTD you can have high confidence in the sensor, even at 0 PSI.

Q: What happens if you do trigger the protection circuit while meggering?

A: Nothing bad. Just remove the voltage, and the circuit will reset on its own once the voltage is removed.

Q: Do we need the resistor when the motor is hooked to the sensor?

A: Probably not; the inherent inductance and resistance of the motor windings will probably be enough to slow the rise time, but the best practice is to use the resistor just to be sure.

Q: What is a low reading of the sensor when meggering?

A: The smallest resistance you should see when Meggering just the sensor will be ~3 giga Ohms. This will get much smaller when the motor is connected. It depends on the motor, but you should see greater than 50 mega Ohms.

ACE Downhole | T: +1 918-876-3246 | E: sales@acedownhole.com