

# BAT R/T MILLENNIUM

## Battery or Loop Powered Ratemeter & Totalizer

### Features

- UL/C-UL Intrinsically Safe Listed
- 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

### 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

#### 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              | 10 yrs                                       | 10 yrs   | 10 yrs   | 10 yrs    |
| <u>standby-operation</u> |  |          |          |           |
| 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%.

#### 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



- Nonvolatile Flash Memory of Setup Data
- RS485 Modbus RTU Communications and Data Logger (optional)
- Setup Software Available for Easy Programming and Monitoring Using a PC and Special Serial Cable

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:

UL/C-UL File E225832

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

See Installation DWNG 17075-1

#### 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
- 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 and 5  
Consult Factory

Flow Instruments  
FIELD INDICATORS

**INPUTS:**

**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.

**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):**

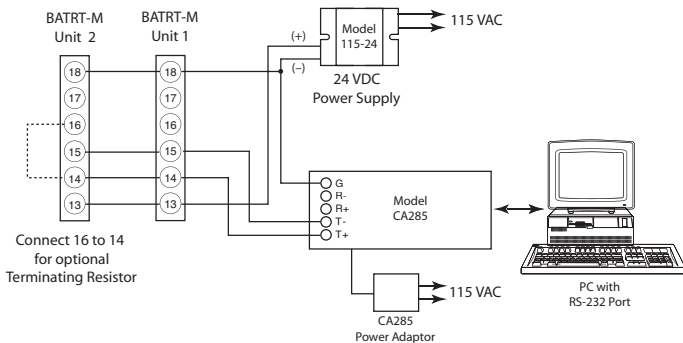
**RS232 SERIAL SETUP SOFTWARE OPTION:**

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)



**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

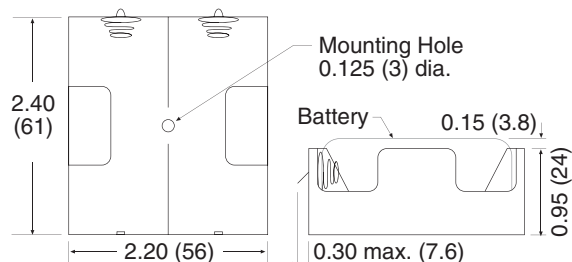
**MAG INPUT / BATPACK POWERED**  
(Power option A or B)

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 (-)

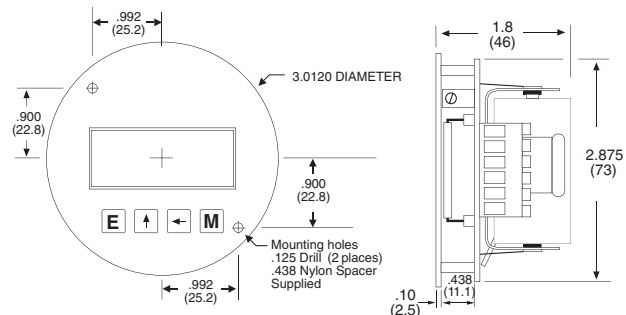
**MAG INPUT / DC POWERED**  
(Power option A or B)

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 (-)

