ESP Simulator Manual

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Any questions concerning the content of this manual, equipment operation, field maintenance, maintenance assistance and operation or maintenance training courses should be directed to:

MODEL:
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1.0 ESP Simulator Overview

Specifications

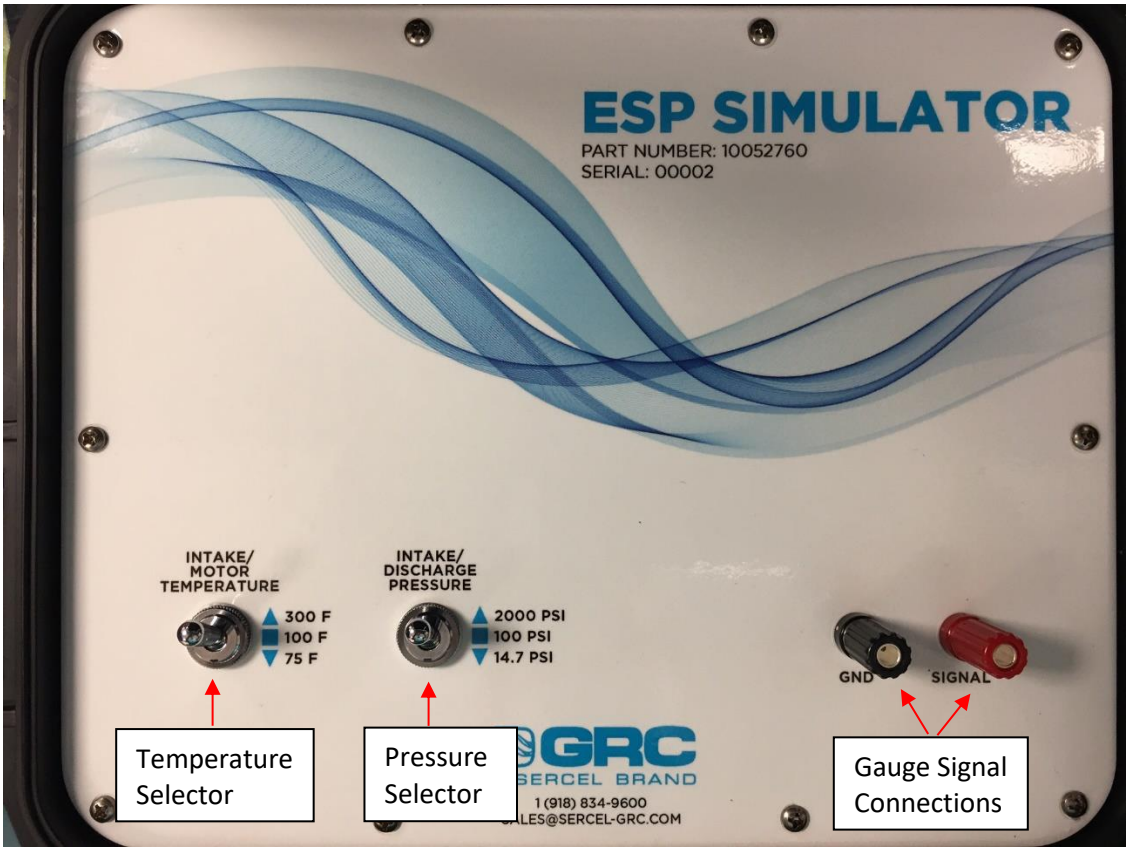
GRC P/N:	10052760
Communication Interface (SRO):	SPS-1500, Data Pro
Gauge Power Input:	40 to 80 VDC Gauge Power Output
Surface readout:	Compatible only with SPS-1500 or Data Pro.

Default/Factory Settings

Spy Pro 11Sensors: Intake Pressure, Discharge Pressure, Intake Temperature, Motor Temperature, Vibration (x, y, and z axis), Line Voltage, Leakage Current, WYE voltage.

2.0 ESP Simulator Layout

Figure 1. ESP Simulator Layout.



Gauge Input	Gauge Signal and Ground from Surface Readout Unit connects to Input Terminals as indicated on panel.
Pressure Select	Switch positions: IP=14.7PSI; DP=19.7 PSI, IP=100 PSI; DP=105 PSI, IP=2000PSI; DP=2005PSI.
Temperature Select	Switch positions: IT=75°F; MT=80°F, IT=100°F; MT=105°F, IT 300°F; MT=305°F.

