# Counters, Panel Meters, Tachometers and Timers



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**Eclipse Series Panel Meter**

**Hour Meter**

**Fusion Integrated Machine Control**

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**Totalizers**

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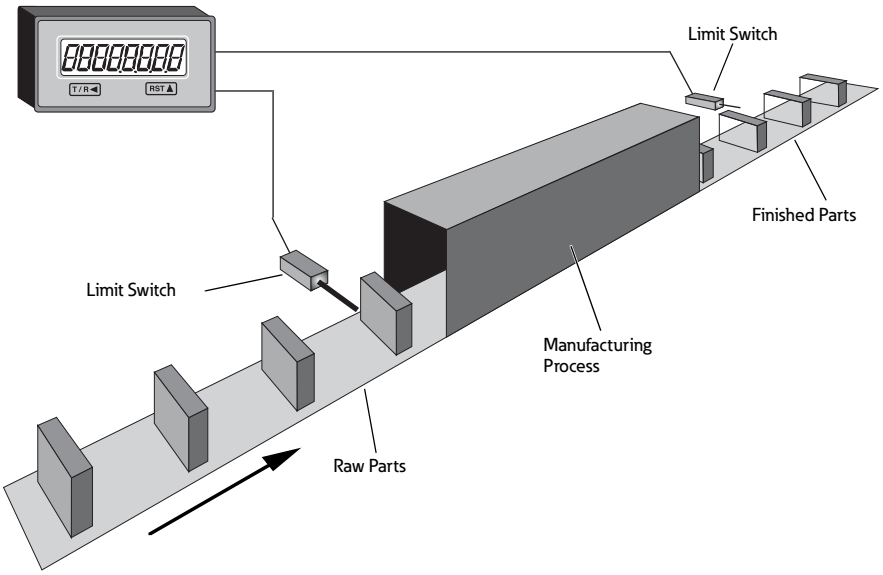
## Product Overview

Totalizers are used in a wide variety of applications where accurate totals are needed. Typical applications include counting the number of parts produced, amount of material used, or the number of machine cycles occurring. Totalizers are the simplest and most common type of counter. As an added bonus, some models can perform both totalizing and ratemeter functions.

## Typical Application

Parts are fed into a machine or process, an operation is performed, and the finished parts exit the machine or process. The subtract totalizer is used to indicate the number of parts in process.

### Application Example



## Product Selection Guide

### Totalizers

| | Characteristics | Typical Applications | Panel Cutout in Inches (mm) | Page |
|---|---|---|---|---|
| **Mechanical** | Various size ranges for different duty cycles and environments<br>No power supply needed<br>Long life and always readable display | Winding and spooling equipment<br>Position display<br>Mechanical piece/cycle counting | Various mounting configurations | **V13-T1-5** |
| **Electromechanical** | Various price, voltage and size ranges for different duty cycles and environments<br>Long life and always readable display | Coin-operated equipment<br>Gaming machines<br>Printing presses<br>Secondary machines (e.g. punch press) | Various mounting configurations | **V13-T1-29** |
| **E5-024-C** | Non-replaceable battery (min. eight-year life)<br>Compact, low cost and high efficiency<br>Eight-digit LCD totalizers<br>Manual or electrical reset<br>Various counting modes/inputs | Replacement for mechanical counters<br>Transaction counting<br>Parts counting<br>Position indication or measurement | 0.870 x 1.772 (22 x 45) | **V13-T1-42** |
| **E5-_24-E** | Compact device with bright, LED display<br>Multiple functions available: count, time, rate, multifunction, double-function<br>24 Vdc Power | Count, measure, time where small package and easy-to-read display required<br>Position display<br>Motor/pulley RPM | 0.870 x 1.772 (22 x 45) | **V13-T1-44** |
| **Courier** | Replaceable lithium battery<br>Eight-digit, high-visibility LCD display<br>Optional backlighting<br>Various input options available | Portable/mobile/remote flow monitoring (e.g. sewer pumping, pesticide application)<br>Position display, RPM<br>Length measurement (e.g. carpet, cable) | 1.299 x 2.677 (33 x 68) | **V13-T1-46** |
| **E5-496-E** | Economical, multifunction display<br>Large, LED characters<br>AC or DC power options | Large, easy-to-read display<br>Position display<br>Motor/pulley RPM | 1.772 x 3.780 (45 x 96) | **V13-T1-49** |

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## Totalizers, continued

| | Characteristics | Typical Applications | Panel Cutout in Inches (mm) | Page |
|---|---|---|---|---|
| **President** | Bright LED display with 14 mm characters<br>Simple configuration with 14-button tactile keypad<br>Many different versions fit almost any application | Cut-to-length machinery with batching<br>Parts batching/palletizing<br>Die press positioning control<br>Applications where parameter changes are required | 2.667 x 5.433 (68 x 138) | **V13-T1-60** |
| **Ambassador** | Eight-digit, high-visibility, two-line LCD display<br>User-configurable control inputs<br>Highly flexible control/display | Flow control where simultaneous total and rate display are required<br>Cut-to-length and other simple processes where flexibility of inputs/outputs required | 2.667 x 2.667 (68 x 68) | **V13-T1-69** |
| **Hour Meter/Counter** | Combination counter consists of time meter and adding counter in one<br>Without reset<br>High shock resistance<br>Magnified figures<br>Protection IP52 (front)<br>Data retention if power is lost<br>Long service life<br>UL approved | General counting<br>Service interval for measurement systems (respiratory ventilators, oxygen machines, dialysis machines)<br>Small appliances<br>UV lamps<br>Display panels in cars | 1.988 (50.5) dia. or DIN rail | **V13-T1-111** |

**Mechanical Totalizers (Stroke)**

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## Mechanical Totalizers (Stroke)

### Product Overview

Eaton's mechanical totalizers are available in a variety of heavy-duty configurations for applications when power is unavailable.

