

# Bitronics® 50 Series

Bitronics has been providing excellence in digital metering for local indication and SCADA communications for over 15 years. The Bitronics 50 Series panel meters continue this tradition of excellence, providing solutions for 3-phase metering. The Bitronics M65x are multifunction meters with a range of measurement capabilities, while the M350 are 3-phase ammeter and voltmeters. There are three display options, the M650 and M350, with a single three-line plus alphanumeric display, the M653 which has three-at-once displays and the M651, which does not have a display. The 50 Series Meters are simple to set up and use, and offer superior communications flexibility. They emphasize simplicity. Primary settings can be programmed using the front display buttons (M650, M350 and M653). Simple and advanced settings are easily configured through the Ethernet service port. Pre-set register/point sets and display screens coupled with the universal power supply and universal wiring make it easy to go from the box to up and running in no time. The external, split core CT option (M65x) streamlines upgrade and retrofit applications as the CT circuit does not need to be interrupted.

The 50 Series Meters share common firmware and protocol support and have the following features:

## Display (M650, M350 and M653)

- 3-line at once, easy-to-read, long-life LED displays that can be read from far away in all substation conditions including bright sunlight (three-at-once for the M653)
- Ultimate precision with five digits per line
- Instant recognition of the displayed function from the trademark alphanumeric display of engineering units
- Easy setup and scrolling from front display with "Touch-Sense" buttons
- Ultimate flexibility by utilizing pre-set measurement screens or customizing screens including engineering units (M65x)

## Communications

- DNP3 or Modbus protocol available via configurable RS-232/RS-485 serial port
- No need for PC software - Ethernet service port provides access to web server in the instrument so meters can be interfaced with just a web browser for viewing and configuration
- Available Ethernet protocol support for DNP3 or Modbus TCP
- Optional fiber port that replaces standard Ethernet service port and includes Modbus and DNP3 Ethernet protocol support
- Optional transducer output to interface with older generation RTUs
- An option for both standard secondary "optimal resolution" or primary units makes communications with SCADA/RTU more flexible

## Measurements

- Full basic measurement set with optional demand and harmonic values (M3)
- 0.2% revenue accuracy
- Option for compensated Watts/VARs (transformer/line loss) for energy values
- Updates every 100ms
- Option to monitor power supply voltage (M65x)



Bitronics M650

## Built for the Substation

- Wide-range universal power supply for all substation installations
- Rugged aluminum case
- Reduce inventory cost as one model covers all wiring options
- Easy to mount with standard 4" round meter

## Applications

- Digital front-end to SCADA systems
- Intelligent Electronic Device (IED) interfacing to RTUs and PLCs
- Local indication of substation conditions
- Plant equipment, line, power & energy monitoring
- Voltage control, power factor control, and load shedding

## Specifications

**Dimensions:** 4.5" (w) x 4.5" (h) x 6.5"(d) for M650, M350; 19" (w) x 5.25" (h) x 6.5"(d) for M653 rack mount; 14" (w) x 4.5" (h) x 6.5" (d) M653 panel mount; 5.25" (w) x 4.5" (h) x 6.5" (d) for M651  
**Weight:** 1.8 lbs. (3.5 lbs for M653)

**Power Supply:** Universal 48-250V dc/55-240V ac nominal

**Current Inputs:** 1 or 5A nominal to maximum of 2A or 10A (2x overload), split-core option for 5A nominal

**Voltage Inputs:** 120V ac nominal, 45-65Hz

### Outputs:

- Optional Configurable RS-232/RS-485 port, configurable from 9600bps to 115.2kbps
- Standard RJ45 10BaseT/100BaseTX port for service port functions, optional Modbus or DNP3 TCP/IP support
- Optional LC 100Base FX fiber port with Modbus or DNP3 TCP/IP support

**Optional transducer output:** Three 0-1mA (active) or 4-20mA (loop powered, passive)

### Environmental:

- Operating temperature range -40° to 70°C, storage temperature -40° to 85°C
- Humidity 0-95% non-condensing
- Surge withstand to ANSI/IEEE C37.90.1: 2002
- UL/CSA Recognized, File Number E164178, CE Marked

Available Measurements		
Available Measurements	M650 B3	M650 M3
Amps A, B, C, Residual	x	x
Demand/Max. Amps A, B, C, Residual	x	x
Volts AN, BN, CN, NG, AB, BC, CA	x	x
Fundamental Frequency	x	x
3-Phase Avg. Amps		x
3-Phase Avg. L-N Volts		x
3-Phase Avg. L-L Volts		x
Watts A, B, C, Total	x	x
VARs A, B, C, Total	x	x
VAs A, B, C, Total	x	x
Power Factor A, B, C, Total	x	x
Watt-Hrs Normal	x	x
Watt-Hrs Reverse	x	x
Watt-Hrs Net	x	x
VA-Hrs	x	x
VAR-Hrs Lag	x	x
VAR-Hrs Lead	x	x
Fund. Amps A, B, C, Residual		x
Fund. Volts AN, BN, CN, AB, BC, CA		x
Phase Angle Amps A, B, C		x
Phase Angle Volts AN, BN, CN, AB, BC, CA		x
K-factor Amps A, B, C, Residual		x
TDD Amps A, B, C, Residual		x
TDD Denominator A, B, C		x
THD Volts AN, BN, CN, AB, BC, CA		x
Demand/Max. Fund. Amps A, B, C, Residual		x
Average/Max./Min. VARs A, B, C, Total		x
Average/Max./Min. VAs A, B, C, Total		x
Average/Max./Min. Volts AN, BN, CN, NG, AB, BC, CA		x
Average/Max./Min. Watts A, B, C, Total		x



The Bitronics M651 is a family of multifunction transducers with a range of measurement capabilities. The M651 transducers are simple to set up and use, and offer superior communications flexibility.



Configuration of the 50 Series can be done from a standard web browser. Measurement values can also be viewed remotely this way.



M653 offers five digits of precision and easy recognition of measured values via alphanumeric display on each of three displays. Most settings can be made using "touch sense" buttons on front.



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