

OWNERS MANUAL SSC3

Solid State Contactor Models:

SSC3-200A (200 Amps, 2 Lug)

SSC3-200B (200 Amps, 4 Lug)

SSC3-300 (300 Amps, 4 Lug)

1.0 Introduction

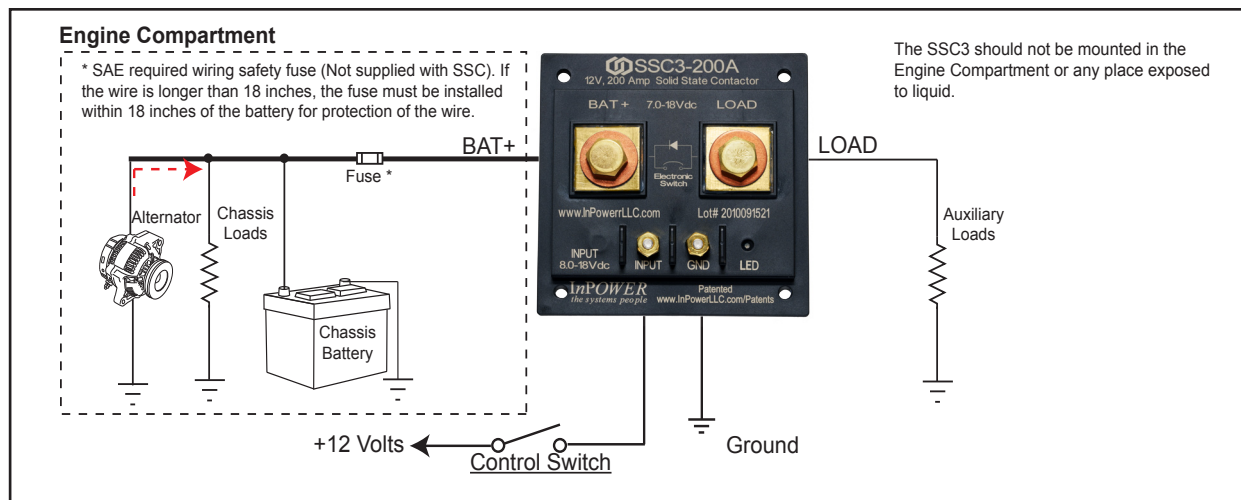
The InPower SSC3 Series is a family of high current universal solid state DC contactors. These contactors are available in current ratings of 200 and 300 amps, and are packaged plastic case with a metal baseplate. As they have extremely low current draw when in the off state, they are ideally suited for use as load disconnect switches. A key feature is the contactor's highly efficient, low on-resistance, DC power switch. This results in superior performance by producing a low voltage drop and generating only a small amount of internal heat.

The SSC3 family also incorporates LoadLogic technology which automatically compensates for different types of loads, starting up difficult loads, yet accurately detecting a dead short fault. In addition, the SmartStart algorithm compensates and adapts to starting up into capacitive loads, inductive loads, resistive loads, incandescent loads, and even safely identifies dead short faults.

The status LED indicator is on when the SSC3 is ON (off when OFF), and flashes to indicate a fault shutdown. Automatic fault shutdown occurs for over-current, loss of ground, high/low-battery voltage, and/or over-temperature. In a fault condition the contactor is latched in the off state. To reset the unit the faults must be cleared; then the control input voltage must be removed (<4.0V), then re-applied (>8.0V). Removing the +BAT cable will also reset the unit.

The control INPUT and GND inputs utilize a 8-32 Threaded Terminals. The brass nuts on the INPUT and GND terminals shall be torqued to 4-5 inch lbs. Connections for the high current DC cables utilize 3/8" - 16 brass bolts and copper washers with brass contact pads for low contact resistance. Four 0.20" mounting holes allow for solid mounting to a secure metal surface.

InPower SSC3-200A Solid State Contactor



2.0 System Operation

The SSC3 is controlled by a positive DC voltage on INPUT terminal. The turn ON voltage is +8.0 Vdc (Range of +8.0 to 18.0 Volts). The turn OFF voltage is <+4.0 Vdc. **Note that the input voltage must drop to under +4.0 volts, then increase to +8.0 volts to turn on again.**

