

## BBM-03-LV SERIES

### Low/Medium Bus Bar Current Sensor

#### DESCRIPTION:

The **SENIS Bus Bar DC Current Sensor** locates two magnetic field sensors on each side of current bus bar. Two precision Hall ICs sense the magnetic field as a function of current on both sides. This allows to effectively cancel external magnetic fields without magnetic cores or shielding, thus avoiding non-linearities and hysteresis effects. The differential hall voltage between the upper and the lower sensor provides a full scale output of  $0 \pm 4.0V$ . DC current ranges that can be sensed depend on the geometry of the bus bar. The BBM-03-LV is supplied with a shielded cable connected to a RJ45 plug. It comes in 2 different mounting variants: BBM-03-LV-N (N: Normal, sensor is placed parallel to the current flow) and BBM-03-LV-R (R: Rotated, sensor is placed perpendicular to the current flow).



**Figure 1:**  
BBM-03-LV Bus Bar Current  
Sensor

#### KEY FEATURES:

- Very compact, low profile package
- Custom design bus bar geometries possible, 2 different mounting options available
- Single +5V Power Supply at less than 25mA
- High Level  $0 \pm 4V$  linear differential output signal
- Signal output insulated from Bus Bar
- DC Currents
- Clean recovery from very high overload (up to 100x nominal current)

#### TYPICAL Applications

|                    |                                   |                              |                                          |                |
|--------------------|-----------------------------------|------------------------------|------------------------------------------|----------------|
| Power<br>Generator | Motor &<br>Electronics<br>Control | Electromechanical<br>Systems | Battery<br>Management,<br>Charge Control | Transportation |
|--------------------|-----------------------------------|------------------------------|------------------------------------------|----------------|

## PRODUCT DIMENSIONS AND CHARACTERISTICS:

### ABSOLUTE MAXIMUM RATINGS

| Symbol | Parameter                                             | Min  | Typ | Max | Units |
|--------|-------------------------------------------------------|------|-----|-----|-------|
| Tstg   | Storage Temperature                                   | -25  | 20  | 60  | °C    |
| VBB    | Busbar Operation Voltage                              | 0    | 600 | 800 | Vdc   |
| VD     | Dielectric Breakdown (housing and cable) <sup>1</sup> | >2.2 | 3   |     | kV    |
| B      | Magnetic Field                                        |      | 8   |     | mT    |

<sup>1</sup>Voltage for AC Isolation Test (LV version) refers to the entire module including connection cables.

### RECOMMENDED OPERATING CONDITIONS

| Symbol | Parameter             | Min | Typ | Max | Units |
|--------|-----------------------|-----|-----|-----|-------|
| Ta     | Operating Temperature | -30 | 25  | 80  | °C    |
| Vcc    | Supply Voltage        | 4.5 | 5   | 5.5 | Vdc   |
| Isup   | Supply Current        | 20  | 25  | 30  | mA    |

