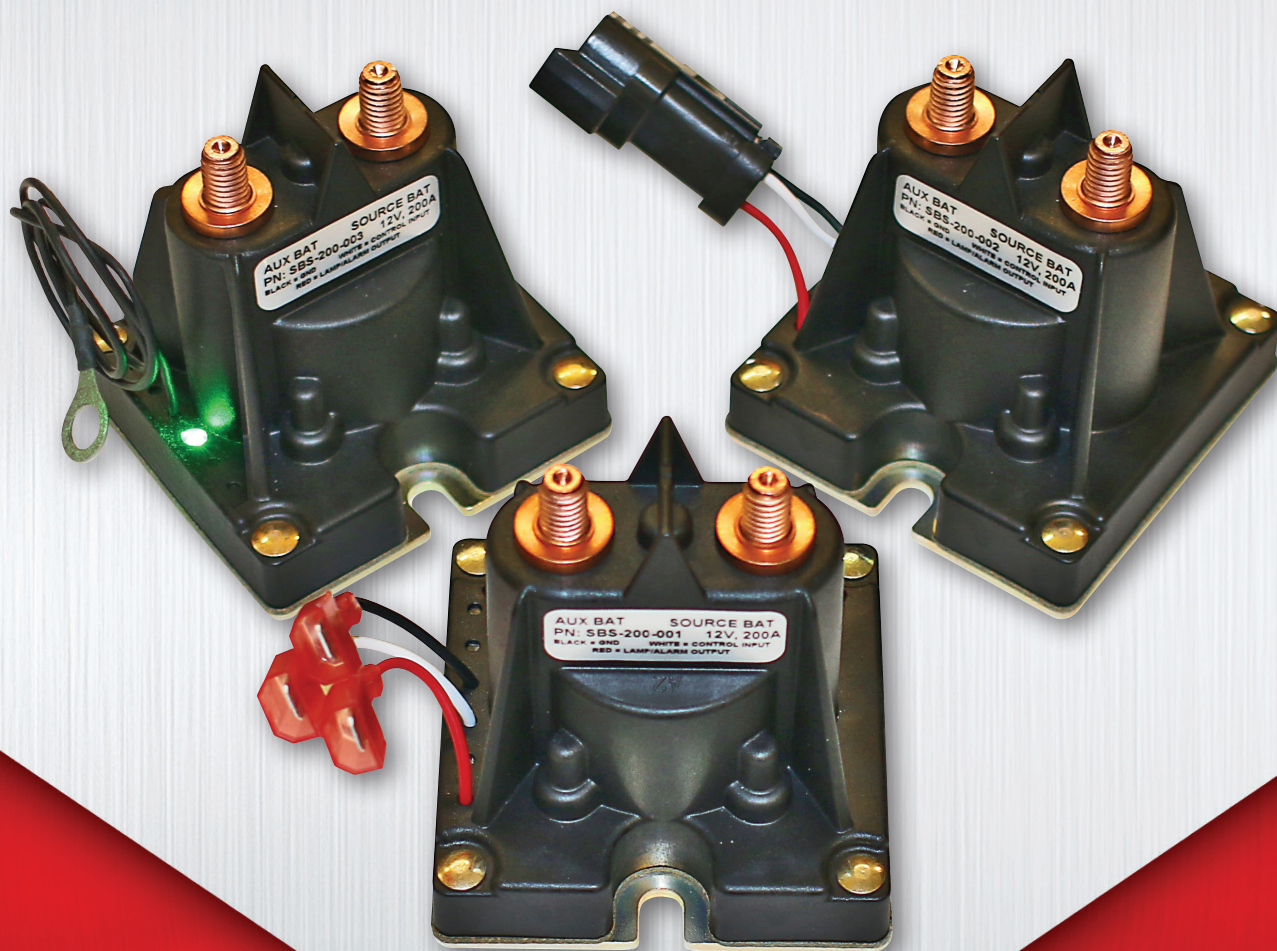


# Trombetta's 200A Magnetic Latching Battery Separator



**TROMBETTA**   
DC Power Solutions for a Harsh World

414-410-0300 • [trombetta.com](http://trombetta.com)

**Trombetta's Battery Separator** solution features a modern, integrated package that eliminates dated side saddle mounting of electronics on a standard solenoid with exposed bus bars and wires. Our integrated circuitry and magnetic latching solenoid are O-ring sealed in an IP69K\* package to stand up to the elements.

