



# BX-35-HZ

## AC Line Frequency

A cost-effective meter for 45.0 to 199.9Hz @80-300VAC AC line frequency measurement. Quick and easily installation make it the OEM's choice for switchboard upgrades.

3 1/2 Digit with 0.56" LEDs  
in a 1/16 DIN Case

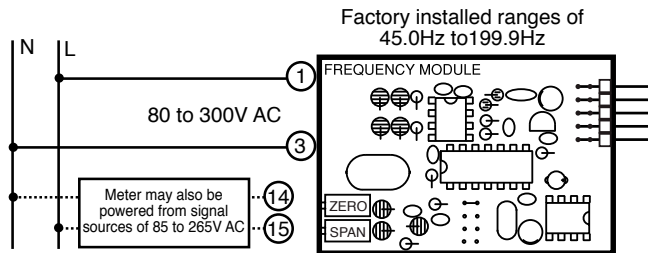
### General Features

The BX-35-HZ is a cost-effective, AC line frequency measuring meter with a factory installed range of 45.0Hz to 199.9Hz. The unique input structure allows safe phase to phase line frequency measurements in multi-phase systems.

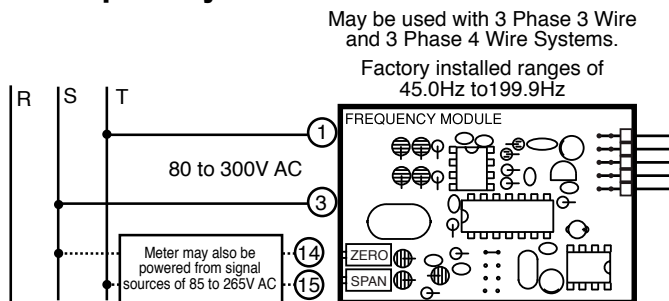
Display Hold and Display Test functions are also provided. The standard meters have a high efficiency red LED display.

### Typical Application Connections

#### AC Line Frequency measurement in Single-phase Systems.



#### AC Phase to Phase Line Frequency measurement in Multi-phase Systems.



### Compatibility

The BX-Series have a matching DIN case style that is complementary to the Leopard and Tiger family of meters. BX-Meters are the OEM's choice for switchboard and process indication. Each model is dedicated to a specific application and designed for quick and easy installation.



### Specifications

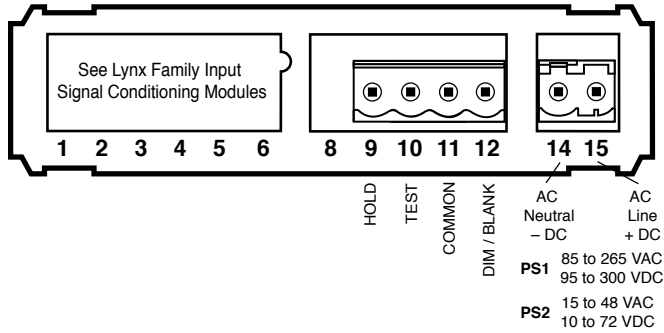
- Input Configuration:**..... Differential with Frequency to Voltage converter. Inputs resistively isolated to 1400V from the internal ground of meter by 1.94MΩ, so that phase to phase measurements up to 300V AC can be safely made.
- Full Scale Ranges:**..... Factory installed range of 45.0Hz to 199.9Hz.
- Input Impedance:**..... 4MΩ
- A/D Converter:**..... 12 bit dual slope
- Accuracy:**..... ±(0.05% of reading + 2 counts)
- Temp. Coeff.:**..... 100 ppm/°C (Typical)
- Warm up time:**..... 2 minutes
- Conversion Rate:**..... 3 conversions per second (Typical)
- Display:**..... 3 1/2 digit 0.56" Red LED display(std), 0.56" GREEN or Super Bright RED are optional. Range 0 to 1999 counts.
- Decimal Selection:**..... Header under face plate, X•X•X•X
- Positive Overrange:**..... 1 (MSD) is displayed with all other digits blank.
- Power Supply:**..... AC/DC Auto sensing wide range supply
  - PS1 (std)..... 85-265 VAC, 50-400Hz / 95-300 VDC @1.5W
  - PS2..... 15-48 VAC, 50-400Hz / 10-72 VDC @4.0W
- Operating Temp.:**..... 0 to 50 °C
- Storage Temp.:**..... -20 °C to 70 °C.
- Relative Humidity:**..... 95% (non condensing)
- Case Dimensions:**..... 1/16 DIN Bezel: 96x24mm (3.78"x0.95")  
Depth behind bezel 122.2 mm (4.83")  
Plus 12.7mm (0.5") for Right-angled connector.
- Weight:**..... 7 oz., 9 oz when packed.
- Certification:**..... UL Listed.

