

# BAT R/T MILLENNIUM

## Battery or Loop Powered Ratometer & Totalizer

### Features

- Accepts Inputs From: Magnetic Pickups, Contact Closures, DC Pulses (Optically Isolated) from Pulse Producing Flowmeters
- Displays Rate & Total Simultaneously  
5 Digit Rate Display, 8 Digit Totalizer Display
- 4-20mA Analog Output Option (8 updates/sec)
- Powered From Internal Battery, External DC Supply or 4-20 mA Output Loop
- 20 Point Linearization (optional);  
10 Point Linearization with Data Logger option
- Isolated Scaled Pulse Output
- Nonvolatile Flash Memory of Setup Data
- RS485 Modbus RTU Communications and Data Logger (S2 option)
- Setup Software Available for Easy Programming and Monitoring Using a PC and Special Serial Cable (S1 option)
- Explosion Proof CSA or UL/C-UL Intrinsically Safe Listed

### Description

Featuring 5 digits of rate and 8 digits of total, the BAT R/T Millennium edition (BATRT-M) is a battery or loop powered indicator capable of accepting magnetic pickup, DC pulse and switch closure inputs from pulse producing flowmeters. The unit can be ordered with an optional 4-20mA output. The BATRT-M uses the 4-20mA loop to provide power when this output is used.

### Specifications

#### DISPLAY:

Rate Display: (selectable decimal)

5 Digits (99999), 0.35" High, Display updates once per second with battery power, 8X per second with DC or Loop power

Rate Descriptors: /SEC, /MIN, /HR  
/MIN, /HR, /DAY with "D" option

Min. Input Frequency: 0.01 Hz to 10 Hz (selectable delay of 0.1 to 99.9 seconds) Selectable Rate Display Damping

Totalizer Display: (selectable decimal)

8 Digits (99999999), 0.2" High

Totalizer Descriptors: GAL, LIT, FT3, M3, "blank"  
GAL, BBL, MCF, M3, "blank" with "D"  
option

Warning Displays: Low battery warning

#### PULSE OUTPUT:

The pulse output advances with the least significant digit of the totalizer or decimal multiples thereof (see Pulse scale divider).

Type: Isolated photomos relay

Max. voltage (off state): 30 VDC

Current (on state): 100mA

Pulse Duration: Selectable 0.5, 0.25, 0.125, 0.0625 seconds

Pulse Scale Divider (Pulscale): User selectable, +1, +10, +100 or OFF

NOTE: Select OFF for max. battery life.

#### ACCURACY:

0.01% Reading, ±1 count

Temperature Drift: 50 ppm/°C Worst Case

#### SAFETY LISTINGS (Mounting Styles 3, 3NE, 3SS):

CSA File 091109 (cert. 1120094)

UL/C-UL File E225832

CLASS 1, DIV 1, GROUPS B, C, D

Additional "enclosure only" approvals available for ATEX and IEC



Mounting Style 1



Mounting Style 2



Mounting Style 3



Mounting Style 3NE



Mounting Style 3SS



Mounting Style 5



Mounting Style 6

**ENVIRONMENTAL:**

**OPERATING TEMPERATURE**

-4°F (-20°C) to + 158°F (70°C)  
Extended Temp: -22°F (-30°C) to + 158°F (70°C)

**HUMIDITY**

0 - 90% Noncondensing

**MOUNTING STYLES:**

- 0- Circuit Board- OEM option (consult factory)
- 1- Panel Mount - NEMA 4X Front
- 2- Wall Mount - NEMA 4X Enclosure  
(keypad mounted behind clear cover)
- 3- Explosion Proof - Class I, Division I, Groups B, C & D  
Class II, Division I, Groups E, F & G  
White, Includes Third Conduit Entry
- 3NE- Explosion Proof - Class I, Division I, Groups B, C & D  
Class II, Division I, Groups E, F & G  
Stainless Steel
- 3SS- Explosion Proof - Class I, Division I, Groups B, C & D  
Class II, Division I, Groups E, F & G  
Stainless Steel
- 5- Wall Mount - NEMA 4X Enclosure  
(keypad mounted on cover)
- 6- Double Ended Explosion Proof - Class I, Division I, Groups B, C & D  
Class II, Division I, Groups E, F & G  
(contact factory for details)

**NOTE:** Meter mounting kits available for styles 2, 3, 5 and 6  
Consult Factory

**NPUS:**

**MAGNETIC PICKUP INPUT**

Frequency Range: 0 to 3500 Hz  
Trigger Sensitivity: 10 mV p-p  
Over Voltage Protected: ± 30 VDC

