



**CN08-2 TR28-2 TR29-2  
Digital Indicator-Totalizers**

**Programming Guide**



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## Introduction

This digital unit is a battery-powered device that accepts pulse inputs and simultaneously indicates both rate and total on a Liquid Crystal Display (LCD). The CN-08-2 offers separate scaling factors for rate and total calculations, which are stored in non-volatile memory along with the totalizer count. The totalizer is updated to non-volatile memory every 60 minutes.

## Front Panel Operations

### Normal Operation (Run Mode):

Under normal conditions, the display will show current flow rate and total flow. When the display timeout feature has been activated, the display is blank, but the totalizer keeps operating. To activate the display again, close the canopy lid momentarily and reopen. The display will remain on for the duration of the programmed timeout.

### Programming Mode:

1. To go into Programming mode, press the **PGM** key and hold for 5 seconds.
2. Use the **←** key to move the currently selected digit. The currently selected digit will blink. If the leftmost digit is selected and the **←** key is pressed, the rightmost digit becomes selected.
3. Use the **↑** key to increase the currently selected digit.
4. Use the **PGM** key to change the current menu item. The following is a list of menu items that can be adjusted:

#### Totalizer

- Scale factor (0001-9999)
- Scale factor decimal place (0 to 4 places)
- Totalizer display decimal point (0 to 4 places)

#### Rate Meter

- Scale factor (0001 – 9999)
- Scale factor decimal place (0 to 4 places)
- Rate display decimal point (0 to 4 places)
- Update time (0.5 to 9.5 seconds in 0.5s increments)
- Rate smoothing (0 to 99%, 0 = no smoothing)
- Display timeout (0 to 9999 seconds, 0 = no timeout)

#### 4-20 mA Analog Rate Output Scaling (TR-28-2)

- Zero Value 4mA (0 to 99999 – decimal point same as Rate Meter)
- Full Scale Value 20mA (0 to 99999 – decimal point same as Rate Meter)

#### Other

- Totalizer Reset

5. To return to Normal operation (Run Mode), press and hold the PGM key for 5 seconds. If no key is pressed for 120 seconds while in Programming Mode, the Normal operation is automatically resumed.

Visual Programming Guide

Menu	
1	
2	
3	
4	
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**All segments displayed** (for illustration only)  
 Hold the PGM key for 5 seconds to activate the programming mode. Then press the PGM key to navigate to the next menu. Use the ← and ↑ keys to select and change digits.

**Totalizer Scale Factor** (0001 to 9999)  
 Use this menu to set the digits only, use the next menu to set the decimal point for totalizer scale factor.

**Totalizer Scale Factor Decimal Point** (0-4 places)  
 This determines the decimal point for the totalizer scale factor (menu 1). Use the ← key to move the decimal point.

**Totalizer Display Decimal Point** (0-4 places)  
 This determines the location of the decimal point displayed during normal run mode. It has no effect on flow calculations. Use the ← key to move the decimal point.

**Rate Scale Factor** (0001 to 9999)  
 Use this menu to set the digits only, use the next menu to set the decimal point for rate scale factor.

**Rate Scale Factor Decimal Point** (0-4 places)  
 This determines the decimal point for the rate scale factor (menu 4). Use the ← key to move the decimal point.

**Rate Display Decimal Point** (0-4 places)  
 This determines the location of the decimal point displayed during normal run mode. It has no effect on flow calculations. Use the ← key to move the decimal point.

**Display Update Time** (0.5 to 9.5 seconds)  
 This menu determines the update speed for the display. 0.5 seconds is the default setting.

**Rate Display Smoothing** (0-99%)  
 This determines how much old rate is used for the new rate calculations. A higher number causes the rate display to change more slowly. This also affects the optional 4-20mA output.

**Display Timeout** (0-9999 seconds)  
 The display will blank after the specified timeout. A momentary darkness (lid closure) will activate the display again for the specified time duration. A value of 0000 disables the timeout.



**Analog Rate 4mA Value** (0 to 99999)  
 Program the 4mA to correspond to the rate shown in this screen.  
NOTE: This menu item will appear only when power has been applied to the optional 4-20mA output.



**Analog Rate 20mA Value** (0 to 99999)  
 Program the 20mA to correspond to the rate shown in this screen.  
NOTE: This menu item will appear only when power has been applied to the optional 4-20mA output.



**Reset (clear) the Totalizer to Zero**  
 The current Totalizer count is displayed on the bottom line.  
 Depress and hold the ⇐ key for 3 seconds to reset the Totalizer.  
NOTE: This function will not be accessible if the Totalizer reset has been disabled permanently.

## Flow Calculations

### Totalizer Scale Factor

$$TSF = \frac{PulsesPerTotalizerUnit}{TotalizerDisplayDPF}$$

The Totalizer Scale Factor (TSF) determines how many input pulses correspond to the change of one digit in the totalizer display.

*DisplayDPF table:*

Display	DPF
00000	1
0000.0	10
000.00	100
00.000	1000
0.0000	10000

For example, when the flowmeter flow sensor outputs 2.1 pulses per Gallon, a Totalizer Scale Factor value of 2.1 will cause the totalizer display to increment every Gallon. Similarly, to increment the totalizer count once every 100 Gallons (multiplier = 100), the Totalizer Scale Factor should be set to 210 (which is 2.1 x 100).

If the totalizer has a display decimal point (menu 3), the Totalizer Scale Factor must be divided by 10 for every increment of the display decimal point (see formula and table above).

### Rate Scale Factor

$$RSF = \frac{PulsesPerRateUnit}{SecondsInTimeUnit \cdot RateDisplayDPF}$$

The Rate Scale Factor (RSF) scales the incoming frequency to display the correct flowrate. A rate scale factor of 1 will cause the rate to display in Hz (pulses per second).

*TimeUnit table:*

TimeUnit	# of Seconds
SEC	1
MIN	60
HRS	3600
DAY	86400

For example, if the sensor produces 2.1 pulses per Gallon, and the desired display is in Gallons Per Minute (GPM), the Rate Scale Factor is 2.1 / 60 = 0.035. If the rate has a display decimal point (menu 6), the Rate Scale Factor must be divided by 10 for every increment of the display decimal point (see formula and table above).

If the frequency (in Hz) of the flow sensor output is known at any given flowrate, the Rate Scale Factor can be calculated using the following formula:

$$RSF = \frac{Frequency}{Flowrate \cdot RateDisplayDPF}$$

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Differential Pressure Flowmeters



Differential Pressure Flowmeters



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Canadian Patent 1325113  
Lit# 30110-17 Rev. 2.5/03-05

European Patent 0277121

U.S. Patents 4638672, 4812049, 5363699, 4944190 and 5,814,738  
Japan patent 1,858,116  
Printed in U.S.A.

Other U.S. and Foreign patents pending  
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