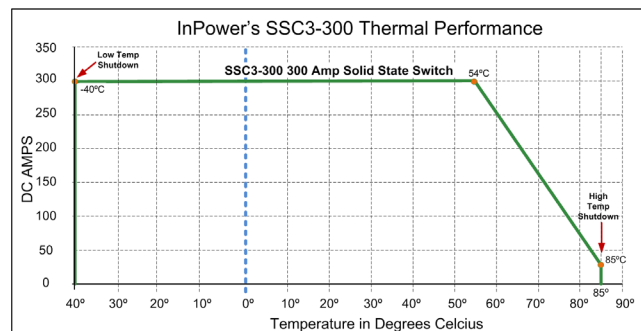
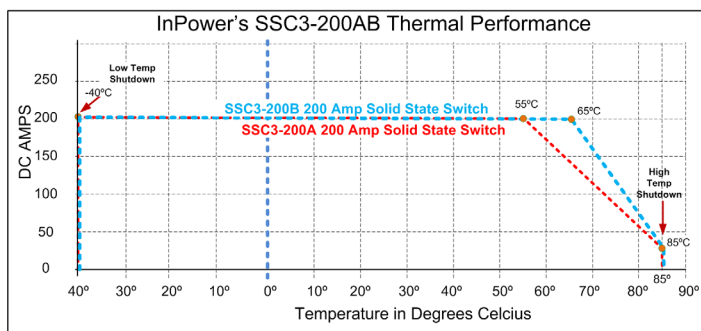
Certain fault conditions will cause the power switch to turn off and the LED to start blinking. The SSC3 will remain latched off until the fault(s) are cleared, the INPUT voltage removed, then the INPUT voltage re-applied.

The fault conditions that the SSC3 will recognize include:

1. Over-current condition for greater than 1 Second.
2. Loss of ground
3. Under-voltage
4. Over-voltage
5. Over-temperature
6. Shorted Load Detection

3.0 Specifications

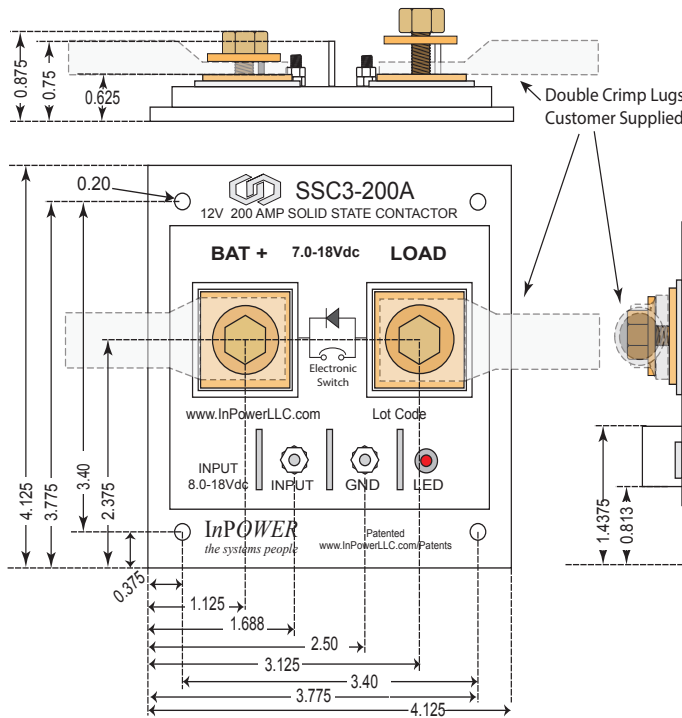
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|---------------------------------------|---|
| Current Rating: | 200 Amps (SSC3-200A/B), 300Amps (SSC3-300) |
| Standby Current: | 3.8 milliamps |
| Over-current Protection Trip: | 205 Amps (+/- 2 Amps) for 1 sec (SSC3-200A/B) 305 Amps (+/- 2 Amps) for 1 sec (SSC3-300) |
| Operational Temperature Range: | -40° to +185° F (-40° to +85° C) |
| Over-temperature Shutdown: | > 185° F (> 85° C) |
| Operational Voltage Range: | +7.0 to +18.0 Volts |
| Fault Reset: | Remove Voltage (<4.0V) and then reapply a voltage (>8.0V) if no faults exist. |
| LED Indicator: | Switch on = LED ON, Switch off = LED Off, Faults exist = LED Flash |
| INPUT Signal Voltage Range: | +8.0 to 18.0 Volts (True - ON), < 4.0 Volts (False - OFF) |
| Standby Current: | <3.8mA |
| Environmental: | Designed to IP67 |
| Power Terminal Torque: | Brass Bolts and Copper Washers (supplied with SSC3) torqued to between 10 to 15 ft-lb. |
| Input and Gnd Terminal Torque: | 8/32 Screw Terminal with Brass Nuts torqued to between 4 to 5 Inch Lbs. |



!!IMPORTANT!!

