

# GBT

## Installation and Operating Manual



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"A Great Plains Ventures Subsidiary"

### Description

The Batcher is a programmable, microprocessor based unit which provides batch control, monitors flow rate and controls the flow of processing liquids. Start/Stop controls can be used in conjunction with prewarn and final relays to provide valve actuation or pump control. An optional configuration offers streamlined preset adjustments, remote Start, Stop & Reset, and weighted averaging.

### Features

- Start/Stop Buttons & Remote Inputs
- Separate 8 Digit K-Factors For Rate & Total
- Accepts Pulse Inputs
- Displays Rate, Total and Grand Total
- Security Lockout with Missing Pulse Detection
- Scaled Pulse Output
- 2 Setpoints For Two Stage Valve Control
- NEMA 4X (IP65) Front Panel



**GBT**

### Application

The unit is normally used for batch control or inventory tracking. The display may be toggled between batch, rate, and grand total. A programmable K-factor makes keying-in engineering units easy. The unit accepts pulse or contact closure inputs and provides two separate preset controls.

### Principle of Operation

The batcher receives an input from a pulse producing flowmeter through a sensor. The user programs the batcher to condition the incoming pulses signal and compute the batch flow and flow rate. A wide variety of different functions can then be performed based on the programmed configurations such as start/stop functions, totalizing, and/or flow rate monitoring.



## **SAFETY INSTRUCTIONS**

**The following instructions must be observed.**

- This instrument was designed and is checked in accordance with regulations in force EN 60950 (“Safety of information technology equipment, including electrical business equipment”).  
A hazardous situation may occur if this instrument is not used for its intended purpose or is used incorrectly. Please note operating instructions provided in this manual.
- The instrument must be installed, operated and maintained by personnel who have been properly trained. Personnel must read and understand this manual prior to installation and operation of the instrument.
- The manufacturer assumes no liability for damage caused by incorrect use of the instrument or for modifications or changes made to the instrument.

### **Technical Improvements**

- The manufacturer reserves the right to modify technical data without prior notice.

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## SECTION 1 INTRODUCTION

### 1-1 General Description

Featuring 8 digits of bright, .55 inch, alphanumeric display, the GBT can accept up to 20,000 pulses per second of digital count. The user, with the push of a button, can toggle the display to view the total of the batch, the rate of flow or the grand total of flow.

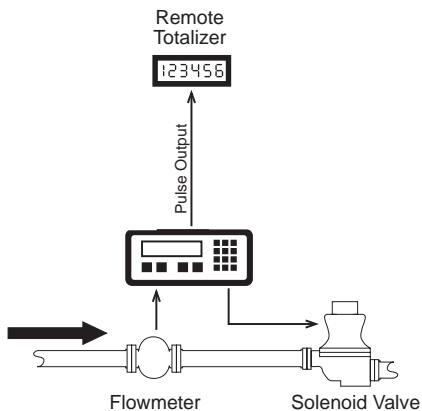
The GBT may be thought of as two separate counters and a ratemeter. The "batching" counter counts to prewarn and preset numbers entered by the user and enables separate control outputs.

The "totalizing" counter gives a cumulative reading or grand total. The ratemeter scales the input pulses to provide gallons per minute or any other rate measurement without the totalizer losing counts.

Setup is done through the front panel and the menu driven software in the unit. Start-Stop control can be activated via the front panel buttons or remote inputs.

The unit uses an EEPROM to hold data a minimum of 10 years if power is interrupted.

### 1-2 Typical Application



The above application involves liquid flow. The start button is pushed and the Batcher receives pulses from the flowmeter. The pulses are scaled by the K Factor and sent out via the pulsed output to an external counter. As the Prewarn is reached, the control valve partially closes. When the final Preset is reached the valve shuts down completely. At any time the flow can be suspended by hitting the stop button.

### 1-3 Principles of Operation

#### Presets

When the start button is pushed, two relays engage simultaneously to start flow. When the prewarn number is reached, one relay drops out. When the preset number is reached, the other relay drops out. The user may enter the two numbers when setting up the batch counter. The prewarn is set a certain number of counts less than the preset number. If the prewarn is set larger than the preset, the message "PREWRONG" will appear on the display.

#### Ratemeter

Accurate to 5 1/2 digits ( $\pm 1$  display digit). The ratemeter 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 6 digits of significant information. The ratemeter with a K Factor of 1 displays the rate of pulses per second. Simply dial in the proper K Factor to display in minutes, hours or other units of measurement. Press the C button, while the unit is displaying the batch, to display the rate; 'R' is displayed on the left side of the display.

#### K Factor

The K Factor is used to convert the input pulses or analog input into workable units. The 8 digit K Factor is a divider with a range of 0.00011 to 99999999 (the decimal point may be keyed into any position). Separate K Factors may be entered into the count and rate sections of the Batcher. Thus, you may batch in gallons and display rate in liters per hour. The maximum factored count speed is 20000 Hz. The maximum factored rate is 7 digits.

## 1-3 Principles of Operation (continued)

### **Counter**

The maximum count is 99999999. In the setup mode choose "RO" (Reset to Zero) for adding (count up) operation or "SP" (Set to Preset) for subtracting (count down) operation. At any time, the display can be made to flash the Grand Total by pressing the ENT button while in the run mode. Activating the CLR button while the Grand Total is flashing, resets the Grand Total counter.

### **Lockout**

Unauthorized front panel changes can be prevented by entering a user selected, four digit code, in the "Lockout" mode. The status of the unit can be observed but "LOCK ON" appears if changes are attempted. Entering the code again returns the unit to "LOCK OFF" status.

### **Frequency out**

The Batcher generates a pulse out for each factored count. An NPN transistor output (Pin 2), can drive external devices at rates of 10, 200, 2000 or 20000 counts per second as selected through the keypad menu. If the K Factor scaled inputs generate pulses faster than the output speed selected, an internal buffer will store up to 9,999 counts before "DATA LOST" flashes on the screen. This indicates that the counts being totaled and the scaled outputs may be incorrect. Note that all counts stored in the internal buffer will be pulsed out at the selected frequency even if the counter is reset.

## 1-4 STD PRE and EZ PRE Operation Modes

### **STD PRE and EZ PRE Operation Modes**

The batcher software allows the user to choose between STD PRE (Standard Preset) and EZ PRE (Easy Preset) operation modes. STD PRE operation is well suited for batch amounts that do not change, since the program mode must be entered to change the preset and the batch count must be cleared before starting a new batch. EZ PRE has been designed for users who frequently change the batch amount. During EZ PRE operation, the preset can be viewed and changed without entering the program mode and another batch can be started without resetting the unit.

**Note:** *Before a batch is started and after a batch is complete, the unit will continue to totalize all inputs.*

#### **Using STD PRE**

##### **Programming**

**Select STD PRE** - Go into the Program Mode and select STD PRE in the PRE TYP sub menu.

**Set the PRESET and PREWARN** - Go into the Program Mode and enter the desired values for the PRESET and the PREWARN.

**Program the Counter** - Go into the Program Mode and set up the counter in the COUNT sub menu.

##### **Operation**

**Start a Batch** - In the Run Mode, reset the total by pressing "CLR", then press "A" to start. When started, both relays energize and the counter begins to count. When the batch is complete, the relays drop out and the unit displays the amount that was batched (0 if in Set to Preset mode).

**Stop a Batch** - Press "B", to temporarily stop process by de-energizing the PRESET and PREWARN relays. Press start, "A", to continue process.

**Repeat a Batch** - In the Run Mode, reset the total and press the start button.

**Change the Batch Size** - Go to the Program Mode and enter new PRESET and PREWARN values.

#### **Using EZ PRE**

##### **Programming**

**Select EZ PRE** - Go into the Program Mode and select EZ PRE in the PRE TYP sub menu.

**Set the PRESET and PREWARN** - Go into the Program Mode and enter the desired values for the PRESET and the PREWARN.

**Program the Counter** - Go into the Program Mode and set up the counter in the COUNT sub menu.

##### **Operation**

**Start a Batch** - In the Run Mode, press "A" to start. When started, both relays energize and the counter begins to total. When complete, the relays drop out and the display flashes the current PRESET value.

**Stop a Batch** - Press "B", to temporarily stop process by de-energizing the PRESET and PREWARN relays. Press start, "A", to continue process.

**Repeat a Batch** - Press the start button.

**Change the Batch Size** - With the current PRESET flashing on the display, type a new number using the keypad. This number becomes the PRESET.

**Display Batch Total or Rate** - With the current PRESET flashing, press "ENT" to place the PRESET value in memory and use the "C" button to toggle between the Batch Total and the Rate.