**OPTO-ISOLATED DC PULSE INPUT**

High (logic 1): 4-30 VDC  
Low (logic 0): Less Than 1 VDC  
Minimum Current: .5 mA  
Hysteresis: 0.4 VDC  
Frequency Range: 0 to 5 kHz  
Min. Pulse Width: 0.1 msec

**CONTACT CLOSURE INPUT (contact closure to common)**

Internal Pullup Resistor: 100 KΩ to +3.6 VDC  
High (logic 1): Open or 4-30 VDC  
Low (logic 0): Less Than .5 VDC  
Internal Switch Debounce Filter: 0 to 40 Hz

**NOTE:** Sustained contact closure will shorten battery life.

**RESET INPUT (contact closure to common)**

Internal Pullup Resistor: 100 KΩ to +3.6 VDC  
High (logic 1): Open or 4-30 VDC  
Low (logic 0): Less Than .5 VDC  
Minimum On : 25 msec

**NOTE:** Sustained contact closure will shorten battery life.

**K-FACTOR**

Range: 0.001 to 99999999  
Decimal Point Locations: XXXX.XXXX to XXXXXXXXX

**20 Point Linearization Option (10 Point with Data Logger option)**

This feature allows the user to enter 20 different frequencies with 20 different corresponding K-Factors to linearize non linear signals.

**ANALOG OUTPUT OPTION:**

Type: 4-20 mA follows rate display, Two wire hookup  
Accuracy: 0.025% Full Scale at 20° C  
Temperature Drift:  
50 ppm/°C Typical  
Reverse Polarity Protected  
Update Rate: 8 times/second

**NOTE:** The BATRT-M uses the 4-20 mA loop power as its primary power source when this option is used. The battery is still required for standby battery operation.

**Power:**

**BATTERY POWERED**

Supplied with 1 or 2 C size Lithium battery pack.

**EXTERNAL POWER INPUT**

Voltage: 8.5 to 30 VDC  
Current: Less than 5 mA  
Supplied with 1 C size lithium battery  
Protection: Reverse Polarity Protection on DC Power Input

**LOOP POWERED**

Voltage: 8.5 to 30 VDC  
Supplied with 1 or 2 C size lithium battery(ies)  
Protection: Reverse Polarity Protection on Current Loop  
Loop Burden: 8.5V maximum

**BATTERY LIFE EXPECTANCY:**

Expected Years of Operation for BATRT-M of various powering options at equipment duty cycles

MODEL	RUN TIME			
	Idle	2hrs/day	8hrs/day	24hrs/day
BATRT-M-A	10 yrs	10 yrs	10 yrs	9.1 yrs
BATRT-M-A-4	10 yrs	10 yrs	10 yrs	8.4 yrs
BATRT-M -B/C	Indefinite operation when externally powered External or loop power			

**NOTE:** Battery shelf life is rated at 10 years by manufacturer  
Life expectancy based on rated battery capacity at 20°C  
The above table is shown with pulse output inactive. Use of pulse output shortens battery life.  
Example: A pulse output of 0.06 sec. duration, once per second, would derate the battery life by 20%.

**DATA STORAGE:**

Setup Information: Stored in flash memory  
Totalizer: Stored in battery backed RAM but can be saved to flash memory by operator for recall after battery change out.

**COMMUNICATIONS OPTION (S1):**

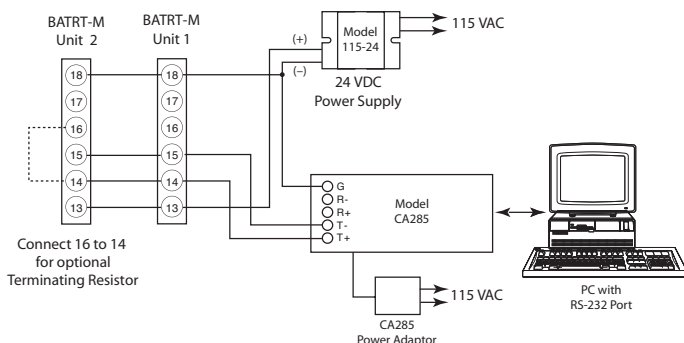
**RS232 SERIAL SETUP SOFTWARE OPTION:**

This option enables you to access a variety of process parameters through serial communications. PC compatible communications software is included with this option. With this software and a BAT R/T-M Serial Adapter Cable (BSAC1) you will be able to setup the BAT R/T-M through your PC.