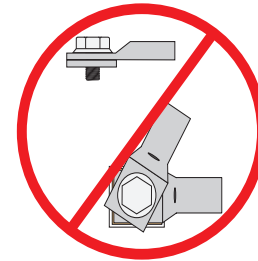
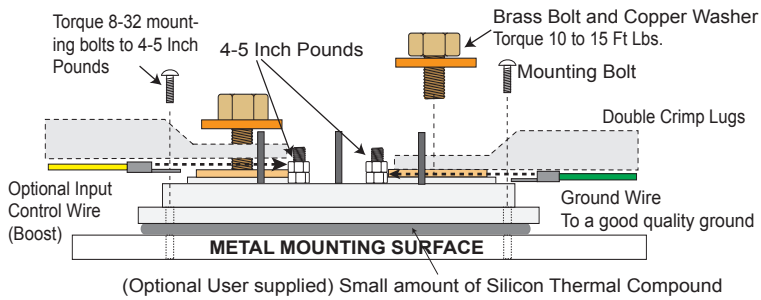
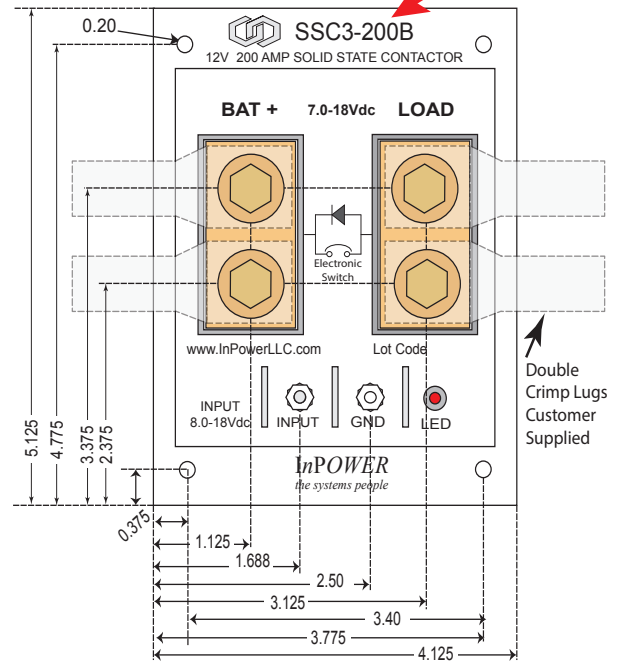
- Mount unit with 144 sq. inches of > 0.125 sheet metal for proper heat dissipation.
- Not for under-hood mounting
- Only use the supplied 0.50 inch long 3/8 - 16 Brass Bolts and Copper Washers - **Do Not Substitute**
- Protect lugs with boots or dielectric grease

Mechanical Specifications



Dimensions are in Inches

Same Dimensions as SSC3-300



Do Not Stack Lugs!
If Multiple Terminations are necessary, please refer to the SSC3-200B

4.0 Installation Procedure

Do not weld on the vehicle with the SSC3 installed and connected as damage to the product may result. If electric welding is necessary, disconnect the control INPUT terminal, and the cables attached to the LOAD and BAT+ terminals. Damage due to electric welding while the unit is installed will void InPower's warranty.



Prior to Starting installation of SSC3 Disconnect Battery and Ground Cables to avoid electric shock.

4.1 Integration Considerations

4.1.1 Wire Gauge

The first consideration is that of wire size for conduction of DC currents. Make certain to follow SAE recommendations, and make certain to size the wiring accordingly for surge, voltage loss across the length of wire, thermal load, thermal rating, and flexibility to facilitate easy installation for both +12V and return wires.

It actually can be less expensive and easier to install multiple, smaller wires than larger ones. This is due to both wire and lugs being less expensive as you purchase smaller gauges.

4.1.2 Grounding

In modern vehicles this is a major issue to remember that the ground path to the battery charging system must be of adequate size also. Conventional grounding to the frame may not be enough with some newer methods of connecting chassis components (using bolts and/or adhesives). Latest manufacturer's directives state that the only guaranteed ground is the Engine Block.

Make certain that you have a continuous path back to the batteries and charging system capable of handling the peak amperage.

4.1.3 Load Considerations

Relays/Solenoids connected to the SSC3 must incorporate Fly Back Suppression Diodes/Circuitry. These Relays/Solenoids (without suppression) can create large voltage and current spikes which damage electronics. Having inductive loads without suppression violates your unit's warranty and may damage your vehicles electronics!