Available in Bidirectional and Unidirectional with Start Assist to provide a cost effective and power saving device ideal for all truck, RV, and emergency vehicle applications. Advanced software with microprocessor controls provide an array of lockouts and delays with the ability to verify the contacts are in the correct state to prevent field issues.

Switch To Trombetta.



**Trombetta  
Battery Separator**

## Theory of Operation

### Normal Operation

The device monitors the voltages on both M8 terminals each second. It will open or close the contacts after specified delay periods only if the voltages are within specified parameters. This eliminates reaction to transients and short-term voltage fluctuations. Except for a short 8 Amp pulse when changing states, the device draws less than 1mA when Open and no more than 10mA when Closed.

### Overvoltage/Undervoltage Lockout

Should the voltages on the M8 studs drop below the under-voltage limit ( $V_{USD}$ ) or exceed the over-voltage limit ( $V_{OSD}$ ), the device will disable contactor Open/Close changes until voltages return within the Functional Voltage Range.

### State Correction

If the device fails to Open or Close properly or if a significant mechanical shock forces the contactor to change state, the contactor coil is pulsed three times to restore the proper state. After the three unsuccessful attempts, the device will wait for two minutes before attempting another state correction pulse sequence.

### Start Assist

While the Start Assist Signal Voltage ( $V_{SS}$ ) is applied to the Start Assist Input -and- the difference between the battery voltages are within the Start Override Battery Difference ( $V_{SBD}$ ), the contactor will be Closed to assist with vehicle starting. The Start Assist Lamp output will be active as an indication that the Start Assist Mode is active. The  $V_{SBD}$  limit prevents activation in the presence of faulty battery conditions.

\*See Mechanical & Environmental Section



## Electrical and Software

| Characteristic                          | Symbol           | Min           | Typical                         | Max        | Notes  |
|---|------------------|---------------|---------------------------------|------------|--|
| INPUT VOLTAGE                           | V <sub>IN</sub>  | 10V           | 12.8V                           | 16V        | Functional voltage range   |
| MAXIMUM CONTINUOUS VOLTAGE              | V <sub>MAX</sub> |               |                                 | 40V        |  |
| CONTINUOUS CARRY CURRENT                |                  |               |                                 | 200A       | Requires 1AWG wire at 25°C, new unit<br>175A at 85°C, new unit<br>115A at 85°C, 50K cycles |
| ELECTRICAL SWITCHING LIFE               |                  | 50,000 cycles |                                 |            | 200A resistive load, 14.4 VDC, 25°C  |
| OVERCURRENT RATING                      |                  |               |                                 | 450A       | 1 minute, 25°C   |
| MAX CONTACT VOLTAGE DROP                |                  |               | 100mV                           |            | At 200A steady state   |
| FUSE REQUIREMENTS                       |                  |               |                                 |            | Required, size to application  |
| QUIESCENT CURRENT (OPEN)                |                  |               | 1mA                             |            |  |
| QUIESCENT CURRENT (CLOSED)              |                  |               | 10mA                            |            |  |
| UNDER-VOLTAGE SHUTDOWN                  | V <sub>USD</sub> |               | 9.8V                            |            | Open/close action disabled   |
| OVER-VOLTAGE SHUTDOWN                   | V <sub>OSD</sub> |               | 17.0V                           |            | Open/close action disabled   |
| CONNECT VOLTAGE                         | V <sub>CON</sub> | 13.1V         | 13.2V                           | 13.3V      |  |
| CONNECT VOLTAGE DELAY                   | T <sub>CON</sub> | 19 seconds    | 20 seconds                      | 21 seconds | The contactor will close if the connect voltage condition is maintained for this period    |
| DISCONNECT VOLTAGE                      | V <sub>DIS</sub> | 12.7V         | 12.8V                           | 12.9V      |  |
| DISCONNECT VOLTAGE DELAY                | T <sub>DIS</sub> | 19 seconds    | 20 seconds                      | 21 seconds | The contactor will open if the disconnect voltage condition is maintained for this period  |
| START ASSIST LAMP DRIVE VOLTAGE         | V <sub>LMP</sub> |               | Battery V <sub>MAX</sub> - 1.4V |            | V <sub>MAX</sub> source is from the battery with the highest voltage                       |
| START ASSIST SIGNAL VOLTAGE             | V <sub>SS</sub>  | 1.5V          |                                 |            | A voltage above this value will activate the start assist mode                             |
| START ASSIST BATTERY VOLTAGE DIFFERENCE | V <sub>SBD</sub> |               |                                 | 0.85V      | The difference between battery voltages must be less than this value                       |
| STATE CORRECTION ATTEMPTS               |                  |               | 3                               |            | Attempts before each lockout period  |
| STATE CORRECTION LOCKOUT PERIOD         |                  |               | 2 minutes                       |            | Delay between state correction attempt sequence  |
| SOLENOID DRIVE PULSE CURRENT            |                  |               | 8A                              |            |  |
| SOLENOID DRIVE PULSE PERIOD             |                  |               | 40mS                            | 100mS      |  |
| RUPTURE CURRENT                         |                  |               |                                 | 2000A      | Single cycle   |
| LOAD DUMP                               |                  |               |                                 | 100V       | ISO 7637-2 12V Pulse 5a, 5b  |
| ESD                                     |                  | -15 kV        |                                 | -15 kV     | J1113-13/J1455, Section 4.13.2.2.3   |
| RADIATED EMISSIONS                      |                  |               |                                 |            | ISO 7637-2:2004  |
| EMI SUSCEPTIBILITY                      |                  |               |                                 |            | ISO 7637-2:2004  |
| INDUCTIVE SWITCHING                     |                  | -600V         |                                 | 400V       | J1455, Section 4.11.2.2.2  |
| MUTUAL COUPLING                         |                  | -300V         |                                 | 300V       | J1455, Section 4.11.2.2.2  |
| ELECTRICAL ISOLATION                    |                  | 500VAC        |                                 |            | From base plate  |