## 1-5 Specifications

### Housing:

High impact plastic case with NEMA 4X front panel.

### Dimensions:

See Section 1-5, Page 4.

### Display:

8 Digit, 0.55" High, 15 Segment, Red Orange, LED.

### Input Power:

A: 110 VAC  $\pm$  15% or 12 to 27 VDC

B: 220 VAC  $\pm$  15% or 12 to 27 VDC

NOTE: AC Inputs are internally fused with a 160mA slow blow fuse.

### Current:

Maximum 280 mA DC or 5.3 VA at rated AC voltage.

### Output Power:

(On AC powered units only): +12 VDC at 100 mA. Separate Isolated 12 VDC at 100 mA to allow  $\pm$  12 VDC or +24 VDC, regulated  $\pm$  5% worst case.

### Temperature:

Operating: +32°F (0° C) to +130 ° F (+54° C)

Storage: -40°F (-40° C) to +200 ° F (+93° C)

(Extended operating temperature range available, consult factory)

### Memory:

EEPROM stores all program, display mode and count data for a minimum of 10 years if power is lost.

### Reset

Front push button: "CLR" resets displayed number and control output.

Remote Input (Terminal 5): Open or 0 to 1 VDC (low), 3 to 30 VDC (high), 10K ohm input impedance to ground. Minimum pulse on / off time 5 msec.

Accuracy over full temperature range:

Digital - 100% (within specified voltage ranges)

### Pulse Inputs:

Standard, High impedance pulse input.

Low: Open or 0 to 1 VDC

High: 3 to 30 VDC, 10K Ohm impedance

Count Speed (Switch selectable):

100 Hz, 1000Hz, 20000Hz

Termination Resistance (Switch selectable):

10K pull down, 4.7K pull up

### Factored Output:

One pulse per each factored count

Sinking (NPN Transistor)

Open Collector sinks 250 mA maximum to 1 volt maximum from 30 VDC maximum

Internal buffer: 9999 pulses

Output speed: user selectable (see table below)

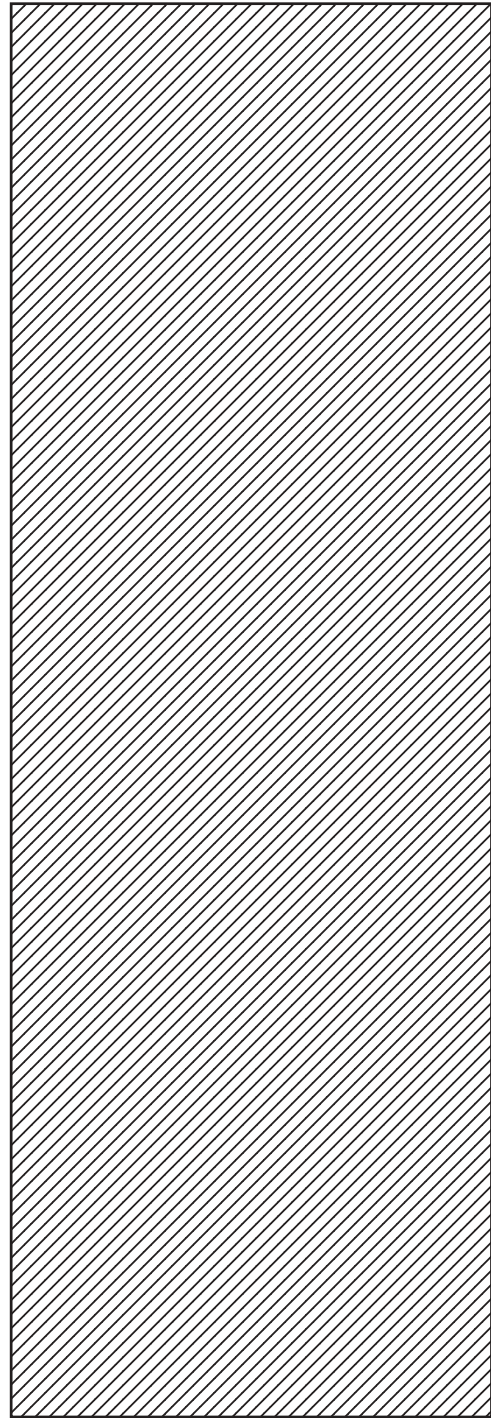
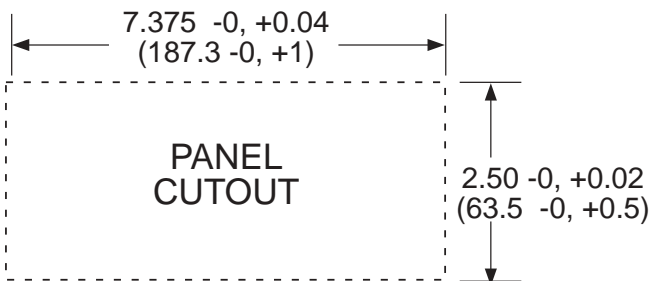
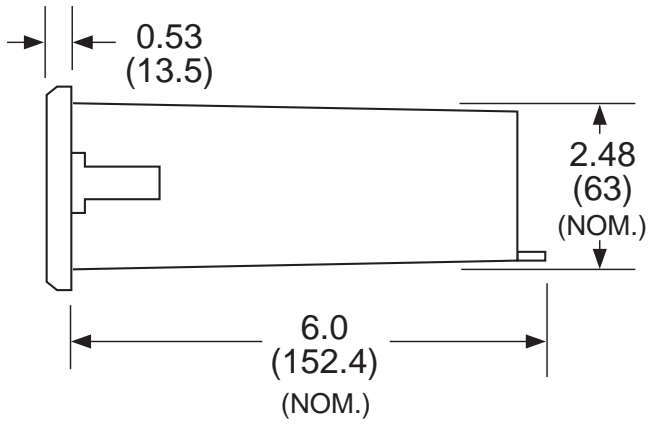
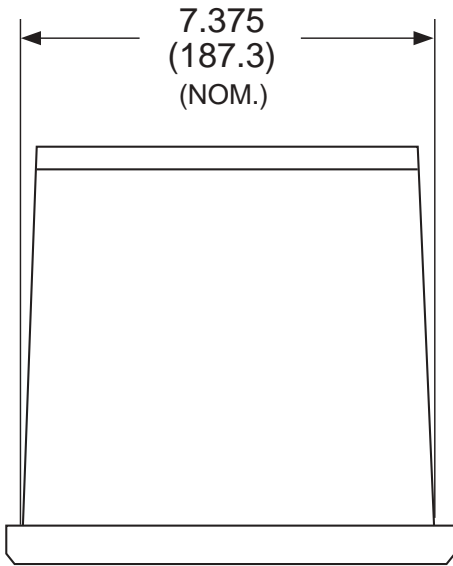
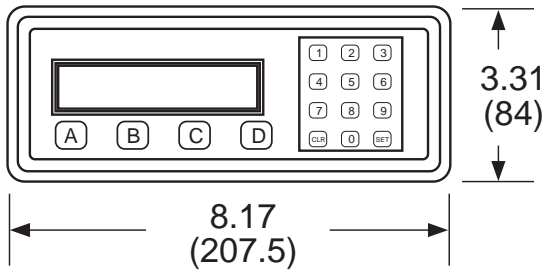
Speed (Hz)	10	200	2000	20000
Min. on/off (msec)	47.5	2.0	0.2	0.013

### Control Outputs:

SPDT Relays

Contact rating: 10 A 120/240 VAC or 28 VDC.

1-6 Dimensions



Full Size Panel Cutout Template  
 (copy before using)

## SECTION 2 INSTALLATION

### 2-1 Receipt of Equipment

When the equipment is received, the outside packing case should be checked for damage incurred during shipment. If the packing case is damaged, the local carrier should be notified at once regarding his liability. A report should be submitted to the factory.

Carefully remove the equipment from the packing case and inspect for damaged or missing parts.

### 2-2 Return Shipment

Do not return assembly or part with out a Return Material Authorization. The RMA is obtained by calling your local distributor.

### 2-3 Panel Mounting

The controller should be located in an area with a clean, dry atmosphere which is relatively free of shock and vibration. The Batcher is installed in a 7.365" (187 mm) wide by 2.495" (63.4 mm) high panel cutout. To mount the controller proceed as follows:

- a. Prepare the panel opening.
- b. Slip the gasket (provided) over the rear of the counter case and slide it forward until it engages the inner surface of the front bezel.
- c. Install the screws (provided) in the mounting brackets and insert in the holes located on both sides of the Batcher.
- d. Tighten the screws firmly to attach the counter bezel to the panel.