### Features

- Variety of reset methods available
- Accurate counting without need for power

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## X Series/Pushbutton Desk Tally

### Product Description

***X Series Counters***

Model X Series is a dustproof and rustproof series of counters for light and medium-duty work. They are sound and durable, requiring a minimum of driving effort, and have been especially designed for incorporation as integral parts of a variety of machines and equipment.

***Pushbutton Desk Tally***

Ruggedly constructed counters with feather-touch pushbutton operation and maximum readability. Specifications and dimensions are basically the same as the X Series counters. Will give long and accurate service in areas requiring hand counting or during hand operations.

### Product Selection

***When Ordering Specify***

To determine a model number from the Product Selection table for Model X Series Stroke Counters and Pushbutton Desk Tallies, consider:

- Number of figures
- Drive

**X Series Stroke Counter**

**Pushbutton Desk Tally**

**X Series Stroke Counters and Pushbutton Desk Tallies**

| No. of Figures | Drive | Reset | Mounting | Catalog Number | Order Number |
|---|---|---|---|---|---|
| 5 | LH lever | Knob | Base | **5-X-1-1-L** | **40272401** |
| 4 | RH lever | Knob | Base | **4-X-1-1-R** | **40263401** |
| 5 | RH lever | Knob | Base | **5-X-1-1-R** | **40272402** |
| 5 | LH lever | Knob | Base | **5-X-1-1-L-REV** ① | **40272400** |
| 5 | RH lever | Knob | Base | **5-X-1-1-R-REV** ① | **40272403** |
| 4 | Push bar | Knob | Base | **4-X-2** | **21619400** |
| 4 | Pushbutton | Knob | Base | **4-X-2-A** | **33245400** |

***Note***

① Reverse stroke.

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## Technical Data and Specifications

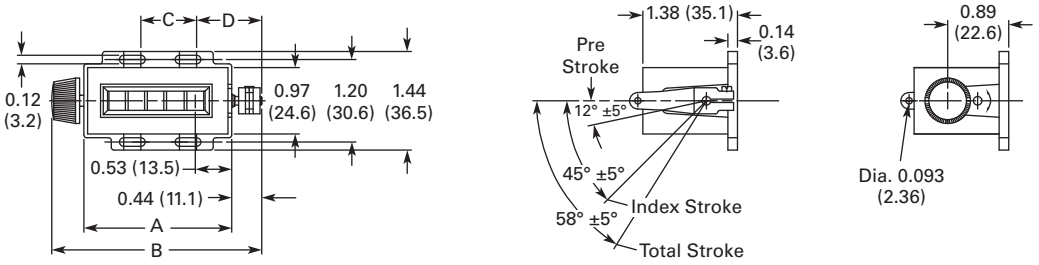
### General Specifications

| Description | Specification |
|---|---|
| Figures | 4 or 5 |
| Speed | 1000 cpm |
| Shaft | 0.125 in (3.2 mm) diameter stainless steel |
| Drive | Drive parts of nylon |
| Bearings | Oil-less, maintenance free |
| Finish | Black frame and Cycolac black cover |
| Stroke operation | 33° minimum; 58° maximum ① |
| Figure size | 3/16 in (4.8 mm) high, white-on-black background |
| Reset | Knob |

## Dimensions

Approximate Dimensions in Inches (mm)

### X Series




| Model | A | B | C | D |
|---|---|---|---|---|
| 4-X-1-1_ | 1.86 (47.2) | 2.76 (70.2) | 0.62 (15.7) | 0.89 (22.6) |
| 5-X-1-1_ | 2.16 (54.8) | 3.06 (77.8) | 0.81 (20.6) | 0.95 (24.1) |

***Note***

① Operating stroke angles apply to forward stroke counter only. Check factory for angles of reverse stroke counter.

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## CS Series

### Product Description

Model CS Series of small, compact, top reading stroke counters is designed for use in most industrial applications. These counters are ruggedly built and feature a single casting case, which assures great rigidity and a tight seal for working parts.