## Mechanical and Environmental

|                                       |                                |   |
|---------------------------------------|--------------------------------|---|
| OPERATING & STORAGE TEMPERATURE RANGE | -40°C to 85°C                  |   |
| THERMAL CYCLIC AGING                  | SAE J1455                      | -40°C to 85°C, 25/ 8 hr. cycles                     |
| THERMAL SHOCK (AIR TO AIR)            | SAE J1455                      | -40°C to 85°C, 36/ 6 hr. cycles                     |
| HUMIDITY                              | SAE J1455, Section 4.2.3.4a    | 95% at 38°C   |
| SEALING                               | IP69K/ IP61                    | *Rating above IP61 is dependent on connector rating |
| MECHANICAL SHOCK-OPERATIONAL          | 20g when mounted with studs up | ** See note below                                   |
| MECHANICAL SHOCK-HANDLING             | SAE J1455, Section 4.11.3.1    |   |
| MECHANICAL SHOCK – TRANSIT DROP       | SAE J1455, Section 4.11.3.2    |   |
| VIBRATION RANDOM                      | 5-500 Hz 4g                    | 9 hours   |
| FATIGUE RESISTANCE                    | ISO 16750-3/4.1.2.7/8          | 96 hours  |
| SALT SPRAY                            | ASTM B 117                     | 96 hours  |
| CHEMICAL TESTING                      | SAE J1455 4.4                  | Automotive fluids                                   |
| COMPLIANCE                            | RoHS/ REACH/ Conflict free     |   |

Values given are based on design intent and lab testing, however customer testing is required to ensure the product operates as intended in each specific application.