### BX-Series, the OEMs choice for switchboard and process indication

- BX-35-ACA**..... AC amps, Scales RMS (True RMS Opt.). (5 Amp Internal Shunt), 3.5digit
- BX-35-ACV**..... AC volts, Scaled RMS (True RMS Opt.). 199.9/300V AC Header  
..... Selectable Ranges, 3.5 digit
- BX-35-DCA**..... DC mV ±50mV, ±100mV, ±200mV Header Selectable Ranges, 3.5 digit
- BX-35-DCV**..... DC volts ±2V/±20V/±200V Header Selectable Ranges, 3.5 digit
- BX-35-CL**..... Process 4 to 20mA (100.0), easily user scalable, 3.5 digit w/Exc. opt
- BX-35-HZ**..... AC Line Frequency 15.0Hz to 199.9Hz. Up to 300V AC input, 3.5 digit
- BX-35-TC-KF or JF** K or J Thermocouple with °F, optional °C, 3.5 digit
- BX-35-RTD-F**..... 100Ω platinum RTD, 3 or 4 wire, °F in 1° resolution, optional °C, 3.5 digit
- BX-35-PRESSURE**..... Pressure, Load Cell 20mV/2mV/V, 5/10V Exc 4-wire 3.5 digit
- BX-45-ACA**..... AC amps, Scales RMS (True RMS Opt.). (5 Amp Internal Shunt), 4.5digit
- BX-45-ACV**..... AC volts, Scaled RMS (True RMS Opt.). 199.99/300.0V AC Header  
..... Selectable Ranges, 4.5 digit
- BX-45-DCA**..... DC mV ±50mV, ±100mV, ±200mV Header Selectable Ranges, 4.5 digit
- BX-45-DCV**..... DC volts ±2V/±20V/±200V Header Selectable Ranges, 4.5 digit
- BX-45-CL**..... Process 4 to 20mA (100.00), easily user scalable, 4.5 digit w/Exc. opt
- BX-45-TC-KF**..... K Thermocouple with °F, optional °C, 4.5 digit
- BX-45-TC-JF**..... J Thermocouple with °F, optional °C, 4.5 digit
- BX-45-RTD-F**..... 100Ω platinum RTD, 3 or 4 wire, °F in 1° resolution, optional °C, 4.5 digit
- BX-45-PRESSURE**..... Pressure, Load Cell 20mV/2mV/V, 5/10V Exc 4-wire 4.5 digit

## Connector Pinouts

This meter uses plug-in type screw terminal connectors for all connections.



## Pin Descriptions

**Pins 1-Signal Input High:** AC voltages from 80 to 300V can be applied this pin which is resistively isolated to 1400V from the internal ground of meter by 1.94MΩ, so that phase to phase measurements up to 300V AC can be safely made.

**Pins 3-Signal Input Low :** AC voltages from 80 to 300V can be applied this pin which is resistively isolated to 1400V from the internal ground of meter by 1.94MΩ, so that phase to phase measurements up to 300V AC can be safely made.

