

BATCHtrol II

Batch Controller With Two Stage Valve Control

Features

- Start/Stop Buttons & Remote Inputs
- Separate 8 Digit K-Factors For Rate & Total
- Accepts Pulse or Analog Inputs
- Displays Rate, Total and Grand Total
- Security Lockout with Missing Pulse Detection
- Scaled Pulse Output
- Two Way RS232/422 Communications Option



- 2 Setpoints For Two Stage Valve Control
- NEMA 4X (IP65) Front Panel

Description:

Featuring 8 digits of bright, .55 inch, alphanumeric display, the BATCHtrol II can accept up to 20,000 pulses per second of digital count. The analog input versions accept inputs, such as 4 to 20 mA or 1 to 5V. The standard unit has two separate, 8 digit, floating decimal, "K" factors to convert the inputs to meaningful total and rate data. An optional 16 point K-factor can linearize flow from non-linear meter outputs. The user, with the push of a button, can toggle back and forth to view the total of the batch, the rate of flow or the grand total of flow.

The BATCHtrol II may be thought of as two separate counters and a ratemeter. The "batching" counter counts to preset numbers entered by the user and enables separate control outputs. The "totalizing" counter gives a cumulative reading or grand total. Finally, the ratemeter counts the number of pulses per second and, with its scaling feature, can provide gallons per minute or any other rate measurement without the totalizer losing counts. At any time, the user may view the total, the grand total or the rate while never interrupting the counting process.

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 operates from either 110 VAC/12 to 27 VDC, or optional 220 VAC/12 to 27 VDC. If AC power is used, two built-in regulated 12 VDC @ 100 mA power supplies are offered. They can be connected to provide +12 VDC and -12VDC or +24 VDC to drive external devices. CMOS Logic is used to provide high noise immunity and low power consumption with EEPROM to hold data a minimum of 10 years if power is interrupted.

Up to 15 addresses can be defined for the optional RS232 or RS422 communications port and units multi-dropped. The serial port can be used to set control points or access data.

Specifications:

DISPLAY:

8 Digit, .55" High, 15 Segment, Red Orange, LED.

INPUT POWER: (Internally Fused)

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

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

CURRENT:

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

OUTPUT POWER: (On AC powered units only):

+12 VDC at 100mA. Separate Isolated 12 VDC at 100mA to allow +12 VDC or +24 VDC regulated \pm 5% worst case.

DC Outputs are supplied with resettable fuses.

TEMPERATURE:

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

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

ET: Extended Temperature -40° to 158°F (-40° to 70° C)

ET not available with analog inputs or outputs

HUMIDITY: 0-90% Noncondensing

Listing: CE Compliant

MEMORY:

EEPROM stores all program and total data for minimum of 10 years if power is lost.

PULSE INPUTS:

3A: Standard, High impedance pulse input.

Low: Open or 0 to 1 VDC

High: 3 to 30 VDC, 10K Ohm impedance 20 kHz max. input speed (min. on/off 25 μ sec.).

3B: Same as 3A but has 4.7K Ohm input pull up resistors to +5 VDC on input for pulsing with contact to ground or NPN open collector transistor.

ANALOG INPUTS:

The current loop or voltage input is converted to a highly linear 0 to 10 kHz frequency. This frequency can then be scaled by the 8 digit K-Factors to total or display rate in separate engineering units.

Accuracy over full temperature range:

Zero error: +0.175% full scale max.

Overall error: +0.5% full scale max.

5A/7A: 4-20mA, 250 Ohm impedance

5B/7B: 0-20mA, 250 Ohm impedance

5C/7C: 1-5 VDC, 15K Ohm impedance

5D/7D: 0-5 VDC, 15K Ohm impedance

5E/7E: 0-10 VDC, 15K Ohm impedance

6A: 4-20 mA, Square Law, 250 Ohm impedance

RESET:

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

REMOTE START & STOP/RESET INPUTS:

A 4 to 30VDC positive pulse will activate these inputs. Pin 10 is the START input and when activated, the unit will "start." Pin 5 is the STOP/RESET input. When activated, the unit will "stop" (if unit is started and the batch is not complete). When the unit is stopped or the batch is complete, activating this input will reset the total. If pin 5 is held high (4 to 30VDC), the display will flash "STOPPED" and any start inputs will be inhibited. Stop always over-rides Start input.

