



ESP High Voltage Surface Choke Field Service Manual

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Sercel-GRC Corp.

6540 East Apache Street, Tulsa, Oklahoma 74115-3616 USA
P.O. Box 581570 Tulsa, Oklahoma 74158-1570 USA
E-Mail: sales@Sercel-GRC.com or support@Sercel-GRC.com
Telephone: (1) 918-834-9600 / Fax: (1) 918-838-8846
Visit our web page at www.Sercel-GRC.com

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Sercel GRC Replacement Part Numbers

043-0029-00	5000 VAC 1/2A Replacement Fuse
90A2180	Motor Phase Resistor Assembly 1K Ohm 7W
90A2181	Surge Suppressor Resistor Assembly 82K Ohm 2W
90A2182	Surge Suppressor MOV Assembly
90A2183	Surge Suppressor Filter Capacitor Assembly 5uF 600V (w/cable ties)
90C2190	Custom Choke Assembly
90C2215	Surge Suppressor Assembly
99B990	3 Phase Choke

! Danger !

**! High voltages present with
risk of electric shock !**

All wiring and repair shown in this manual
must be performed by qualified personnel.
Always use proper PPE and use caution
when working on equipment. Never perform
maintenance on powered equipment.

Surface Interface and Protection

ESP Gauge Surface Interface Equipment connects to the downhole tool via the motor power cable. The Motor Power cable connects to the equipment via the Surface Choke. Communication and Power are provided via a “Comms-on” technique meaning that the communication and power is combined with the motor power. “Comms-on” power is provided to the ESP Gauge by the ESP Interface Surface Equipment. The ESP Interface Surface Equipment is connected to the ESP Surge Protection Equipment via the Gauge Signal and Ground wire.

