

BB19 & BB200 Bare Bones Series

Current, Voltage, Line Frequency & Temperature Meters



INSTRUCTION
SHEET

M3313/0200

BB19 & BB200 Features

- ✓ NEMA-4 and IPC55 (Splash Proof, Hose Down)
- ✓ 1/8 DIN Panel Cutout
- ✓ Low Cost
- ✓ Shallow Depth (Only 1" Deep)
- ✓ Screw Terminals
- ✓ High Impact Polycarbonate Case
- ✓ Red or Green Backlit Display
- ✓ Wide Operating Temperature -4 to 140°F (-20 to 60°C)
- ✓ User Selectable Decimal Points

BB19 Features

Current and Voltage Monitor Features

- ✓ Overrange Indication
- ✓ AC Voltage and Current (Average Response)
- ✓ Ideal for Line Monitoring
- ✓ Input Signal Can Be Used to Power Meter
- ✓ Multiple Ranges Available for Use with External Current Transformers

Line Frequency Monitor Features

- ✓ 0.1 Hz or 1.0 Hertz Resolution
- ✓ Overrange Indication

BB200 Features

- ✓ Thermocouple Input: J, K, or T
- ✓ RTD Input: Pt.385, 2-,3-Wire, 0.1° or 1° Display Resolution

OMEGA's Bare Bones (BB) Series meters are designed for low cost OEM applications. The BB19 Series gives OEM buyers an easy-to-use digital indicator for current, voltage, and line frequency which can be incorporated into the design of machines or systems.

Units feature convenient screw terminal connections for quick hook-up of sensor input and power.

BB19 Series meters have a compact size and wide ambient operating range, so they can be used in a variety of applications.

The ac voltage units (BB19-AV1, BB19-AV2) can be used to monitor line power to make sure that the correct level of voltage is being used in the application. For example, you may want to monitor the voltage that is being applied to equipment to verify that the ac signal is within specifications. It is also important to monitor the level of current draw. Current draw that is too high may cause damage to equipment. The BB19 ac current meters give the user a low cost means of monitoring line current.

Line frequency monitors (BB19-F1 or BB19-F2) can be used in situations where it is necessary to verify that the frequency of the power source falls within specifications.

DC voltage and dc current meters (BB19-DC series and BB19-DV series) can be used in process measurement and control applications as a secondary source to monitor signals that are being sent by temperature, pressure or flow transducers.

These meters can also be used as a troubleshooting device to assist the user who believes that transducers are not functioning properly.

In addition to BB19 series, the BB200 series measure thermocouple and process inputs. The BB201 and BB202 models are can be ordered with either thermocouple types: J, K, T or RTD with 0.1 or 1 degree resolution. The BB211 and BB212 universal process meters accept inputs from pressure and flow sensors with voltage or milliamp outputs. They can be scaled to display in engineering units up to 1500 counts.

UNPACKING INSTRUCTIONS

Remove the Packing List and verify that all equipment has been received. Make sure that the following is in the box: a BB19 and an operator's manual. If there are any questions about the shipment, please contact the OMEGA Engineering Customer Service Department.

Note: The carrier will not honor any claims unless all shipping material is saved for their examination. After examining and removing contents, save packing material and carton in the event reshipment is necessary.

BB19 & BB200 Series Specifications

Display: 3½-digit, 7-segment backlit LCD; 13 mm (0.5") height

Polarity: Automatic (-) displayed

Warmup: 10 minutes

Environment

Operating Range: -20 to 60°C (-4 to 140°F)

Storage Range: -30 to 70°C (-22 to 159°F)

Performance

Conversion Rate: 2.5 per second

Normal Mode Rejection:

≥40 db 50-60 Hz

Common Mode Rejection:

≥100 db 50-60 Hz, except isolated

Zero Adjustment: Automatic

FCC Compliance: Complies with class B

limits of FCC rules and regulations,

part 15, subpart J for conducted and

radiated emissions

Panel Cutout: 1

BB200 Series: 1/8 DIN,

45 H x 92 mm W (1.772 x 3.622");

Weight: 2 oz (56.7 g)

BB19 Specifications

DC Input Types and Ranges

200 mV dc & 2 Vdc: BB19-DV1, -DV2
Accuracy: $\pm(0.1\% + 1 \text{ count})$ typical;
 $\pm(0.2\% + 1 \text{ count})$ max.

Input Resistance: $\geq 100 \text{ M}\Omega$

Overload Protection:

200 V continuous, 300 V intermittent

20 Vdc & 200 Vdc: BB19-DV3, -DV4

Accuracy: $\pm(0.1\% + 1 \text{ count})$ typical;
 $\pm(0.2\% + 1 \text{ count})$ max.