NOTE: The remote START input will not work with the type 7 input option (analog in & analog out) boards. All other features will work as described above.

These new features have not yet been added to the 16 point linearization BATCHtrol II version 12.0 .

FACTORED OUTPUT:

The BATCHtrol II gives one pulse out for each increment in total. The open collector sinks 30 VDC maximum to 1 volt maximum at 100mA maximum. Output speed is user selectable (see table below). An internal buffer holds up to 10,000 pulses for output at the selected frequency before "DATA LOST" flashes, indicating pulses are lost. If factored rate exceeds 7 digits "RFF..." flashes. These alarms indicated that speed has been exceeded.

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

CONTROL OUTPUTS:

(Each of two outputs)

1. NPN Transistor Version: (Optional)

The open collector sinks max. 250mA from 30 VDC when active. (When relay is used, 10 VDC is provided at transistor outputs through relay coil. If greater than 2mA is used, relay will remain energized. Applying greater than 10 VDC may destroy unit. Transistor will sink 100mA in "ON" state).

2. SPDT Relay Version:

10A 120/240 VAC or 28 VDC (Standard).

ANALOG OUTPUT:

Digital input or analog input (except Square Law) versions can be ordered with an analog output of the rate or total reading. User keys in the low and high settings at set-up.

Current Outputs:

A sinking driver generates a corresponding linear current through the external devices, updating with each update of the rate. Accuracy is ±.5% FS worst case. Compliance voltage must be 3 to 24 VDC, non inductive. (The BATCHtrol II can provide the DC source as long as the drop across all devices being driven does not exceed 21 V).

Voltage Outputs:

When the voltage out option is ordered, a controlled voltage output is located at terminal 3 and referenced to pin 12 (ground). Accuracy is .1% @ 20°C (max. drift .01%/C°).

SECURITY:

The BATCHtrol II has a missing pulse detector. The user selects the amount of time (1 to 99 sec.) that the unit will "wait" for input pulses. If the unit doesn't receive pulses within the selected time, the unit displays "SECURITY" and both relays drop out. (00 Disables the security feature; Entering the lockout code returns the unit to the run mode)

PRESETS:

The user may enter two numbers to set up the batch totalizer, Preset and Prewarn. The Prewarn is a number set a certain amount before the preset number. For instance, you may want one hundred gallons in a particular batch. You may also want a valve to close and slow down flow 25 gallons before the end. Your preset is 100, your prewarn is 25. When the start is activated, the relays energize simultaneously to start flow. When the totalizer reaches 75, the prewarn relay drops out. When the totalizer reaches 100 the preset relay drops out. The preset values can be viewed or changed via the menu (when stopped).

K-FACTOR:

In the standard unit a fixed K-Factor is used to convert the input pulses or frequency generated internally by the analog input to engineering units. The 8 digit K-Factor dividers, with decimal keyed into any position, allow easy direct entry of any K-Factor greater than 0.0001 to 99999999. Separate K-Factors may be entered for the total and rate section. Thus, you may batch and total in gallons and display rate in liters per hour.

16 POINT LINEARIZATION:

This variable K-factor option makes flow systems more accurate and often extends their usable range by allowing users to dial in different K-factors for different flow rates. It works with either pulse input or standard analog current loop or voltage input. It is recommended for flow meters whose K-factors change with different rates of flow. From 3 to 16 points of frequency from 0 to 10,000 Hz. and K-factors greater than .0001 to 999,999 are

dialled in at set up. The 16 point linearization option uses 8 digit floating math to interpolate between settings. Rate per second, per minute or per hour programmability eliminates the need to calculate separate K-factors for total and rate.

