

The Badger® Series 2300 is a versatile, microprocessor based, BTU monitor. This device accepts the inputs of one flow sensor, and two temperature sensors and calculates the energy being produced or consumed between the two thermal measurement points.

The compact sized panel meter, 192 mm X 96 mm, is rated NEMA 4X and conforms to standard DIN dimensions for meter sizes and panel cut-outs. The Series 2300 is also available in a NEMA 4 or NEMA 4X wall mount versions.

The display contains two lines of sixteen alpha-numeric characters. The user may configure the display to simultaneously show any combination of flow rate or total, energy rate or total, temperature inputs, temperature differential or relay status.

The Series 2300 will accept flow inputs from any Badger Meter impeller type flow sensor. Additionally, the monitor will accept input signals from any digital, pulse, sine wave or analog sensor, including non-linear and logarithmic signals. Like all Badger Meter flow monitors, the Series 2300 may be calibrated in the field. For Badger Meter sensors, a K and an Offset value are entered. Other flow sensors are calibrated by entering K factors, entering up to sixteen points for linearization, or other analog scales.

Temperature measurement may be made with a variety of thermistors or RTDs. The Series 2300 software will accept several popular curves or may be programmed for custom inputs.

Programming is menu driven and all data is entered using five, front panel mounted keys.

A software lock allows the user to enter a password that prevents changing totals, calibration information or control settings. Programming flexibility extends to the measurement units. The Series 2300 software contains nineteen units for rate of flow and seven units for total flow. Temperatures can be shown in fahrenheit or celsius scales, while energy may be displayed in five units of rate or two total units. There is also the provision for adding custom units for each.

Also written into the software is a self-diagnostic program that assists the operator in troubleshooting.

The Series 2300 provides a standard pulse output to interface with external data collection devices. The resolution of the TTL compatible signal may be programmed from the front keypad.



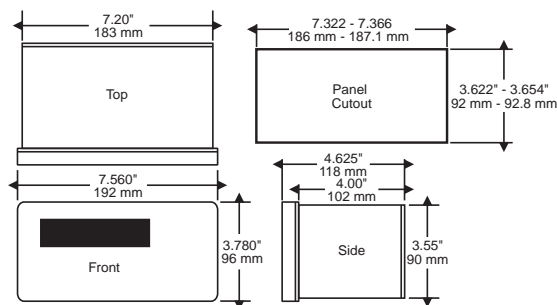
All calibration information, units of measure, totals and control parameters are stored in a non-volatile memory that does not require battery back-up.

Options Include:

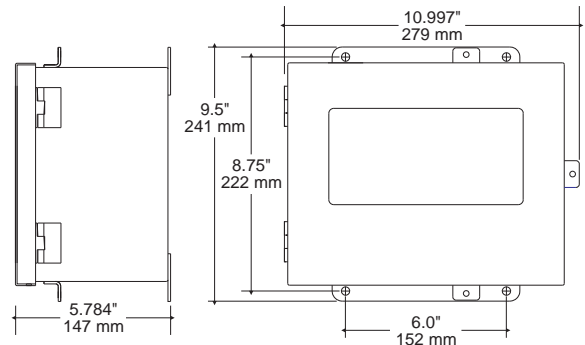
- Power supplies: 12-36 VDC, 24 VAC, 115 VAC or 230 VAC.
- Display backlighting with adjustable contrast.
- Mechanical counters, one or two integral, seven digit, non-resettable counters may be programmed to totalize flow or energy.
- Control relays, either two or four, independently programmed from the keypad for flow, energy or temperature inputs to provide rate(alarm) or totalizer(counter) functions.

Expansion slots are available to add a maximum of two of the following card options:

- Analog input, 4-20 mA, 0-20 mA, 0 to 1 VDC, 0 to 5 VDC, 0 to 10 VDC inputs allows the use of other types of flow sensors.
- Digital/sine wave input, for use with other magnetic generator or pulse and contact type flow sensors.
- Analog outputs, isolated 4-20 mA, 0-20 mA, 0 to 1 VDC, 0 to 5 VDC or 0 to 10 VDC outputs, programmed from the keypad to transmit flow, energy, temperature rates or temperature differential.
- RS 232/485 serial communications card.



Panel Mount



Wall Mount



SPECIFICATIONS

Power

- Power supply options: 10-26 VAC/12-36 VDC(24 VAC/12-36 VDC option), or 115/230 VAC, 50/60Hz (115/230 VAC option), or 10.6-16 VDC (12 VDC option)
- Power consumption: 8.5 Watts maximum

Display

- 16 characters by two lines, alphanumeric, dot matrix LCD display with variable contrast
- Large 0.32" character height
- Super-Twisted Nematic (STN) display type with +/- 20 degree viewing angle
- Optional backlighting

Operating Temperature

+32°F to +158°F (0°C to +70°C)

Storage Temperature

-40°F to +185°F (-40°C to +85°C)

Dimensions

- Panel mount
7.56"W x 3.78"H x 4.625"D
- Wall mount
10.997"W x 9.5"H x 5.784"D

Weight

- 3 pounds maximum (panel mount with DIN draw mounting brackets)
- 9.2 pounds maximum wall mount

Sensor Input

- Digital pulse input
- Input impedance: 14 kΩ
- Signal amplitudes: 3 to 15 VDC (high) open or 0 to 1 VDC (low)
- Frequency input range: 0 to 10 kHz

