

# 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  $\Omega$  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: 0.25Hz (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





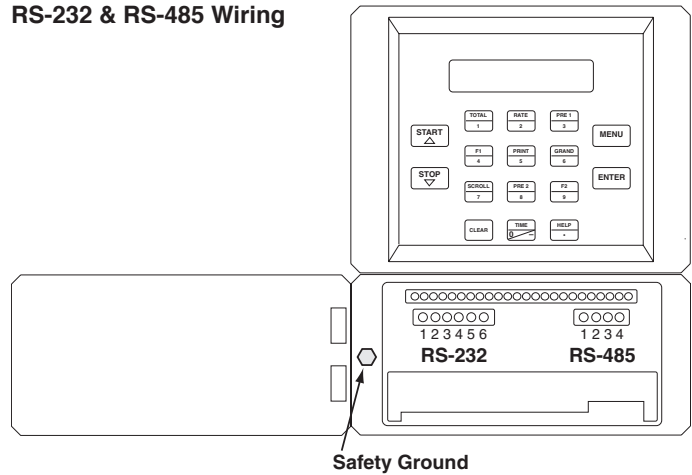
## Terminal Designations

### 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)	
• 11 RTD SENS (-)	I in (+)	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)	
• 11 RTD SENS (-)	I in (+)	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>