### 2-4 Electrical Connections (Reference Figures 2-1 to 2-3)

All connections are completed at terminal blocks located at the rear of the case. Make sure all power is disconnected before making any electrical connections. In cases where cables are situated in areas with heavy electrical fields, shielding is required for maximum noise immunity. One end of the shielding should be connected to earth ground. Relays or inductive coils connected to or located in the immediate area should be arc suppressed with appropriate diodes, MOV's or resistor capacitor networks.



**Caution:** An external fuse is required:

DC Power: 0.5 Amp

AC Power: 0.125 Amp

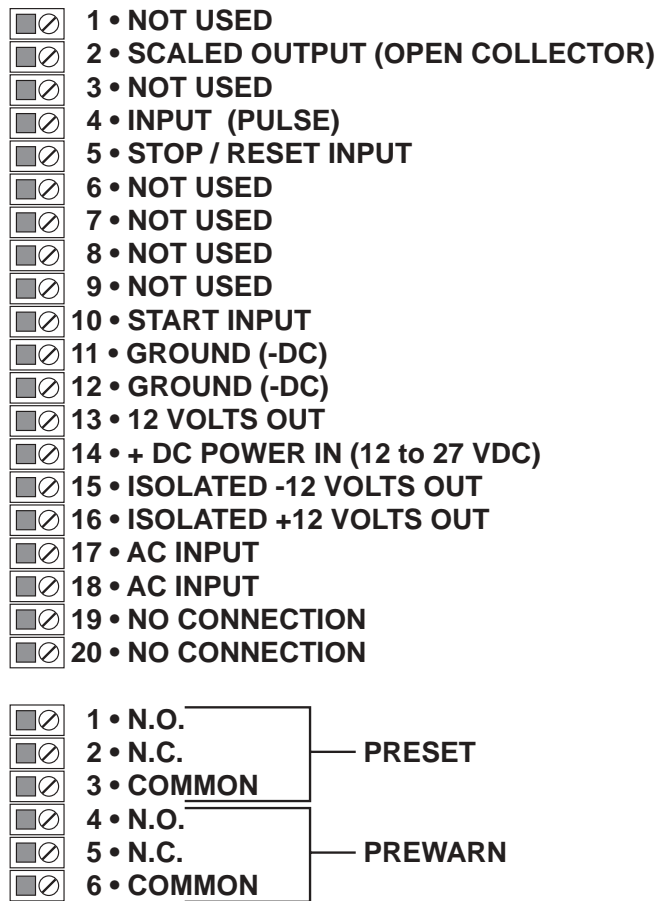


Figure 2-1 Terminal Block Connections

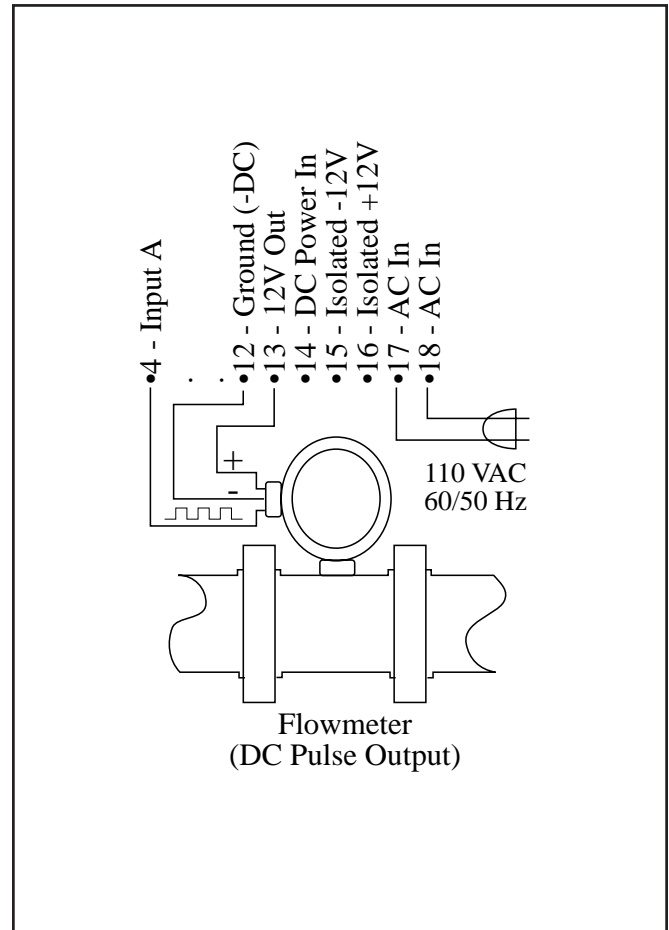
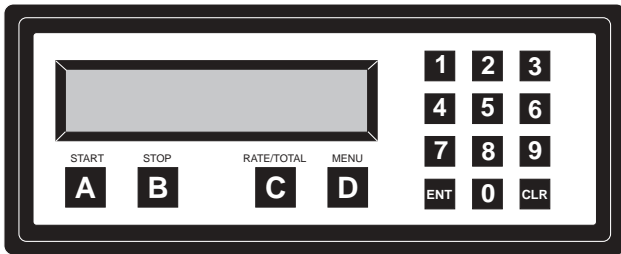


Figure 2-2 Typical Wiring Connections

### 3-1 Front Panel Operation



**A**

**START** - Pressing "A", starts the process by energizing the PRESET and PREWARN relays. Press "CLR" to reset Batch Total before starting new batch.

**B**

**STOP** - Pressing "B", will temporarily stop the process by de-energizing the PRESET and PREWARN relays. Use START to continue the process from where it stopped.

**C**

**RATE/TOTAL** - Pressing "C" toggles between rate and total count displays. The rate display has an "R" on the left side of the screen.

**D**

**MENU** - Pressing "D" takes the unit out of the Run Mode and into the Programming Mode. "D" is also used to make some programming selections.

**ENT**

**ENT** - With Count showing in the Run Mode, pressing "ENT" displays the Grand Total, which begins flashing on the screen. Press "ENT" again to return to the Count. In the Programming Mode, "ENT" is used to accept a selection.

**CLR**

**CLR** - When the count total is displayed, pressing "CLR" will reset the counter to 0 or to Preset A depending on how it was programmed. When the Grand Total is displayed, pressing "CLR" will reset it to 0. When the Preset or Program Mode values are displayed, pressing "CLR" will reset them to 0, so that new values can be entered.

### Weighted Averaging

The batcher software includes weighted averaging of the rate display. Weighted averaging is not available on units with 16 Point Linearization.

Weighted averaging can be used to create a more stable display when the rate input is fluctuating. A weight, "W", from 00 to 99 is applied to the old rate data before the new rate data is sent to the display. The following equation is used:

$$\text{Rate Display} = \frac{(\text{Old Data} \times W + \text{New Data})}{(W + 1)}$$

W = Weight (00-99)

If a weight of 00 is used, the new rate data will go directly to the display without being averaged. If a number other than 00 is entered for the weight, then the new data will be averaged with the old data before being sent to the display. Higher weight numbers will create a more stable rate display. Small rate changes will be more noticeable when lower weight numbers are used.

### Programming Weighted Averaging

1. In the Program Mode, got to the RATE sub menu and program the K-FACTOR, the WINDOW, and the SIG FIG parameters.
2. When the display shows WEIGHTXX (XX represents the current WEIGHT value), either accept the current value and return to the Run Mode by pressing "ENT" or clear the current value by pressing "CLR".
3. If the current value was cleared, the display shows WEIGHT00. Using the keypad, enter a new WEIGHT value from 00 to 99. Press "ENT" to accept the new value and return to the Run Mode.

### Remote Start, Stop, and Reset

A 4 to 30 VDC positive pulse will activate these inputs. Remote Start, Stop, and Reset is not available on units ordered with the Control Input option 7A (4-20 mA In, 4-20 mA Out).

**START (Pin 10):** When activated, the unit will START as described in Front Panel Operation.

**STOP/RESET (Pin 5):** When activated, the unit will STOP (If the unit is started and the batch is not complete). A second pulse to pin 5 will reset the counter (When the unit is stopped or when the batch is complete). If pin 5 is held high (4 to 30 VDC), the display will flash "STOPPED" and any start inputs will be inhibited.

### 3-2 Programming

#### Overview:

This Section of the manual provides an outline of programming procedures for the batcher software version 8.7. Detailed descriptions and programming instructions for this unit are available in previous sections of this manual. Page number references are included to help you find related information in this manual.

