

• **SYSTEM-10-P1 BTU METER** •  
**SIEMENS P1 (FLN) COMPATIBLE**



PROCESS CONTROL EQUIPMENT  
3GF5

**DESCRIPTION**

The System-10-P1 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-P1 provides energy, flow and temperature data on a local alphanumeric display and to the network via the P1 (FLN) communications driver. An optional auxiliary input is also available to totalize pulses from another device and communicate the total directly to the 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

**ORDERING INFORMATION**

The System-10 BTU Meter is sold complete with temperature sensors. Thermowell installation kits and flow meters are purchased separately.

**FEATURES**

**P1 Compatible Serial Communications** - Provides complete energy, flow and temperature data to the control system through a single P1 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 certificates.

**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.

ITEM #	DESCRIPTION
SYSTEM-10-P1	System-10 BTU Meter, P1 (FLN) Compatible
SYSTEM-10-OPT8	High temperature sensors (over 200° F)
SYSTEM-10-OPT9	Add one analog output
SYSTEM-10-OPT10	Add four analog outputs
<b>Choose from the following commonly used thermowell installation kits:</b>	
SYSTEM-10-OPT4	Upgrade to outdoor thermowells (pair)
BTU-ST-INSTL32	Brass kit for welded steel pipe (¾" - 5")
BTU-ST-INSTL52	Brass kit for threaded steel pipe (¾" - 2½")
BTU-ST-INSTL34	SS kit for welded steel pipe (¾" and up)
BTU-ST-INSTL36	Brass kit for copper tube (¾" - 2")
BTU-ST-INSTL37	Brass kit for copper tube (2 ½" - 3")
<b>Choose from the following flow meters:</b>	
F-1100/F-1200	Insertion Turbine Flow Meter (1¼" - 72")
F-1300	Inline Turbine Flow Meter (¾" - 1")
F-3000 Series	Inline Electromagnetic Flow Meter (¼" - 48")
F-3500	Insertion Electromagnetic Flow Meter (3" - 72")
F-4200	Clamp-on Ultrasonic Flow Meter (½" - 48")
F-2000 Series	Inline Vortex Flow Meter ( ½" - 12")
Refer to catalog for flow meter installation kits. Consult with ONICON for additional thermowell installation kit and flow meter options.	

# SYSTEM-10-P1 BTU METER SPECIFICATIONS



## CALIBRATION

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

## ACCURACY

### TEMPERATURE

Overall differential temperature measurement uncertainty of  $\leq \pm 0.15^\circ\text{F}$  over the stated range (Includes uncertainty associated with the sensors, transmitters, cabling and calculator input circuitry)

Temperature sensors meet EN1434 / CSA C900.1 accuracy requirements for 1K sensors for cooling applications, 32 - 77° F  
 Temperature sensors meet EN1434 / CSA C900.1 accuracy requirements for 2K sensors for heating applications, 140 - 212° F

### CALCULATOR

Computing nonlinearity within  $\pm 0.05\%$   
 Calculator meets EN1434 / CSA C900.1 class 1 accuracy requirements for 2K sensors for all applications

### PROGRAMMING

Factory programmed for specific application.  
 Field programmable via front panel interface.

### MEMORY

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

### DISPLAY

Alphanumeric LCD displays total energy, total flow, energy rate, flow rate, supply temperature, return temperature, serial number and alarm status  
 Alpha: 16 character, 0.2" high  
 Numeric: 8 digit, 0.4" high  
 Rate Display Range: 0 - 9,999,999  
 Total Display Range: 0 - 9,999,999  
 The totals will roll over to zero when the maximum count is exceeded.

## OUTPUT SIGNALS

### P1 Output Points:

Name	Point Type/Category	Units
Total Energy	3/LAI	Btu, kW-hrs or ton-hrs
Energy Rate	1/LAI	Btu/hr, kW or tons
Total Flow	3/LAI	gallons, liters or meters <sup>3</sup>
Flow Rate	1/LAI	gpm, gph, mgd, l/s, l/m, l/hr or m <sup>3</sup> /hr
Supply Temperature	1/LAI	°F or °C
Return Temperature	1/LAI	°F or °C
Delta T	1/LAI	°F or °C
Energy Total Reset	1/LDO	Not applicable
Flow Total Reset	1/LDO	Not applicable
Auxiliary Input 1	3/LAI	Pulse Accumulator
Auxiliary Input Reset	1/LDO	Not applicable

### Isolated solid state dry contact for energy total:

Contact rating: 100 mA, 50 V  
 Contact duration: 0.5, 1, 2, or 6 seconds

### 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

Standard liquid temperature range: 32° to 200° F  
 Optional extended temperature ranges available.  
 Ambient temperature range: -20° to 140° F

## MECHANICAL

### Electronics Enclosure:

Standard: Steel NEMA 13, wall mount, 8"x 10"x 4"  
 Optional: NEMA 4 (Not UL listed)  
 Approximate weight: 12 lbs

### Temperature Sensor Thermowell Kits:

Thermowells and other kit components vary by fluid type, fluid temperature, pipe material and pipe size. Commonly used kits are listed on the previous page. Contact ONICON for additional thermowell kit options, including hot tap installation kits for retrofit installations.

## 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

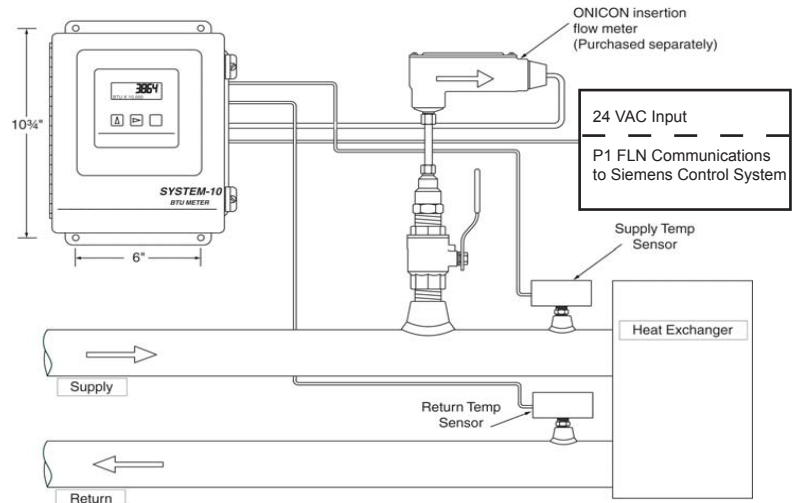
### Wiring:

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

Note: Specifications are subject to change without notice.

## TYPICAL SYSTEM-10-P1 INSTALLATION

(Also refer to Siemens Application Note, Document No. 140-0280.)



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.