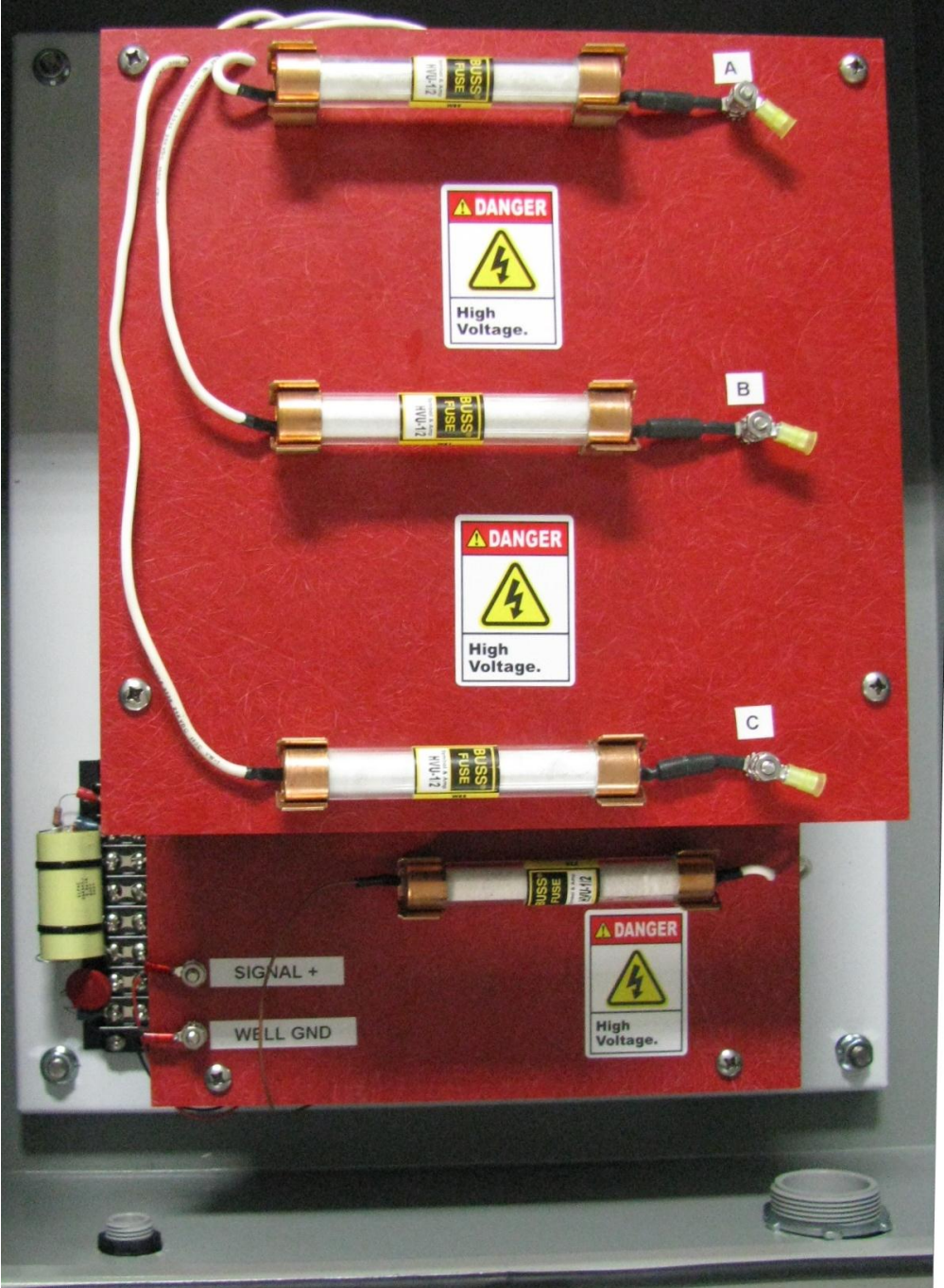


Figure 1. ESP Surface Choke Assembly.

Surface Choke

The surface choke is connected between the VSD 3-phase power and the Surge Panel or Surge Protector. The purpose of the surface choke is to allow the ESP Gauge Interface to provide power and communicate with the downhole tool. The ESP Gauge Interface provides between 30-80VDC to the Neutral wire on the Surface Choke to power the downhole gauge. The Surface Choke is designed to provide a neutral point "WYE point" for direct connection of power and communication on the three phase cable. The Choke also adds low pass filtering to protect sensitive electronic equipment from damaging voltage transients.



Figure 2. 3 Phase Surface Choke.

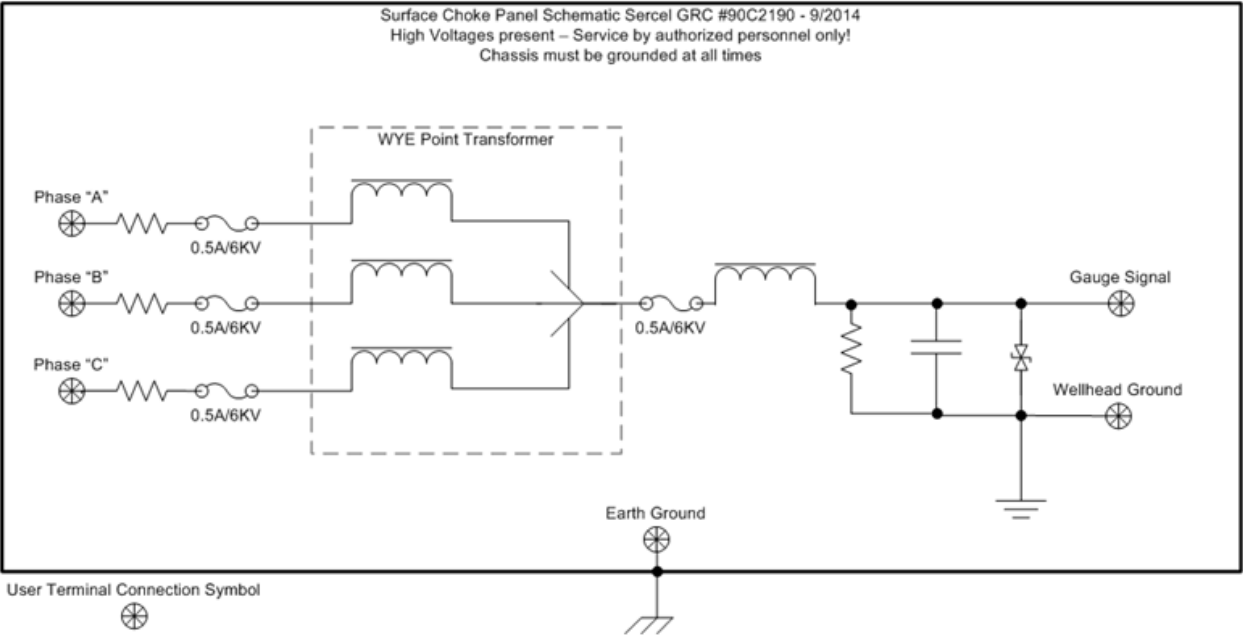


Figure 3. 3 Phase Surface Choke Wiring Diagram.