#### Programming Procedures:

**Enter Program Mode** - Press the MENU button, "D", in the Run Mode.

**Choosing a Sub Menu** - Once in the Program Mode, continue pressing the "D" button until the desired Sub Menu is displayed. Press "ENT" to enter the selected Sub Menu.

**Making a Selection** - An arrow, "↓", appearing over only the "D" button indicates that "D" is used to change the selection. When an arrow appears over "B" and "D", one must be selected.

**Entering a Value** - The keypad is used to enter a number. Use the "D" button to enter a decimal. (Ex: 34.5 would be entered by pressing "3", "4", "D", and "5")

**Accept a Value or Selection** - Press "ENT" to accept the value and go to next step.

**Exit Program Mode** - Program or skip each step of one of the menus to return to the Run Mode. Pressing "ENT" allows a step to be skipped without changing its value.

### Key to Programming Flow Chart:

**Display** - This box represents the unit's display. In the Run Mode, the flow rate, the batch total, or the grand total will be displayed.

**XX** **Current Value** - The number that is currently programmed for that step. It must be cleared (CLR button) before entering a new value.

**00** **No Value** - Indicates that programmed value for that step has been cleared, and a new number may be entered.



**Keypad** - Use the front panel keypad to enter a value or select a decimal point location for this step.

### 3-3 K-Factor Programming

(See Programming Flow Chart, Page 10)

The K-Factor is usually provided in pulses per unit, and will have to be modified before entering it into the unit. On most flowmeters, the K-Factor is stamped on the meter body. (see section 7 for Calculating K-Factors)

#### Count K-Factor:

The Count K-Factor must be modified to allow for the decimal point location chosen in the "DEC LOC" step.

$$\frac{\text{K-Factor}}{\text{DPF}} = \text{Count K-Factor}$$

**DPF** - The Decimal Point Factor is a divider to compensate for the displayed decimal point.

#### DPF Table

DPF	Decimal	DPF	Decimal
1	XXXXXX.	1000	XXX.XXX
10	XXXXX.X	10000	XX.XXXX
100	XXXX.XX	100000	X.XXXXX

#### Rate K-Factor:

The Rate K-Factor must be modified to display the correct volume per time unit. The Rate K-Factor is not affected by the decimal point location selected in the Count menu. The decimal point displayed by the Rate Meter floats according to the significant figure setting used in the SIG FIG step.

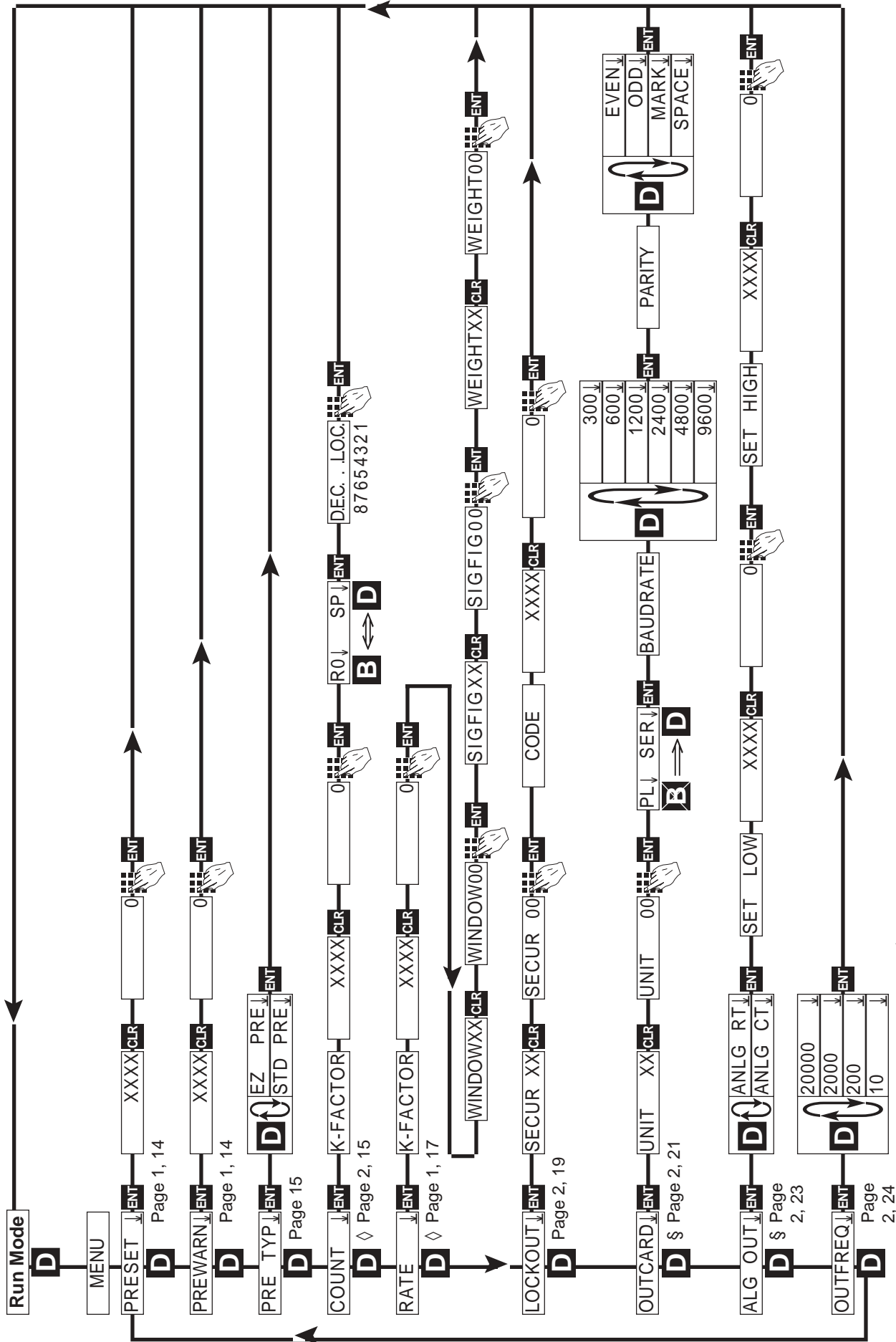
$$\frac{\text{K-Factor}}{\text{TF}} = \text{Rate K-Factor}$$

**TF** - The Time Factor is a divider to adjust the time units that the Rate Meter shows.

#### TF Table

TF	Time Units	Rate Display
1	Seconds	Units per Second
60	Minutes	Units per Minute
3600	Hours	Units per Hour

Programming Flow Chart



◇ - On a Standard unit (Without 16 Point Linearization), the Count and/or the Rate must be programmed for basic operation.  
 § - Sub menu will always appear, but feature may not be included in the unit. (Check Model Number).

### 3-5 How to Program

The initial programming of the unit is accomplished by first depressing the MENU button. After pressing the MENU button once, the display will read preset. To cycle to the next control parameter option, merely press the MENU button and Prewarn will appear on the display. If the user does not wish to choose this section of the menu, depress MENU button again and the next control or parameter will appear.

Selection of all MENU control parameters is accomplished through the routine described for Preset.

The following is the sequence for entering a Preset quantity.

1. Depress the Menu D button once. The display will read MENU. After a one second pause the display will read PRESET.
2. Depress the Enter ENT button; the display will flash indicating that you are not in the Run Mode and not displaying the current batch total.
3. If the batch size is satisfactory, depress the ENT button. This value will be entered into memory. Simultaneously, the unit will return to the Run Mode.
4. To change the preset value, depress the CLR button and enter new number. Example: Suppose "250" is the new batch size. Press CLR, then 2, then 5, then 0. When the display holds the desired value, depress the ENT button. The new batch size will be stored in memory and simultaneously the batcher will return to the Run Mode.

### 3-6 Frequently Asked Questions About Setting Up The Batcher

- Q. Is there any way to backspace if the wrong button is hit by accident?
- A. No, you can depress the CLR button and start entering the number all over again or press ENT repeatedly until back in the Run mode and start over again from there.
- Q. Is there any way to put a decimal point in a number such as a preset or K Factor?
- A. Yes, simply press the D button after the digit that you would like the decimal point. It will appear to the right of the digit.
- Q. Is there any way to enter a negative number for one of the Presets or K Factors?
- A. No, negative values are not allowed.
- Q. Is there any way to ruin the unit or completely erase it by entering a bad number?
- A. No, if a number or entry is not valid the unit will ignore it or flash an error message.
- Q. If the unit does not have serial communications or analog out, does the OUTCARD and ALG OUT sections of the menu still have to be set up?
- A. No, there are default settings from the factory already in the unit. No setup of these menu items is necessary for normal operation.
- Q. Does the Batcher have to be told what type of input it has connected to it?
- A. No, The input signals are conditioned in hardware. This allows the input cards to be interchanged without modifying the software.
- Q. If CLR is not pressed, numbers can still be written over the Presets or K Factors. Will these numbers be accepted if the ENT button is pushed?
- A. No, in order for a Preset or K Factor to be changed, the old number must be cleared out first by depressing the CLR button.