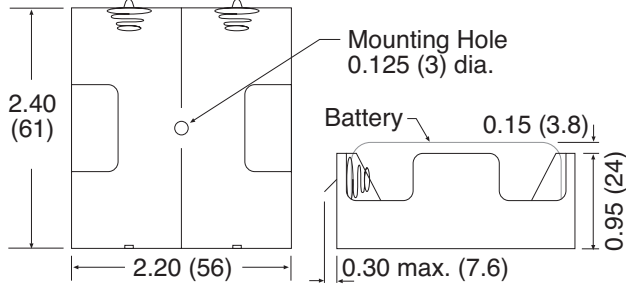
**RS-485 MODBUS and DATA LOGGER OPTION (S2):**

The optional RS-485 card utilizes Modbus RTU protocol to access a variety of process parameters. The Data Logger stores the totalizer to flash memory once every 24 hours at the time you set. The data logger can hold 27 days of totals, on the 28th day the oldest total in the logger is dropped. Requires external DC power: 6-28VDC (input is reverse polarity protected)

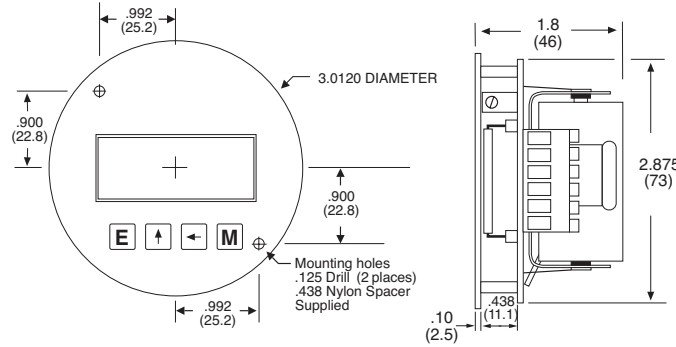
Current Draw:  
Receiving: 2 mA  
Transmitting: 125 mA (instantaneous peak)



