

# MRT (MINITROL)

## Features

- CSA Approved
- Separate Scaling Factors For A & B Inputs
- Display Rate & Total
- Pulse Input - 10 kHz Max.
- RS422/RS232 Serial Communication
- Modbus RTU RS422/RS485/RS232
- NEMA 4X / IP65 Front Panel
- Separate Add/Subtract Simultaneous Inputs
- Quadrature & U/D Direction Control Inputs

## Application:

Any rate, total or blending application where 2 preset alarms and scaling are required.

## Description:

The MINITROL is a 6 digit totalizer / ratemeter with two level, 5 digit preset alarm control of total or rate. Inputs A & B have separate scaling K-factors. The totalizer can be programmed for "A" subtract "B", "A" add "B" or A & B as separate totalizers, with display and control of the "net" total and rate of "A". The MINITROL is also available in 4 other versions. MC2: a two preset totalizer with scaling, MR2: a high/low alarm ratemeter with scaling; The "MC": a totalizing counter only, and the "MR": a rate meter display only. If only one input is required, the unit will display the total and rate from that one channel. The MINITROL can accept up to 10,000 pulses per second. It has a 5 digit floating decimal scale factor allowing total readout in true engineering units and rate per second, minute or hour.

Input "A" simultaneously drives a ratemeter which can be programmed to display the basic frequency (rate per second) or factored to show rate per minute or rate per hour. Simply push the "VIEW" button to see either total or rate without losing a count. Two separate 5 A relay contacts can be set to operate at either rate or total presets in a latch or auto-recycle mode with output timing from 0.1 to 99.9 seconds.

Two control outputs can be assigned to either the totalizer or ratemeter and can automatically recycle at the batch or stay latched until reset.

Up to 99 units can communicate to a host computer on a single RS232 or RS422 loop.

When two inputs are received (A & B), the unit can either add or subtract the two inputs or display the two inputs as separate totalizers.

## Low Cost, Pulse Input Totalizer/Ratemeter



- 30mV Magnetic Pickup Inputs
- 4-20mA or 0-20mA Analog Output

## 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

24VAC  $\pm$  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)

**Humidity:** 0-90% Noncondensing

**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. Accepts simultaneous inputs. May be used with KEP 711 series or 715-1 encoders or PD & D series sensors.
- 3M: Mag. Input, Input A only, accepts 30mV input (50 V max. P/P) signals 10 K $\Omega$  imp. 5 kHz max. (Input B, 4-30V)
- 3MB: Mag. Input, Inputs A & B, accepts 30mV input (50 V max. P/P) signals 10 K $\Omega$  imp. 5 kHz max.
- 5: 4-30 V Count pulses on Input A, 4-30 V Direction Control input (level) on Input B. May be used with KEP 715-2 Encoder.
- 5M: 30 mV Count pulses on Input A (50 V max. P/P) 4-30 V Direction Control input (level) on Input B.
- 9: Quadrature, accepts 4-30 V pulses with 90° phase shift for direction detection. May be used with KEP 716 encoder.
- 9MB: Quadrature, accepts 30 mV (50 V max. P/P) pulses with 90° phase shift for direction detection.

**Approvals:** CSA File# LR91109-7, CE Approved

**Reset:**

Front Panel:

Resets displayed value and control output

Remote:

4-30 VDC (75 - 240 V AC/DC, Input 8) negative edge resets Totalizer "A" and control output

**Control Outputs:**

Relays:

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. Transistor output is internally pulled up to 10 VDC through relay coil, sinks from 10 VDC to .5 V @ 100 mA)

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:  $\pm .25\%$  FS worst case.

Compliance Voltage: 3 to 30 VDC non inductive.

**Scaling Factor (K-Factor):** In the standard unit, a user programmable K-Factor is used to convert the input pulses to engineering units. The 5 digit K-Factor dividers, with decimal keyed into any position, allow easy direct entry of any K-Factor from 0.0001 to 99999. Separate factors may be entered for the 2 separate input channels.

**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 ratemeter (high/low), one preset for rate and one for total, or two presets (2 stage shut off) on the A and B totalizers. 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. In the A-B or A+B versions, the relays will be assigned to either net total or A rate.

**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:** Accuracy: 0.01% FS ( $\pm 1$  display digit).

The rate display updates once per second. The rate meter can be programmed to accept almost any number of pulses per unit of measurement, sample from 2 to 24 seconds maximum, and auto-range up to 5 digits of significant information. In the "RPS" mode, the ratemeter displays in units per second, and in the "scale" mode, units per hour or per minute. The unit will display the rate of the A Input only.

**Totalizer:** The two 6-digit totalizers can count at 10 kHz max. Each can have a 5-digit dividing scale factor. The totalizer advances on the positive edge of each pulse. Count up or down modes available, as are quadrature inputs from encoders for position or flow measurement. The unit can be programmed to view the net value of "A+B" or "A-B", or A and B as separate totalizers.

**RS232/RS422 with KEP Protocol:**

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 received and transmitted over standard EIA RS232 or RS422 levels. Unit number, baud rate and parity are entered in the "Program Setting" set up mode and remain in memory even if power is off.