### 3-7 Setup Procedure For The Batcher

#### MENU ITEM 1 **PRESET**

<u>PRESS</u>	<u>DISPLAY</u>
<b>D</b> Menu Button.	PRESET ↓
<b>ENT</b> Enters Preset Routine.	Flashing PRESET number.
<b>CLR</b> Clears out existing PRESET.	0 Flashes.
<b>1 2 3 4</b> Sample Preset.	1234 PRESET Flashes.
<b>ENT</b> Store new Preset.	Last count, unit now in run mode.
Final Preset is Set.	

#### MENU ITEM 2 **PREWARN**

The Prewarn value is the amount before the Preset value that the Prewarn relay will deactivate. For example, if you want the Prewarn relay to drop out 10 counts before the Preset and your Preset is 1234, then set your Prewarn at 10 (not at 1224). Enter a Prewarn of "0" for the Prewarn and Preset relays to activate together. To disable the Prewarn relay, enter the same value for Preset and Prewarn.

<u>PRESS</u>	<u>DISPLAY</u>
<b>D</b> MENU Button.	PRESET ↓
<b>D</b>	PREWARN ↓
<b>ENT</b> Enters Prewarn Routine.	Flashing PREWARN number.
<b>CLR</b> Clears out existing PREWARN.	0 Flashes.
<b>1 2 3 4</b> Sample Prewarn.	1234 Prewarn Flashes.
<b>ENT</b> Store new Prewarn.	Last count, unit now in Run Mode.
The Prewarn is Set.	

Note: Remember, if the prewarn is a larger number than the preset, then the warning "**PREWRONG**" will flash on the display. Enter a prewarn value that is less than or equal to the preset to clear this warning.

3-7 Setup Procedure For The Batcher (continued)

**MENU ITEM 3 PRE TYP**

This menu item is used to set up the Preset Type.

<u>PRESS</u>	<u>DISPLAY</u>
<b>D</b>	PRESET ↓
<b>D</b>	PREWARN ↓
<b>D</b>	PRE TYP ↓
<b>ENT</b>	STD PRE ↓ EZ PRE ↓
Press D toggle between selections.	
<b>ENT</b>	Enters displayed selection Run Mode

The PRE TYP is Set.

**MENU ITEM 4 COUNT**

Setting the Counter

<u>PRESS</u>	<u>DISPLAY</u>
<b>D</b>	PRESET ↓
<b>D</b>	PREWARN ↓
<b>D</b>	PRE TYP ↓
<b>D</b>	COUNT ↓
<b>ENT</b>	K FACTOR
K FACTOR flashes then shows the current K Factor.	
<b>CLR</b>	0 Flashes.
Clears out existing K FACTOR.	
<b>3 7 D 6</b>	37.6 Flashes.
Sample K Factor, or enter calculated value from notes or worksheet.	

continued on next page

### 3-7 Setup Procedure For The Batcher (continued)

#### MENU ITEM 4 **COUNT** (continued)

PRESS

**ENT**

Store new K Factor.

DISPLAY

R0 ↓ SP ↓

---

**RO is Reset to zero. SP is Reset to Preset.** This selection determines whether the unit counts up or counts down. If RO is selected ( B is pressed), the unit will count in the "up" direction towards the Preset (dropping out the Prewarn, if passed). If SP is selected ( D is pressed), the unit starts at the Preset and counts "down" towards zero (dropping out the Prewarn at its set value.)

**B** or **D**

Selects by moving the cursor under the arrow by **RO** or **SP**

---

**ENT**

Store R0 or SP.

DEC LOC

---

**DEC LOC allows the user to choose where the decimal point will be located when the Batch Count or Grand Total are displayed.** The decimal point is for display only and does not affect K Factors. (The K Factor must be scaled to reflect the DEC LOC, see Section 7 for calculating the K Factors) Simply press the keypad numbers to move the decimal point. Only one decimal point can be displayed, multiple decimal points are not available. Pressing 0 turns off the decimal point.

**4**

DEC LOC

As an example, the decimal point will move to the right of the fourth digit from the right (displays units and thousandths).

---

**ENT**

Store new DEC LOC.

Run Mode.

---

The Counter portion of the Batcher is now set up.

3-7 Setup Procedure For The Batcher (continued)

MENU ITEM 5 RATE

Setting the Ratemeter

<u>PRESS</u>	<u>DISPLAY</u>
<b>D</b>	PRESET ↓
<b>D</b>	PREWARN ↓
<b>D</b>	PRE TYP ↓
<b>D</b>	COUNT ↓
<b>D</b>	RATE ↓
<b>ENT</b>	K FACTOR

This selects the Ratemeter portion of the menu.  
K FACTOR flashes then shows the current Ratemeter K Factor.

---

<b>CLR</b>	0 Flashes.
Clears out existing K FACTOR.	

---

<b>1 2 D 0 5 6</b>	12.056 Flashes.
Sample K Factor, or enter calculated value from notes or worksheet.	

---

<b>ENT</b>	WINDOW ##
Store new K Factor.	
<u>Normally the ratemeter updates each second.</u> If no signal comes in during that time, the ratemeter will wait until the window times out or a signal comes in; the display will not update. The window is the maximum sample time, in seconds, on which the waiting period is based. The range is from 02 to 24 seconds.	

---

<b>CLR</b>	WINDOW 00
Clears out existing WINDOW number value.	

---

<b>5</b>	WINDOW 05
As an example, extends the window to 5 seconds.	

---

continued on next page

3-7 Setup Procedure For The Batcher (continued)

MENU ITEM 6 **RATE** (continued from previous page)

From the previous page, we are in the SIG FIG setting portion of the Ratemeter setup Menu.

PRESS

DISPLAY

**ENT**

SIG FIG ##

Store new WINDOW.

---

**SIG FIG indicates how many meaningful digits are shown.** For example, if SIG FIG is set at three; a rate of 24737.89 will be displayed as 24700; a rate of 0.739216 will be displayed as 0.739. Note that trailing zeroes will be inserted only if necessary. Digits beyond the SIG FIG value are truncated and zeroes are inserted as needed, no rounding is done.

**CLR**

SIG FIG 00

Clears out existing SIG FIG number value.

---

**4**

SIG FIG 04

As an example,

display will show 4 significant figures.

---

**ENT**

WEIGHT##

Store new SIG FIG.

WEIGHT is an averaging factor. Higher settings provide more averaging for a more stable rate display. Derived from:

$$\frac{(\text{OLD DATA} \cdot \text{"WEIGHT"} + \text{NEW DATA})}{(\text{"WEIGHT"} + 1)}$$

---

**CLR**

WEIGHT 00

Clears out existing WEIGHT value.

---

**4**

WEIGHT04

As an example,

---

**ENT**

RUN MODE

---

The Ratemeter portion of the Batcher is now setup.

### 3-7 Setup Procedure For The Batcher (continued)

#### MENU ITEM 6 LOCKOUT

This menu item uses a 4 digit security code to prevent unwanted changes in the programming or improper use of the Batcher. The unit is shipped from the factory with a security setting of 00 and a lockout code of 1000.

Security example: First set the security shut down time in the Lockout menu then go to the Run Mode. Press the START button. The word STARTED should briefly appear. If no signal comes in before the security time is reached, the unit locks and displays SECURITY. Once the unit locks all buttons except 0 thru 9 are disabled. To unlock the unit simply press in the lockout code. When the unit is unlocked all menu features are available for change.

Lockout example: To lock the unit, first make sure it is in the Run Mode, then press 1 - 0 - 0 - 0. The words LOCK ON should briefly appear. Once the unit is locked:

- a. Preset can still be accessed and changed.
- b. Prewarn can still be accessed but cannot be changed.
- c. the rest of the menu cannot be accessed.

To unlock the unit simply press 1 - 0 - 0 - 0. The words LOCK OFF will appear briefly. When the unit is unlocked all menu features are available for change.

To put in a different security time or lockout code follow this setup procedure.