### ELECTRICAL CHARACTERISTICS

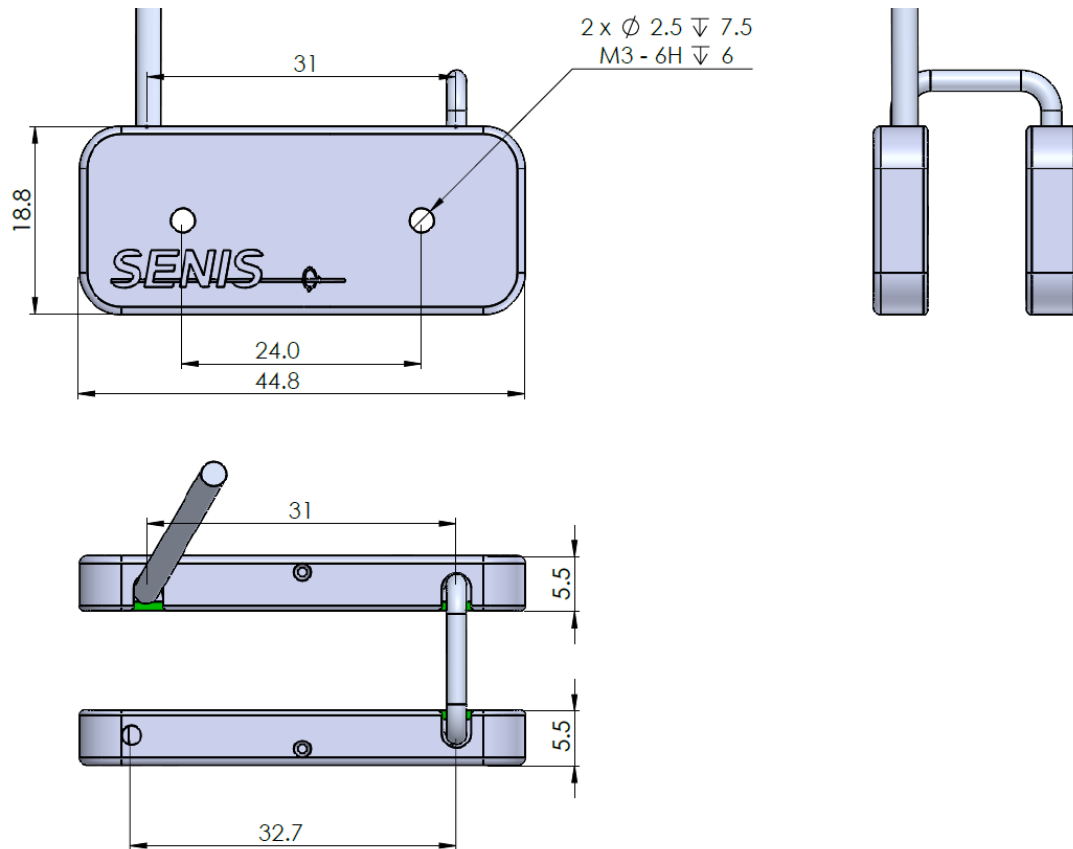
| Symbol          | Parameter                        | Min  | Typ | Max  | Units |
|-----------------|----------------------------------|------|-----|------|-------|
| Sdiff           | Output Sensitivity (A1-A2)       | 520  | 560 | 600  | V/T   |
| BL              | Linear Magnetic Range            | -7   |     | +7   | mT    |
| B <sub>FS</sub> | Full scale Magnetic Field Range  | -8   |     | +8   | mT    |
| Voff            | DC offset voltage @ T=23°C       | -30  | 0   | +30  | mV    |
| V0Diff          | Differential linear output       | -4   | 0   | 4    | V     |
| XL              | Non Linearity (% of full scale)  | -2   | 0.5 | 2    | %     |
| Tcs             | Temp. coefficient of sensitivity | -300 | 0   | +300 | ppm/K |
| Toff            | Temp. coefficient of offset      | -0.3 | 0   | 0.3  | mV/K  |
| tr              | Response time                    | 2    | 4   | 6    | µs    |
| r               | Magnetic resolution              |      | 5   |      | µT    |

### DIMENSIONS AND WEIGHT

| Symbol | Parameter                        | Min | Typ  | Max | Units |
|--------|----------------------------------|-----|------|-----|-------|
| WR     | Width of busbar                  | 15  |      | 160 | mm    |
| CL     | Interconnecting cable length     |     | 100  |     | mm    |
| CT     | Module connector type            |     | RJ45 |     |       |
| IL     | Module cable length <sup>2</sup> |     | 200  |     | mm    |
| M      | Weight including cable           |     | 25   |     | g     |

<sup>2</sup> The output cable length can be customized on customer request.