TOTALIZER:

Each of the total and grand total counters have 8 digits. In the set-up mode choose "R0" (reset to zero) for adding operation or "SP" (set to preset) for subtracting operation. While viewing the total the display can be made to flash the grand total by pressing "ENT". Activating "CLR" while the grand total is flashing, resets the grand totalizer.

RATEMETER:

Accurate to 51/2 digits (±1 display digit). 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 autorange up to 6 digits of significant information. The rate meter 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. (See 16 Point Opt. Above) 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.

WEIGHT:

This feature is used to provide a weighted averaging of the rate data being received. Higher settings provide more averaging for a more stable display, derived from the equation:

$$\frac{(\text{Old Data} \times \text{"Weight"}) + \text{New Data}}{(\text{"Weight"} + 1)}$$

LOCKOUT:

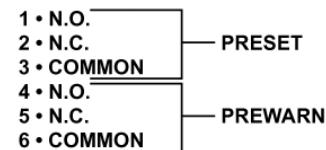
Unauthorized front panel changes can be prevented by entering a user selected four digit code.

OUTCARD:

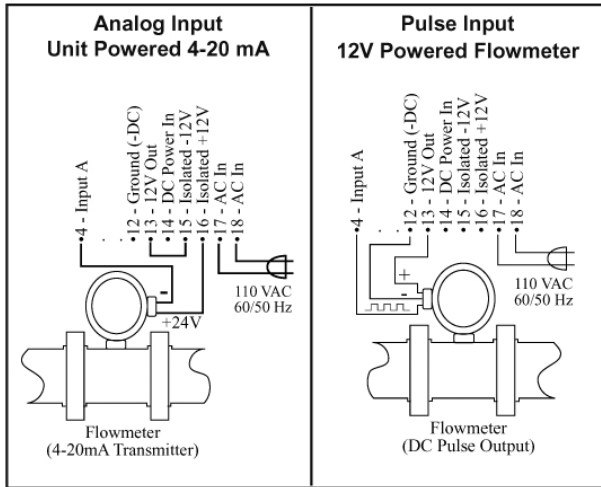
RS232 or RS422 serial two way communication options are available. Up to 15 units can be linked together and addressed separately to transmit unit status or accept new set points in the standard ASCII format. Baud rates of 300, 600, 1200, 2400 4800 or 9600 as well as choice of odd, even, space or mark parity can be selected by keypad control.

Termination:

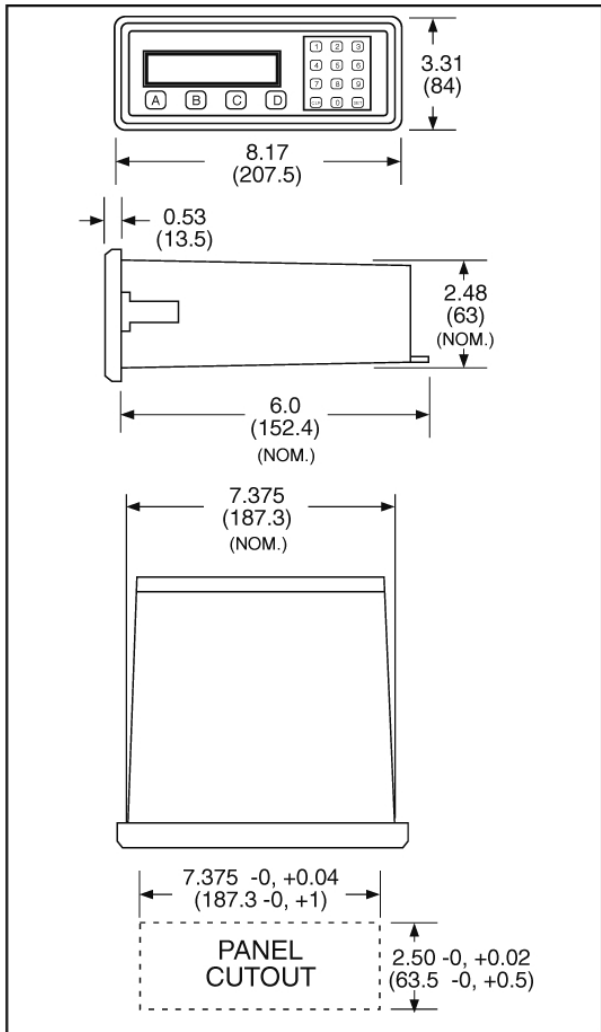
- 1 • NOT USED
- 2 • SCALED OUTPUT (OPEN COLLECTOR)
- 3 • ANALOG OUTPUT (SINK)
- 4 • INPUT (PULSE/ANALOG)
- 5 • STOP / RESET INPUT
- 6 • NOT USED
- 7 • NOT USED
- 8 • NOT USED
- 9 • NOT USED
- 10 • START INPUT
- 11 • NO CONNECTION
- 12 • GROUND (-DC)
- 13 • 12 VOLTS OUT
- 14 • + DC POWER IN (12 to 27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



