

### SYSTEM

Computer-based building automation systems are capable of monitoring all aspects of building operation. A large part of the computer's operation is dedicated to energy management with energy transferal; usually measured in tons, kBtu/hr, or kWh is calculated from flow and temperature differential data provided by sensors in the system. This data can be used to proportion energy costs based on actual usage, or monitor system performance.

### PROBLEM

Computer systems require inputs from a large number of diverse data points. For HVAC energy management, these primarily include temperature and flow measurements. Relatively inexpensive temperature sensors have been available for some time; however, cost effective, easy to install flow sensors that can interface easily with a computer have not been available.

### SOLUTION

Badger Meter's Series 200, and SDI Series sensors are easy to install with models available at permit installation and removal from fully pressurized, active piping systems. Their low impedance pulse signal permits long cable runs of up to 2000 feet.

Data Industrial provides a wide range of monitors and transmitters for both flow and energy. Outputs include 4-20mA, scaled pulse, and direct N2 Metasysâ, and LonWorksâ protocols.

### SPECIFIC RECOMMENDATIONS

#### Sensors

| Product Series | Type   |         | Output    |              |        | Pipe Size |    |    |      | Pipe Material |        | Display |    |
|----------------|--------|---------|-----------|--------------|--------|-----------|----|----|------|---------------|--------|---------|----|
|                | Direct | Hot Tap | Raw Pulse | Scaled Pulse | Analog | <2"       | 2" | 3" | >4"+ | Steel         | Copper | Yes     | No |
| 220            | X      |         | X         |              |        |           |    | X  | X    | X             | X      |         | X  |
| 250B           |        |         | X         |              |        | X         |    |    |      | X             | X      |         | X  |
| 228            | X      |         | X         |              |        |           | X  |    |      | X             | X      |         | X  |
| 225B           |        | X       | X         |              |        |           |    | X  | X    | X             | X      |         | X  |
| 226            |        | X       | X         |              |        |           |    | X  | X    | X             | X      |         | X  |
| SDI            | X      | X       | X         | X            | X      |           | X  | X  | X    | X             | X      | X       | X  |

#### Transmitters

| Product Series | Power Source |              | Output |    |           |              |        |        | Display |         |     |    |
|----------------|--------------|--------------|--------|----|-----------|--------------|--------|--------|---------|---------|-----|----|
|                | Remote       | Loop Powered | LW     | N2 | Set Point | Scaled Pulse | 4-20mA | 0-1VDC | 0-5VDC  | 0-10VDC | Yes | No |
| 310            | X            | X            |        |    |           | X            | X      |        |         |         |     | X  |
| 320            | X            |              |        |    |           | X            |        |        |         |         |     | X  |
| 330            | X            |              |        |    | X         |              |        |        |         |         |     | X  |
| 340            | X            |              |        |    |           | X            |        |        |         |         |     | X  |
| 340LW          | X            |              | X      |    |           | X            |        |        |         |         |     | X  |
| 340N2          | X            |              |        | X  |           | X            |        |        |         |         |     | X  |
| 1550           | X            |              |        |    | X         | X            | X      |        |         |         |     | X  |
| 2300           | X            |              |        |    | X         | X            | X      | X      |         | X       |     | X  |
| SDI            | X            |              |        |    | X         | X            | X      |        |         |         |     | X  |

All the above products are designed for field calibration. Refer to product data sheets for details

### ADVANTAGES

1. Economical pricing.
2. Sensor installation without system disruption.
3. Directly compatible analog and pulse signals.
4. Standard sensor for most pipe sizes.
5. Low head loss.

### LOCAL VS. IN-COMPUTER COMPUTATIONS

Better accuracy and reading consistency is obtained when the computation of energy transfer is computed locally, and then transmitted to the computer. One reason for this is the fact that this type of math computation is often a secondary computer function, assigned on a low priority by programmers. Another reason is down time. When the computer is being serviced, upgrades installed, or large reports printed these inputs can be ignored. The result is gaps in the data. Using a distributed system approach, computing and storing flow and energy totals locally eliminates these gaps.

### ANALOG

Analog signals are recommended whenever real time flow rate, energy rate, or other data is to be displayed. The industry standard is 4-20mA, usually preferred due to its excellent noise immunity, and long distance transmission capability.

### SCALED PULSE

Low-resolution pulse inputs are only recommended where the primary function is totalization of flow, energy, etc. Since few building automation systems can handle the high frequencies associated with raw sensor pulse data pulse scaling/conditioning devices are required. This low frequency conditioned signal can result in poor response time. When pulse data is required, scaleable, low frequency dry or solid state contact closures are available from the Model 320 Programmable Pulse Transmitter, Model 340 Btu Transmitter, the Model 1550 Btu Monitor, and Series 2300 Btu Monitor.

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(previously known as AN54)

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