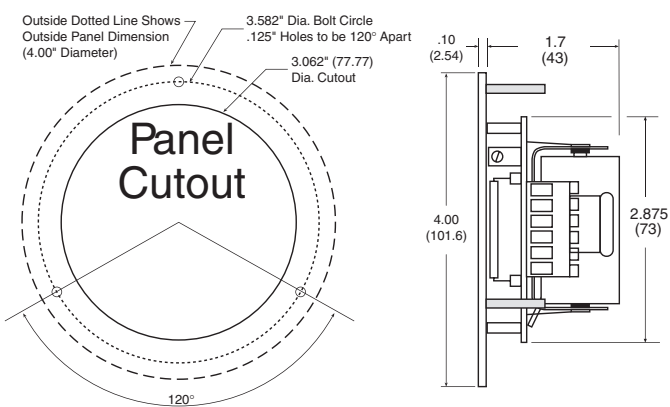
### BATPACK



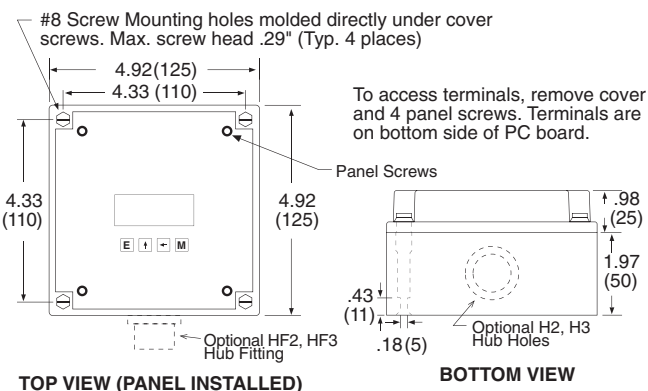
### BATRT-M-0



### BATRT-M-1

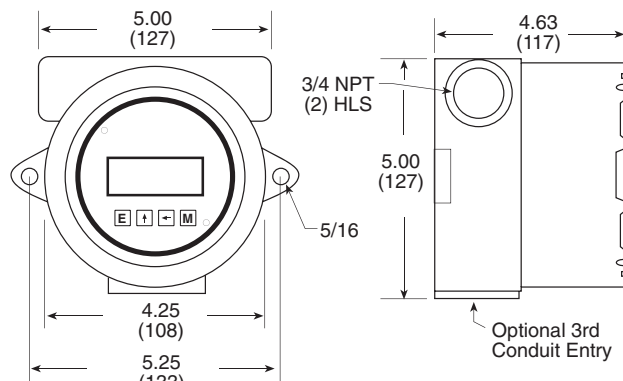


### BATRT-M-2

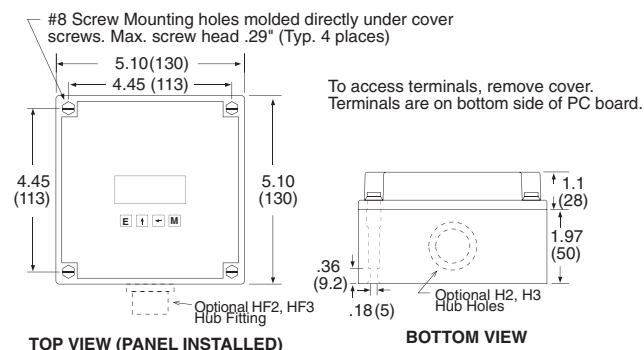


### BATRT-M-3

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



### BATRT-M-5



## Ordering Information

**EXAMPLE: BATRTM 3 A 4 ET**

|  |  |  |  |
|--|--|--|--|
| <b>Series:</b>   |  |  |  |
| <b>Mounting:</b>   |  |  |  |
| * 0 = OEM  |  |  |  |
| * 1 = Panel Mount  |  |  |  |
| 2 = NEMA 4X Box (Bat R/T-M behind clear cover)             |  |  |  |
| 3 = Explosion Proof Housing                                |  |  |  |
| 5 = NEMA 4X Box (Bat R/T-M outside opaque cover)           |  |  |  |
| 6 = Double Ended Explosion Proof Housing (consult factory) |  |  |  |
| <b>Power Supply:</b>                                       |  |  |  |
| * 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      |  |  |  |

|  |  |
|--|--|
| <b>Options (Multiple Options Available)</b>                        |  |
| 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 Compliant  |  |
| CSA** = CSA Listed Explosion Proof                                 |  |
| IS** = UL/C-UL Listed IS   |  |
| TRX = NEMA7 Explosion Proof Reset Switch (mounting style 3 only)   |  |
| RN = External Magnetic Reset                                       |  |
| T = Third Conduit Entry in Ex-Proof Housing (mounting style 3)     |  |
| H2 = 0.875" Hole for mounting styles 2 and 5                       |  |
| HF2 = 0.5" Female NPT Hub fitting for mounting styles 2 and 5      |  |
| H3 = 1.125" Hole for mounting styles 2 and 5                       |  |
| HF3 = 0.75" Female NPT Hub fitting for mounting styles 2 and 5     |  |

|   |  |
|---|--|
| <b>Accessories:</b>   |  |
| 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            |  |

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

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