Input Resistance: $1 \text{ M}\Omega$

Overload Protection:

350 V continuous, 500 V intermittent

dc Current: BB19-DC

Accuracy: $\pm(0.1\% + 1 \text{ count})$ typical;
 $\pm(0.2\% + 1 \text{ count})$ max.

Input Resistance: 200 mV drop full scale

Overload Protection:

3 times f.s. current

AC Input Types and Ranges

ac Voltage: BB19-AV1, -AV2

Accuracy: $\pm(0.5\% + 1 \text{ count})$

Input Resistance: $1 \text{ M}\Omega$

Overload Protection:

350 V continuous, 500 V intermittent

5 A ac Current: BB19-AC1

Accuracy: $\pm(0.5\% + 1 \text{ count})$

Input Resistance: Current transformer

Overload Protection: 3 times f.s. current

50 A ac Current: BB19-AC2

Accuracy: $\pm(0.5\% + 5 \text{ counts})$

Input Resistance: Current transformer

Overload Protection: 3 times f.s. current

Frequency Input Types and Ranges

40 to 440 Hz: BB19-F1

Accuracy: $\pm 1 \text{ Hz}$

40.0 to 199.9 Hz: BB19-F2

Accuracy: $\pm 0.2 \text{ Hz}$ (40 to 70 Hz),
 $\pm 0.5 \text{ Hz}$ (above 70 Hz)

Distortion: $\leq 0.1 \text{ Hz}$ for up to 20% third harmonic distortion

Power Options

115 V +10%, -15%: 50 to 400 Hz at 2 VA

230 V +10%, -15%: 50 to 400 Hz at 2 VA

12 to 24 Vdc: 150 mA

Common Mode Rejection:

dc powered, which is $\geq 80 \text{ db}$ 50-60 Hz

Display

Decimal Point: Three position, external selection

Overload: Three lower digits blank for readings greater than 1999

BB200 Series Specifications

Temperature Input: Type:

J, K, T Thermocouple;

BB201, BB202

100 Ω RTD Pt 385 2- or 3-wire;

BB201, BB202

Process Input Type and Ranges

200 mVdc, 2 Vdc, 10 Vdc, 20 mA:

BB211, BB212

Power Supply Options:

115 Vac or 230 Vac $\pm 10\%$; 50 to 400 Hz

To Order (Specify Model Number)

Model Number	Description	Range
BB19-AV1	ac voltage meter	80 to 130 Vac
BB19-AV2	ac voltage meter	80 to 260 Vac
BB19-DV1	dc voltage meter	200 mV dc
BB19-DV2	dc voltage meter	2 Vdc
BB19-DV3	dc voltage meter	20 Vdc
BB19-DV4	dc voltage meter	200 Vdc
BB19-AC1-(*)	ac current meter	0 to 5 Amps ac**
BB19-AC2	ac current meter	0 to 50 Amps ac**
BB19-DC1	dc current meter	200 mA dc
BB19-DC2	dc current meter	2 mA dc
BB19-DC3	dc current meter	20 mA dc
BB19-DC4	dc current meter	200 mA dc
BB19-F1	Line frequency monitor	40 to 440 Hz
BB19-F2	Line frequency monitor	40 to 199.9 Hz

* Enter display max for 0 to 5 Amp ac input meter

** For use with 5 A or 50 A external current transformer (supplied with meter)

Comes complete with operator's manual and panel mount adaptor

Ordering Examples:

BB19-DV3, dc voltage meter with range up to 20 Vdc,

BB19-AC1-2, ac current meter with range 0 to 5 A with maximum display range 1500,

BB19-F1-GN-LVI, line frequency meter with range 40 to 440 Hz, green display, and 12 or 24 Vdc isolated power,

BB19 Display Options

Order Suffix	Description
-GN	Green display

BB19 Power Options

Order Suffix	Description
-230	230 Vac
-LV	12 or 24 Vdc (isolated) power

BB19-AC1 Display Max Ordering Suffixes

Suffix	Display Max
-1	2000
-2	1500
-3	1000
-4	600
-5	500
-6	300
-7	200
-8	100



BB200 Series Temperature Input Types and Ranges

Input Type	Range	Accuracy
J	-10 to 1200°F -30 to 650°C	2.8°F + 0.1% rdg
K	-40 to 1500°F -40 to 800°C	2.5°F + 0.1% rdg
T	-100 to 600°F -100 to 350°C	3.5 F + 0.1% rdg
P1 (RTD)	-200 to 600°F -100 to 500°C	1°F + 0.2% rdg
P2 (RTD)	-100.0 to 199.9°F -100.0 to 199.9°C	0.1F + 0.2% rdg

To Order (Specify Model Number)