Typical Hookup:



Dimensions:



Ordering Information

Example BT28 A 3A 2 A 13

Series: _____

Batchrol II

Operating Voltage: _____

A: 110 VAC ±15% or 12 to 27 VDC

B: 220 VAC ±15% or 12 to 27 VDC

Control Inputs: _____

* 3A: STD Pulse 3-30 VDC 20 kHz Max.

* 3B: As 3A, with 4.7 KΩ pull up resistors

5A: 4-20 mA

5B: 0-20 mA

5C: 1-5 VDC

5D: 0-5 VDC

5E: 0-10 VDC

6A: 4-20 mA Square Law

7A: 4-20mA in, 4-20mA out

7B: 0-20mA in, 4-20mA out

7C: 1-5VDC in, 4-20mA out

7D: 0-5VDC in, 4-20mA out

7E: 0-10VDC in, 4-20mA out

For Other Outputs:
Add X for 0-20mA out
Add Y for 0-5V out
Add Z for 0-10V out

Control Outputs: _____

1: Open Collector

2: SPDT Relay 10A (standard)

Input Speed: _____

* A: 0-40 CPS (Inputs 3A, 3B)

* C: 0-400 CPS (Inputs 3A, 3B)

* E: 0-20K CPS (Inputs 3A, 3B)

K: Inputs 5A-5E, 6A, 7A-7E

* Dip switch selectable, all units can be field modified easily.

Options: (Multiple Options Available) _____

1: RS232 Serial Interface

2: RS422 Serial Interface

3: 4-20 mA Output (Input 3A or 3B only)

3X: 0-20 mA Output (Input 3A or 3B only)

3Y: 0-5VDC Output (Input 3A or 3B only)

3Z: 0-10VDC Output (Input 3A or 3B only)

4: 16 Point Linearization Opt.

CSA: CSA Approved Unit (pending) Consult Factory

ET: Extended Temperature:

-40° to 158°F (-40° to 70° C)

ET not available with analog inputs or outputs

Accessories:

FLEXCOVER #36120

XTROL7/4- Explosion proof housing

NEMA 4X wall mount enclosure available, see NEMATROL

Serial printer available, see P1000, P295

Ethernet Port Server available, see IEPS

RS-422/485 to RS-232 Communication Adaptor available, see CA285

Batchers

SUPERtrol-I

Multi-Function Flow Totalizer, Ratemeter and Batcher

Features

- "EZ Setup" Guided Setup for First Time Users
- Rate/Total and Batching Functions
- Menu Selectable Hardware & Software Features
- Environmental Compliance Monitoring and Report Generation
- Universal Viscosity Curve (UVC) and API Eq.
- Advanced Batching Features: Overrun Compensation, Autobatch Start, Print End of Batch, Slow Fill, 2 Stage Batching
- Isolated Outputs Standard
- RS-232 Port Standard, Modbus RTU RS-485 Optional
- Advanced Printing Capabilities
- Windows™ Setup Software
- DIN Enclosure with Two Piece Connectors
- On Board Data Logging
- DDE Server & HMI Software Available
- Enhanced Modem Features for Remote Metering

Description:

The SUPERtrol-I Flow Computer satisfies the instrument requirements for a variety of flowmeter types in liquid applications. Multiple flow equations and instrument functions are available in a single unit with many advanced features.