### Product Selection

***When Ordering Specify***

To determine a model number from the Product Selection table for Model CS Series Stroke Counters, consider:

- Number of figures
- Drive lever

**CS Series Stroke Counter**

#### CS Series Stroke Counters

| No. of Figures | Drive | Reset | Mounting | Catalog Number | Order Number |
|---|---|---|---|---|---|
| 5 | RH lever | Wing nut | Base | **5-CS-1-1-R** | **31062401** |
| 5 | RH lever | Wing nut | Base | **5-CS-1-1-R-RP** ① | **01464400** |

### Technical Data and Specifications

#### General Specifications

| Description | Specification |
|---|---|
| Figures | 4 or 5 |
| Speed | 600 cpm |
| Stroke operation | 37-1/2° minimum; 75° maximum |
| Shaft | 0.25 in (6.4 mm) diameter stainless steel, rustproof |
| Drive | Accurately machined, hardened steel parts |
| Bearings | Oil-less, maintenance free |
| Figure size | 11/32 in (8.7 mm) high, black-on-white background |
| Reset | Contoured wing nut |
| Finish | Black frame |
| Operating lever | Cast zinc. Adjustable to any position. Furnished complete with pull spring. |

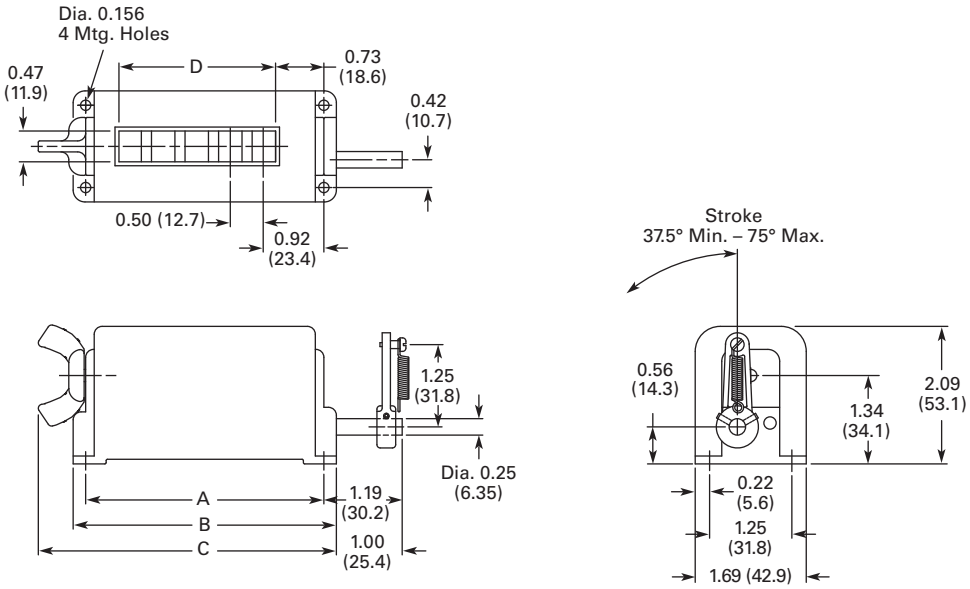
***Note***

① Special feature: rustproof.

## Dimensions

Approximate Dimensions in Inches (mm)

### CS Series




| Model | A | B | C | D |
|---|---|---|---|---|
| 4-CS-1_ | 3.12 (79.2) | 3.50 (88.9) | 4.03 (102.3) | 1.87 (47.6) |
| 5-CS-1_ | 3.62 (91.9) | 4.00 (101.6) | 4.53 (115.0) | 2.38 (60.5) |

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## H Series

### Product Description

Model H Series heavy-duty counters are designed for hard usage and long, trouble-free service. They are high speed, streamlined counters constructed of the highest quality materials and drive shaft moves in oil-less bearings. All shafts are stainless steel. The drive action is designed with overstroke so counter does not bottom, increasing life and permitting easier installation. The sturdy cover is stamped steel, locked into position on a heavy, die-cast base of a special alloy. A heavy steel mounting plate is adjustable for either bottom or back mounting. Model "H" has earned the reputation of being the "work horse" of industrial counters. Wing nut or tamper-proof reset lock which requires a key to reset the counter, guarding against unauthorized resetting or tampering.

### Product Selection

***When Ordering Specify***

To determine a model number from the Product Selection table for Model H Series Stroke Counters, consider:

- Number of figures
- Drive lever location (left or right side)
- Type of reset (lock or wing nut)

**H Series Stroke Counter**

#### H Series Stroke Counters

| No. of Figures | Drive | Reset | Mounting | Catalog Number | Order Number |
|---|---|---|---|---|---|
| 5 | RH lever | Wing nut | Base | **5-H-1-1-R** | **40205400** |
| 5 | LH lever | Wing nut | Base | **5-H-1-1-L** | **40205401** |
| 5 | RH lever | Wing nut | Base | **5-H-1-1-R-REV** ① | **00597400** |
| 5 | LH lever | Wing nut | Base | **5-H-1-1-L-REV** ① | **00598400** |
| 5 | RH lever | Wing nut | Base | **5-H-1-1-R-RP** ② | **40205404** |
| 5 | LH lever | Wing nut | Base | **5-H-1-1-L-RP** ② | **40205405** |
| 5 | RH lever | Lock reset | Base | **5-H-1-2-R** | **40206404** |
| 5 | LH lever | Lock reset | Base | **5-H-1-2-L** | **40206405** |
| 5 | RH lever | Lock reset | Base | **5-H-1-2-R-RP** ② | **40206400** |
| 5 | RH lever | Wing nut | Rear | **5-H-1-4-R** | **00507400** |
| 5 | RH trip arm | Wing nut | Base | **5-H-5-A** | **31049400** |
| 5 | RH trip arm | Wing nut | Base | **5-H-5-B** | **31049401** |
| 5 | LH trip arm | Wing nut | Base | **5-H-5-C** | **31049402** |
| 5 | LH trip arm | Wing nut | Base | **5-H-5-D** | **31049403** |
| 5 | RH trip arm | Lock reset | Base | **5-H-6-A** | **01533400** |
| 5 | RH trip arm | Lock reset | Base | **5-H-6-B** | **01534400** |
| 5 | LH trip arm | Lock reset | Base | **5-H-6-C** | **01535400** |
| 5 | LH trip arm | Lock reset | Base | **5-H-6-D** | **01536400** |