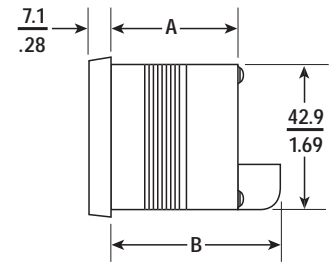
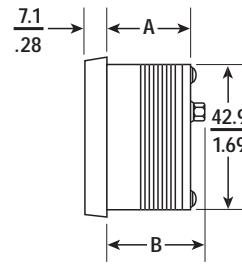
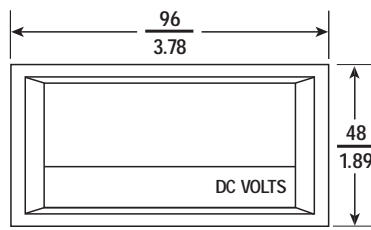
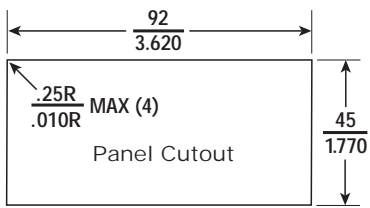
Model No.	Description
BB201(*)	1/8 DIN temperature meter with green backlit display
BB202(*)	1/8 DIN temperature meter with red backlit display
BB211	1/8 DIN scalable process meter, green backlit display
BB212	1/8 DIN scalable process meter with red backlit display

*Specify Input : J, K, T thermocouple, P1 for 1° resolution RTD, or P2 for 0.1° resolution RTD.

To order with optional 230 Vac power, add suffix "-230" to Model Number.

Ordering Example: BB201K, temperature meter with type K thermocouple input, green backlit display and 115 Vac,

BB19 & BB200 Series Dimensions



Panel Cutout Notes:

1. For optimum water resistance use cutout height of 43 MM (1.693 Inches).
2. Panel thickness .81 to 6.35 MM (.032 to .250 Inches).

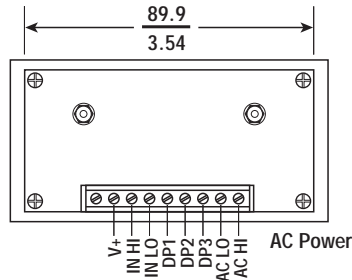


Figure A

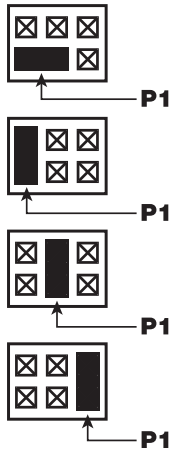
Figure B

Input Type	Figure	A (MM/In.)	B (MM/In.)
AC	A	25.1/.99	29.2/1.15
DC	A	25.1/.99	29.2/1.15
Temperature	A	25.1/.99	29.2/1.15
4-20mA Process	B	37.8/1.49	50.8/2.00
Frequency	A	25.1/.99	29.2/1.15

Ranging Header

Linear Input
Catalog No. 2013-3019-00

Square Root Input
Catalog No. 2013-3018-00



Range: 1000 – 1999 Counts
(As Shipped)

1500 – 1999 Counts

Range: 800 – 1000 Counts

100 – 500 Counts

Range: 250 – 500 Counts

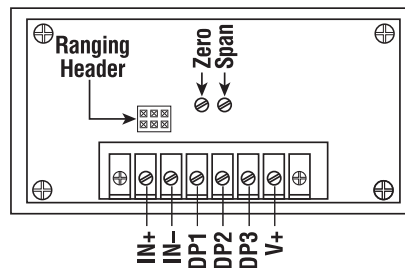
500 – 1000 Counts
(As Shipped)

Range: 100 – 250 Counts

1000 – 1500 Counts

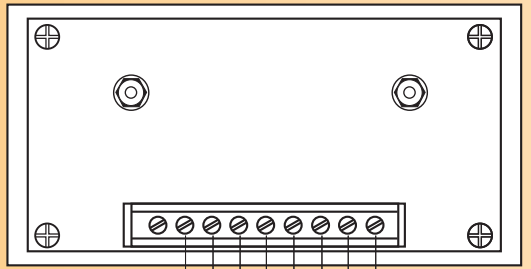
Calibration

1. Select position of P1 for desired range.
 2. Adjust zero for desired indication at 4mA input.¹
 3. Adjust span for desired indication at 20mA input.
 4. Repeat steps 2 and 3 as necessary.
- ¹ 4.32mA for square root input.