**RS232/RS422/RS485 with Modbus RTU Protocol:**

The serial port can be used for serial printing or also for data acquisition. The unit can address up to 247 units (The terminal addressing the unit must be capable of driving all loads in the loop.) The unit can communicate with a master device through a Modbus-RTU protocol. The data given for each parameter is in IEEE float format comprising of 2 words. The unit can be connected in a network.

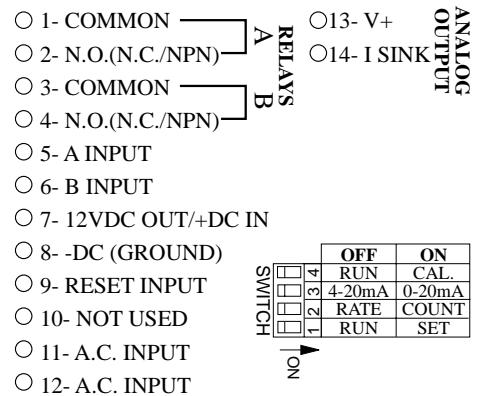
Device ID: 01-247

Baud Rates: 300, 600, 1200, 2400, 4800, 9600

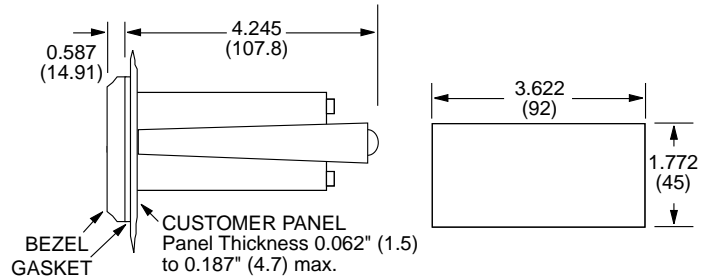
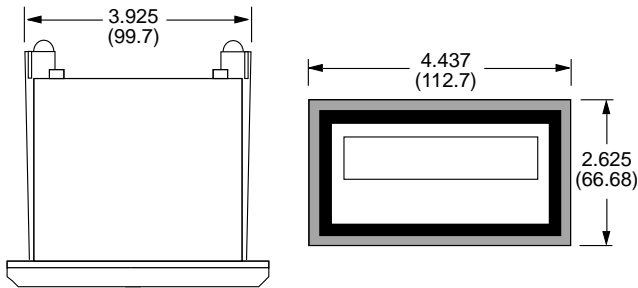
Parity: None, Odd, Even

Protocol: Modbus RTU (Half Duplex)

**Termination:**



**Mounting:**



Flow Instruments  
RATEMETERS/TOTALIZERS

**How To Order:**

**MINItrol (MRT, MC2, MR2)**

**Example:** MRT A 3 1 A

<b>Series:</b>	MRT= 6 digit counter / 5 digit ratemeter with presets and scaling.	A	3	1 A
	MC2= 6 digits, counter only with presets and scaling.			
	MR2= 5 digits, rate only with presets and scaling.			
<b>Operating Voltage:</b>				
	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			
<b>Count Inputs:</b>				
	3 = Standard, 4-30 VDC simultaneous inputs.			
	3M = Mag. Input, Input A only, 30mV input (Input B, 4-30V)			
	3MB = Mag. Input, Inputs A & B, 30mV input			
	5 = 4-30 V pulses on Input A, 4-30 V Direction Control input on Input B.			
	5M = 30 mV pulses on Input A, 4-30 V Direction Control input on Input B			
	9 = Quadrature, accepts 4-30 V pulses			
	9MB = Quadrature, accepts 30 mV pulses (A & B)			
<b>Options (Multiple Options Not Available)</b>				
	1= RS232 Communications			
	2= RS422 Communications			
	3= Modbus RTU RS232			
	4= Modbus RTU RS422/RS485			
	A= Analog Output (4-20/0-20 mA)			

**Accessories**

Separate non keyboard panel order #34235  
Separate keyboard panel - order #34237

**MINItrol (MR, MC)**

**Example:** MC H A 3 M (MR ONLY) 1

<b>Series:</b>	MR= 5 digits, rate display only no presets, no scaling	A	3	M (MR ONLY)	1
	MC= 6 digits, dual input, bi-directional counter only, no presets, no scaling				
<b>Input Speed:</b>					
	L = Low speed input debounce filter 40 Hz max.				
	H = High speed input (0 to 9.99 kHz)				
<b>Operating Voltage:</b>					
	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				
<b>Count Input:</b>					
	3 = Standard, 4-30 VDC simultaneous inputs.				
	3M = Mag. Input, Input A only, 30mV input (Input B, 4-30V)				
	3MB = Mag. Input, Inputs A & B, 30mV input				
	5 = 4-30 V pulses on Input A, 4-30 V Direction Control input on Input B.				
	5M = 30 mV pulses on Input A, 4-30 V Direction Control input on Input B				
	9 = Quadrature, accepts 4-30 V pulses				
	9MB = Quadrature, accepts 30 mV pulses (A & B)				
<b>Rate Time Base: MR ONLY</b>					
	S= RPS (rate per second)				
	M= RPM (rate per minute)				
	H= RPH (rate per hour)				
<b>Options: (Multiple Options Not Available)</b>					
	1= RS232 Communications				
	2= RS422 Communications				

**Options: (Multiple Options Not Available)**

1= RS232 Communications  
2= RS422 Communications

**Accessories**

Separate non keyboard panel order #34235  
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