**Pin 9 - Hold:** If this pin is left unconnected the meter will operate in a free running mode. When this pin is connected to the Common Pin 11, the meter display will be latched. A/D conversions will continue, but the display will not be updated until Pin 9 is disconnected from Pin 11.

**Pin 10 - Display Test:** When this pin is connected to the Common Pin 11, all segments of the display light up and 1888 is displayed. This is used to detect any missing segments in the display.

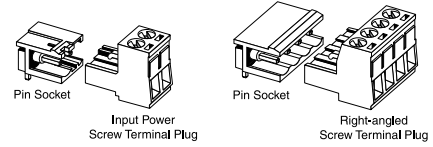
**Pin 11 - Common:** To Hold, Test or Dim the display, the respective pins have to be connected to this Common Pin.

**Pin 12 - Dim/Blank:** When this pin is connected to the Common Pin 11 the display is blanked out. If it is connected through an external 1KΩ pot, the display may be dimmed.

**Pin 14 & 15 - AC/DC Power Input:** These pins are the power pins of the meter and they only accept a special polarized screw terminal plug that can not be inserted into any other input socket. The standard meter has a auto sensing AC/DC power supply that operates from 85-265 VAC/95-300 VDC (PS1 Std). An optional isolated low voltage power supply that operates from 15-48 VAC/10-72 VDC (PS2) is also available.

## Connectors

This meter uses plug-in type screw terminal connectors for all input and output connections. The power supply connections (pins 14 and 15) have a unique plug and socket outline to prevent cross connection. The main board uses standard right-angled connectors.

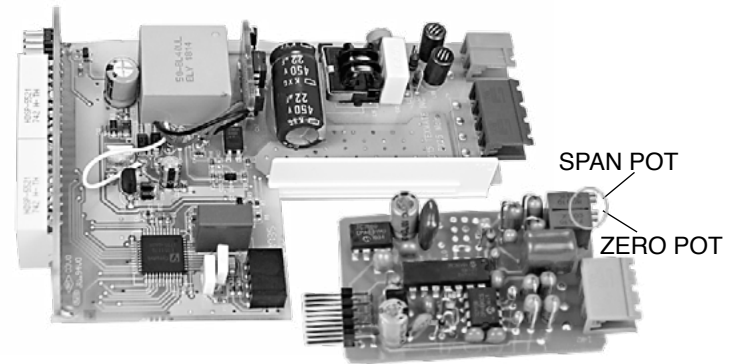


**WARNING:** AC and DC input signals and power supply voltages can be hazardous. Do Not connect live wires to screw terminal plugs, and do not insert, remove or handle screw terminal plugs with live wires connected.

## Calibration Procedure

1. Apply a zero input by shorting the inputs to the meter. Adjust the zero trim pot until the meter reads 000.
2. Apply an AC voltage from 60V to 500V AC, of a known frequency.
3. Adjust the Span Pot until the meter displays the frequency being applied.
4. The BX-35-HZ is now calibrated and ready for use.

## Component Layout



## Signal Conditioning Components

**SPAN Potentiometer (Pot)**

SPAN

To the Right Front

Turn Clockwise to Increase Reading

The 15 turn SPAN pot is always on the right side (as viewed from the back of the meter). Typical adjustment is 20% of the input signal range.

**ZERO Potentiometer (Pot)**

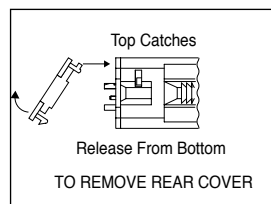
ZERO

To the Left Front

Turn Clockwise to Increase Reading

The ZERO pot is always to the left of the SPAN pot (as viewed from the back of the meter). Typically it enables the display reading to be offset ±50 counts.

## Opening Back Panel

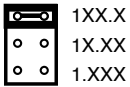


To open back panel, insert a flat screwdriver or similar instrument in both slots on the top of the case and pry open. The BX-Series meters slide out from the rear of the case as a complete assembly.