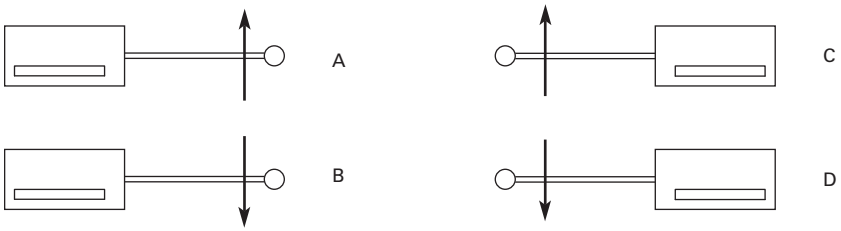
***Notes***

① Special feature: Reverse stroke.

② Special feature: Rustproof.

## Technical Data and Specifications

### Direction Location for 5H5 and 5H6



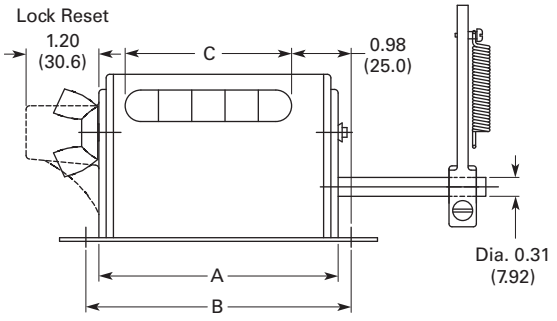

### General Specifications

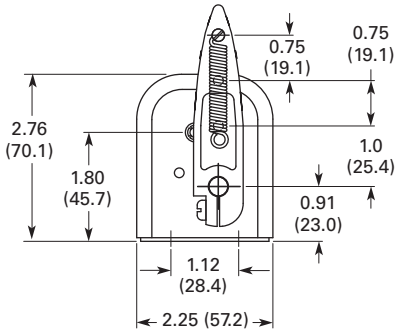
| Description | Specification |
|---|---|
| Figures | 5 |
| Speed | 800 cpm |
| Stroke operation | 37° stroke to count; 60° maximum stroke |
| Shaft | 0.31 in (7.9 mm) diameter stainless steel, rustproof |
| Drive | Accurately machined, hardened steel parts; Geneva drive for extra long life |
| Bearings | Oil-less, maintenance free |
| Figure sizes | 11/32 in (8.7 mm) high, black-on-white background |
| Reset | Wing nut or tumbler lock reset |
| Finish | Black frame and cover |
| Operating lever | Adjustable to any position. Furnished complete with pull spring for attaching. |

## Dimensions

Approximate Dimensions in Inches (mm)

### H Series




| Model | A | B | C |
|---|---|---|---|
| Five figure units | 3.95 (100.4) | 4.38 (111.3) | 2.75 (69.9) |

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## D Series

### Product Description

Model D Series are medium-duty stroke counters available with 4, 5 or 6 figures that have been designed for general service on small production machines.

Although compact, "D" models are sturdily constructed and thoroughly tested for accuracy and efficient operation.

### Product Selection

***When Ordering Specify***

To determine a model number from the Product Selection table for Model D Series Stroke Counters, consider:

- Number of figures
- Drive lever

**D Series Stroke Counter**

#### D Series Stroke Counters

| No. of Figures | Drive | Reset | Mounting | Catalog Number | Order Number |
|---|---|---|---|---|---|
| 4 | RH lever | Wing nut | Base | **4-D-1-1-R** | **34269401** |
| 5 | RH lever | Wing nut | Base | **5-D-1-1-R** | **34269402** |
| 6 | RH lever | Wing nut | Base | **6-D-1-1-R** | **34269403** |
| 4 | LH lever | Wing nut | Base | **4-D-1-1-L** | **34269405** |
| 5 | LH lever | Wing nut | Base | **5-D-1-1-L** | **34269406** |

### Technical Data and Specifications

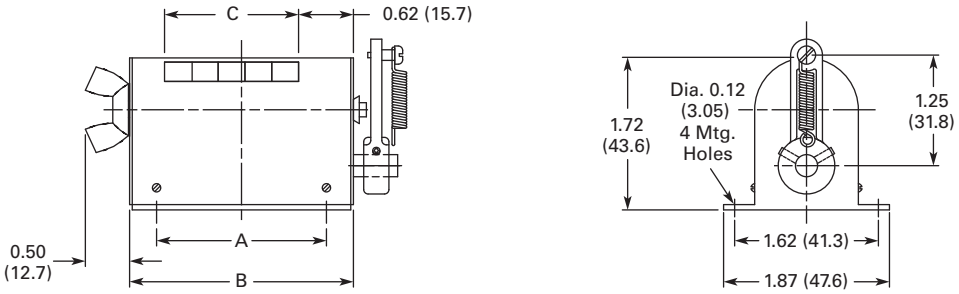
#### General Specifications

| Description | Specification |
|---|---|
| Figures | 4, 5 and 6 |
| Speed | 400 cpm |
| Shaft | 0.25 in (6.4 mm) diameter stainless steel, rustproof |
| Drive | Nylon rachet and Delrin drive plate. Right-hand drive standard; left-hand drive available |
| Bearings | Oil-less, maintenance free |
| Figure size | 1/4 in (6.4 mm) high, black-on-white background |
| Reset | Wing nut |
| Finish | Black frame and cover |
| Operating lever | Adjustable to any position. Furnished complete with pull string |