The alphanumeric display shows measured and calculated parameters in easy to understand format. Single key direct access to measurements and display scrolling is supported

The versatility of the SUPERtrol-I permits a wide measure of versatility within the instrument package. The various hardware inputs and outputs can be "soft" assigned to meet a variety of common application needs. The user "soft selects" the usage of each input/output while configuring the instrument.

The isolated analog output can be chosen to follow volume flow, corrected volume flow, mass flow, temperature, or density by means of a menu selection. Most hardware features are assignable by this method.

The user can assign the standard RS-232 Serial Port for data logging, transaction printing, or for connection to a modem for remote meter reading.

A Service or Test mode is provided to assist the user during start-up system check out by monitoring inputs and exercising outputs and printing system setup.



Specifications:

Flow Meters and Computations

Meter Types: All linear and square law meters supported including: vortex, turbine, magnetic, PD, target, orifice, venturi, v-cone and many others
 Linearization: Square root, 16 point table or UVC table
 Computations: Volume, Corrected Volume & Mass
 Fluid Computations: Temperature, Density, Viscosity and API 2540 for petroleum.

Environmental

Operating Temperature: 0°C to +50°C
 Storage Temperature: -40°C to +85 C
 Humidity : 0-95% Non-condensing
 Materials: U.L. approved

Listing: UL/C-UL Listed (File No. E192404), CE Compliant

Display

Type: 2 lines of 20 characters
 Types: Backlit LCD and VFD ordering options
 Character Size: 0.3" nominal
 User programmable label descriptors and units of measure

Keypad

Keypad Type: Membrane Keypad with 16 keys

Enclosure

Size: See Dimensions
 Depth behind panel: 6.5" including mating connector
 Type: DIN
 Materials: Plastic, UL94V-0, Flame retardant
 Bezel: Textured per matt finish

Real Time Clock

The SUPERtrol-I is equipped with a battery backed real time clock with display of time and date.
 Format: 12 or 24 hour time display
 Day, Month, Year date display

Power Input

The factory equipped power option is internally fused. An internal line to line filter capacitor and MOV are provided for added transient suppression.

110 VAC Power: 85 to 127 Vrms, 50/60 Hz
 220 VAC Power: 170 to 276 Vrms, 50/60 Hz
 DC Power: 12 VDC (10 to 14 VDC)
 24 VDC (14 to 28 VDC)

Power Consumption:

AC: 11.0 VA (11W)
 DC: 300 mA max.

Flow Inputs:

Analog Input:

Accuracy: 0.01% FS at 20° C
 Ranges
 Voltage: 0-10 VDC, 0-5 VDC, 1-5 VDC
 Current: 4-20 mA, 0-20 mA
 Basic Measurement Resolution:
 16 bit
 Update Rate: 4 updates/sec
 Automatic Fault detection: Signal over/under-range,
 Current Loop Broken
 Calibration: Software Calibration (no trimmers) and Auto-zero Continuously
 Extended calibration:
 Learns Zero and Full Scale of each range using special test mode.
 Fault Protection:
 Reverse Polarity: No ill effects
 Over-Voltage Limit: 50 VDC Over voltage protection
 Over-Current Protection: Internally current limited protected to 24VDC

Pulse Inputs:

Number of Flow Inputs: one with or without quadrature or pulse security checking
 Input Impedance: 10 K Ω nominal
 Pullup Resistance: 10 K Ω to 5 VDC (menu selectable)
 Pull Down Resistance: 10 K Ω to common
 Trigger Level: (menu selectable)
 High Level Input
 Logic On: 3 to 30 VDC
 Logic Off: 0 to 1 VDC
 Low Level Input (mag pickup)
 Sensitivity:
 10 mV or 100 mV
 Minimum Count Speed:
 Menu selectable
 Maximum Count Speed:
 Menu Selectable: 40Hz, 3000Hz or 20 kHz
 Overvoltage Protection: 50 VDC

Auxiliary / Compensation Input

The auxiliary/compensation input is menu selectable for temperature, density or not used. This input is used for the compensated input when performing compensated flow calculations. It can also be used as a general purpose input for display and alarming.

