

# MS-748

## Rugged, Field Mount Multi-Function Flow Computer

- "EZ Setup"- Guided Setup for First Time Users
- Liquid, Gas, Steam and Heat Flow Equations
- Utility Metering
- Menu Selectable Hardware & Software Features
- Internal Data Logging Option
- Isolated Pulse and Analog Outputs Standard
- RS-232 Port Standard, RS-485 Optional  
Windows™ Setup Software
- NX19 Gas Equations, Stacked DP Transmitters
- DDE Server & HMI Software Available
- Remote Metering by Wireless or Modem
- NEW! - Attractive, Rugged, Field Mount  
Enclosure



### Description:

The MS-748 Flow Computer satisfies the instrument requirements for a variety of flowmeter types in liquid, gas, steam and heat applications. Multiple flow equations are available in a single instrument with many advanced features.

The alphanumeric display offers measured parameters in easy to understand format. Manual access to measurements and display scrolling is supported

The versatility of the Flow Computer permits a wide measure of versatility within the instrument package. The various hardware inputs and outputs can be "soft" assigned to meet a variety of common application needs. The user "soft selects" the usage of each input/output while configuring the instrument. Consider the following illustrative examples.

The isolated analog output can be chosen to follow the volume flow, corrected volume flow, mass flow, temperature, pressure, or density by means of a menu selection. Most hardware features are assignable by this method.

The user can assign the standard RS-232 Serial Port for external data logging, transaction printing, or for connection to a modem for remote meter reading.

A Service or Test mode is provided to assist the user during start-up system check out by monitoring inputs and exercising outputs. The system setup can also be printed.

### Specifications:

#### Environmental

Operating Temperature: -20 to 55 C  
Storage Temperature: -40 to +85 C  
Humidity : 0-95% Non-condensing  
Materials: UL, CSA, VDE approved

#### Display

Type: 2 lines of 20 characters  
Types: Backlit LCD and VFD ordering options  
Character Size: 0.3" nominal  
User selectable label descriptors and units of measure

#### Keypad

Keypad Type: Membrane Keypad  
Keypad Rating: Sealed to Nema 4  
Number of keys: 16

#### Enclosure

Size: See Dimensions  
Materials: Aluminum, UL94V-0 Keypad  
Enclosure Rating: NEMA 4X  
Provisions for sealing unit

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## Power Input

The factory equipped power option is internally fused. An internal line to line filter capacitor is provided for added transient suppression. MOV protection for surge transient is also supported

Universal AC Power: 85 to 276 Vrms, 50/60 Hz

DC Power Option: 24 VDC (16 to 48 VDC)

Power Consumption

AC Power: 6.5 V/A

DC Power: 300 mA max.

## Flow Meter Types:

Linear: Vortex, Turbine, Positive Displacement, Magnetic, GilFlo, Laminar and others

Square Law: Orifice, Venturi, Nozzle, V-Cone, Wedge, Averaging Pitot, Target and others

Multi-Point Linearization: May be used with all flowmeter types. Including: 16 point, UVC and dynamic compensation.

## Flow Inputs:

### Analog Input:

Accuracy: 0.01% FS at 20° C

Ranges

Voltage: 0-10 VDC, 0-5 VDC, 1-5 VDC

Current: 4-20 mA, 0-20 mA,

4-20 mA stacked, 0-20 mA stacked

Basic Measurement Resolution: 16 bit

Update Rate: 4 updates/sec

Automatic Fault detection: Signal over/under-range, Current Loop Broken

Calibration: Operator assisted learn mode

Extended calibration: Learns Zero and Full Scale of each range

Fault Protection:

Fast Transient: 500 V Protection (capacitive clamp)

Reverse Polarity: No ill effects

Over-Voltage Limit: 50 VDC Over voltage protection

Over-Current Protection: Internally current limited protected to 24VDC

### Pulse Inputs:

Number of Flow Inputs: one

Input Impedance: 10 k  $\Omega$  nominal

Trigger Level: (menu selectable)

High Level Input

Logic On: 2.5 to 30 VDC

Logic Off: 0 to 2 VDC

Low Level Input (mag pickup)

Selectable sensitivity: 10 mV and 100 mV

Minimum Count Speed: 0.25 Hz (to maintain rate display)

Maximum Count Speed: Selectable: 0 to 50 kHz

Overvoltage Protection: 50 VDC

## Temperature, Pressure, Density Inputs

The compensation inputs usage are menu selectable for temperature, temperature 2, pressure, density or not used.

