

- Mixed inputs analog and/or pulse
- Multiple flow inputs for auto ranging, summing or tube switching
- Programmable in any engineering units
- Calculated or custom linearization of flow inputs
- Direct and linearized RTD or thermocouple transmitter inputs
- 32 character alpha-numeric data display
- Flexible programmable alarms for all inputs and computed value
- Automatic calibration of the measurement circuits
- Automatic value selection on input signal failure
- Built in diagnostics to help system troubleshooting
- Optional 24 Vdc power for input signal transmitters
- Two built in independent totalizers
- Optional batching function
- Menu assisted configuration and calibration
- Serial communication port
- Remote configuration and calibration through optional CS or RA software (Windows only)



MicroCOMET in Panel Mount Housing

The MicroCOMET model MCU5 Steam Flow Computer is designed to compensate volumetric flow measurement of steam for varying pressure in the range from 1 to 3500 [psia] and the temperature in the range from 100 to 1600 [°F], both for saturated and superheated steam, to compute an accurate mass flow. Almost any flow-measuring device can be used as a primary element. The MCU5 single stream Flow Computer can accept up to three flow inputs, which may be analog or pulse types. This feature enables accuracy to be improved by auto-ranging 'stacked' d/p cells. Even better measurement accuracy can be achieved by using 'tube switching' where the MCU5 automatically selects the measuring run which gives the optimum accuracy dependent on flow-rate. The inputs may also be summed or subtracted. For the general case, density is corrected based on temperature and pressure and the MCU5 also calculates the degree of superheat, which can be displayed and alarmed. The MCU5 can be programmed for saturated steam where only pressure or temperature measurement is required and the other value is computed from stored curves. If required, the 'batch control' option, which can be configured in many ways, allows the MCU5 to be used for measuring and controlling the size of steam batches. The MCU5 is available for panel, or surface mounting (NEMA 4 enclosure).

In addition MCU5 can be ordered as one of the two additional variations:

- MCUSE which computes energy (enthalpy) flow for square root inputs, and
- MCUSI which computes energy flow for linear flow inputs

The MCU5 flow correction formula:

$$F = A \cdot C \cdot E \cdot F_{NC} \cdot \left[\frac{P}{Z_{(P,T)} \cdot T} \right]^{(E_i - V_M)}$$

Where:

$$C = \min \left[C_{LIMIT}, C_0 + \frac{B}{FN} \right], E = E_0 + \frac{4 \cdot K \cdot F_{NC}}{P}$$

- F = Steam flow
- A = Constant correction factor
- T = Flowing temperature (absolute)
- F_{NC} = Composite non-corrected flow rate
- E_i = Linearizing exponent for F_{NC} from inputs (E_i=0.5 for orifice)
- V_M = Adjustment to the correction exponent. (E_i-V_M) is a correction exponent)
- C = Discharge coefficient (correction for Reynolds number)
- C_{LIMIT} = Upper limit for discharge coefficient
- C₀ = Initial discharge coefficient
- B = Programmable constant
- N = Reynolds exponent 0.75 for orifice, 0.5 for flow nozzle, 0 for venturi
- P = Pressure (absolute)
- Z_(P,T) = Compressibility (from ASME Steam Tables)
- E = Expansion coefficient
- K = Programmable constant
- E₀ = Constant for expansion coefficient

INPUTS:

- Three flow inputs: V, mA or Freq.
- One temperature input: V, mA or RTD
- One pressure input: V, mA

ANALOG INPUT RANGE:

- 0-50 mA_{dc} into 200 W or
- 0-10 V_{dc} into 100 mW
- THERMOCOUPLE TRANSMITTER INPUTS can be linearized for either: J, K, T, E, R, or S thermocouple
- RTD INPUTS can be linearized for either: Pt100 (DIN & SAMA), Pt 500 (DIN), Cu10 or Ni120

Note:

Zero and span completely flexible within the operating range
All inputs use common ground

FREQUENCY INPUT RANGE:

- 30 Hz - 100 kHz Optically isolated, adjustable threshold (0 -15 V_{dc}), current limited, diode clamped

OUTPUTS

- ONE ANALOG OUTPUT, with the range of:
- 0 - 50 mA_{dc}, or 0-10 V_{dc} Optically isolated, 12bit resolution.

Note:

Zero and span completely flexible within the operating range

REMOTE TOTALIZER OUTPUT

- Open collector: 30 V_{dc}, 100 mA_{dc}, 0 -10 kHz (programmable pulse width)
- Optional internal 12 V_{dc} loop power
 - Optional Mercury wetted relay: Form 1C (SPDT), contacts rated at 100 VA, 500 V_{dc}, 1A_{dc} max.
- Bounce: None
Life Expectancy: 2x10⁹ cycles @ 10 V_{dc}, 10 mA

OPTIONAL RELAY OUTPUT

- Two relays: Form 1C (SPDT), contacts rated at: 115 Vac, 5 A (resistive load)

The relays can be used for

- Alarm output, or
- Tube switching control, or
- Batch control

COMMUNICATIONS PORT (a choice of either RS232C or multi-drop interface).

- RS232C, data Format 7 bits data + 1 or 2 stop bits (depending on baud rate)
- Multi-drop, optically isolated 3-wire (TxD, RxD, GND)

Baud rate: Five selectable rates from 50 to 19200. Parity: Selectable

- Optional RS-M63 multi-drop adapter allows up to 63 units in one loop to communicate with another device that uses RS232C interface (computer)
- Optional RS-M1 adapter allows one unit to communicate with another device that uses RS232C interface (computer, serial printer)

PERFORMANCE ACCURACY

- ANALOG INPUTS: ± 0.04 % of maximum span
- FREQ. INPUTS: ± 0.05 %
- RTD INPUTS: ± 0.1 %
- COMPUTING ERROR: ± 0.01 %
- ANALOG OUTPUT: ± 0.08 % of maximum span
- Temperature effect: $\pm 0.004\%/^{\circ}\text{C}$ of range between 0 $^{\circ}\text{C}$ and 50 $^{\circ}\text{C}$
- Line voltage effect negligible

AMBIENT CONDITIONS

- Operating Temperature: -20 $^{\circ}\text{C}$ to +45 $^{\circ}\text{C}$
- Storage Temperature: -40 $^{\circ}\text{C}$ to +80 $^{\circ}\text{C}$
- Humidity: less than 95% non-condensing

ISOLATION

Input signals, output signals and computer power supply are fully isolated up to 500 V_{dc}

POWER SUPPLY

- 115 Vac, 230 Vac ± 10 %, 50/60 Hz, 6 VA plus the transmitter power
- 24 V_{dc} ± 15 %, 8 W plus the transmitter power

POWER OUTPUT

- 24 V_{dc} to supply field devices: 250 mA max., protected by auto-resettable fuse.

CLASSIFICATION

General purpose
CSA Approved

MOUNTING

- Panel Mount (DIN Standard)
7.55"Wx5.67"Hx5.75"D or
195x144x120[mm], 6lb or 2.7kg
- Surface Mount (NEMA 4)
9" W x 12.6" H x 4.9" D or
230 x 320 x 125[mm], 15 lb. (6.8 kg)

See below for dimensional drawings