## Dimensions

Approximate Dimensions in Inches (mm)

### D Series




| Model | A | B | C |
|---|---|---|---|
| 4-D-1-1_ | 1.59 (40.4) | 2.20 (55.9) | 1.20 (30.6) |
| 5-D-1-1_ | 1.92 (48.8) | 2.53 (64.3) | 1.51 (38.5) |
| 6-D-1-1_ | 2.26 (57.5) | 2.87 (73.0) | 1.83 (46.4) |

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**Mechanical Totalizers (Revolution)**

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| HDW Series | **V13-T1-23** |
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| Electromechanical Totalizers | **V13-T1-29** |
| Electronic Totalizers | **V13-T1-41** |


## Mechanical Totalizers (Revolution)

### Product Overview

Eaton's mechanical totalizers are available in a variety of heavy-duty configurations for applications when power is unavailable.

### Features

- Variety of reset configurations available
- Accurate length measurement for application where power is not available

## X Series

### Product Description

Model X Series are dust- and rust-proof counters designed for small, medium-duty units, accurate, durable and require a minimum of driving effort.

They are especially designed for incorporation as integral parts of a variety of equipment that gets severe usage under adverse climatic conditions.

### Product Selection

***When Ordering Specify***

To determine a model number from the Product Selection table for Model X Series Revolution Counters, consider:

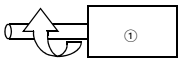
- Number of figures
- Ratio
- Drive shaft location
- Shaft rotation direction

**X Series Revolution Counter**

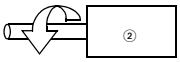
### X Series Revolution Counters

| No. of Figures | Drive | Rotation | Reset | Mounting | Catalog Number | Order Number |
|---|---|---|---|---|---|---|
| 4 | LH | Clockwise ① | Knob | Base | **4-X-7-1-L-CL** | **40270406** |
| 4 | LH | Anti-clockwise ② | Knob | Base | **4-X-7-1-L-AC** | **40270404** |
| 4 | RH | Clockwise ③ | Knob | Base | **4-X-7-1-R-CL** | **40270407** |
| 4 | RH | Anti-clockwise ④ | Knob | Base | **4-X-7-1-R-AC** | **40270405** |
| 5 | RH | Anti-clockwise ④ | Knob | Base | **5-X-7-1-R-AC** | **40275406** |
| 4 | LH | Clockwise ① | Knob | Base | **4-X-7-1-L-CL** ⑤ | **40270402** |
| 5 | LH | Clockwise ① | Knob | Base | **5-X-7-1-L-CL** ⑤ | **40275402** |
| 4 | LH | Anti-clockwise ② | Knob | Base | **4-X-7-1-L-AC** ⑤ | **40270400** |
| 5 | LH | Anti-clockwise ② | Knob | Base | **5-X-7-1-L-AC** ⑤ | **40275400** |
| 4 | RH | Clockwise ③ | Knob | Base | **4-X-7-1-R-CL** ⑤ | **40270403** |
| 5 | RH | Clockwise ③ | Knob | Base | **5-X-7-1-R-CL** ⑤ | **40275403** |
| 4 | RH | Anti-clockwise ④ | Knob | Base | **4-X-7-1-R-AC** ⑤ | **40270401** |
| 5 | RH | Anti-clockwise ④ | Knob | Base | **5-X-7-1-R-AC** ⑤ | **40275401** |

### Top View—Left-Hand Drive

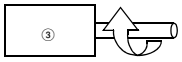



**Clockwise Shaft Rotation**

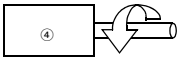



**Anti-Clockwise Shaft Rotation**

### Top View—Right-Hand Drive




**Clockwise Shaft Rotation**




**Anti-Clockwise Shaft Rotation**

***Notes***

When shaft is turned in the reverse direction of rotation, the counter will subtract.

① Top view—left-hand drive with clockwise shaft rotation.
② Top view—left-hand drive with anti-clockwise shaft rotation.
③ Top view—right-hand drive with clockwise shaft rotation.
④ Top view—right-hand drive with anti-clockwise shaft rotation.
⑤ Special feature: 10:1 ratio.

