# BAT R/T MILLENNIUM

## Battery or Loop Powered Ratemeter & 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

Mounting Style 1

Mounting Style 2

Mounting Style 3NE

Mounting Style 3SS

Mounting Style 5

Mounting Style 6

**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 there of (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

**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)
**3NE**- Explosion Proof - White, Includes Third Conduit Entry Class I, Division I, Groups B, C & D Class II, Division I, Groups E, F & G
**3SS**- Explosion Proof - Stainless Steel Class I, Division I, Groups B, C & D Class II, Division I, Groups E, F & G
**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

**NPUTS:**
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 XXXXXXXX

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

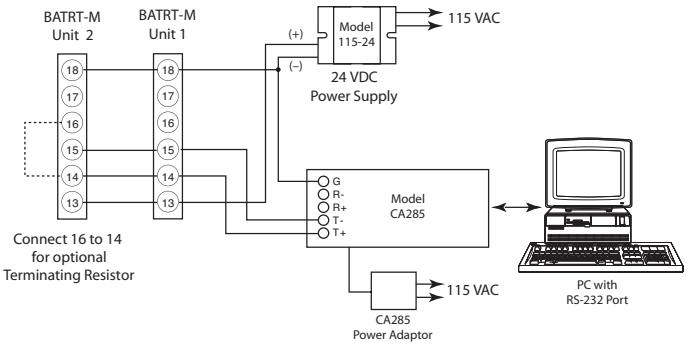
| MODEL | RUN TIME | | | |
|---|---|---|---|---|
| | Idle | 2hrs/day | 8hrs/day | 24hrs/day |
| BATRT-M-A | 10 yrs | 10 yrs | 10 yrs | 9.1 yrs |
| BATRT-M-A-4 | 10 yrs | 10 yrs | 10 yrs | 8.4 yrs |
| BATRT-M -B/C External or loop power | Indefinite operation when externally powered | | | |

**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%.

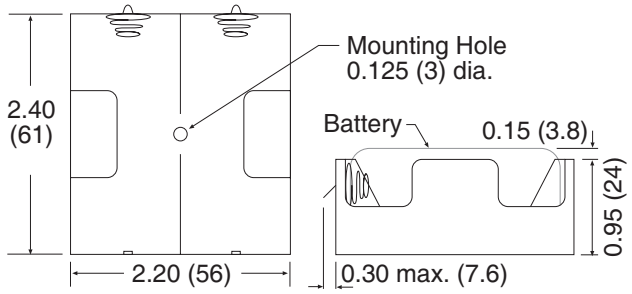
**IDATA STORAGE:**
Setup Information: Stored in flash memory
Totalizer: Stored in battery backed RAM but can be saved to flash memory by operator for recall after battery change out.

**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.

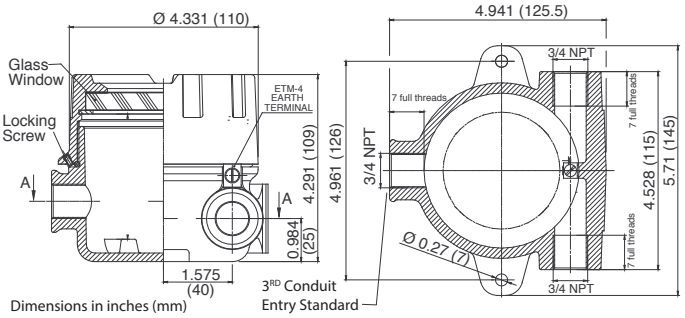
**RS-485 MODBUS and DATA LOGGER OPTION (S2):**
The optional RS-485 card utilizes Modbus RTU protocol to access a variety of process parameters. The Data Logger stores the totalizer to flash memory once every 24 hours at the time you set. The data logger can hold 27 days of totals, on the 28th day the 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)



