



• **SYSTEM-10-BAC BTU METER** •  
**BACnet MS/TP COMPATIBLE**



**DESCRIPTION**

The System-10 BTU Meter provides highly accurate thermal energy measurement in chilled water, hot water and condenser water systems based on signal inputs from two matched temperature sensors (included) and any of ONICON's insertion or inline flow meters (ordered separately). The System-10-BAC-MS/TP provides energy flow and temperature data on a local alphanumeric display and to the network via the BACnet communications MS/TP driver. An optional auxiliary input is also available to totalize pulses from another device and communicates the total directly to the BACnet MS/TP network.

**APPLICATIONS**

- Chilled water, hot water and condenser water systems for:
- Commercial office tenant billing
  - Central plant monitoring
  - University campus monitoring
  - Institutional energy cost allocation
  - Performance/efficiency evaluations
  - Performance contracting energy monitoring

**FEATURES**

**BACnet Compatible Serial Communications** - Provides complete energy, flow and temperature data to the control system through a single BACnet MS/TP network connection, reducing installation costs.

**Simple Installation and Commissioning** - Factory programmed and ready for use upon delivery. All process data and programming functions are accessible via front panel display and keypad.

**Single Source Responsibility** - One manufacturer is responsible for every aspect of the energy measurement process ensuring component compatibility and overall system accuracy.

**N.I.S.T. Traceable Calibration with Certification** - Each Btu measurement system is individually calibrated using application specific flow and temperature data and is provided with calibration certifications.

**Precision Solid State Temperature Sensors** - Custom calibrated and matched to an accuracy better than  $\pm 0.15^\circ$  F over calibrated range.

**Highly Accurate Flow Meters** - ONICON offers a wide variety of insertion and inline type flow measurement technologies including turbine, electromagnetic and vortex sensing. Each type offers unique advantages depending on the application. All ONICON flow meters are individually wet calibrated and designed to operate over a wide flow velocity range with accuracies ranging from  $\pm 0.2\%$  to  $\pm 2.0\%$  of rate depending on the model.

**Complete Installation Package** - All mechanical installation hardware, color coded interconnecting cabling and installation instructions are provided to ensure error-free installation and accurate system performance.

**ORDERING INFORMATION**

The System-10 BTU Meter is sold complete with temperature sensors and standard thermowells. Flow meters are purchased separately.

ITEM #	DESCRIPTION
SYSTEM-10-BAC MS/TP	System-10 BTU Meter BACnet MS/TP compatible
SYSTEM-10-OPT1	Add for 6" and larger pipes
SYSTEM-10-OPT2	Add for 2.5" - 3" copper tube
SYSTEM-10-OPT3	Add for 4" copper tube
SYSTEM-10-OPT4	Upgrade to outdoor thermowells (pair)
SYSTEM-10-OPT5	Upgrade to hot tap thermowells (pair)
SYSTEM-10-OPT8	High temperature sensors (over 200°F)
SYSTEM-10-OPT9	Add one analog output
SYSTEM-10-OPT10	Add four analog outputs
SYSTEM-10-OPT11	Auxiliary pulse input
<b>Choose from the following flow meters:</b>	
F-1100/F-1200	Insertion Turbine Flow Meter (1 1/4" - 72")
F-1300	Inline Turbine Flow Meter (3/4" - 1")
F-2000 Series	Full Bore Vortex Flow Meter
F-3000 Series	Full Bore Electromagnetic Flow Meter
F-3500	Insertion Electromagnetic Flow Meter (3" - 72")
Refer to catalog for flow meter installation kits. Consult with ONICON for additional flow meter types.	



PROCESS CONTROL EQUIPMENT  
3GF5

# SYSTEM-10 BTU METER SPECIFICATIONS



## CALIBRATION

Flow meters and temperature sensors are individually calibrated followed by a complete system calibration. Field commissioning is also available.

## ACCURACY

Differential temperature accuracy  $\pm 0.15^\circ$  F over calibrated range  
Computing nonlinearity within  $\pm 0.05\%$

## PROGRAMMING

Factory programmed for specific application  
Field programmable via front panel interface

## MEMORY

Non-volatile EEPROM memory retains all program parameters and totalized values in the event of power loss.

## DISPLAY

Alphanumeric LCD displays total energy, total flow, energy rate, flow rate, supply temperature and return temperature.