## Decimal Point Selection



0.56" Display



Decimal Select Header



Decimal selection is made by moving the jumper to the indicated position on the header for the decimal required on the front of the display board.

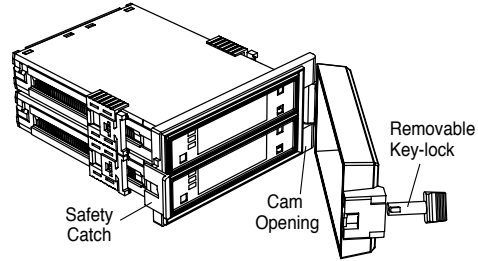
## Installation Guidelines

1. Install and wire meter per local applicable codes/regulations, the particular application, and good installation practices.
2. Install meter in a location that does not exceed the maximum operating temperature and that provides good air circulation.
3. Separate input/output leads from power lines to protect the meter from external noise. Input/output leads should be routed as far away as possible from contactors, control relays, transformers and other noisy components. Shielding cables for input/output leads is recommended with shield connection to earth ground near the meter preferred.
4. A circuit breaker or disconnect switch is required to disconnect power to the meter. The breaker/switch should be in close proximity to the meter and marked as the disconnecting device for the meter or meter circuit. The circuit breaker or wall switch must be rated for the applied voltage (e.g., 120VAC or 240VAC) and current appropriate for the electrical application (e.g., 15A or 20A).
5. See *Case Dimensions* section for panel cutout information.
6. See *Connector Pinouts* section for wiring.
7. Use 28-12 AWG wiring, minimum 90°C (HH) temperature rating. Strip wire approximately 0.3 in. (7-8 mm).
8. Recommended torque on all terminal plug screws is 4.5 lb-in (0.51 N-m).



## Clear Lockable Water-proof Cover

The clear lockable cover is designed to be dust and water proof to NEMA-4X, IP65 standards. The assembly consists of a base and cover with a cam hinge and key-lock fastening mechanism. An O-ring, or neoprene gasket forms a seal between the base and the panel. The cam hinge prevents the cover from closing when opened until pushed closed. The cover has a tapered recess that, when closed, forms a seal with a tapered spigot on the base. A key-lock employs a cam locking device to force the spigot into the recess, ensuring seal integrity. A safety catch keeps the cover closed even when the key is removed, and the keyhole can be used to attach a safety seal clip, preventing unauthorized opening.



Clear Lockable NEMA 4X Splash Proof Cover can accept two 1/16 DIN cases P/N:(OP-N4/96x48)



## Optional Face Plate Descriptors



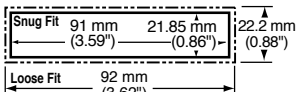
To customize the face plate, clear adhesive label containing various popular descriptors may be ordered. Choose the descriptor desired, peel off the adhesive backing and align the descriptor in the center right of the faceplate.

P.N.: 75-DESCRIPTR

## BX Case Dimensions and Panel Cutouts

### PANEL CUTOUT

Case will mount in standard 1/16 DIN cutouts

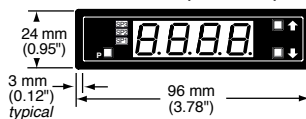


Panel adaptor plates are available to retrofit most existing panel cutouts.

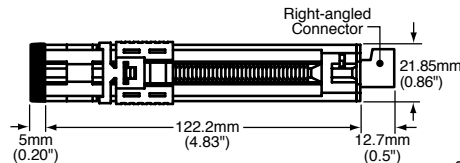
When extra panel mounting tightness is required, optional Screw Mounting Clips are included which fit on the Mounting Slide Clips.