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## Technical Data and Specifications

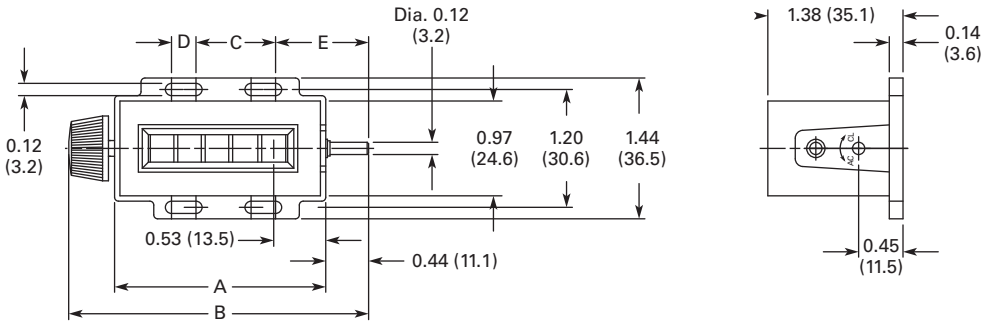
### General Specifications

| Description | Specification |
|---|---|
| Figures | 4 or 5 |
| Speed | 1000 cpm in 1:1 ratio; |
| | 10,000 cpm in 10:1 ratio for intermittent duty |
| Rotation direction | Clockwise or anti-clockwise when viewed from right-hand end of counter |
| Ratio | 1:1 and 10:1 standard in 4-X-7 models |
| | 10:1 standard in 5-X-7 models |
| Shaft | 0.125 in (3.2 mm) diameter stainless steel; standard length 0.44 in (11.1 mm) |
| Bearings | Oil-less, maintenance free |
| Figure size | 3/16 in (4.8 mm) high, white-on-black background |
| Reset | Knob |
| Finish | Black frame, Cycolac black cover |
| Drive | Right- or left-hand drive; drive parts of Delrin |
| Ratio information | 1:1 is one count to each revolution of drive shaft, 10:1 is ten counts to each revolution |

## Dimensions

Approximate Dimensions in Inches (mm)

### X Series




| Model | A | B | C | D | E |
|---|---|---|---|---|---|
| 4-X-7-1_ | 1.86 (47.2) | 2.76 (70.2) | 0.62 (15.7) | 0.19 (4.8) | 0.89 (22.6) |
| 5-X-7-1_ | 2.16 (54.8) | 3.06 (77.8) | 0.81 (20.6) | 0.25 (6.4) | 0.95 (24.1) |

## CS Series

### Product Description

Model CS Series top reading revolution counters are designed for use in most industrial applications. The entire case is a single casting. This provides greater rigidity, tighter seal of working parts and more streamlined contour. The unit is compact, rugged and features a flush mounted window to assure greater visibility.

### Product Selection

***When Ordering Specify***

To determine a model number from the Product Selection table for Model CS Series Revolution Counters, consider:

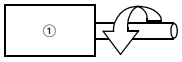
- Number of figures
- Ratio
- Drive shaft location
- Shaft rotation direction

**CS Series Revolution Counter**

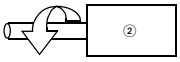
### CS Series Revolution Counters

| No. of Figures | Drive | Rotation | Reset | Mounting | Catalog Number | Order Number |
|---|---|---|---|---|---|---|
| 5 | RH | Clockwise ① | Wing nut | Base | **5-CS-7-1-R-CL** | **31060409** |
| 5 | RH | Anti-clockwise ② | Wing nut | Base | **5-CS-7-1-R-AC** | **31060411** |
| 5 | LH | Clockwise | Wing nut | Base | **5-CS-7-1-L-CL** ③ | **00440400** |
| 4 | RH | Clockwise ① | Wing nut | Base | **4-CS-7-1-R-CL** ③ | **31057401** |
| 4 | RH | Anti-clockwise ② | Wing nut | Base | **4-CS-7-1-R-AC** ③ | **31057403** |
| 5 | RH | Anti-clockwise ② | Wing nut | Base | **5-CS-7-1-R-AC** ③ | **00443400** |
| 4 | RH and LH | Clockwise ④ | None | Base | **4-CS-7-3-CL** ⑤ | **31057408** |
| 4 | RH and LH | Anti-clockwise ⑥ | None | Base | **4-CS-7-3-AC** ⑤ | **31057409** |

### Top View—Right-Hand Drive

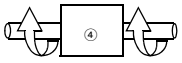



**Clockwise Shaft Rotation**

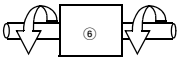



**Anti-Clockwise Shaft Rotation**

### Top View—Right- and Left-Hand Drive




**Clockwise Shaft Rotation**




**Anti-Clockwise Shaft Rotation**

***Notes***

When shaft is turned in the reverse direction of rotation, the counter will subtract.

① Top view—right-hand drive with clockwise shaft rotation.
② Top view—right-hand drive with anti-clockwise shaft rotation.
③ Special feature: 10:1 ratio.
④ Top view—right- and left-hand drive with clockwise shaft rotation.
⑤ Special feature: 10:1 ratio, non-reset, double shaft.
⑥ Top view—right- and left-hand drive with anti-clockwise shaft rotation.