Operation: Ratiometric
 Accuracy: 0.01% FS at 20° C
 Basic Measurement Resolution:
 16 bit
 Update Rate: 1 update/sec minimum
 Automatic Fault detection:
 Signal Over-range/under-range
 Current Loop Broken
 RTD short
 RTD open
 Fault mode to user defined default settings
 Fault Protection:
 Reverse Polarity: No ill effects
 Over-Voltage Limit (Voltage Input): 50 VDC
 Available Input Ranges
 Voltage: 0-10 VDC, 0-5 VDC, 1-5 VDC
 Current: 4-20 mA, 0-20 mA
 Resistance: 100 Ohms DIN RTD

100 Ohm DIN RTD
 (DIN 43-760, BS 1904):
 Three Wire Lead Compensation
 Internal RTD linearization learns ice point resistance
 1 mA Excitation current with reverse polarity protection
 Temperature Resolution: 0.01 C

Control Inputs

Switch Inputs are menu selectable for Start, Stop, Reset, Lock, Inhibit, Alarm Acknowledge, Print or Not Used.
 Number of Control Inputs: 3
 Control Input Specifications
 Input Scan Rate: 10 scans per second
 Logic 1: 4 - 30 VDC
 Logic 0: 0 - 0.8 VDC
 Input Impedance: 100 K Ω
 Control Activation:
 Positive Edge or Pos. Level based on product definition for switch usage.

Excitation Voltage

Menu Selectable: 5, 12 or 24 VDC @ 100 mA (fault protected)

Relay Outputs

The relay outputs are menu assignable to (Individually for each relay) Low Rate Alarm, Hi Rate Alarm, Prewarn Alarm, Preset Alarm or General purpose warning (security), low temperature/high temperature.

Number of relays: 2 (4 optional)
 Contact Style: Form C contacts
 Contact Ratings: 5 amp, 240 VAC or 30 VDC

Serial Communication

The serial port can be used for printing, datalogging, modem connection and communication with a computer.

RS-232:
 Device ID: 01-99
 Baud Rates: 300, 600, 1200, 2400, 4800, 9600, 19200
 Parity: None, Odd, Even
 Handshaking: None, Software, Hardware
 Print Setup: Configurable print list and formatting.
 Print Out: Custom form length, print headers, print list items.
 Print Initialization: Print on end of batch, key depression, interval, time of day, control input or serial request.
 RS-485: (optional 2nd COM port)
 Device ID: 01-247
 Baud Rates: 2400, 4800, 9600, 19200
 Parity: None, Odd, Even
 Protocol: Modbus RTU (Half Duplex)

Data Logging

The data logger captures print list information to internal storage for approximately 1000 transactions. This information can be used for later uploading or printing. Storage format is selectable for Comma-Carriage Return or Printer formats.

Isolated Analog Output

The analog output is menu assignable to correspond to the Uncompensated Volume Rate, Corrected Volume Rate, Mass Rate, Temperature, Density, Volume Total, Corrected Volume Total or Mass Total.
 Type: Isolated Current Sourcing
 Available Ranges: 4-20 mA, 0-20 mA
 Resolution: 12 bit
 Accuracy: 0.05% FS at 20° C
 Update Rate: 1 update/sec minimum
 Temperature Drift: Less than 200 ppm/C
 Maximum Load: 1000 ohms (at nominal line voltage)
 Compliance Effect: Less than .05% Span
 60 Hz rejection: 40 dB minimum
 Calibration: Operator assisted Learn Mode
 Averaging: User entry of damping constant to cause a smooth control action