<u>PRESS</u>	<u>DISPLAY</u>
<b>D</b>	PRESET ↓
<b>D</b>	PREWARN ↓
<b>D</b>	DEV TYP ↓
<b>D</b>	LOCKOUT ↓
<b>ENT</b>	SECUR ##

**SECUR is the time, in seconds, that the unit will wait between pulses or for a signal to come in once STARTED.** For example: The SECUR is set at 15, in run mode the START button is pressed. If at any time the unit does not receive a signal for 15 seconds the display will go to security and the unit will lock itself. The unit retains elapsed security time if STOPPED before security times out. When restarted, the unit resumes security timing from where it left off. As soon as a signal comes in the security time is reset. Entering a security time of 00 disables the security feature.

<b>CLR</b>	SECUR 00
Clears out existing security time.	

<b>3 4</b>	SECUR 34
As an example, unit waits 34 seconds before Security Mode.	

Continued on next page

### 3-7 Setup Procedure For The Batcher (continued)

From the previous page, we are in the **CODE** setting portion of the Lockout setup Menu.

PRESS

DISPLAY

**ENT**

CODE

Store new security time.

---

Enters device routine to program in a 4 digit Lockout Code. The word CODE appears briefly then the current Lockout Code number is displayed.

**CLR**

0 Flashes.

Clears out existing Lockout Code.

---

**1 2 3 4**

1234 Flashes.

Sample Lockout Code, or enter desired value from notes or worksheet.

**Be sure to record any changes in the lockout code in case it is forgotten!**

---

**ENT**

Last count, unit now in Run Mode.

Store new LOCKOUT Code. (Sample tryout below.)

---

**1 2 3 4**

LOCK ON

Enter the sample / new value . . . the unit is now locked!

---

**1 2 3 4**

LOCK OFF

Enter the sample / new value. . . the unit is now unlocked!

---

The lockout procedure is finished.

3-7 Setup Procedure For The Batcher (continued)

MENU ITEM 7 **OUTCARD**

**NOTE:**  
NOT USED; This menu item reserved for future use of RS232/422 communication option.

MENU ITEM 8 **ALG OUT**

**NOTE:**  
NOT USED; This menu item reserved for future use of analog output card option.

MENU ITEM 9 **OUT FREQ**

All models of the Batcher have a pulse generator built in to them. **This Output Frequency generator sends pulses out which are scaled relative to the input signal via the counter K Factor.** This means that for every time the counter increments, a pulse is available at the output. Various output frequencies are available to the user for driving external devices. In case the rate exceeds the output frequency selected, a 9999 pulse buffer is provided to hold the excess pulses. If the buffer is completely filled the warning message DATALOST will flash on the display.

<u>PRESS</u>	<u>DISPLAY</u>
<b>D</b>	PRESET ↓
<b>D</b>	PREWARN ↓
<b>D</b> Press until . . .	OUT FREQ ↓
<b>ENT</b>	20000 ↓
Enters the routine for setting up the Frequency Output. The display shows the last Frequency selection.	
<b>D</b>	2000 ↓
<b>D</b>	200 ↓
<b>D</b>	10 ↓
Press D to go to 20000 ↓ Press ENT at desired Frequency.	
<b>ENT</b>	Last count unit now in Run Mode.

Pulse Output is now set.

## 3-8 Run Mode

### 3-8.1 The Display

In the Run Mode the display will initially display:

- a) Zero, if setup to reset to zero.
- b) Preset number, if set to reset to preset .
- c) A warning message

**The unit will accept input signals and display Rate, Batch Total or Grand total.**

The Batch Total is displayed as a number.

The Rate is displayed as "R" followed by a number.

The Grand Total is displayed as a flashing number.

(The Grand Total flashes so that it will not be confused with the Batch Total.)

To toggle between the Rate and Batch Total, press the C button. Press the ENT button at any time to view the Grand Total, then press it again to go back to the Rate or Batch Total.

### 3-8.2 Resetting (Clearing) the Totalizers.

To clear the Batch Totalizer,

- a) the unit must be in the Run Mode.
- b) the unit must be displaying the Batch Total.
- c) the unit must not be locked out.\*

If the above conditions are met, press the CLR (clear) button. The display should then show the preset or zero depending on how the unit is configured.

To clear the Grand Totalizer,

- a) the unit must be in the Run Mode.
- b) the unit must be displaying the Grand Total.
- c) the unit must not be locked out.

If the above conditions are met, press the CLR button. The display should then show zero.

\* The unit may be reset if it is locked out by putting a 3-30 VDC signal to pin 5 on the rear of the unit.

### 3-8.3 Locking the Unit

The unit is shipped from the factory unlocked. To lock the unit, it must be in the Run Mode. The unit is shipped from the factory with a Lockout Code of 1000.

As a test, when you receive the unit, power it up and press 1 then 0 three times. The display should briefly show LOCK ON. This means that the unit is now "locked out". Press 1 then 0 three times again. The display should then show LOCK OFF briefly. This means that the unit is now unlocked.

**What LOCK ON or "Locked Out" means:**

- a) the Grand Totalizer cannot be reset.
- b) only the preset can be accessed and changed.
- c) the prewarn can be accessed but **not** changed.
- d) the rest of the Menu cannot be accessed.

The unit will still:

- e) accept input signals
- f) display Rate, Batch Total and Grand total.
- g) have Start, Stop and Rate/Total buttons enabled.

**LOCK OFF means that the unit functions normally as described in this manual.**

The Lockout code can be changed or viewed by accessing Lockout in the setup Menu. The unit must be Unlocked to do this so be sure to record any Lockout code changes in case it is forgotten.

The Lock toggles back and forth from LOCK ON to LOCK OFF each time the code sequence is entered. The last four digits pressed, while in the Run mode, are the ones that the unit checks for Lockout code sequence. For example: while 1000 will unlock/lock a new unit from the factory, so will the number 347191000 (the last four digits are the code sequence, so, this number works also!).

**RECORD ALL LOCKOUT CODE CHANGES.**

### 3-8 Run Mode (continued)

#### 3-8.4 Start and Stop Operation.

The Batcher is designed for batching operations. The batching operation is controlled by two internal relays, Preset and Prewarn settings and the CLR, START and STOP buttons on the front panel.

A typical operation proceeds as follows:

- a) The Preset is accessed and changed to the amount desired.
- b) The unit accepts input signals
- c) The CLR button is pushed to reset the Batch Totalizer.
- d) The Start button is pushed and the process begins.
- e) The Stop button can be pushed at any time to temporarily halt the process (the Start button resumes it from where it stopped).
- f) The display shows Rate, Total or Grand Total.
- g) The Prewarn is reached and the process is slowed down.
- h) The Preset is reached and the process is halted.

The Batcher will always accept input pulses whether the unit is Started or not! All pulses on the input terminal are counted and shown on the display. This means that all pre-run and post-run pulses will be recorded. For this reason, always press the CLR button before start.

**The START button energizes the Preset and Prewarn relays.**

**The STOP button de-energizes the Preset and Prewarn relays.**

### 3-8.4 Start and Stop Operation (continued).

The START button initiates the batch sequence. Once the unit is started:

- a) The display will prompt the operator with the word STARTED.
- b) Both relays will engage (Unless the Prewarn has been reached already).
- c) All buttons on the front panel will be locked out except the STOP button and ENT button which allows access to the Grand Totalizer.

**NOTE:** Once both Prewarn and Preset points are reached, the unit cannot be started until it receives a reset signal or the CLR button is pressed.

The STOP button is used to stop a batch that has already started. When the STOP button is pressed:

- a) The display will prompt the operator with the word STOPPED.
- b) The Preset and Prewarn relays will de-energize.
- c) The unit will still accept input pulses.
- d) All buttons on the front panel will be usable.
- e) The unit may be restarted by pressing the START button.

### 3-9 Internal Operation

#### 3-9.1 Digital Inputs and Computations

The 3-30 Volt input signal is filtered electronically

Computations:

$$\frac{\text{Pulses In}}{\text{Count K Factor}} = \text{Count}$$

$$\frac{\text{Pulses In}}{\text{Rate K Factor}} = \text{Rate}$$

$$\text{Batch Total} = \sum \text{Count (since last Batch Reset)}$$

$$\text{Grand Total} = \sum \text{Count (since last Grand Total Reset)}$$

$$\text{Rate} = \frac{\text{Rate}}{\text{Tau}}$$

$$\text{Tau} = 1 \text{ sec or WINDOW if } (\text{Rate} / 1 \text{ sec}) = 0$$

*Frequency Out* = Count  
(Sequenced out as per OUT FREQ selection and buffered to 9999 pulses)

*Prewarn Out* =  
Count  $\geq$  Preset - Prewarn (if Reset to 0)  
Count  $\leq$  Prewarn (if Reset to Preset)

*Preset Out* =  
Count  $\geq$  Preset (if Reset to Zero)  
Count  $\leq$  0 (if Reset to Preset)

### SECTION 4 INPUTS

#### 4-1 Digital Pulse Inputs (Terminal 4)

Digital Pulse Inputs: The input board is a separate board that is plugged into the mother board just behind the display. All digital inputs are on the same board. There are four dip switches on the board. The input conditioning characteristics may be altered by changing the dip switches. A valid pulse is one which makes a transition from the off state (low) to the on state (high): a positive going edge. The off state is 0 - 1 VDC with respect to Terminal 12 (Ground). The on state is 3 - 30 VDC with respect to Terminal 12. The input impedance is 10 K ohms. At 30 VDC, the current draw will be 3 mA. This should be the maximum current that the Batcher will draw. Acceptable pulse width is determined by the dip switch settings (See Table 4-1 below).