Panel Surge Protector

The surge kit provides protection for the ESP Surface Interface equipment from several failures including; overvoltage from imbalance, transient voltage pulses, and electro static discharge. The components are replaceable; the part numbers are located on page 3. The enclosure Earth Ground is internally linked to the Well Ground.

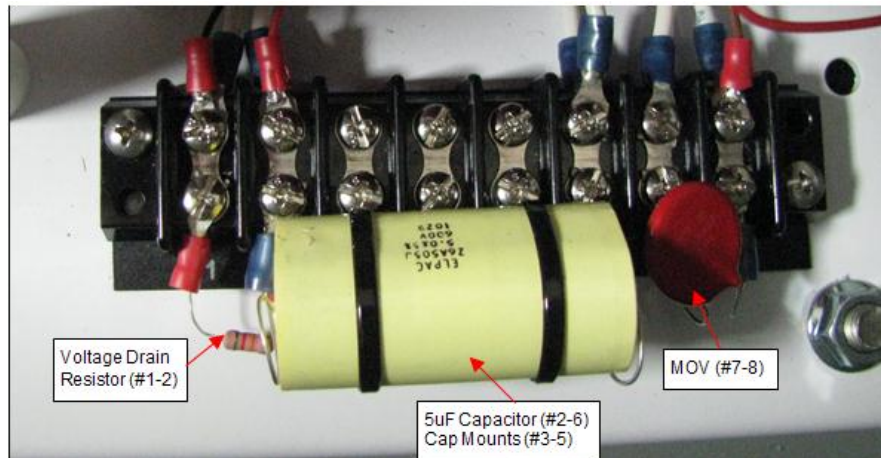


Figure 4. Surge Panel Component Detail.



Figure 5. Earth Ground Terminal.

Motor/ Fuse Interface Panel

The Motor/ Fuse interface panel contains protection fuses for each phase connecting to the Surface Choke and the terminals for connecting the motor phases to the Surface Choke. Each leg is protected with a replaceable 1/2A High Voltage fuse and 1K Ohm Power Resistor. The resistors filter low frequency DC voltage signals while the motor drive output frequency is ramping up. The 3 phase terminals are shipped with #10 stud size 12-10 Ga. Crimp terminals installed.