4.1.3 Connector Lugs

In addition to wiring considerations, to minimize losses in the system, double crimping lugs, or crimping technology for a 360 degree crimp is important to minimize resistance (electrical and thermal) for the wire to connector transition. In other words, maximize the good contact surface area.

4.1.4 Battery Cable Fusing for Wiring Protection

If the SSC3 is located further than 18 inches from the battery, a fuse must be installed within 18 inches of the respective battery. This fuse is for the protection of the wiring. For 200 Amp service it is suggested that 225 Amp fuses minimum are used to accommodate surges (the SSC3-200A is protected).

4.2 Additional Installation Information.

This manual provides instructions for installing InPower SSC3 Solid State Contactors. It is important that you follow these instructions carefully and contact InPower if you need assistance or more information.

You can contact InPower at:

InPower LLC
8311 Green Meadows Drive
Lewis Center, Ohio 43035
740-548-0965
www.InPowerLLC.com

4.3 Safety Precautions

This product requires the installer to be trained for installation and work on vehicle electrical systems. We recommend that all wiring meet the SAE and applicable vehicle manufacturer's wiring specifications. Inspect the product and all other components for damage before starting the installation. Do not perform the installation if any problems exist.

Make sure that the vehicle battery power is disconnected during installation of the solid state contactor. Re-connect the battery when the installation is complete. Wear appropriate safety equipment such as eyeglasses, face shield and clothing when installing the equipment and handling the battery. Be careful when working near a battery or loads with high current conductors. Make sure the area is well ventilated and that there are no flames near the battery. Never lay objects on the battery that can short the terminals together or to ground. If battery acid gets in your eyes immediately seek first aid. If acid gets on your skin immediately wash it off with soap and water.

4.4 Mounting Location

First determine where the contractor will be mounted. We recommend mounting it to a flat metal surface that can absorb heat produced by the contactor. Also take into consideration the maximum current needed and the maximum mounting surface temperature (See Specification Section). **The SSC3 should not be mounted in the engine compartment or any location near the engine's heat.** For maximum thermal efficiency the mounting surface should be a thick metal surface such as an aluminum plate 1/8 x 16 x 16 inches or larger. To facilitate heat transfer, please apply a thin layer of silicon thermal material (user supplied) to the metal plate on the bottom of the SSC3. Smooth this out with a flat edge to insure there are no gaps. Secure the contactor to the flat metal surface using four screws and tighten to a torque setting of 5 inch pounds. **Do not drill out the contactor's four mounting pad holes to use a larger bolt size.**

4.5 Connect the GND

Proper operation of the SSC3 is dependent on a good quality ground system with appropriate sized wires for connection to the chassis battery and the load. For the grounding of the SSC3, be wary of attaching to the frame since many manufacturers only recommend grounding directly to the Engine Block as a guaranteed ground. Consult the recommended grounding documentation for your vehicle.

Install a #16 AWG ground wire with a ring terminal and connect it to this good quality ground. Place this on the GND terminal and torque the brass nuts on the 8/32 screw terminal to 4 - 5 Inch Lbs.

4.6 Connect the POWER CABLES and Control INPUT

Prepare the cables to the battery and auxiliary load using a appropriate size cable for the current required. Install a double crimped (or 360 degree crimped) lug terminal on the ends. BAT+ terminal is connected to the positive feed from the chassis battery and LOAD terminal is connected to the auxiliary load(s).

To connect the control voltage to the INPUT terminal, install a #16 AWG ground wire with a ring terminal, and connect that to a 12V control voltage. This can be a switch or voltage source of your choice such as the IGNITION signal. Refer to the input voltage specifications for this interface. Place the ring terminal on the GND terminal and torque the brass nuts on the 8/32 screw terminal to 4 - 5 Inch Lbs.

After installation is complete and checked, verify proper connectivity and then re-attach Battery and Ground Cables.

5.0 Testing Procedure

Make the following resistance measurements with a digital multimeter with all wires removed from the SSC3.

1. Measure the resistance between the two power terminals (BAT+ to LOAD). The resistance should be 150-160 kOhms in either direction.
2. Measure the resistance from the control INPUT terminal to the GND terminal. The "+" probe should be on the INPUT and "-" probe on the GND. The resistance should be 130 kOhms.
3. Measure the resistance to ground of each power terminal to a GND terminal with the "+" probe on the power terminal and "-" probe on the GND.
4. The resistance should be 104K (BAT+) and 50K (LOAD) Ohms.