Calibration: Operator assisted learn mode

Operation: Ratiometric

Accuracy: 0.01% FS at 20° C

Basic Measurement Resolution: 16 bit

Update Rate: 2 updates/sec minimum

Automatic Fault detection:

Signal Over-range/under-range

Current Loop Broken

RTD short

RTD open

Reverse Polarity: No ill effects

Over-Current Limit

(current input) Internally limited to protect input to 24 VDC

Available Input Ranges

Current: 4-20 mA, 0-20 mA

Resistance: 100 Ohms DIN RTD

100 Ohm DIN RTD (DIN 43-760, BS 1904):

Three Wire Lead Compensation

Internal RTD linearization learns ice point resistance

1 mA Excitation current with reverse polarity protection

Temperature Resolution: 0.01 C

## Stored Information (ROM)

Steam Tables (saturated & superheated),

Fluid Properties: Water, Air, Natural Gas and Other Common Fluids or Generic

## User Entered Stored Information (EEPROM / Nonvolatile RAM)

Transmitter Ranges, Signal Types

Fluid Properties

(reference density, expansion factor, specific heat, viscosity, isentropic exponent, combustion heating value, Z factor)

Units Selections (English/Metric)

Language Translations (optional)

## Excitation Voltage

24 VDC @ 100 mA (fault protected)

## Relay Outputs

The relay outputs usage is menu assignable to (Individually for each relay) Hi/Lo Rate Alarm, Hi/Lo Temperature Alarm, Hi/Lo Pressure Alarm, Pulse Output (pulse options), Wet Steam or General purpose warning (security).

Number of relays: 2 (3 optional)  
Contact Style: Form C contacts  
Contact Ratings: 240 V, 5 amp

## Analog Outputs

The analog outputs are menu assignable to correspond to the Uncompensated Volume Rate, Corrected Volume Rate, Mass Rate, Heat Rate, Temperature, Density, or Pressure.

Number of Outputs: 2  
Type: Isolated Current Sourcing (shared common)  
Available Ranges: 0-20 mA, 4-20 mA (menu selectable)  
Resolution: 16 bit  
Accuracy: 0.05% FS at 20 Degrees C  
Update Rate: 5 updates/sec  
Temperature Drift: Less than 200 ppm/C  
Maximum Load: 1000 ohms  
Compliance Effect: Less than .05% Span  
60 Hz rejection: 40 dB minimum  
EMI: No effect at 3 V/M  
Calibration: Operator assisted Learn Mode  
Averaging: User entry of DSP Averaging constant to cause a smooth control action

**Listing:** CE Compliant, UL/CSA Pending

## Serial Communication

The serial port can be used for printing, datalogging, modem connection, two way paging and communication with a computer.

RS-232:

Device ID: 01-99  
Baud Rates: 300, 600, 1200, 2400, 4800, 9600, 19200  
Parity: None, Odd, Even  
Handshaking: None, Software, Hardware  
Print Setup: Configurable print list and formatting

RS-485:

Device ID: 01-247  
Baud Rates: 300, 600, 1200, 2400, 4800, 9600, 19200  
Parity: None, Odd, Even  
Protocol: Modbus RTU (Half Duplex)

## Data Logging

The data logger captures print list information to internal storage for approximately 1000 transactions. This information can be used for later uploading or printing. Storage format is selectable for Comma-Carriage Return or Printer formats.

## Isolated Pulse output

The isolated pulse output is menu assignable to Uncompensated Volume Total, Compensated Volume Total, Heat Total or Mass Total.

Pulse Output Form (menu selectable): Open Collector NPN or 24 VDC voltage pulse  
Nominal On Voltage: 24 VDC  
Maximum Sink Current: 25 mA  
Maximum Source Current: 25 mA  
Maximum Off Voltage: 30 VDC  
Saturation Voltage: 0.4 VDC  
Pulse Duration: User selectable  
Pulse output buffer: 8 bit  
Fault Protection  
Reverse polarity:  
Shunt Diodes  
Over-current Protected  
Over-voltage Protected

## Real Time Clock

The Flow Computer is equipped with a non-volatile real time clock with display of time and date.

Format:

24 hour format for time  
Day, Month, Year for date