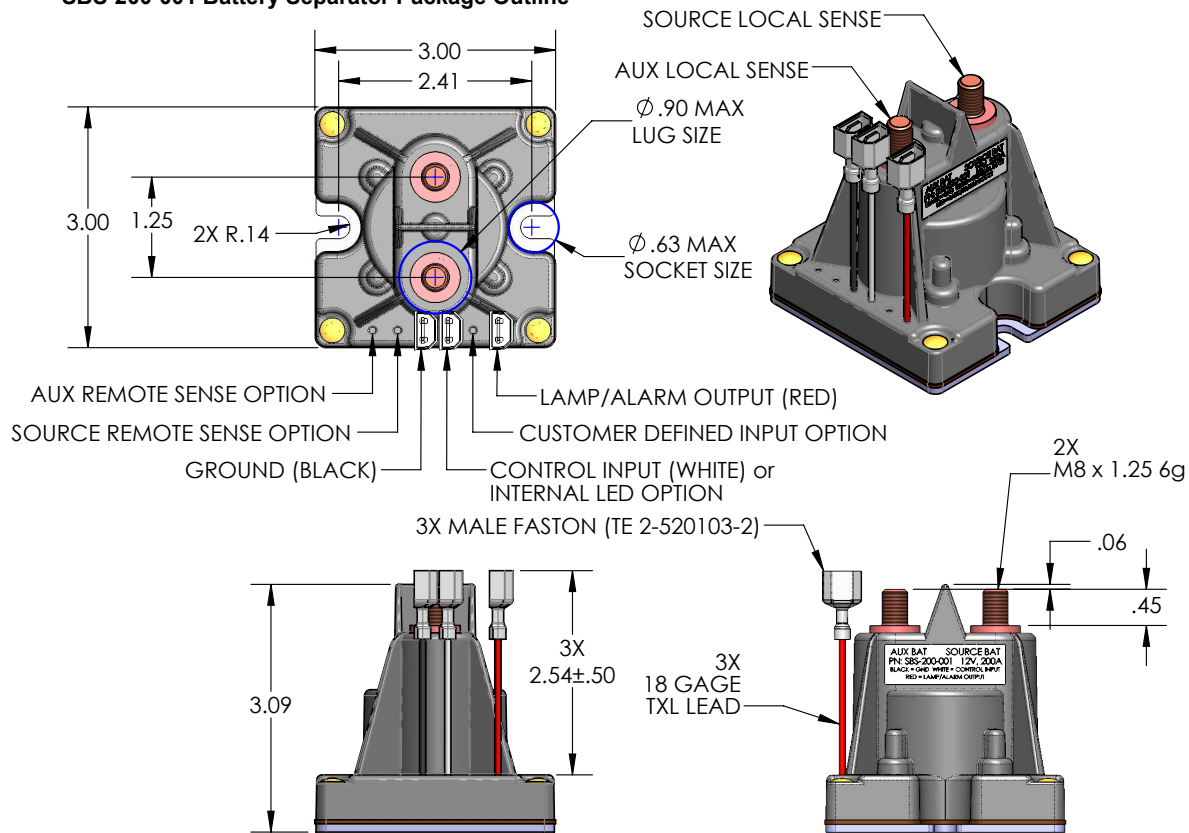
\*\*Shock greater than 20g with studs facing up and unit in open-state may result in unintended closure of contacts, higher resistance to inadvertent state change may be achievable in other orientations. Unit withstands forces up to 30g without physical damage to unit.

## (Optional LED) conditions

|           |   |
|-----------|---|
| OFF       | During the state correction lockout period or the stud voltages are not within the functional voltage range |
| BLINKING  | The contactor is open and operating within normal operating conditions                                      |
| ON STEADY | The contactor is closed   |



### SBS-200-001 Battery Separator Package Outline

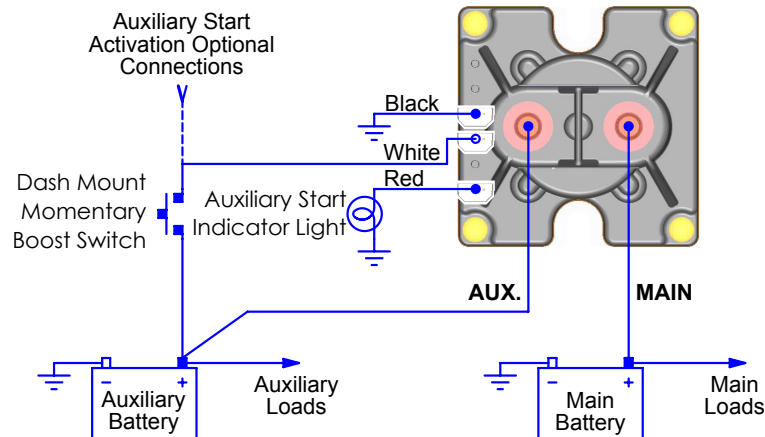


NOTE: ALL DIMENSIONS, UNLESS OTHERWISE STATED, ARE  $\pm 0.04$ .

| MODEL NUMBER | LEADS | LED OPTION | CONNECTOR            |
|--------------|-------|------------|----------------------|
| SBS-200-001  | 3     | NO         | 3) 1/4" MALE FASTON  |
| *SBS-200-002 | 3     | NO         | DEUTSCH DT04-3P      |
| *SBS-200-003 | 1     | YES        | 1) LUG FOR 3/8" STUD |

\*ITEM NOT SHOWN

### SBS-200-001 Battery Separator Connection Diagram



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