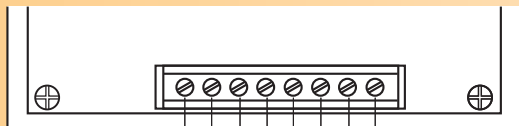
Terminal	Description
IN+ } IN- }	Signal Input
DP1 } DP2 } DP3 }	Decimal point selection, connect to V+ as follows: DP1 = XXX.X, DP2 = XX.XX, DP3 = X.XXX
V+	DC voltage output to select decimal points

AC Power and DC Isolated Power



V+
IN HI
IN LO
DP1
DP2
DP3
AC LO
AC HI

AC Power



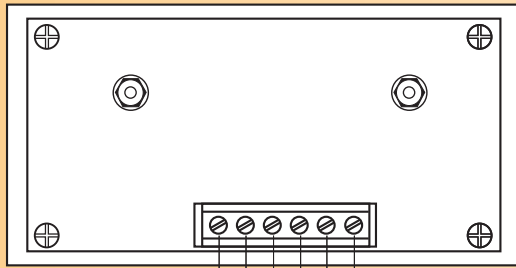
V+
IN HI
IN LO
DP1
DP2
12V
24V
Power GND

12 or 24VDC
Power Option

Terminal	Description
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V+	10-28VDC power input
IN HI IN LO	Signal Input
DP1, DP2, DP3	Decimal point selection, connect to V+ as follows: DP1=XXX.X, DP2=XX.XX, DP3=X.XXX
AC Power LO AC Power HI	AC Power Input, 115VAC or 230VAC depending on model selected
12V Power GND	12VDC power input } (optional)
24V Power GND	

Frequency Input

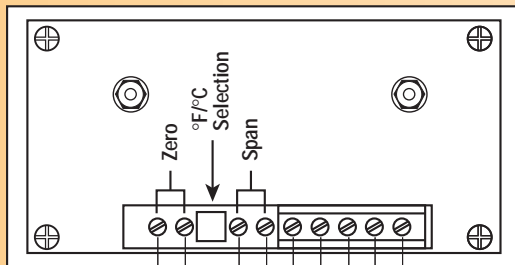


12 VDC
DC GND
24 VDC
EARTH GND
AC LO
AC HI

Terminal	Description
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AC LO AC HI Earth GND	Signal input and power, 115VAC or 230VAC depending on model selected.
12VDC Power GND	12VDC power input } (optional)
24VDC Power GND	

Temperature Inputs



°F
°C
Zero
°F/C Selection
Span
°F
°C
TC+
TC-
AC LO
AC HI

1 2 3

Terminal	Description
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TC+ TC-	Thermocouple Inputs
AC Power Low AC Power HI	AC Power Input, 115VAC or 230VAC depending on model selected
1 2 3	RTD inputs



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WARNING: These products are not designed for use in, and should not be used for, patient-connected applications.



WARRANTY/DISCLAIMER

OMEGA ENGINEERING, INC. warrants this unit to be free of defects in materials and workmanship for a period of 13 months from date of purchase. OMEGA's WARRANTY adds an additional one (1) month grace period to the normal one (1) year product warranty to cover handling and shipping time. This ensures that OMEGA's customers receive maximum coverage on each product.

If the unit malfunctions, it must be returned to the factory for evaluation. OMEGA's Customer Service Department will issue an Authorized Return (AR) number immediately upon phone or written request. Upon examination by OMEGA, if the unit is found to be defective, it will be repaired or replaced at no charge. OMEGA's WARRANTY does not apply to defects resulting from any action of the purchaser, including but not limited to mishandling, improper interfacing, operation outside of design limits, improper repair, or unauthorized modification. This WARRANTY is VOID if the unit shows evidence of having been tampered with or shows evidence of having been damaged as a result of excessive corrosion; or current, heat, moisture or vibration; improper specification; misapplication; misuse or other operating conditions outside of OMEGA's control. Components which wear are not warranted, including but not limited to contact points, fuses, and triacs.

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RETURN REQUESTS / INQUIRIES

Direct all warranty and repair requests/inquiries to the OMEGA Customer Service Department. BEFORE RETURNING ANY PRODUCT(S) TO OMEGA, PURCHASER MUST OBTAIN AN AUTHORIZED RETURN (AR) NUMBER FROM OMEGA'S CUSTOMER SERVICE DEPARTMENT (IN ORDER TO AVOID PROCESSING DELAYS). The assigned AR number should then be marked on the outside of the return package and on any correspondence.

The purchaser is responsible for shipping charges, freight, insurance and proper packaging to prevent breakage in transit.

FOR WARRANTY RETURNS, please have the following information available BEFORE contacting OMEGA:

1. Purchase Order number under which the product was PURCHASED,
2. Model and serial number of the product under warranty, and
3. Repair instructions and/or specific problems relative to the product.

FOR NON-WARRANTY REPAIRS, consult OMEGA for current repair charges. Have the following information available BEFORE contacting OMEGA:

1. Purchase Order number to cover the COST of the repair,
2. Model and serial number of the product, and
3. Repair instructions and/or specific problems relative to the product.

OMEGA's policy is to make running changes, not model changes, whenever an improvement is possible. This affords our customers the latest in technology and engineering.

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