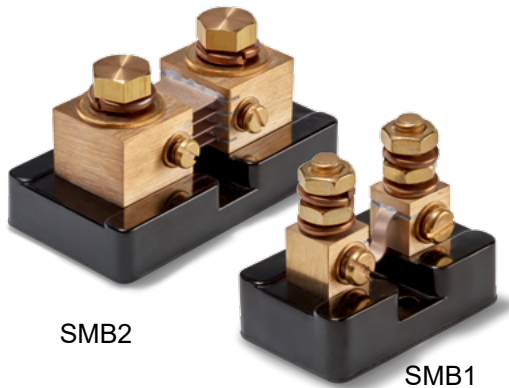


# Data Sheet for Precision Resistor

Shunt (bare metal)

Series SMB



SMB2

SMB1

- DC Ammeter Shunts
- Manganin Resistive Element
- Non-Inductive Metal Element
- Rated current up to 1200 A
- Rated Output 50mV, 100mV or customized
- Voltage tolerance  $\pm 0.25\%$  (optional  $\pm 0.1\%$ )

Applications: e.g. Power Supply, Power Converters, Current Measurements

Electrical Specification	SMB		
	1	2	3
Rated Output	50 mV, 100 mV, customized		
Voltage Tolerance	$\pm 0.25\%$ ( $\pm 0.1\%$ )		
Rated Current	5...150 A	170...600 A	800..1200 A
TCR (ppm/°C)	$\pm 15$ ppm/°C		
Operating Temperature	-40 °C up to +60 °C		
Storage Temperature	-55 °C up to +80 °C		
Dielectric strength	750 VDC		

Mechanical Specification	
Resistance technology / material	Bare metal / Manganin
Housing material	Cooper
Connections	Radial cooper tinned

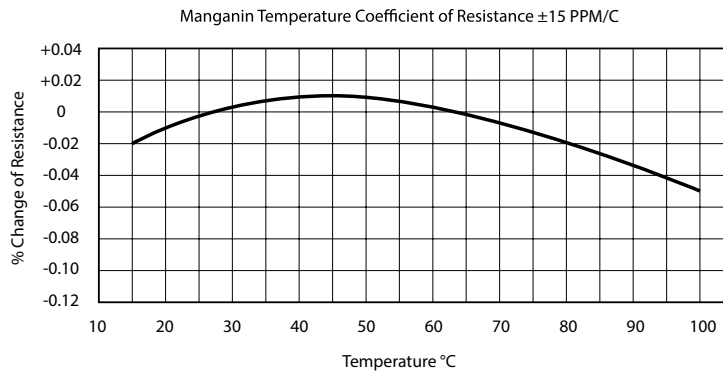
Type	Rated current in Ampere	Operating Current in Ampere	Resistance @ 50 mV in mΩ	Resistance @ 100 mV in mΩ
SMB1	5	3.33	10	20
	10	6.67	5	10
	15	10	3.333	6.667
	20	13.3	2.5	5
	30	20	1.667	3.333
	50	33.3	1	2
	75	50	0.667	1.333
	80	53.3	0.625	1.25
	85	56.7	0.588	1.176
	100	66.7	0.5	1
SMB2	150	100	0.333	0.6667
	170	113	0.2941	0.5882
	200	133	0.25	0.5
	250	166	0.2	0.4
	300	200	0.1667	0.3333
	400	267	0.125	0.25
	450	300	0.1111	0.2222
	500	333	0.1	0.2
SMB3	600	400	0.0833	0.1667
	800	533	0.0625	0.125
	1000	666	0.05	0.1
	1200	800	0.0417	0.0833

# Data Sheet for Precision Resistor

Shunt (bare metal)

Series SMB

## Power Derating Curve



## Note

**Mounting:** Shunts should be mounted with manganin resistive blades in a vertical position in order to promote the free convective flow of air. If vertical mounting is not practical, forced air cooling or adding heat sinks to the blocks can reduce the operating temperature. The manganin blades must never exceed  $+145^{\circ}\text{C}$ , otherwise permanent resistance change may occur.

