Process Panel Display

Dual-Line Rate and Total

measuring • monitoring • analyzing

MPV

- Pulse or Analog Inputs
- Displays Rate and Total Simultaneously
- Square Root Extraction
- 5, 10, or 24 V_{DC} Flowmeter Power Supply
- K-Factor, Internal Scaling, or External Calibration
- 32-point Linearization with Free Software
- Open Channel Flow with Programmable Exponent
- Gate Function for Rate Display of Slow Pulse Rates
- Isolated 24 V_{DC} @ 200 mA Transmitter Power Supply
- On-board Digital Input
- Modbus® RTU Communication Protocol

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Description

The MPV is designed for simultaneous display of both the flow rate and total for flowmeters with analog or pulse outputs. The upper display can be programmed to display flow rate, total, or grand total and the lower display can be programmed to display flow rate, total, grand total, engineering units, custom legends, or can be turned off. Both displays are also capable of displaying relay set points, or maximum and minimum values. They are also able to provide power to the flowmeter. The MPV features a rugged design with a unique front panel that is nearly impenetrable in typical applications. Set-up is easy with the user-friendly dual line display.

Specifications

Display: Upper Display: 0.60" (15 mm) high. Lower Display: 0.46" (12 mm) high. Both are 6 digits (-99999 to 999999), red LEDs

Intensity: 8 Intensity Levels, User Adjustable

Update Rate: 5/second (200 ms)

Overrange: Flashes 999999

Underrange: Flashes -99999

Display Assignment: The upper and lower displays may be assigned to rate, total, grand total, alternate (rate/total, rate/grand total, rate/units, total/units, and grand total/units), max/min, units (lower display only), set points, or Modbus® input. Additional displays are available if parameter total is off, and parameter d-SCAL is on: gross, alternating gross/net, PV1, PV2, and PCT

Front Panel: NEMA 4X, IP 65

Programming Methods: Four front panel buttons, digital inputs, PC and MeterView Pro software, Modbus® registers, or cloning using 'Copy' function.

Noise Filter: Programmable from 2 to 199 (0 disables)

Filter Bypass: Programmable from 0.1 to 99.9% of span

Recalibration: Calibrated by factory, recommended to recalibrate at least every twelve months

Max/Min Display: Max (peak) and Min (valley) readings are stored until user reset of power to meter is cycled

Password: Three programmable passwords restrict modification of programmed settings and two prevent resetting the totals

Non-Volatile Memory: All programmed settings are stored in non-volatile memory for a minimum of ten years if power is lost

Power Options: 85-265 V_{AC} 50/60 Hz, 90-265 V_{DC} 20 W max, or jumper selectable 12/24 V_{DC} ±10%, 15 W max.

Isolated Transmitter Power Supply: Terminals P+ & P-: 24 VDC ± 10%. 12/24 V_{DC} powered models selectable for 24, 10, or 5 V_{DC} supply (internal jumper J4). 85-265 V_{AC} models rated @ 200 mA max, 12/24 V_{DC} powered models rated @ 100 mA max, @ 50 mA max for 5 or 10 V_{DC} supply

Normal Rejection Mode: Greater than 60 dB at 50/60 Hz

Isolation: 4 kV input/output-to-power line, 500 V input-to-output or output-to-P+ supply

Operating Temp. Range: -40...149 °F

Storage Temp. Range: -40...185 °F

Relative Humidity: 0 to 90% non-condensing

Connections: Removable screw terminal blocks accept 12 to 22 AWG wire, RJ45 for external relays, digital I/O, and serial comm. adapters

Enclosure: 1/8 DIN, high impact plastic, UL-94V-0

Mounting: 1/8 DIN panel cutout required, 3.622" x 1.772", bracket assemblies included

Tightening Torque: Screw terminal connectors, 5 lb/in

Dimensions: 4.68" x 2.45" x 5.64"

Weight: 9.5 oz (269 g)

UL File Number: UL & c-UL Listed. E513096; 508 Industrial Control Equipment.

Warranty: 3 years parts & labor

*Except where noted all specifications apply to operation at 77 °F.

Analog Input

Inputs: Field selectable: 0-20, 4-20 mA, ±10 V_{DC} (0-5, 1-5, 0-10 V), Modbus PV (Slave)

Accuracy: ± 0.03% of calibrated span ±1 count, square root & programmable exponent accuracy range: 10-100% of calibrated span

Temperature Drift: 0.005% of calibrated span/°C max from 0 to 65°C ambient, 0.01% of calibrated span/°C max from -40 to 0°C ambient

Signal Input Conditioning: Linear, square root, programmable exponent, or round horizontal tank volume calculation

Multi-Point Linearization: 2 to 32 points

Programmable Exponent: 1.0001 to 2.9999

Low-Flow Cutoff: 0-999999 (0 disables)