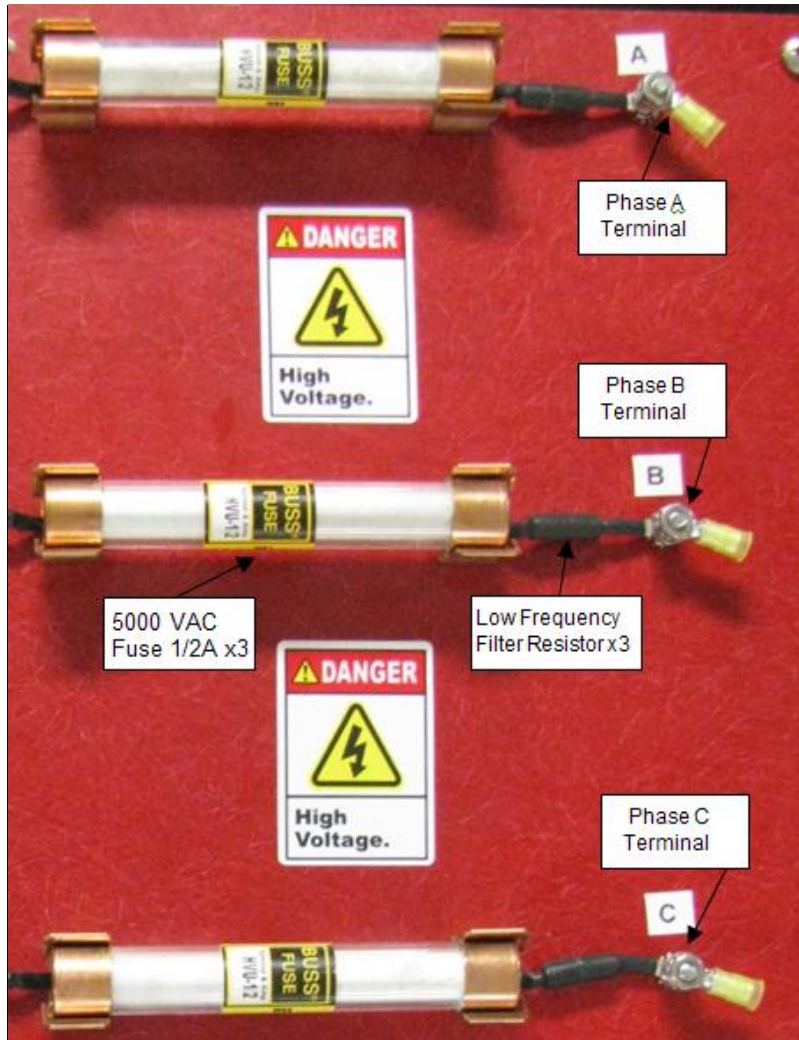


Figure 6. Motor/ Fuse Interface Panel Detail.

Surface Interface Connections

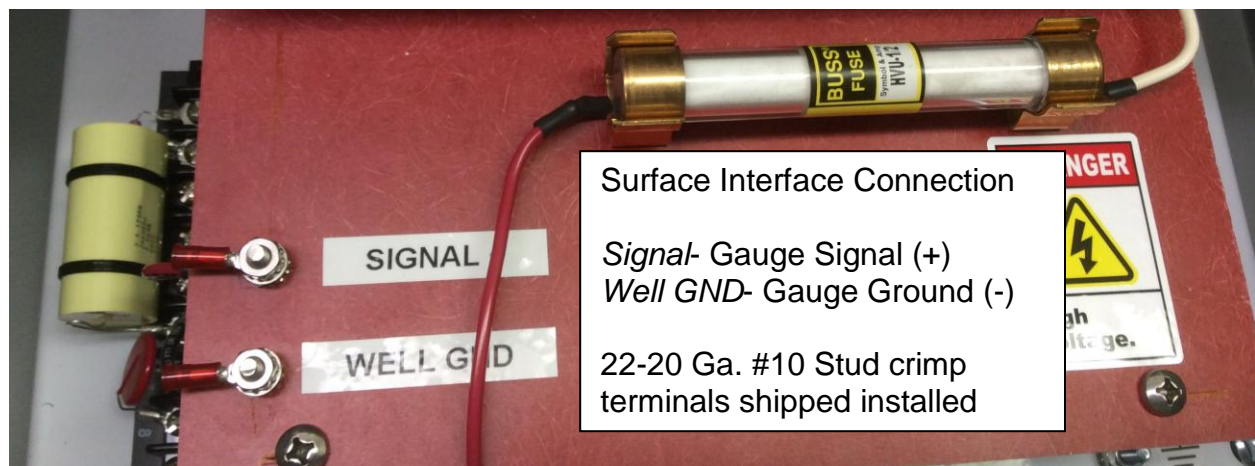


Figure 7. Surface Interface Connections.

Before Installation Checks

The interface between the ESP Gauge and a surface readout device (Scout or SPS) is composed of two parts. The first part is the high-voltage 3-phase choke that connects to the motor power cable. The second part is the fuse block/surge suppressor between the choke and the Scout/SPS. A visual inspection should check for the following:

- Verify that the wiring on the fuse block assembly and the 3-phase choke are correct and have not been damaged.
- Verify that the 0.5A high-voltage fuses on the fuse block assembly and surge suppressor are not open circuits.
- Verify that the MOV on the surge suppressor assembly has not been damaged.

A resistance check on the MOV should read open ($> 1\text{Mohm}$) when the MOV is removed from the circuit. Low resistance or a broken MOV indicates the MOV must be replaced. **Do not operate the unit without the MOVs in place.** Check the three-phase choke with a meter by measuring the resistance between each of the three phases and the neutral lead that connects to the fuse block. It should measure around 130 ohms.

Field Tips:

- Make sure that the Surface Choke wires that are connected to the transformer are braided.
- If longer cable is needed from the Transformer to the Surface Choke, make sure that it is rated for the Transformer voltage.

Contact Sercel-GRC Customer Service for any additional information.