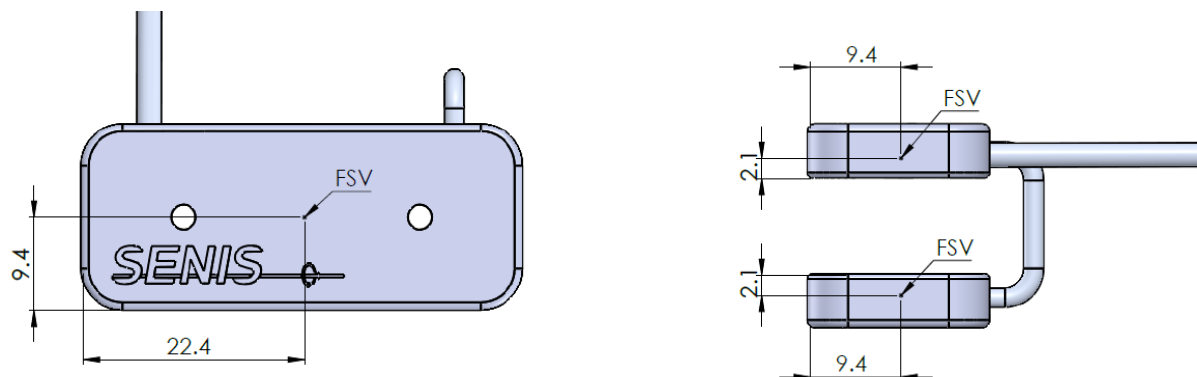
## OUTLINE DIMENSIONS:



**Figure 2:** Mechanical dimensions (all dimensions are in millimeters).

\* Customized geometries can be engineered on request.

## FSV position:

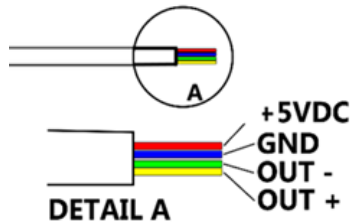


**Figure 3:** Field Sensitive Volume position (all dimensions are in millimeters).

## WIRING DIAGRAM:

### SIGNAL WIRES COLOR CODE

Senis BBM-03 has power and signal connections color code like shown on figure 4.:



**Figure 4:** BBM-03 wires color scheme

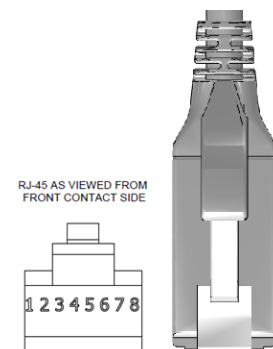
Senis produces BBM-03 modules with main cable length 200mm, terminated with standard RJ-45 connector. Standard length interconnection cable is 100mm. Senis doesn't provide recipient mating connector.

Per customer request, we can deliver BBM-03 modules without RJ-45 connector at the end of the main cable (free wires), in case customer's clump-on system terminal application.

### RJ-45 CONNECTOR PINOUT

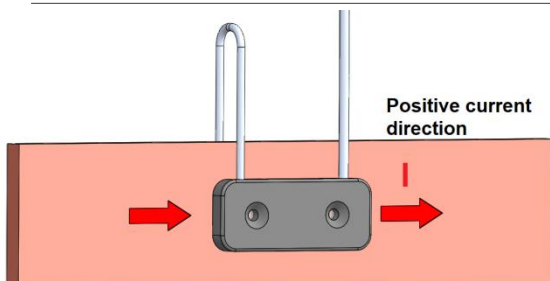
Senis BBM-03 is terminated by standard RJ-45 connector, product number SS-39100-039, and corresponding table with signal-pin position is next:

| BBM-03 TO RJ-45 PIN MAPPING |                   |             |
|-----------------------------|-------------------|-------------|
| BBM-03 SIGNAL               | BBM-03 WIRE COLOR | RJ-45 PIN # |
| +5VDC                       | RED               | 6           |
| GND (COMMON)                | BLUE              | 5           |
| OUT (-)                     | GREEN             | 4           |
| OUT (+)                     | YELLOW            | 3           |

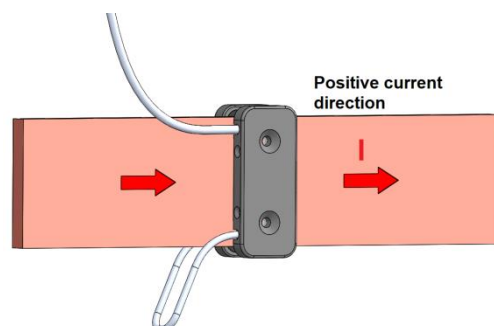


**Figure 5:** RJ-45 Pins positions

## BBM-03 MOUNTING ON BUSBAR:



**Figure 6:**  
BBM-03-LV-N mounting position  
and busbar positive current direction



**Figure 7:**  
BBM-03-LV-R mounting position  
and busbar positive current direction