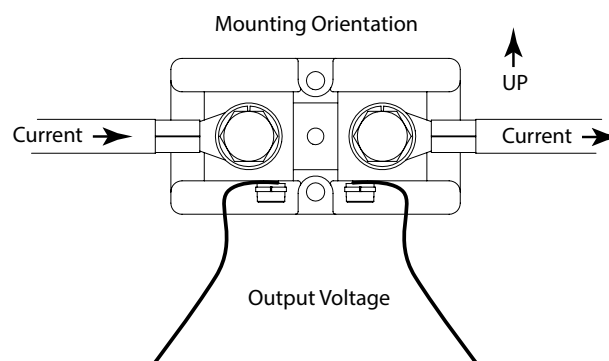
When current of 100A or greater is passing through the shunt, the major portion of heat generated is dissipated by conduction through the shunt terminal blocks into the connecting buss bar or cable. Therefore it is necessary to insure that good contact is made between the shunt terminal blocks and the conductor terminals and that the conductors have adequate cross section to keep the temperature of the shunt from exceeding  $145^{\circ}\text{C}$  ( $125^{\circ}\text{C}$  recommended).

If the shunt is mounted in an enclosure, care must be taken to ensure adequate cooling. If the power density is greater than 1/4 watt per square inch of the enclosure surface for all enclosed devices, additional cooling must be supplied in the form of air vents or fans.

Shunts also must be installed in a way that protects them from thermal expansion forces produced from buss bar or short-circuit forces. Flexible wiring may be required in high pulse current, high vibration, or high temperature applications. Where possible, all shunts should be mounted on the ground side of the circuit. For circuits above 750VDC, shunts must be mounted on the ground side due to the dielectric strength of the shunt base.

**Operating Current Derating:** For continuous operation, it is recommended that shunts are not run at more than two thirds (2/3) the rated current under normal conditions per IEEE standards for DC instrument shunts. At ambient temperatures above  $40^{\circ}\text{C}$ , the current must be further derated to prevent damage.

**Pulse Operation:** Shunts that do not need continuous operation and are only exposed to intermittent pulses can be operated at levels above their rated current for short periods of times. Pulses are limited to the maximum temperature of the blades not exceeding  $145^{\circ}\text{C}$  ( $125^{\circ}\text{C}$  recommended). Many variables such as ambient temperature, cross section of the current carrying conductors, and pulse duration make calculating exact values difficult. Shunt size will need to be validated by customer for pulse current and duty cycle on a case by case basis.



# Data Sheet for Precision Resistor

Shunt (bare metal)

Series SMB

Order code						
Description		Selection: <b>standard=black/bold</b> , possible <i>options=grey/italic</i>				
<b>Series:</b>	<b>SMB</b>					
<b>Type 1</b>		<b>1</b>				
<b>Rated current:</b>						
5 A			<b>A5</b>			
10 A			<b>A10</b>			
15 A			<b>A15</b>			
20 A			<b>A20</b>			
30 A			<b>A30</b>			
50 A			<b>A50</b>			
75 A			<b>A75</b>			
80 A			<b>A80</b>			
85 A			<b>A85</b>			
100 A			<b>A100</b>			
150 A			<b>A150</b>			
<b>Type 2</b>		<b>2</b>				
<b>Rated current:</b>						
170 A			<b>A170</b>			
200 A			<b>A200</b>			
250 A			<b>A250</b>			
300 A			<b>A300</b>			
400 A			<b>A400</b>			
450 A			<b>A450</b>			
500 A			<b>A500</b>			
600 A			<b>A600</b>			
<b>Type 3</b>		<b>3</b>				
<b>Rated current:</b>						
800 A			<b>A800</b>			
1000 A			<b>A1000</b>			
1200 A			<b>A1200</b>			
<b>Voltage tolerance:</b>						
<b>±0,25%</b>					<b>V0,25%</b>	
<i>Optional ±0,1%</i>					<i>V0,1%</i>	
<b>Rated output:</b>						
50 mV						<b>mV50</b>
100 mV						<b>mV100</b>
<i>Optional xy mV</i>						<i>mV...</i>
<b>Base plate:</b>						
<b>With base plate</b>						<b>-</b>
<i>Optional without base plate</i>						<i>WO</i>

Order Example	Series	Type	Rated current	Voltage tolerance	Rated output	Nennleistung
Choice	SMB	3	800 Ampere	±0.25%	50 mV	With
Code	SMB	3	A800	V0.25%	mV50	-