Decimal Point: Up to five decimal places or none (x.xxxxx, xx.xxxx, xxx.xxx, xxxx.xx xxxxx.x, xxxxxx)

Calibration Range:

Input Range	Min Span Input 1 & 2
4-20 mA	0.15 mA
± 10 V	0.10 V

*Error message appears if input signals are too close

Input Impedance: Voltage ranges: > 1 MΩ, Current ranges: 50-100 Ω (depending on resettable fuse impedance

Input Overload: Current input protected by resettable fuse, 30 V_{DC} Max, reset after fault is removed

Pulse Inputs

Inputs: Field selectable: pulse or square wave 0-5 V, 0-12 V, or 0-24 V @ 30 kHz; TTL; open collector 4.7 kΩ pull-up to 5 V @ 30 kHz; NPN or PNP transistor, switch contact 4.7 kΩ pull-up to 5 V @ 40 Hz; coil (sine wave) 40 mVp-p min @ 10 kHz; Modbus® PV (Slave)

Low Voltage Mag. Pick-up: Isolated, sensitivity of 40 mVp-p to 8 Vp-p

Min. Input Frequency: 0.001 Hz (Min. frequency depends on high gate setting)

Max. Input Frequency: 30,000 Hz (10,000 for low voltage mag. pick-up)

Pulse Inputs Continued

Input Impedance: Pulse input is >300 kΩ @ 1 KHz, open collector/switch input is 4.7 kΩ pull-up to 5 V

Accuracy: ± 0.03% of calibrated span ±1 count

Display Update Rate: Total: 10/sec, Rate: 10/sec to 1/1000 sec

Temperature Drift: Not affected by changes in temperature

Multi-Point Linearization: 2 to 32 points

Low-Flow Cutoff: 0-999999 (0 diasbles)

Decimal Point: Up to five decimal places or none

Calibration: May be calibrated using K-factor, scale using internal calibration, or calibrate by applying an external calibration signal

K-Factor: Field programmable K-factor converts input pulses to rate in engineering units, may be programmed from 0.00001 to 999,999 pulses/unit

Calibration Range: Input 1 signal set anywhere, input 2 set above

Filter: Programmable contact de-bounce filter, 40 to 999 Hz max. input frequency

Time Base: Second, minute, hour, day

Low Gate: 0.1 to 99.9 seconds

High Gate: 2.0 to 999.9 seconds

Rate/Totalizer

Rate Display Indication: 0 to 999999, “R” LED illuminates

Total Display & Total Overflow: 0 to 999,999, “T” LED illuminates and “GT” for grand total, up to 999,999,999 with total-overflow feature

Total Decimal Point: Up to five decimal places or none, total decimal point is independent of rate decimal point

Totalizer: Calculates total based on rate and field programmable multiplier to display total in engineering units, time base must be selected according to the time units in which the rate is displayed, selectable up/down count

Totalizer Rollover: When display exceeds 999,999,999 relay status reflects the display value

Total Overflow Override: Program total reset for automatic with 0.1 second delay and set point 1 for 999,999

Rate/Totalizer Cont.

Totalizer Presets: Up to 8, user selectable, any set point can be assigned to total and be programmed anywhere in the meter range

Total Reset Delay: 0.1...999.9 seconds, applied to first relay assigned to total or grand total, if meter is programmed to reset total to zero automatically when preset is reached then a delay will occur before total is reset

Total Reset: Via front panel button, external contact closure on digital inputs, automatically via user selectable preset value and time delay, or through serial communications

Total Reset Password: Total and grand total passwords may be entered to prevent resetting the total or grand total from the front panel

Non-Resettable Total: The grand total can be programmed as a non-resettable total by entering the password "050873"

Caution: *Once the grand total has been programmed as non-resettable, it can't be disabled*

Relays

Rating: 2 or 4 SPDT (Form C) internal and/or 4 SPST (Form A) external; rated 3 A @ 30 V_{DC} and 125/250 V_{AC} resistive load; 1/14 HP (≈ 50 watts) @ 125/250 V_{AC} for inductive loads such as contactors, solenoids, etc

Noise Suppression: Recommended for each relay contact switching inductive loads

Relay Assignment: May be assigned to rate, total, grand total

Deadband: 0-100% of span, user programmable

High or Low Alarm: Program any alarm for high or low trip point, unused alarms and relays can be turned off

Relay Operation: Automatic (non-latching), latching (requires manual acknowledge), sampling (based on time), pump alternation control (2 to 8 relays), off (disable unused relays and enable interlock feature, manual on/off control mode)

Relay Reset: User selectable via front panel buttons digital inputs, or PC
1) Automatic reset only (non-latching) when input passes reset or total reset to 0
2) Automatic + manual reset at any time (non-latching)
3) Manual reset only, anytime (latching)
4) Manual reset after alarm clears (latching)

Relays Cont.

