

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
- 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, OLED and VFD ordering options
Character Size: 0.2” nominal
User selectable label descriptors and units of measure

Keypad

Keypad Type: Membrane Keypad with 116 keys
Keypad Rating: Sealed to NEMA 4X / IP65

Enclosure

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

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.

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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: 0.02% 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: 500V 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 Ω 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: 0.25Hz (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.

Termination: Terminal Block

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

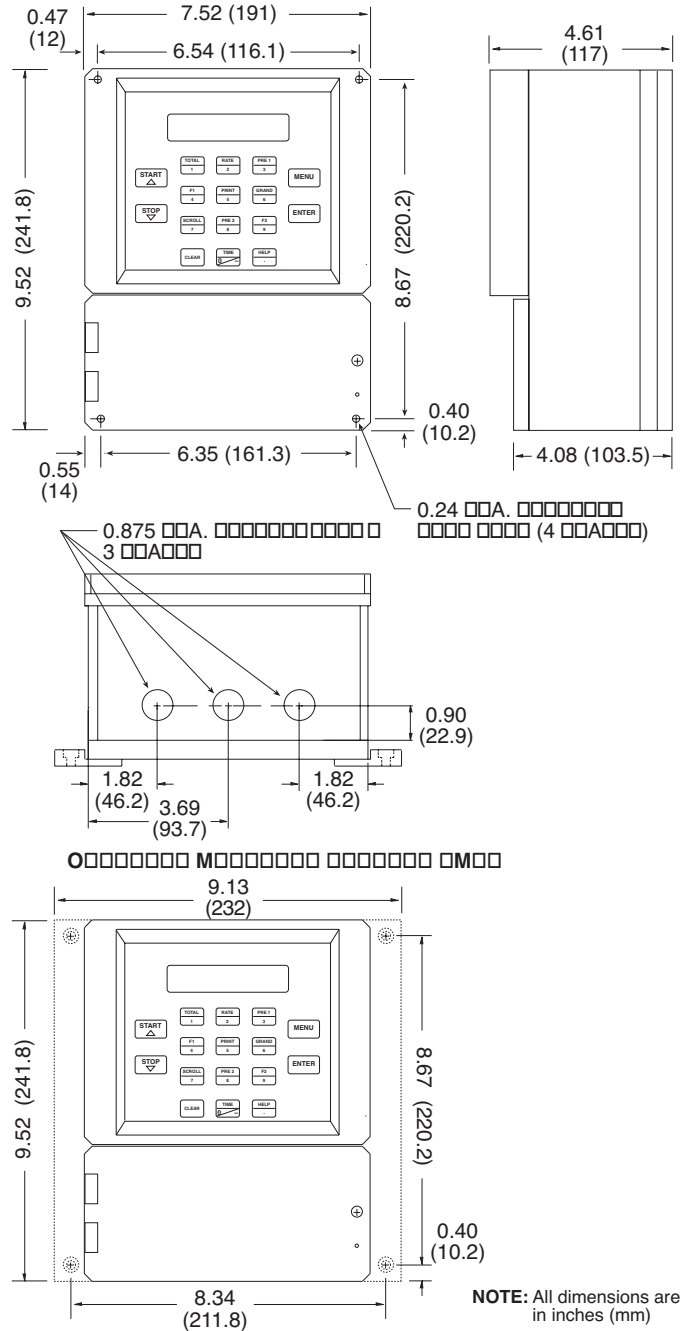
Real Time Clock

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

Dimensions



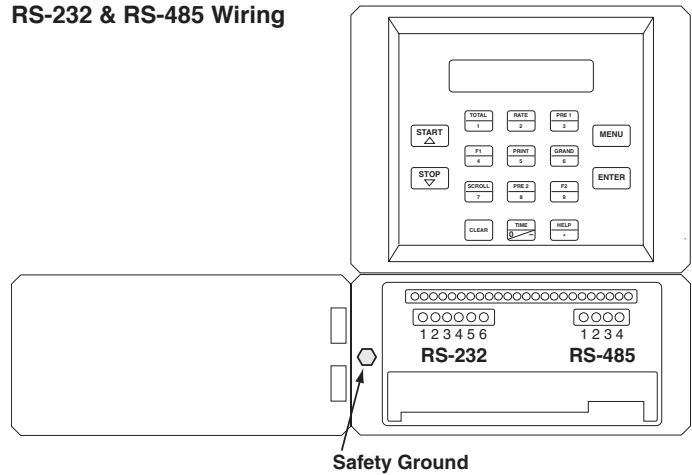
Terminal Designations

Two Relay Wiring

• 1 DC OUTPUT		FLOW
• 2 PULSE IN	V in (+)	IN
• 3 -----	I in (+)	
• 4 COMMON		
• 5 RTD EXCIT (+)		TEMP.
• 6 RTD SENS (+)		IN
• 7 RTD SENS (-)	I in (+)	
• 8 DC OUTPUT		
• 9 RTD EXCIT (+)		PRESSURE
• 10 RTD SENS (+)	(TEMP2)	IN
• 11 RTD SENS (-)	I in (+)	
• 12 PULSE OUTPUT (+)		
• 13 PULSE OUTPUT (-)		
• 14 ANALOG OUTPUT 1 (+)		
• 15 ANALOG OUTPUT 2 (+)		
• 16 ANALOG OUTPUT COMMON (-)		
• 17 NO		
• 18 COM RLY1		
• 19 NC		
• 20 NC		
• 21 COM RLY2		
• 22 NO		{22307b}
• 23 L1 / AC LINE	L+/DC (+)	POWER
• 24 N / AC LINE	L-/DC (-)	IN

— Bronze Safety Ground Screw

RS-232 & RS-485 Wiring



Safety Ground

RS-485 Wiring

- 1 Transmit (+)
- 2 TX-180 Ref
- 3 Transmit (-)
- 4 G 180 Ref

RS-232 Wiring

- 1 Transmit
- 2 Receive
- 3 Ground
- 4 MP.
- 5 DCD
- 6 Do Not Use

Three Relay Wiring

• 1 DC OUTPUT		FLOW
• 2 PULSE IN	V in (+)	IN
