

• **SYSTEM-40-BAC** •  
**BTU MEASUREMENT SYSTEM**



**DESCRIPTION**

The System-40-BAC provides highly accurate thermal energy measurement in chilled water, hot water or condenser water systems. It is provided as a complete meter and includes a matched pair of 2-wire 1000Ω platinum RTD temperature sensors and an integral inline ultrasonic flow sensor. This compact system is available for use in ½” through 2” piping systems with flow rates ranging from 0.03 to 70 GPM.

The native BACnet® MS/TP network interface communicates energy, flow and temperature data directly to the network. The System-40-BAC also provides advanced metrics to the network including peak and average values, interval data and meter operating status. The calculator enclosure features a built-in user interface/display that provides a local indication of the same data. The enclosure is also easily detachable and suitable for wall mounting using the cable provided.

Each System-40-BAC is provided with three auxiliary pulse inputs for totalizing the pulse outputs from external devices such as water, natural gas or electric meters. Pulse totals are accumulated in internal registers and then transmitted to the network. These totals are also available on the built-in display.

**APPLICATIONS**

Chilled water, hot water and condenser water systems for:

- Commercial office tenant billing
- Residential apartment and condominium tenant billing

**CALIBRATION**

Each flow sensor is wet calibrated. Each temperature sensor is tested for absolute accuracy. Temperature sensors are then matched for differential accuracy. Functional system verification testing is performed on each complete meter. Absolute accuracy for calibration and testing is directly traceable to N.I.S.T.<sup>2</sup> and other national standards. A certificate of calibration is provided with each meter.

**FEATURES**

**Reliable No-Moving-Parts Design –**

The System-40-BAC utilizes direct beam path wetted ultrasonic transducers to measure flow. This no-moving-parts design optimizes signal strength and ensures long-term reliability.

**Simple Installation and Commissioning -**

Each meter is delivered fully programmed and ready for use upon delivery. Commissioning is done through the user interface/display without the need for special tools.

**Highly Accurate Flow Meter -**

The built-in ultrasonic flow meter is accurate to within ±1% of reading over the standard operating range (25:1 turndown) and within ±2% of reading over an extended range (100:1 turndown).

**Matched Platinum 1000Ω RTD Temperature Sensors -**

Integral 2-wire sensors are custom calibrated and matched to a differential uncertainty of better than ±0.18° F.

**Native BACnet® MS/TP Communications -**

BTL<sup>1</sup> tested and approved to ASHRAE Standard 135.1: 2009

**Suitable for Water and Water/Glycol Solutions -**

System-40-BAC programming allows for flow measurement and energy calculation corrections based on customer supplied fluid data.

**Detachable Calculator -**

The System-40-BAC electronics enclosure is easily detached from the flow body to allow for remote wall mount installations using the 5 ft. cables provided with the meter.

BACnet® Objects	
Ai	9 objects report instantaneous values and rate data
AV	24 objects report flow, energy and auxiliary input totals
BV	10 objects reset totals and indicating status
Trend log	1 trend log object for trending user defined data

<sup>1</sup> BACnet® Testing Laboratories

<sup>2</sup> National Institute of Standards and Technology

Meter Models with Flow Ranges in GPM						
Model Number	Meter Size	Typical Design Flow	Pressure Drop @ Design Flow	1% of Rate Range	Min Flow	Length w/tail pieces
	(Standard thread type is NPT)	(gpm)	(psi)	(gpm)	(gpm)	(in)
SYSTEM-40-BAC-050	½"	6.6	1.2 psi	0.6 - 15	0.03	11.2
SYSTEM-40-BAC-075	¾"	6.6	1.2 psi	0.6 - 15	0.03	11.7
SYSTEM-40-BAC-075H	¾" (high flow)	11	1.6 psi	1 - 25	0.05	11.7
SYSTEM-40-BAC-100	1"	11	1.6 psi	1 - 25	0.05	12.3
SYSTEM-40-BAC-100H	1" (high flow)	15.4	1.6 psi	1.4 - 35	0.07	15
SYSTEM-40-BAC-125	1¼"	TBD	TBD	TBD	TBD	TBD
SYSTEM-40-BAC-150	1½"					
SYSTEM-40-BAC-200	2"					

## GENERAL SPECIFICATIONS\*



### ACCURACY

#### FLOW

- ± 1% of reading over 25:1 turndown
- ± 2% of reading over 100:1 turndown
- Overall turndown exceeds 500:1
- Repeatability:  $\leq \pm 0.2\%$
- Meets EN1434 Class 1 accuracy requirements

#### TEMPERATURE

- Field serviceable MID certified matched pair of 2-wire 1000 $\Omega$  platinum RTDs
- Calibrated to a differential measurement uncertainty of  $\pm 0.18^\circ\text{F}$
- Meets EN1434/C900.1 accuracy requirements for 3K sensors

#### CALCULATOR

- Computation error:  $\leq 0.09\%$  @  $30^\circ\text{F}$   $\Delta t$
- Meets EN1434 Class 1 requirements with 3K minimum  $\Delta t$

### MECHANICAL

#### METER SIZES (Nominal Diameter)

$\frac{1}{2}$ " ,  $\frac{3}{4}$ " , 1" ,  $1\frac{1}{4}$ " ,  $1\frac{1}{2}$ " and 2"

#### PIPING SYSTEM CONNECTIONS

Male NPT threads or optional BSPT threads

#### MAXIMUM OPERATING PRESSURE

400 PSI

#### PRESSURE DROP

Less than 1 PSI at 4 ft/sec, decreasing at lower velocities

#### FLUID TEMPERATURE RANGE

$32^\circ\text{F}$  to  $250^\circ\text{F}$

#### MATERIALS

Wetted components: Lead-free brass, PEEK  
Enclosure: Polycarbonate

### ENVIRONMENTAL

- Meets EN1434/C900.1 Class A Requirements
- Operating Temperature Range:  $-13^\circ$  to  $131^\circ\text{F}$
- Operating Humidity Range: 5 to 90% RH (Non-condensing environment)
- Storage Temperature Range:  $-14^\circ$  to  $158^\circ\text{F}$
- Enclosure rating: IP65

### ELECTRICAL

#### POWER SUPPLY REQUIREMENTS

- 12-36 VAC, 50/60 Hz, 15 VA maximum
- 12-42 VDC, 15 W maximum

#### AUXILIARY PULSE INPUTS

- Three isolated totalizing pulse inputs for use with sinking open collector or dry contact outputs
- Input rating: 30 VDC, 10 mA maximum
- Pulse duration: 50 msec minimum

#### NETWORK CONNECTION

Isolated RS485 serial interface

#### COMMUNICATION PROTOCOLS

BACnet<sup>®</sup> MS/TP per ASHRAE Standard 135.1: 2009

#### NETWORK CONFIGURATION & ADDRESSING

- Baud Rates: 9600, 19200, 38400 & 76800
- Device Address Range: 1 – 255
- Device Instance Range: 1 – 4,194,303
- Network Number Range: 1-255

### APPROVALS

- FCC: Part 15, Subpart B
- CE
- Conforms to ANSI/NSF 61 & 372 (certification pending)
- BTL Certified to ASHRAE 135:2009

\*Specifications subject to change without notice

## TYPICAL SYSTEM-40 INSTALLATION

(Meter may be installed in supply or return.)