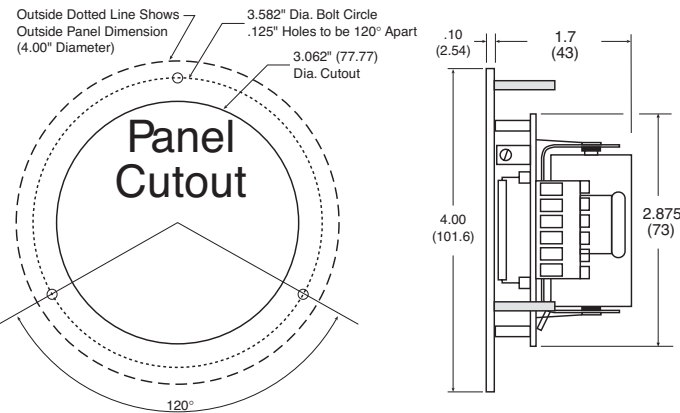
### BATPACK



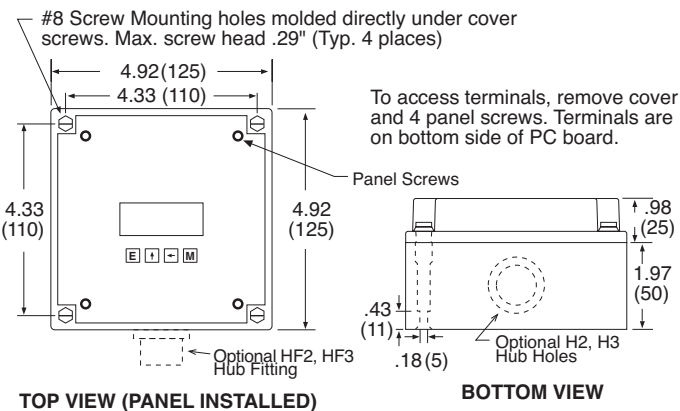
### BATRT-M-0



### BATRT-M-1

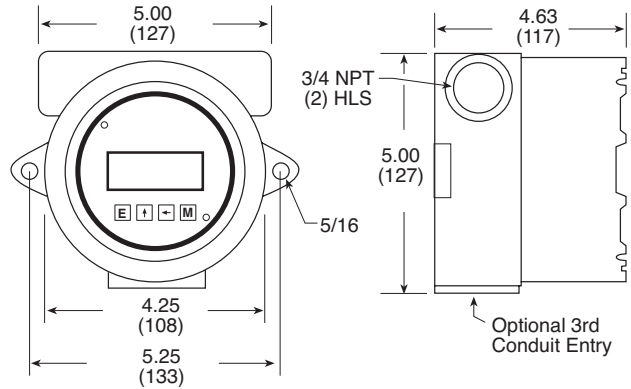


### BATRT-M-2

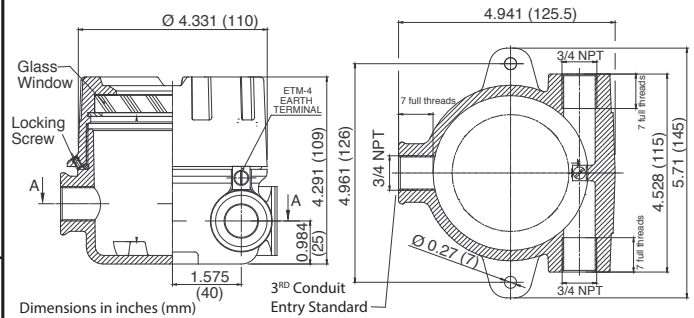


### BATRT-M-3

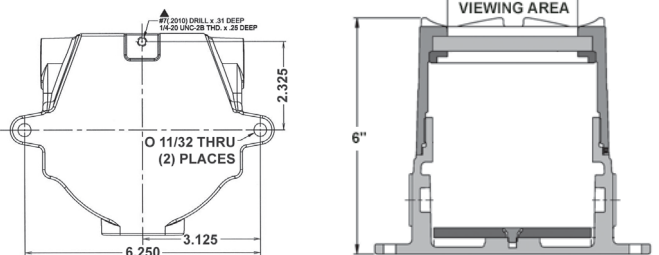
To access terminals, unscrew cover and loosen 2 panel screws. Terminals are on bottom side of PC board.