• 3 -----	I in (+)	
• 4 COMMON		
• 5 RTD EXCIT (+)		TEMP.
• 6 RTD SENS (+)		IN
• 7 RTD SENS (-)	I in (+)	
• 8 DC OUTPUT		
• 9 RTD EXCIT (+)		PRESSURE
• 10 RTD SENS (+)	(TEMP2)	IN
• 11 RTD SENS (-)	I in (+)	
• 12 PULSE OUTPUT (+)		
• 13 PULSE OUTPUT (-)		
• 14 ANALOG OUTPUT 1 (+)		
• 15 ANALOG OUTPUT 2 (+)		
• 16 ANALOG OUTPUT COMMON (-)		
• 17 NO		
• 18 COM RLY1		
• 19 C		
• 20 NO RLY3		
• 21 COM		
• 22 NO RLY2		{22554b}
• 23 L1 / AC LINE	L+/DC (+)	POWER
• 24 N / AC LINE	L-/DC (-)	IN

— Bronze Safety Ground Screw

Ordering Information

Example MS-748 L 1 0 V TB

Series: _____

MS-748 = Flow Computer

Display Type: _____

L = LCD
O = OLED
V = VFD

Input Power: _____

1 = 85 to 276 VAC
3 = 24 VDC (16 to 48 VDC)

Network Card: _____

0 = None
1 = RS485/Modbus (optional 2nd COM port)

Mounting: _____

V = Field, Skid, Vehicle Mount

Options: _____

- 1 = Peak Demand
- 2 = AGA NX-19 calculation for natural gas
- 3 = Three Relays
- 4 = Stacked DP option
- 5 = Datalogger option (consult factory)
- 6 = Stack Emissions Controller option
- 7 = Manifold Flowmeter Controller option
- 9 = 3 Relay Super Chip (options 1, 2, 4, 6, 7)
- 10 = 2 Relay Super Chip (options 1, 2, 4, 6, 7)
- 13 = Superchip; 2 relay, Positive heat only
- 14 = Superchip; 3 relay, Positive heat only
- ET = Extended Temperature; -4°F to 131°F (-20°C to 55°C)
- IM = Internal Modem
- M = Modem Power Option
- TB = RS485 Terminal Block for Panel Mount Enclosure
- TU = Translation Utility Disk

Accessories:

OPC/DDE Server for RS232 Port available, see EX5-UCOND-NA00
 OPC/DDE Server for Modbus Suite available, see EX5-MDBUS-NA00
 Modem Available, see MPP-56KN and MPP-2400N
 Serial printer available, see P1000, P295
 Ethernet Port Server available, see IEPS
 Ethernet Port Server Modbus TCP available, see ADAM4572
 RS-422/485 to RS-232 Communication Adapter available, see CA285
 RS232 Extender Cable: P/N=13220-<length in inches>