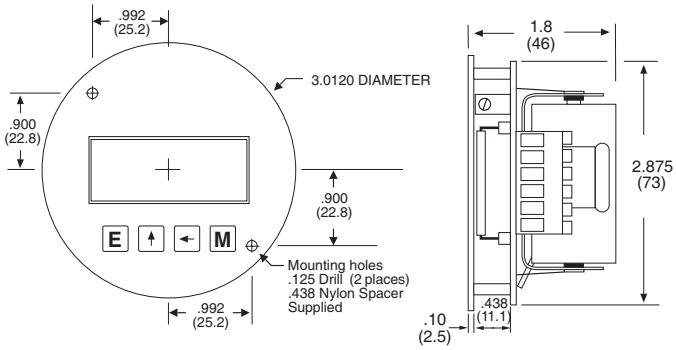
## BATPACK



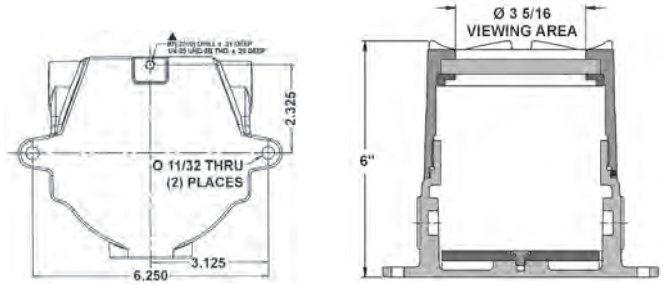

## BATRT-M-3NE



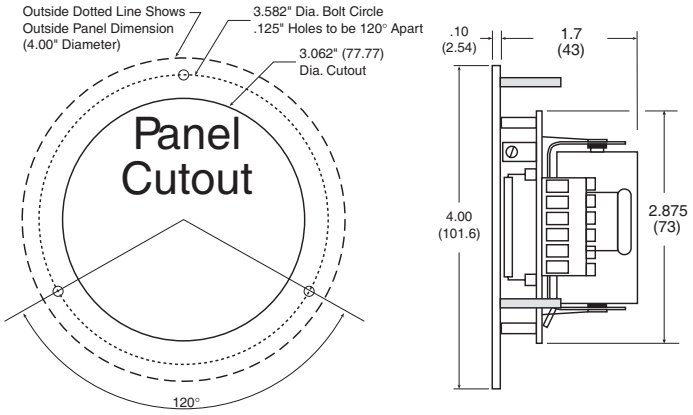

## BATRT-M-0



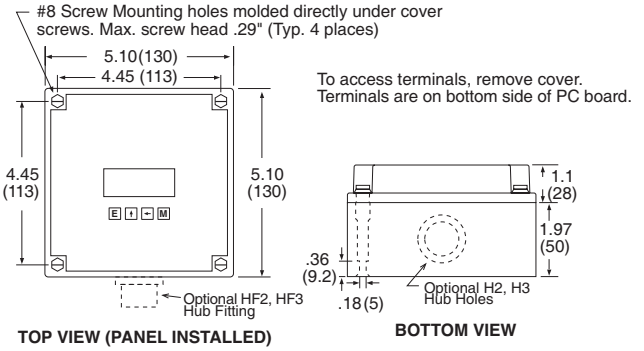

## BATRT-M-3SS



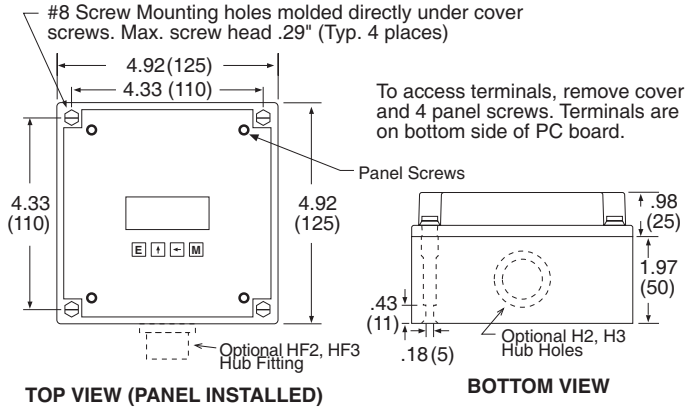

## BATRT-M-1



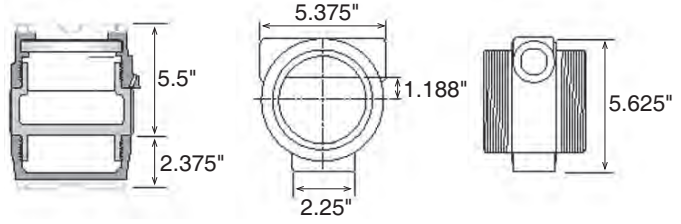

## BATRT-M-5




## BATRT-M-2



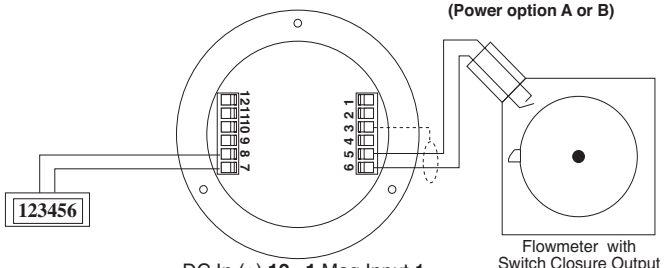

## BATRT-M-6




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

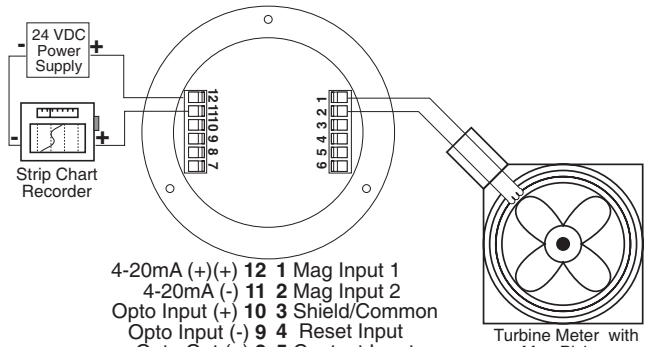
## Typical Wiring:

### CONTACT INPUT / PULSE OUTPUT / BATTERY POWERED
**(Power option A or B)**



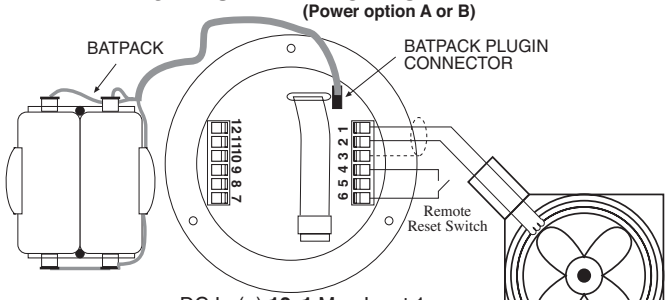

DC In (+) **12** **1** Mag Input 1
Not Used **11** **2** Mag Input 2
Opto Input (+) **10** **3** Shield/Common
Opto Input (-) **9** **4** Reset Input
Opto Out (+) **8** **5** Contact Input
Opto Out (-) **7** **6** Common/ DC In (-)

### MAG INPUT / 4-20 mA LOOP POWERED
**(Power option C or AC)**



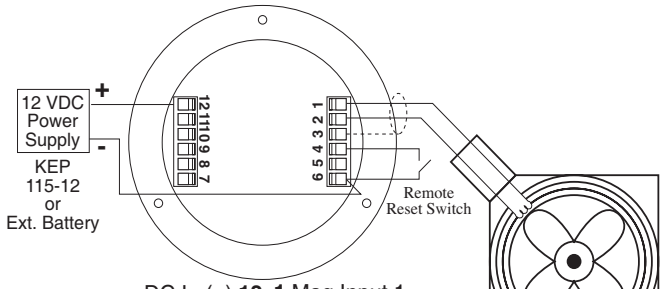

4-20mA (+)(+) **12** **1** Mag Input 1
4-20mA (-) **11** **2** Mag Input 2
Opto Input (+) **10** **3** Shield/Common
Opto Input (-) **9** **4** Reset Input
Opto Out (+) **8** **5** Contact Input
Opto Out (-) **7** **6** Common

### MAG INPUT / BATPACK POWERED
**(Power option A or B)**




DC In (+) **12** **1** Mag Input 1
Not Used(-) **11** **2** Mag Input 2
Opto Input (+) **10** **3** Shield/Common
Opto Input (-) **9** **4** Reset Input
Opto Out (+) **8** **5** Contact Input
Opto Out (-) **7** **6** Common/ DC In (-)

### MAG INPUT / DC POWERED
**(Power option A or B)**




DC In (+) **12** **1** Mag Input 1
Not Used (-) **11** **2** Mag Input 2
Opto Input (+) **10** **3** Shield/Common
Opto Input (-) **9** **4** Reset Input
Opto Out (+) **8** **5** Contact Input
Opto Out (-) **7** **6** Common/ DC In (-)

## 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)
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
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**