### FRONT VIEW

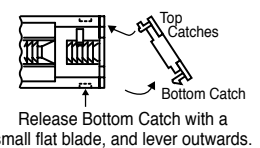
1/16 DIN (96x24mm)



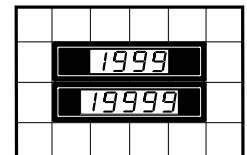
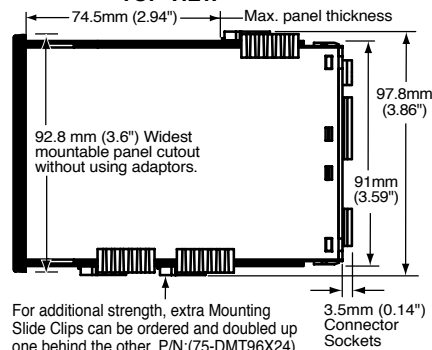
### SIDE VIEW



### TO REMOVE REAR COVER



### TOP VIEW



The 96x24mm case is particularly suitable for mounting in mosaic panels or insulative panels up to 2" thick. They can also stack mount, 2 up in existing cut-outs for 1/8 DIN (96x48mm) or 4 up in 1/4 DIN (96x96mm).

## Ordering Information

### Standard Options for this Model Number

Part Number	Description	List
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► **BASIC MODEL NUMBER** Includes plug in type screw terminals, standard display and standard power supply unless optional versions are ordered.  
**BX-35-HZ**..... AC Line Frequency, 45.0 to 199.9Hz (IF02).....

#### ► DISPLAY

**DR** . . . Red LED, 0.56 inch high . . . . .  
**DB** . . . Super-bright Red LED, 0.56 inch high . . . . .  
**DG** . . . Green LED, 0.56 inch high . . . . .

#### ► POWER SUPPLY

**PS1** . . 85-265VAC/95-300VDC . . . . .  
**PS2** . . 15-48VAC/10-72VDC . . . . .

### Special Options and Accessories

Part Number	Description	List
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#### ► SPECIAL OPTIONS (Specify Inputs or Outputs & Req. Reading)

**ZR** . . . . . Range Change from Standard Range shown in **BOLD** type  
**ZS** . . . . . Custom display scaling within standard ranges . . .

#### ► ACCESSORIES (Specify Serial # for Custom Artwork Installation)

**75-DBBZ96X24** . Black Bezel for 96x24mm Case. . . . .  
**75-DMTC96X24** Side Slide Brackets (2 pc) - extra set, extra strength . . .  
**ART-FS-S/D** . . . NRC for artwork & set-up Faceplate/Desc. . . . .  
**ART-FS1** . . . . . Install Custom Faceplate per meter - 1 color . . . . .  
**93-PLUG2P-DP** Extra Screw Terminal Conn., 2 Pin Power Plug . . . . .  
**93-PLUG2P-DR** Extra Screw Terminal Conn., 2 Pin Plug. . . . .  
**93-PLUG3P-DR** Extra Screw Terminal Conn., 3 Pin Plug. . . . .  
**93-PLUG4P-DR** Extra Screw Terminal Conn., 4 Pin Plug. . . . .  
**DN.CAS96X24L** Complete 96x24mm Case with bezel . . . . .  
**OP-MTLCLIP** . . . Screw Mounting Clips (2 pc) to screw tighten slide brackets .  
**75-DTP96X24** . . Black Metal Trim Plate (96x24mm Case) 1 Meter . . . . .  
**75-DTP2X9624** . Black Metal Trim Plate (96x24mm Case) 2 Meters . . . . .  
**75-DTP3X9624** . Black Metal Trim Plate (96x24mm Case) 3 Meters . . . . .  
**OP-PMA/SWB-2** Switch Board Panel Mounting Adapter 2 Meters . . . . .  
**OP-PMA/SWB-3** Switch Board Panel Mounting Adapter 3 Meters . . . . .  
**75-DESCRIPTR** . Clear adhesive descriptors label for face plate . . . . .

#### WARRANTY

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