Note: *Front panel button or digital input may be assigned to acknowledge relays programmed for manual reset*

Time Delay: 0 to 999.9 seconds, on & off relay time delays, programmable and independent for each relay

Fail Safe Operation: Programmable and independent for each relay

Note: *Relay coil energized in non-alarm condition, in case of power failure, relay goes to alarm state*

Auto Initialization: When power is applied to meter, relays reflect state of input to meter

Isolated 4-20 mA Transmitter Output

Output Source: Process variable (PV), max, min, set points 1-8, manual control setting, or Modbus® input

Scaling Range: 1.000 to 23.000 mA for any display range

Calibration: Factory calibrated: 4.000 to 20.000 = 4-20 mA output

Analog Output Programming: 23.000 mA Max for all parameters: overrange, underrange, max, min, break

Accuracy: ± 0.1% of span ± 0.004 mA

Temperature Drift: 0.4uA/°C max from 0 to 65 °C ambient, 0.8 uA/°C max from -40 to 0 °C ambient

Note: *analog output drift is separate from input*

Isolated Transmitter Power Supply: Terminals I+ & R: 24 VDC ± 10%, may be used to power the 4-20 mA output or other devices, all models rated @ 40 mA max.

External Loop Power Supply: 35 VDC Max

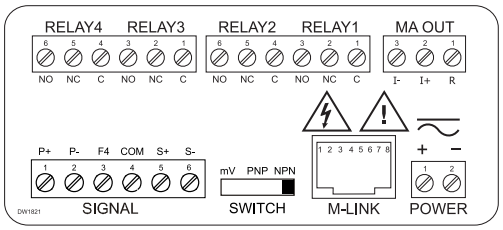
Output Loop Resistance: Loop Resistance

Power Supply	Minimum	Maximum
24 V_{DC}	10 Ω	700 Ω
35 V_{DC}	100 Ω	1200 Ω

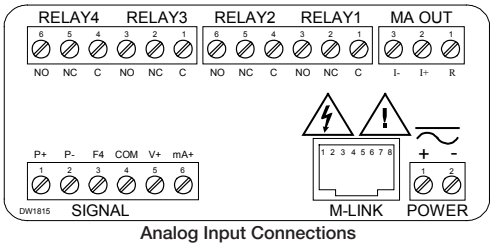
Serial Communications

Protocol:	Modbus® RTU
Meter Address Slave ID:	1-247
Baud Rate:	300-19,200 bps
Transmit Time Delay:	Programmable, between 0 and 199 ms or transmitter always on for RS-422
Data:	8 bit (1 start bit, 1 or 2 stop bits)
Parity:	Even, odd, or none with 1 or 2 stop bits
Byte-to-byte Timeout:	0.01-2.54 seconds
Turnaround Delay:	Less than 2 ms (fixed)

Connections



Pulse Input Connections



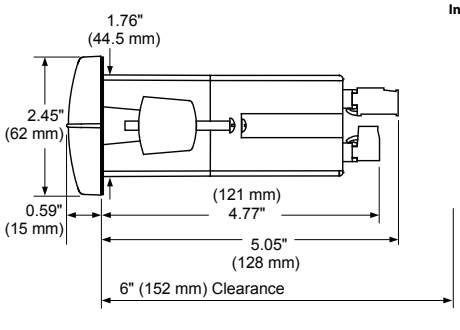
Analog Input Connections

Order Details (Example: **MPV-4 5 2 4 R X**)

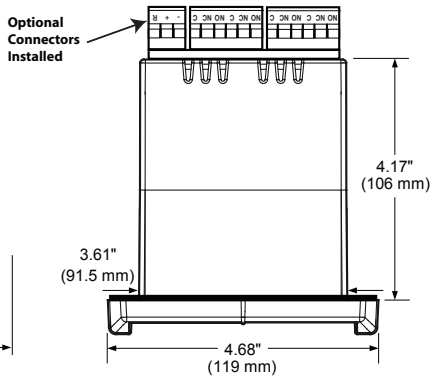
Model	Function	Operating Voltage	Input Signal	Output	Options
MPV-..	**..1..** = Rate and Total **..4..** = Batching	**..3..** = 12-36 V_{DC} **..5..** = 85-265 V_{AC}	**..1..** = Pulse Input **..2..** = Analog Input	**..0** = None* **..2** = Two SPDT Relays* **..3** = 4-20 mA* **..4** = Four Relays **..5** = 4-20 mA & Two SPDT Relays **..7** = 4-20 mA & Four SPDT Relays	**..B** = RS-422/485 Serial Adapter **..E** = Custom Set-up **..G** = Meter Copy Cable **..R** = 4x Relay Expansion Module **..S** = Digital I/O Expansion Module **..X** = NEMA 4X Enclosure

*Output Option Only Available for MPV-1 Models

Dimensions



Side View



Top View