DIP SWITCH SETTINGS

SW1	SW2	SW3	SW4	Conditioning
ON	ON	---	---	0-100 Hz min. 12.5 msec on/off
ON	OFF	---	---	0-1000 Hz min. 1.25 msec on/off
OFF	OFF	---	---	0-20000 Hz min. 0.25 usec on/off
---	---	OFF	OFF	needs sourcing input (drive input high)
---	---	OFF	ON	needs sinking input (pull input low)

ON →

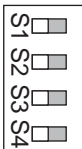


Table 4-1

## 4-1 Digital Pulse Inputs (continued)

### 4-1.1 STANDARD: High Impedance (Terminal 4).

Has a 10 K Ohm pull down resistor to ground (Terminal 12) and must be driven high. Typical drivers include a contact closure from a 3-30 VDC source (such as Terminal 13), a PNP transistor (proximity switch or other device) or an amplified signal from an inductive pickup. Remember, the input signal must be referenced to Terminal 12 of the Batchter.

### 4-1.2 High Impedance with pull-up (Terminal 4).

Has a 4.7 K Ohm pull up resistor to +5 VDC and must be pulled low. Typical drivers include a contact closure to Ground (such as Terminal 12), or an NPN transistor (proximity switch or other device). Remember, the input signal must be referenced to Terminal 12 of the Batchter.

Idea: This input works well with TTL devices.

### 4-1.3 Reset Input (Terminal 5)

Identical to the Standard, High Impedance Input with one exception. The input speed is fixed for a minimum pulse width of 5 msec.

**Note:** The reset input will not be changed to a sourcing type of input even if the dip switch is set for pull up or is changed to the pull up settings.

#### 4-2 DC Power Inputs (Terminals 12, 14)

The Batcher may be powered by an external DC power supply. The supply must provide 12 - 27 Volts DC and at least 280 mA of current. The positive side (+DC) of the DC supply should be hooked to Terminal 14 and the negative (or Ground) side to Terminal 12.

**NOTE:** Units powered by DC Voltages do not have an isolated voltage out on Terminals 15 and 16 or +12 VDC on Terminal 13.

#### 4-3 AC Power Inputs (Terminals 17, 18)

The Batcher may be ordered for 110 or 220 VAC power. The unit requires single phase 50/60 Hz AC power.

The voltage range is  $\pm 15\%$  of the rated voltage. Voltages below this range will not power the unit. Voltages above this range may damage the unit. The Batcher is relatively immune from electrical noise on the AC lines. However, in extremely noisy applications some line conditioning or filtering may be necessary. If fusing is required, external fusing must be supplied.

**Note:** The Batcher has no internal fuse to blow out. If the unit does not function when power is applied, contact the factory for assistance or to arrange for repair.



**Caution:** An external fuse is required:  
DC Power: 0.5 Amp  
AC Power: 0.125 Amp

## SECTION 5 OUTPUTS

The Batcher has two outputs for controlling external devices or monitoring the rate and totals. They are: Frequency Output and Relay Outputs..

### 5-1 Frequency Output (Terminal 2)

#### 5-1.1 Electrical Characteristics of Frequency Output

The Batcher generates a pulse out for each factored count. A sinking NPN transistor output (see Figure 5-0.1), can drive external devices at various rates selected through the keypad menu see Table 5-0.2 below). The Open Collector sinks 30 VDC maximum to 1 volt maximum with a maximum current of 100 mA.

Speed (Hz)	10	200	2000	20000
Min. on/off (msec)	47.5	2.0	0.2	0.013

Table 5-0.2

Applications: Remote totalizers, ratemeters or other monitoring devices.

10 Hz: Electromechanical totalizers  
Programmable Controller inputs

200 Hz: Electronic totalizers  
Programmable controllers with high speed input cards.

2000 Hz: High speed totalizers.

20000 Hz: High speed totalizers.

## 5-1.2 Internal Buffer for Frequency Output

An internal buffer will store up to 9,999 counts if the scaled input generates pulses faster than the output speed selected. The warning message "DATA LOST" flashes on the screen when the buffer overflows (see Section 6-1, Warning Messages). This indicates that the counts being totalled and the scaled outputs may be incorrect.

**Note:** All counts stored in the internal buffer will be pulsed out at the selected frequency even if the counter is reset before it is finished sending them.

## 5-2 Control Outputs

### 5-2.1 SPDT Relay Version (Standard)

When the start button is pushed, the two relays engage simultaneously to start flow. When the prewarn number is reached, one relay drops out. When the preset number is reached, the other relay drops out. The user may enter the two numbers when setting up the batch counter (see Section 3-3, Menu Items 1 and 2). The contacts are rated at 10 A, 120/240 VAC or 28 VDC.

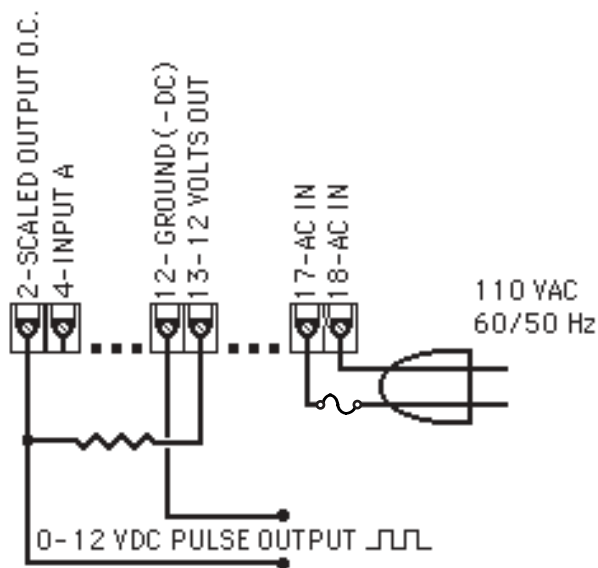


Figure 5-0.1

## SECTION 6 TROUBLE SHOOTING AND MAINTENANCE GUIDE

### 6-1 Warning Messages

#### 6-1.1 PREWRONG

Indicates that the values in Preset and Prewarn are not acceptable. This condition will occur when the Preset value is less than the Prewarn value. The display will continue to display this message until the error is corrected. To change the Preset and Prewarn values see Section 3-3, Setup Procedure.

#### 6-1.2 DATALOST

Warning message that indicates the unit is receiving pulses faster than 20000 pulses per second or the data buffer is full. In either case the display will not show the proper count or rate and the frequency output will be inaccurate. There are three possible remedies:

- a) Check to see that your input is not exceeding the Batcher ratings of 20 KHz Max. Input speed.
- b) Change your OUT FREQ settings to handle a higher count speed (Section 3-3, Menu Item 7).
- c) Change your count K Factor to a larger number, since the output frequency is based on the factored count (Section 3-3, Menu Item 3).

#### 6-1.3 RFFFFFFFF

Indicates that the factored input rate has exceeded a 7 digit number. The ratemeter cannot handle numbers larger than 7 digits (i.e. 9999999). Change the Rate K Factor to a larger number (Section 3-3, Menu Item 3) to correct this problem.

#### 6-1.4 LOCK ON

Indicates that the unit has been locked out! The unit must be unlocked before any changes can be made. See Section 3-3, Menu Item 4 to unlock the unit.

#### 6-1.5 SECURITY

Indicates that no signal has come in for the duration time set in the Lockout menu. Lockout code must be entered before the unit will continue. Section 3-3, Setup Procedure.

## 6-2 Troubleshooting

### 6-2.1 General

The following troubleshooting procedures have been developed as an aid in locating defects. Not every possible problem has been listed, but a general isolation procedure for tracking down problems has been given. A standard recommendation is the removal of power for 2 seconds. This allows the microprocessor to go through a reinitialization cycle at power up. If it is determined that the unit is faulty, contact your local Factory Representative or Sales Office concerning replacement. The Batcher is not field serviceable and all repairs should be performed by the factory.