Sensor Calibration

- Badger Meter K and Offset numbers or 16 point linearization with 7 digit floating point K factor and frequency table entries

UNITS OF MEASURE

Flow Rate

- 19 standard, 1 custom programmable
- Standard flow rate units:
 - GPM** gallons/minute
 - GPS** gallons/second
 - GPH** gallons/hour
 - MGD** millions of gallons/day
 - L/SEC** liters/second
 - L/MIN** liters/minute
 - L/HR** liters/hour
 - FT3/SEC** cubic feet/second
 - FT3/MIN** cubic feet/minute
 - FT3/HR** cubic feet/hour
 - CM/SEC** cubic meters/second
 - CM/MIN** cubic meters/minute
 - CM/HR** cubic meters/hour
 - ACF/SEC** acre-feet/second
 - ACF/MIN** acre-feet/minute
 - ACF/HR** acre-feet/hour
 - BBL/SEC** barrels (oil)/second
 - BBL/MIN** barrels (oil)/minute
 - BBL/HR** barrels (oil)/hour

Btu Rate Units

- KBTU/HR** 1000 Btu/hour
- BTU/MIN** Btu/minute
- KW** kilowatts
- TONS** tons of refrigeration
- J/SEC** joules/second

Custom Flow and Btu Rate Units:

- 7 character label
- 7 digit floating point conversion from gallons/minute to custom unit
- 7 digit floating point conversion from 1000 Btu/hour to custom unit

Flow Total

- 1 standard, 1 custom programmable
- Standard flow total units:
 - GAL** gallons
 - MG** millions of gallons
 - LIT** liters
 - FT3** cubic feet
 - CM** cubic meters
 - ACF** acre-feet
 - BBL** barrels (oil)

Btu Total Units

- KBTU** kBtu
- KWH** kilowatt-hours

Custom flow and Btu Total Units

- 4 character label 7 digit floating point conversion from gallons to custom unit
- 4 character label 7 digit floating point conversion from 1000 Btu to custom unit

Temperature Units

- °F degrees fahrenheit
- °C degrees centigrade

Totalizer

- 0 to 1,000,000,000 units

Data Update Rate

- Adjustable 0.5 seconds to 5.0 seconds in 0.5 second increments
- Adjustable averaging function for smoothing erratic flow rates

Pulse Output

- Open collector transistor pulse in any standard or custom flow total units
- Adjustable 100 mS to 5.0 second pulse output width in 100 mS increments
- Maximum sinking current: 300 mA @ 36 VDC

OPTION SPECIFICATIONS

Relays

- 2 or 4 optional relays
- SPDT contacts, 6.0 amps @ 250 VAC or 30VDC maximum resistive load
- User configurable totalizer, high rate alarm, or low rate alarm functions for each individual relay
- Adjustable 0 to 120 second delay (in 0.5 second increments) until activation for alarm functions
- 0 to 50% (of set point) hysteresis for alarm functions

Mechanical Totalizer

- Two 7 digit, non-resettable, electro-mechanical counters
- User configurable output in any standard or custom flow total units

Temperature Sensor Types

- 100Ω platinum RTD, DIN calibration curve
- 100Ω platinum RTD, REF calibration curve
- 500Ω nickel RTD
- 1000Ω platinum RTD, DIN calibration curve
- 1000Ω platinum RTD, REF calibration curve
- 3000Ω thermistor
- 5000Ω thermistor
- 10 kΩ thermistor
- one user definable sensor type

EXAMPLE: 2300 - x x x x - x x x	
SERIES	
Btu Monitor (Single Channel)	2300
Btu Monitor w/12 Point Linearization	2310
CARD OPTION 1	0
Temperature Input Board	0
CARD OPTIONS 2 and 3 (select one option for each column)	
No Option	0 0
Analog Output	1 1
Analog Input	2 2
Digital/Sine Wave Input - 10VDC Excitation	3 3
Digital/Sine Wave Input - 24VDC Excitation	4 4
RS-232 Serial Communications Output	5 5
RS-485 Serial Communications Output	6 6
OPTIONS-RELAY	
No Relays	0
2 Relays	1
4 Relays	2
INPUT VOLTAGE / BACKLIGHTING	
12 VDC - Only Without LCD Illumination	A
24 VAC / 12-36 VDC Without LCD Illumination	B
115 VAC Without LCD Illumination	C
230 VAC Without LCD Illumination	D
12 VDC - Only With LCD Illumination	E
24 VAC / 12-36 VDC With LCD Illumination	F
115 VAC With LCD Illumination	G
230 VAC With LCD Illumination	H
COUNTER	
No Mechanical Counter	0
One Mechanical Counter	1
Two Mechanical Counters	2
MOUNTING	
Panel Mount NEMA 4X Front Panel	0
Wall Mount NEMA 4X Hinged Polymer Enclosure	3
Wall Mount NEMA 4 PreWired Hinged Metal Enclosure	4

Series 2300 Ordering Matrix

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Due to continuous research, product improvements and enhancements, Badger Meter reserves the right to change product or system specifications without notice, except to the extent an outstanding contractual obligation exists.

ETA Associates
 119 Foster Street, Bldg #6
 Peabody, MA 01960
 Tel: (978) 532-1330
 Fax: (978) 532-7325
 www.ETAassociates.com
 eta@ETAassociates.com




BadgerMeter, Inc.

P.O. Box 581390, Tulsa, Oklahoma 74158
 (918) 836-8411 / Fax: (918) 832-9962
 www.badgermeter.com