

# MINITROL-PW

## Totalizer/Ratemeter for Paddle or Pelton Wheel Turbine Flowmeters

### Features

- Display Rate & Total  
Flowrate Display =  $\frac{\text{Input Frequency} + \text{Offset B}}{\text{Factor A}}$
- Pulse Input - 10 kHz Max.
- 30mV Magnetic Pickup Inputs (optional)
- Security Lockout
- RS422/RS232 Serial Communication (optional)
- NEMA 4X / IP65 Front Panel
- 4-20mA or 0-20mA Analog Output (optional)
- CSA Approved

### DESCRIPTION:

The Minitrol-PW is a single input counter/ratemeter intended for use with low flow paddle or pelton wheel turbine flowmeters. Two scale factors are used to describe the flowmeter calibration characteristics. The two 5 AMP preset relay outputs can be programmed by the user to apply to the "A" total counter or the "A" ratemeter. The user can view the rate, total and grand total.

### SPECIFICATIONS:

**DISPLAY:** 6 digit, 0.55" High LED

#### INPUT POWER:

110 VAC  $\pm$  15% or 12 to 15 VDC  
220 VAC  $\pm$  15% or 12 to 15 VDC  
24 VAC  $\pm$  15% or 12 to 15 VDC

**CURRENT:** 250 mA DC max. or 6.5 VA AC

**OUTPUT POWER** (AC powered units only)

+12 VDC @ 50 mA, unregulated -10 + 50%

#### TEMPERATURE:

Operating:

+32°F (0°C) to +130 F (+54°C)

Storage:

-40 F (-40°C) to +200°F (93°C)

**MEMORY:** EEPROM stores data for 10 years if power is lost.

#### INPUTS:

3: High Impedance DC pulse input 4-30 VDC (high), Open or 0-1 VDC (low), 10 K $\Omega$  imp. 10 kHz max. speed.

3M: Mag. Input, Rate/total input only, accepts 30mV input (50 V max. P/P) signals 10 K $\Omega$  imp. 5 kHz max. (Inhibit input, 4-30V)

**NOTE:** The Mag. input has filtering as follows: up to 300Hz @30mV, 5KHz @ .25V to 50V max.

#### INHIBIT TOTAL INPUT

Terminal 6: 4-30 VDC level will inhibit totalization

#### RESET:

Front Panel: Resets displayed value and control output

Remote: 4-30 VDC, negative edge resets Totalizer (Total A) and control output

**NOTE:** The remote reset will not reset Grand Total (Total B)

**Listing:** CSA (File No. LR91109), CE Compliant ,  
NRTL/C pending

#### K FACTOR/SCALING

The K-Factor is used to convert the input pulses to engineering units. The two 5 digit scale factors, with decimal keyed into any position, allow easy direct entry of any scaling factor from 0.0001 to 99999. Factor A is used to enter the linearized K-Factor and Factor B is used to enter the offset frequency.



### LOW FLOW CUTOFF:

A low flow cutoff is provided to inhibit operation in low flow out of range regions.

### CONTROL OUTPUTS:

Relays:

The relays may be assigned to rate or total.

2 each N.O. Relay; 5 Amps 120/240 VAC or 28 VDC. (N.C. relay contacts and NPN transistor output available with solder jumpers.

Analog Output:

An optional 4-20mA (0-20mA) output is available for the Minitrol series. The output can be programmed to track rate or total. This feature is available by adding suffix A to the part number. Connections are via a 2 terminal pluggable screw connector. Programming is accomplished by using the front panel in conjunction with rear dip switches.

Accuracy:  $\pm$  0.25% FS worst case.

Compliance Voltage: 3 to 30 VDC non inductive.

### RS232/RS422 SERIAL INTERFACE

If the serial interface option is supplied, up to 99 units can be linked together. (The terminal addressing the unit must be capable of driving all loads in the loop.) Unit status and new set points can be communicated by serial communication. Mode changes, however, must always be made on the front panel. Data is transmitted at selected baud rates using standard seven bit ASCII characters and parity with two additional bits of "Start" and "Stop" to make up the standard ten bit character.

Data is received and transmitted over standard EIA RS232 or RS422 levels. Each 10 bit character is made up of a start bit, 7 bit ASCII code, parity bit and stop bit. Unit number, baud rate and parity are entered in the "Program Setting" set up mode and remain in memory even if power is off.

Note that the input impedance of RS232 is 3K or 7K Ohm worst case. The terminal addressing the unit must be capable of driving all loads in the loop. RS422 input impedance is much higher and there is usually no problem driving 25 units. Unit serial transmit line remains in a high impedance "OFF" state until addressed. A print list can be triggered by external switch.

### PRESETS

Two control outputs are provided. To set relay values, press "menu" button until "Relay" appears on the display, the A and B outputs can be assigned to the rate alarm (high/low), or for total (A) or grand total (B). A 5 digit value can be entered for both presets and the decimal point location is the same as the counter. The outputs can be set to energize from 0.1 to 99.9 seconds or latch (0.0). If a value other than 0.0 is entered, the totalizers will auto reset at the preset. This may be used to create a relay pulse output instead of grand total.

### LOCKOUT

Unauthorized front panel changes can be prevented by entering a user selected 5 digit code, in the "LOC" , . mode. The front panel can be completely locked out or the presets can remain accessible.

### RATEMETER

Accurate to 4 1/2 digits (±1 display digit). The rate meter can be programmed to accept almost any number of pulses per unit of measurement and auto-range up to 5 digits of significant information. The display can be programmed to read in units per Second (SEC), Minute (MIN), Hour (Hour), or Day (DAY).