1

## Technical Data and Specifications

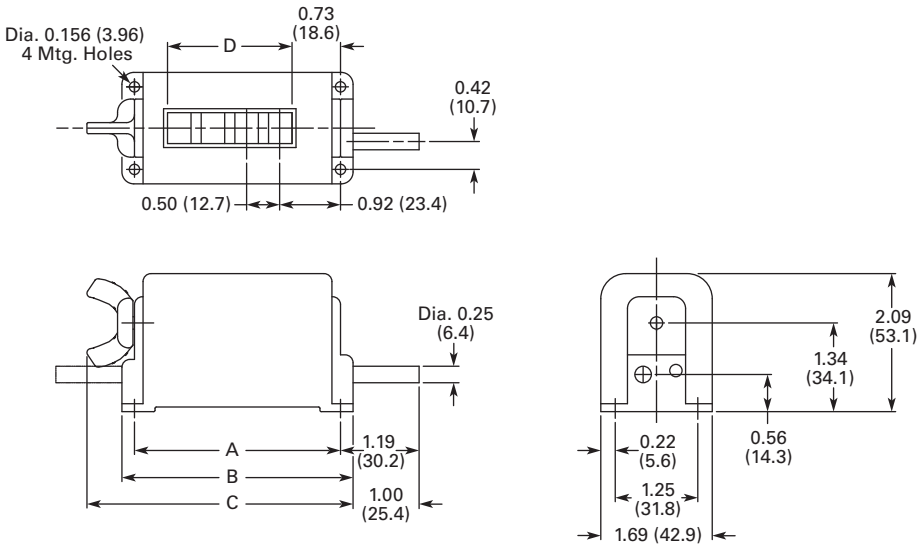
### General Specifications

| Description | Specification |
|---|---|
| Figures | 4 or 5 |
| Speed | 600 cpm in 1:1 ratio |
| Rotation direction | Clockwise or anti-clockwise when viewed from right-hand end of counter |
| Ratio | 1:1 standard |
| Shaft | 0.25 in (6.4 mm) diameter stainless steel; standard length 1 in (25.4 mm) |
| Drive | Spur gear |
| Bearings | Oil-less, maintenance free |
| Figure size | 11/32 in (8.7 mm) high, black-on-white background |
| Reset | Contoured wing nut |
| Finish | Black frame |

## Dimensions

Approximate Dimensions in Inches (mm)

### CS Series




| Model | A | B | C | D |
|---|---|---|---|---|
| 4-CS-7_ | 3.12 (79.2) | 3.50 (88.9) | 4.03 (102.3) | 1.89 (47.9) |
| 5-CS-7_ | 3.62 (91.9) | 4.00 (101.6) | 4.53 (115.0) | 2.38 (60.5) |

## D-7 Series

### Product Description

Model D-7 Series spur gear end drive units are compact counters that meet a variety of needs. Accurate, dependable and moderately priced, they are especially recommended for braiding machines, low-speed coil winders, wire measuring equipment and all medium-duty revolution applications.

### Product Selection

***When Ordering Specify***

To determine a model number from the Product Selection table for Model D-7 Series Revolution Counters, consider:

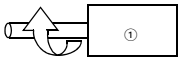
- Number of figures
- Shaft drive
- Shaft rotation direction
- Reset or non-reset

**D-7 Series Revolution Counter**

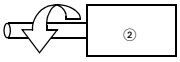
#### D-7 Series Revolution Counters

| No. of Figures | Drive | Rotation | Reset | Mounting | Catalog Number | Order Number |
|---|---|---|---|---|---|---|
| 5 | LH | Clockwise ① | Wing nut | Base | **5-D-7-1-L-CL** | **31127408** |
| 5 | LH | Anti-clockwise ② | Wing nut | Base | **5-D-7-1-L-AC** | **31127405** |
| 5 | RH | Clockwise ③ | Wing nut | Base | **5-D-7-1-R-CL** | **31127431** |
| 5 | RH | Anti-clockwise ④ | Wing nut | Base | **5-D-7-1-R-AC** | **31127400** |
| 5 | LH | Anti-clockwise ② | None | Base | **5-D-7-3-L-AC** | **31127412** |
| 5 | RH | Clockwise ③ | None | Base | **5-D-7-3-R-CL** | **31127438** |

#### Top View—Left-Hand Drive

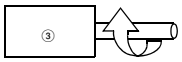



**Clockwise Shaft Rotation**

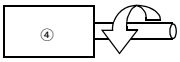



**Anti-Clockwise Shaft Rotation**

#### Top View—Right-Hand Drive




**Clockwise Shaft Rotation**




**Anti-Clockwise Shaft Rotation**

***Notes***

When shaft is turned in the reverse direction of rotation, the counter will subtract.

① Top view—left-hand drive with clockwise shaft rotation.
② Top view—left-hand drive with anti-clockwise shaft rotation.
③ Top view—right-hand drive with clockwise shaft rotation.
④ Top view—right-hand drive with anti-clockwise shaft rotation.