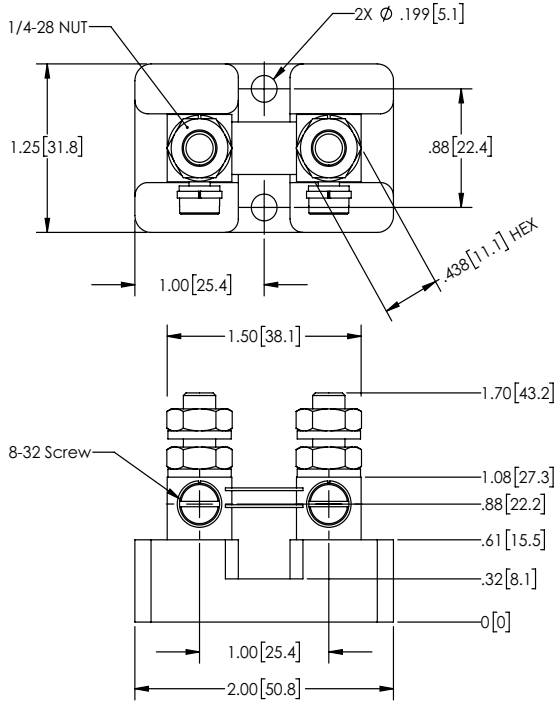
# Data Sheet for Precision Resistor

Shunt (bare metal)

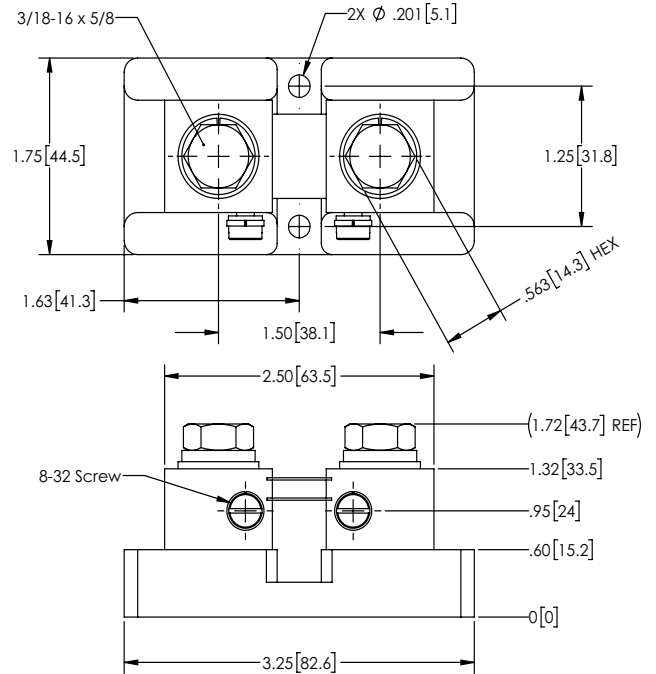
Series SMB

## Drawing

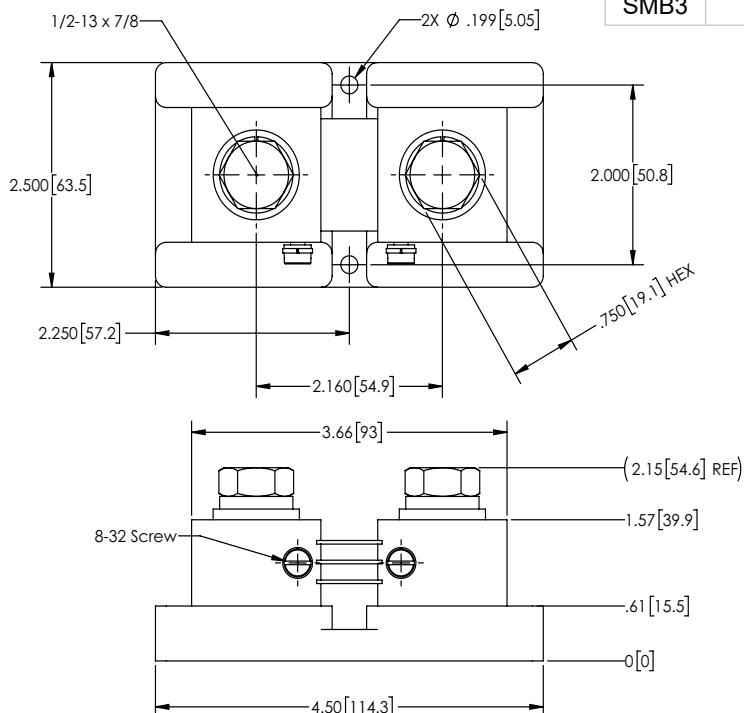
### SMB1



### SMB2



### SMB3



Type	Fastener Torque	Mass	Fastener Torque 8-32 Output
SMB1	4.3 ±0.2 Nm	0.1 kg	1.65 ±0.05 Nm
SMB2	19.5 ±0.5 Nm	0.3 kg	
SMB3	41.5 ±6.5 Nm	0.9 kg	