Table 1. ESP Simulator Functions.

3.0 ESP Simulator Operation

To operate the ESP Simulator, connect the Gauge Signal and Ground directly from the Surface Readout Unit (SRO) or from the "WYE" connection on the surge panel. **DO NOT USE THE SIMULATOR WITH 3-PHASE POWER CONNECTED!!** The simulator has a built in line resistance to simulate the gauge choke and allow for direct connection from the SRO but does not have high voltage protection. Once the connections are completed, power on the SRO connected to the simulator. The SRO will run through the normal analyze process and establish communication within 5 minutes. The SRO should display the following values:

Intake Pressure:	Selected Pressure Value
Discharge Pressure:	Intake Pressure + 5psi
Intake Temp:	Selected Temperature Value
Motor Temp:	Intake Temperature + 5°
Vibration X:	+/- 1 G (Vibration value dependent on position of simulator case)
Vibration Y:	+/- 1 G (Vibration value dependent on position of simulator case)
Vibration Z:	+/- 1 G (Vibration value dependent on position of simulator case)
Line Voltage:	20-80V (Dependent on SPS-1500 Analyze settings)
Line Current:	0-20mA (Will vary due to installation specifics)
WYE:	20-80V (Dependent on SPS-1500 Analyze settings)

The simulator can only control pressure and temperature values. All other values are variables which cannot be predicted due to installation variations. The SRO readings will not update immediately after pressure or temperature selections are changed. The gauge communication will update the samples in 1 minute or less.

Use the codes (shown in Table 2) as a guide for correcting gauge communication problems. Contact Sercel-GRC Customer Service for detailed information for specific installation problems.

Error	Possible Cause	Troubleshooting Information
ANALYZING	No Error, normal operation during start up.	Scout-SPS-1500 calculating optimum gauge comm. Settings.
OKAY	No error, normal operation.	SPS-1500 communicating with the gauge
DC-DC BAD DC-DC NOISY LINE BAD LINE NOISY	Phase imbalance, short circuit or damaged equipment	Check drive, grounding to wellhead, surface cable to wellhead and system grounds. Check Surge Suppressor MOV, Fuses, Surface Choke and wiring. Check gauge fuse on SPS-1500. Test resistance/ insulation of the downhole cable at wellhead.
HI AMPS	Short circuit	Check surface surge suppressor MOV, fuses, and choke. Check the wiring and downhole cable and/ or equipment if necessary.
LOW AMPS	Not enough voltage, phase imbalance, short circuit or damaged equipment and/or fuse blown	Check SPS-1500 gauge fuse; check fuses on surge panel and in choke assembly. Verify AutoAnalyze enabled, if enabled set to manual mode and increase voltage (Power-On Volt Setting); see SPS-1500 Operations Manual.
NO TOOL	Blown fuse or bad connection	Check all fuses and surface connections.
NO SIGNAL	Bad connection to the gauge; if connections and equipment okay error may indicate possible gauge problem.	Check drive, grounding to wellhead, surface cable to wellhead and system grounds. Check Surge Suppressor MOV, Fuses, Surface Choke and wiring. Check gauge fuse on SPS-1500. Test resistance/ insulation of the downhole cable at wellhead.
BAUD SLOW BAUD FAST BAUD NOISY NO SYNC BREAK	Bad ground, phase imbalance, installation problem.	Possible wellhead ground problems check wiring; check motor drive.
HdrPACKET XSUM	Incorrect gauge voltage	If AutoAnalyze and AutoVolt are disabled (Manual Mode), increase the voltage; if AutoVolt and AutoAnalyze are enabled on the SPS-1500, try running in Manual mode and increase the Set Voltage until the gauge is communicating. See SPS-1500 manual 006-0202-00 for instructions.
ESP FRAMING ESP OVERRUN ESP STARTBIT DATPACKET XSUM	Communication problem as the Scout looks for the optimal voltage to run the gauge.	If AutoAnalyze and AutoVolt are disabled (Manual Mode), increase the voltage; if AutoVolt and AutoAnalyze are enabled on the SPS-1500, try running in Manual mode and increase the Set Voltage until the gauge is communicating. See SPS-1500 manual 006-0202-00 for instructions.
REFERENCE ERR	If error keeps occurring the SPS board may be damaged.	Replace the SPS-1500. Call Sercel-GRC customer service. If SPS replace unit.

Table 2. ESP Error and Troubleshooting Guide.