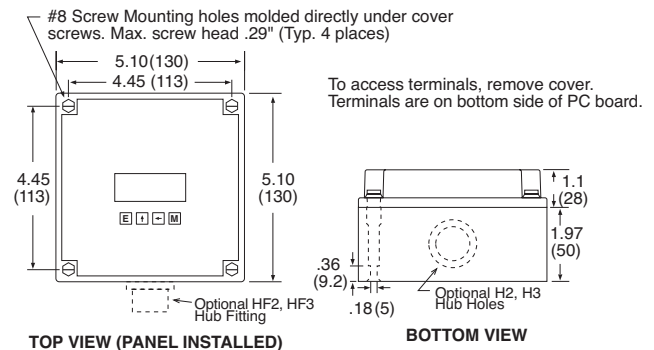
### BATRT-M-3NE



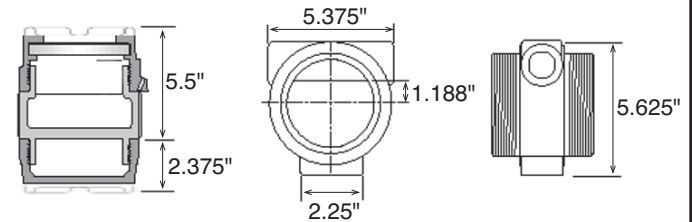
### BATRT-M-3SS



### BATRT-M-5

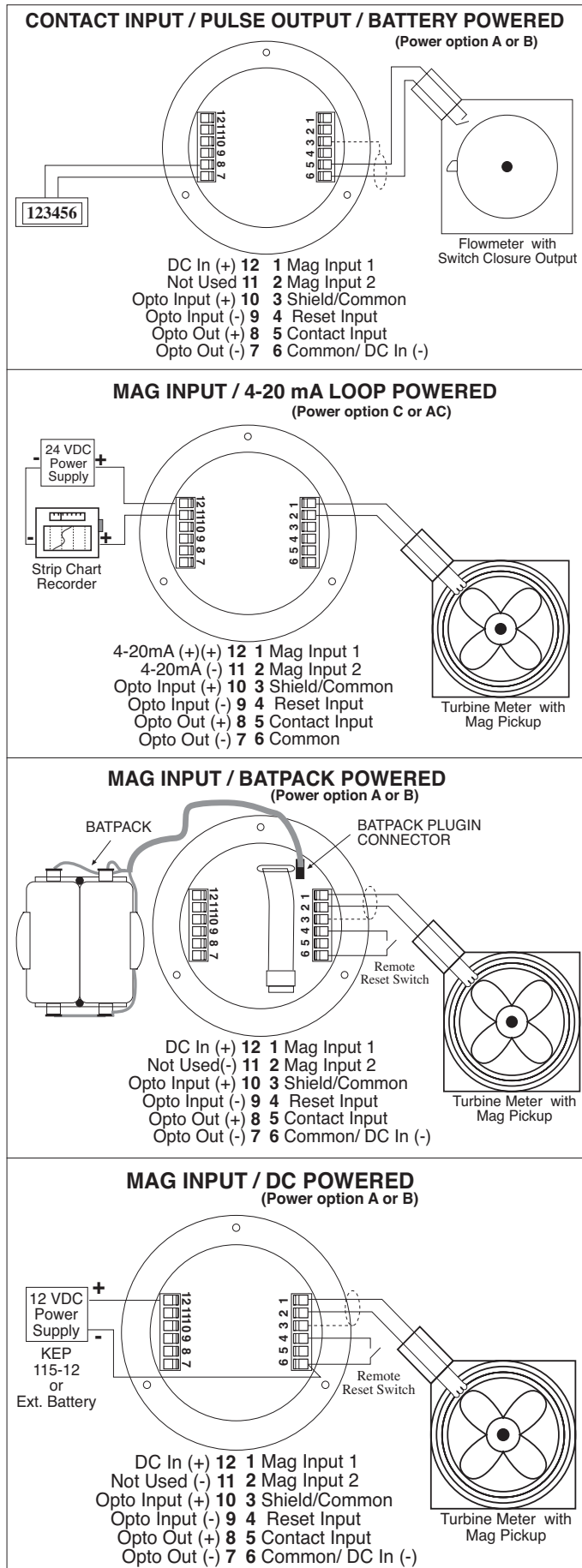


### BATRT-M-6



NOTE: Additional entry holes may be provided on styles 2 and 5.

## Typical Wiring:



## Ordering Information

**EXAMPLE:** BATRTM 3 A 4 ET

**Series:** \_\_\_\_\_

**Mounting:** \_\_\_\_\_

† 0 = OEM

† 1 = Panel Mount

2 = NEMA 4X Box (BAT R/T behind clear cover)

3 = Explosion Proof Housing

3NE = Explosion Proof Housing, White  
Includes Third Conduit Entry

3SS = Stainless Steel Ex-Proof Housing (consult factory)

5 = NEMA 4X Box (BAT R/T outside opaque cover)

6 = Double Ended Explosion Proof Housing

**Power Supply:** \_\_\_\_\_

† A = Battery (2 supplied)

B = External Power Supply (8.5 to 30 VDC)

C = Loop Powered with 4-20 mA Output

AC = Loop Powered with 4-20 mA Output and 2 Batteries

**Options** (Multiple Options Available) \_\_\_\_\_

S1 = Serial Setup Software for use with BSAC1

S2 = RS485/Modbus/Data Logger - Isolated  
(power options B, C only)

4 = 20 Point Linearization (10 point with S2 option)

D = Rate per Day, Hour or Minute

ET = Extended Temp.: -22°F to 158°F (-30°C to 70°C)

CE = CE Approved Version (LVD & EMC only)

CSA = CSA Approved Version (explosion proof)

IS\*\* = UL Listed IS (consult factory)

ATEXCASE\*\* = European Flame Proof  
ATEX Case (consult factory)

TRX = NEMA7 Explosion Proof Reset Switch  
on Third Conduit Entry (mounting style 3 only)

RN = External Magnetic Reset

T = Third Conduit Entry in Ex-Proof Housing  
(mounting style 3 only, Third Conduit Entry is Standard on  
3NE & 3SS model and does not need to be specified)

H2 = 0.875" Hole for mounting styles 2 and 5

HF2 = 0.5" Female NPT Hub fitting (mount styles 2 & 5)

H3 = 1.125" Hole for mounting styles 2 and 5

HF3 = 0.75" Female NPT Hub fitting (mount styles 2 & 5)

**Special Battery Options**

NB = No Battery

AB = Supplied with A size batteries

**Accessories:**

BATPACK= External Batt. Pack with  
2 C Size Batteries & 12" leads

BATC = Single Battery: Tadiran P/N TL2200/S  
3.6V 7200mAh or equal

115-24 = 115 VAC to 24 VDC power supply

BSAC1 = RS232 Serial Adapter Cable  
with setup software

TFMMK-1 = Turbine Flowmeter Mounting Kit  
for flow meters with a 1" Male NPT riser

TFMMK-3/4 = Turbine Flowmeter Mounting Kit  
for flow meters with a 3/4" Male NPT riser

CA-TFM-2-18FL = 18" Long Turbine Flowmeter  
Cable Assembly

† External battery pack supplied with models BATRTM0A & BATRTM1A  
\*\* Contact factory for latest information

**RoHS Compliant planned**