Alpha: 16 character, 0.2" high; Numeric: 6 digit, 0.4" high

## OUTPUT SIGNALS

BACnet MS/TP Points List

Name	BACnet Object Type	Units
Total Energy	Analog Value	Btu, kW-hrs or ton-hrs
Energy Rate	Analog Input	Btu/hr, kW or tons
Total Flow	Analog Value	gallons, liters or meters <sup>3</sup>
Flow Rate	Analog Input	gpm, gph, mgd, l/s, l/m, l/hr or m <sup>3</sup> /hr
Supply Temperature	Analog Input	$^\circ$ F or $^\circ$ C
Return Temperature	Analog Input	$^\circ$ F or $^\circ$ C
Delta-T	Analog Input	$^\circ$ F or $^\circ$ C
Energy Total Reset	Binary Value	Not applicable
Flow Total Reset	Binary Value	Not applicable
Auxiliary Input Total	Analog Value	Pulse Accumulator
Auxiliary Input Reset	Binary Value	Not Applicable

Baud Rate: 76,800, 38,400, 19,200 or 9,600 bps  
Isolated solid state dry contact for energy total:  
Contact rating: 100 mA, 50 V  
Contact duration: 0.5, 1, 2, or 6 sec  
Optional Analog Output(s): 4-20 mA, 0-10 V or 0-5 V  
One or four analog output(s) available for flow rate, energy rate, supply/return temps, or delta-T.

## LIQUID FLOW SIGNAL INPUT

0-15 V pulse output from any ONICON flow meter

## TEMPERATURE SENSORS

Solid state sensors are custom calibrated using N.I.S.T. traceable temperature standards.  
Current based signal (mA) is unaffected by wire length.

## TEMPERATURE RANGE

Liquid temperature range: 32 $^\circ$  F to 200 $^\circ$  F  
Optional liquid temperature range: 122 $^\circ$  F to 302 $^\circ$  F  
Ambient temperature range: -20 $^\circ$  F to 140 $^\circ$  F

## MECHANICAL

### Electronics Enclosure:

Standard: Steel NEMA 13, wall mount, 8"x10"x4"  
Optional: NEMA 4 (Not UL listed)  
Approximate weight: 12 lbs

### Temperature Thermowells:

Standard: 1/2" NPT brass thermowells (length varies with pipe size) with junction box  
Note: 6" pipes and larger require SS thermowell option.

- Optional:
- 1/2" NPT stainless steel thermowells
  - Outdoor junction box with thermal insulation
  - Hot tap thermowells with isolation valves are available in plated brass or stainless steel.

## ELECTRICAL

### Input Power\*:

Standard: 24 VAC, 50/60 Hz, 500 mA  
Optional: 120 VAC, 50/60 Hz, 200 mA  
230 VAC, 50 Hz, 150 mA

\*Based on Btu meters configured for network connection without the optional analog outputs

### Internal Supply:

Provides 24 VDC at 200 mA to electronics and flow meter

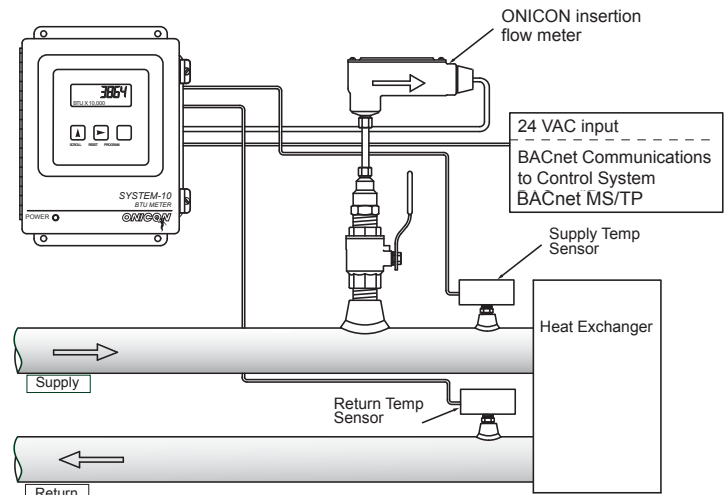
### Wiring:

Temperature signals: Use 18-22 ga twisted shielded pair.  
Flow signals: Use 18 - 22 ga - see flow meter specification sheet for number of conductors.

Note: Specifications are subject to change without notice.

## TYPICAL SYSTEM-10-BAC-MS/TP INSTALLATION

Insertion turbine flow meter shown. Any ONICON flow meter may be used with the System-10 BTU Meter. Consult with ONICON for additional flow meter types.



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