### 6-2.2 Problems

Symptom: **Display will not light.**

Possible Cause: No power to unit, power to unit not to specifications or bad connection between display board and mother board.

Test Procedure: See Specifications Section 1-4 for proper input voltages. Then;

- a) Check AC voltage input on terminals 17 & 18.
- b) (if DC Powered unit) Check DC voltage input on terminals 12 & 14.
- c) Check connection of display board to mother board

*Corrective Action:* If all checks okay, replace unit.

Symptom: **Unable to start batch.**

Possible Cause #1: Displayed Batch count already exceeds the Preset value.

Test Procedure: Check Preset value against the displayed value. If the Preset is less, go to corrective action.

*Corrective Action:* Reset the unit by pressing the CLR button or change the Preset to a larger value.

Possible Cause #2: Incorrect programming.

Test Procedure: Check for programming errors, review manual.

*Corrective Action:* Reprogram unit as required.

Possible Cause #3: Defective Circuit board or component.

Test Procedure: Press the Start button and check for relay action. An OHM meter across the appropriate relay terminals should give the proper indication. (Be sure to disconnect all power to the relay terminals first!)

*Corrective Action:* If no relay action replace unit.

Symptom: **Unit not totalizing.**

Possible Cause #1: Incorrect programming.

Test Procedure: Check for programming errors, review manual. For Example, if the K Factor is too large it may take some time before a count is registered on the display.

*Corrective Action:* Reprogram unit as required.

Possible Cause #2: Input signal invalid.

Test Procedure: See Specifications Section 1-4 for proper input signals. Then use oscilloscope to;

Check Digital voltage input on terminals 3 and 12.

*Corrective Action:* If inputs check okay, replace unit.

### 6-3 Removing the Case

To install or change the input or data interface cards, the case must be removed. **Remove all power before opening the case.** CMOS logic is used so observe standard precautions against damage by static discharge. Remove the six (6) flat head screws behind the front bezel and lift off the bezel assembly. Slide the main board display out the front of the case by pushing from the rear. Once modifications are made, reverse the procedure to reassemble the unit. Make sure that the main board is in the track. The six (6) screws that hold the panel must be tight to seal the rubber keypad panel assembly, approximately 0.6 in-lb torque.

#### 6-3.1 Input Card Modification

Follow the instructions for removing the case in Section 6-3. The Input card is mounted just behind the display and plugs onto the 15 pin post connector. Remove the board and make desired changes. When installing the Input card, make sure that the component side of the board is facing the front and that the 15 pin connector is mated properly and not offset to the side. Replace the front panel per Section 6-3.

### 6-4 Maintenance

The Batcher does not require any "Routine Maintenance" by the user. If a problem should occur, and all troubleshooting procedures have been exhausted, contact your local representative or distributor (phone number on cover of manual).

## SECTION 7 CALCULATING THE K FACTORS

### 7-1 General

The key to accurate flow measurement with the Batcher is correct scaling. The electronics of the unit have been designed for stability and repeatability. Even the finest measuring device and equipment cannot make up for improper factoring and programming. Due to the complexity of the concept of K Factors, this special section has been provided for those who still find it hard to understand. A separate worksheet has also been provided with this manual to help in calculating the K Factors. It is hoped, that between this section of the manual and the worksheet, that any questions you may have, regarding the K Factor, will be answered.

#### 7-1.1 What is a K Factor?

**The K Factor is a divider.** This means that if the K Factor is greater than 1, it will diminish any input signal. Conversely, if it is less than 1, it will increase any input signal. The K Factor range of the Batcher is from 0.0001001 to 99999999. This allows a wide range of factoring from greatly increasing (to display a large value) to decreasing the input (to display a very small value).

### 7-2 Calculating the K Factors.

The following steps are the recommended procedure for calculating the K Factors. Take your time and go through the procedure slowly at first. After several tries you should be fairly adept at calculating the K Factor for any given input.

#### 7-2.1 Calculating the K Factor for Digital Pulse Inputs.

**Step 1.** Find out what value the pulses represent. This should be specified on your device or with its paper work.

Example #1: 360 Pulses = 1 yard

Example #2: 1 Pulse = 2 gallons

Example #3: 2000 Pulses = 1 m<sup>3</sup>

**Step 2.** The Count K Factor is equal to the number of pulses per value from Step 1 (Pulses ÷ Value).

Example #1: Count K Factor = 360

Example #2: Count K Factor = 0.5 (1 pulse ÷ 2 gallons)

Example #3: Count K Factor = 2000

**Step 3.** Enter the Count K Factor. (See Section 3-3, Menu Item 3).

**Step 4.** Modify the Count K Factor to reflect any time conversions for the rate display to the Rate K Factor. This is done by dividing the Count K Factor by the Time Conversion Factor. If no conversion is necessary skip this step and let the Rate K Factor be the same as the Count K Factor. USE THE TIME CONVERSION CHART AS NEEDED.

Example #1: Convert yds per sec to yds per hour.

$$\text{Rate K Factor} = 360 \div 3600 = \underline{0.100}$$

Example #2: Convert gallons per sec to gallons per min.

$$\text{Rate K Factor} = 0.5 \div 60 = \underline{0.00833333}$$

Example #3: No conversion necessary.

$$\text{Rate K Factor} = \underline{2000}$$

**Step 5.** Enter the Rate K Factor. (See Section 3-3, Menu Item 3)

#### TIME CONVERSION CHART

To convert:	divide by
sec to min	60.00
sec to hr	3600
min to sec	0.01666667
min to hr	60.00
hr to min	0.01666667
hr to sec	0.0002778

#### 7-2.2 Digital K Factor Formulas

$$\frac{\text{Pulses}}{\text{Units Value}} = \text{Base K Factor}$$

$$\frac{\text{Base K Factor}}{\text{Units Conversion Factor}} = \text{Count K Factor}$$

$$\frac{\text{Count K Factor}}{\text{Time Conversion Factor}} = \text{Rate K Factor}$$

# 8 Programming Worksheet

Model # \_\_\_\_\_

Serial # \_\_\_\_\_

Unit # \_\_\_\_\_

PRESET \_\_\_\_\_

PREWARN \_\_\_\_\_

PREset TYPE  EZ PRE  STD PRE

OUTput FREQuency 20000

2000

200

10

## COUNTER

K-FACTOR \_\_\_\_\_

Reset to 0  Set to Preset

Decimal Location (0-8)

8 7 6 5 4 3 2 1 0  
         None

## RATEmeter

K-FACTOR \_\_\_\_\_

WINDOW (02-24) \_\_

SIGNificant FIGures (1-6) \_

WEIGHT (00-99) \_\_

## Lockout Code

SECUR \_\_

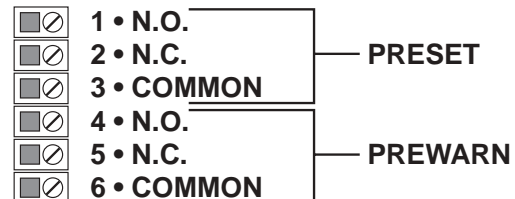
CODE \_\_\_\_\_

Output Communication (Not Used)

Analog Output (Not Used)

## Terminals

- 1 • NOT USED
- 2 • SCALED OUTPUT (OPEN COLLECTOR)
- 3 • NOT USED
- 4 • INPUT (PULSE)
- 5 • STOP / RESET INPUT
- 6 • NOT USED
- 7 • NOT USED
- 8 • NOT USED
- 9 • NOT USED
- 10 • START INPUT
- 11 • GROUND (-DC)
- 12 • GROUND (-DC)
- 13 • 12 VOLTS OUT
- 14 • + DC POWER IN (12 to 27 VDC)
- 15 • ISOLATED -12 VOLTS OUT
- 16 • ISOLATED +12 VOLTS OUT
- 17 • AC INPUT
- 18 • AC INPUT
- 19 • NO CONNECTION
- 20 • NO CONNECTION



## WARRANTY

This product is warranted against defects in materials and workmanship for a period of one (1) year from the date of shipment to Buyer.

The Warranty is limited to repair or replacement of the defective unit at the option of the manufacturer. This warranty is void if the product has been altered, misused, dismantled, or otherwise abused.

ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED, ARE EXCLUDED, INCLUDING BUT NOT LIMITED TO THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

## Ordering

### Ordering Information

**GBT 110** - 110 VAC Powered  
**GBT 220** - 220 VAC Powered



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