### COUNTER

The two 6-digit totalizers can count at 10kHz speed. They share a 5-digit dividing scale factor. The totalizer performs as follows:

#### If Freq. In > Cutoff

$$\text{Total increment} = \frac{\text{Freq. Offset} \cdot \Delta \text{Time}}{\text{K Factor A}} + \frac{\text{Pulses In}}{\text{K Factor A}}$$

$$\text{Rate} = \frac{(\text{Freqin} + \text{Freq offset}) \cdot \text{time base}}{\text{K Factor A}}$$

Time base: Sec =1, Min = 60, Hour = 3600, Day = 86400

#### If Freq. In < Cutoff

$$\text{Total Increment} = 0$$

$$\text{Rate} = 0$$

Total B (grand total) increments with Total A.

### THEORY OF OPERATION

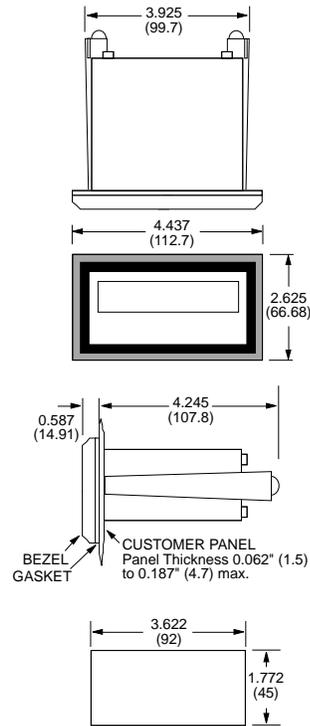
Low flow, Pelton Wheel turbine flowmeters have a transfer characteristic which can best be represented by the following equation for frequencies above the minimum usable flowrate for the device:

$$\text{frequency} = \left( \frac{K_{\text{linearized}} \cdot \text{GPM}}{60} \right) - \text{Offset Frequency}$$

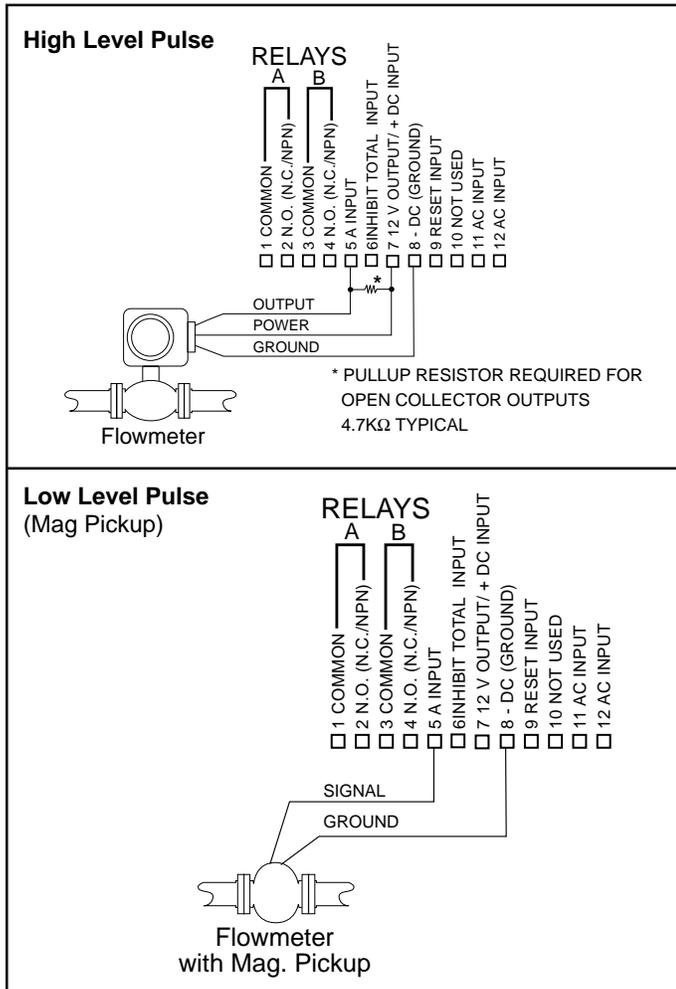
Where:  $K_{\text{linearized}}$  and offset frequency are scaling constants determined during flow sensor calibration.

This transfer characteristic applies within the meter manufacturers published range. Below some minimum flow meter output frequency, the flow rate should be considered as 0 and the totalization inhibited. This is called the "cutoff" frequency.

#### Dimensions:



### TYPICAL SENSOR HOOKUP



### Ordering Information

**Example:** MRTPW A 3 1

**Series:** MRTPW= 6 digit counter / 5 digit ratemeter with presets and scaling.

**Operating Voltage:**  
A= 110 VAC ± 15% or 12 to 15 VDC  
B= 220 VAC ± 15% or 12 to 15 VDC  
C= 24 VAC ± 15% or 12 to 15 VDC

**Count Inputs:**  
3 = Standard, 4-30 VDC simultaneous inputs.  
3M = Mag. Input, rate/total input only, 30mV input (Inhibit input, 4-30V)

**Options**  
1= RS232 Communications  
2= RS422 Communications  
A= Analog Output (4-20/0-20 mA)  
CE = CE Compliant Version

**NOTE:** RS232/RS422 & Analog Output options can not be combined

**Accessories**  
XHV - Explosion proof housing (see accessories section)  
NEMA-1/8DIN- NEMA 4X enclosure (see accessories section)  
P1000- Serial Printer (see accessories section)  
Separate non keyboard panel order #34235  
Separate keyboard panel - order #34234