1

## Technical Data and Specifications

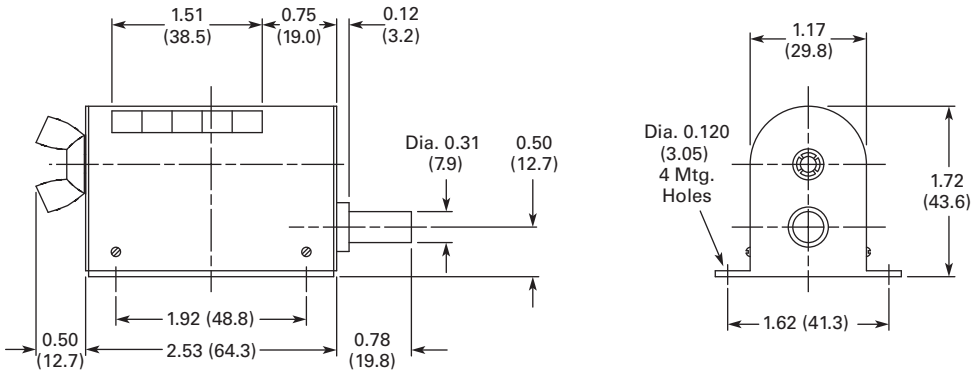
### General Specifications

| Description | Specification |
|---|---|
| Figures | 5 standard |
| Speed | Up to 800 cpm in 1:1 ratio |
| Rotation direction | Clockwise or anti-clockwise when viewed from right-hand end of counter |
| Ratio | 1:1 standard |
| Shaft | 0.31 in (7.9 mm) diameter stainless steel; 0.66 in (16.7 mm) right-hand drive, 0.63 in (15.9 mm) left-hand drive |
| Drive | Right- or left-hand spur gear drive |
| Bearings | Oil-less, maintenance free |
| Figure size | 1/4 in (6.4 mm) high, black-on-white background |
| Finish | Black frame and cover |
| Reset | Wing nut or non-reset |

## Dimensions

Approximate Dimensions in Inches (mm)

### D-7 Series



## D-6 Series

### Product Description

Model D-6 right-angle worm drive counters are ruggedly designed for high speeds on light-duty applications. Small "D" counters are easily adapted as accessory equipment on machinery where right-angle drive is desired to permit full view reading of the counter.

### Product Selection

***When Ordering Specify***

To determine a model number from the Product Selection table for Model D-6 Series Revolution Counters, consider:

- Shaft rotation direction

**D-6 Series Revolution Counter**

#### D-6 Series Revolution Counters

| No. of Figures | Drive | Rotation | Reset | Mounting | Catalog Number | Order Number |
|---|---|---|---|---|---|---|
| 5 | Front and rear | Anti-clockwise ① | Wing nut | Base | **5-D-6-1-AC** | **31052401** |
| 6 | Front and rear | Anti-clockwise ① | Wing nut | Base | **6-D-6-1-AC** | **31052402** |
| 5 | Front and rear | Clockwise ② | Wing nut | Base | **5-D-6-1-CL** | **31052404** |
| 6 | Front and rear | Clockwise ② | Wing nut | Base | **6-D-6-1-CL** | **31052405** |
| 5 | Front and rear | Anti-clockwise ① | Wing nut | Base | **5-D-8-1-AC** ③ | **40187401** |
| 5 | Front and rear | Clockwise ② | Wing nut | Base | **5-D-8-1-CL** ③ | **40187417** |
| 6 | Front and rear | Clockwise ② | Wing nut | Base | **6-D-8-1-CL** ③ | **40187418** |
| 5 | Front and rear | Clockwise ② | Wing nut | Base | **5-D-9-1-CL** ④ | **40187404** |
| 5 | Front and rear | Anti-clockwise ① | Wing nut | Base | **5-D-9-1-AC** ④ | **40187410** |
| 5 | Front and rear | Clockwise ② | Wing nut | Base | **5-D-90-1-CL** ⑤ | **40187414** |
| 5 | Front and rear | Anti-clockwise ① | Wing nut | Base | **5-D-90-1-AC** ⑤ | **40187408** |

#### Top View of Counter

**Anti-Clockwise Shaft Rotation** **Clockwise Shaft Rotation**

***Notes***

When shaft is turned in the reverse direction of rotation, the counter will subtract.

① Top view of counter—anti-clockwise shaft rotation.
② Top view of counter—clockwise shaft rotation.
③ Special feature: Measuring wheels and brackets available for lineal measurement in feet.
④ Special feature: Measuring wheels and brackets available for lineal measurement in yards and 1/8ths.
⑤ Special feature: Measuring wheels and brackets available for lineal measurement in yards.

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## Technical Data and Specifications

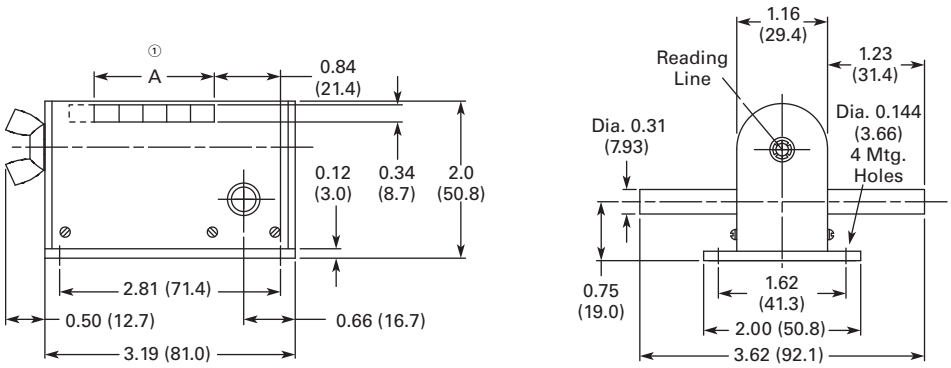
### General Specifications

| Description | Specification |
|---|---|
| Figures | 5 or 6 |
| Speed | Up to 1500 cpm in 1:1 ratio |
| Rotation direction | Clockwise or anti-clockwise when viewed from right-hand end of counter |
| Ratio | 1:1 standard |
| Shaft | 0.31 in (7.9 mm) diameter stainless steel; 1.25 in (31.8 mm) length standard |
| Drive | Worm drive |
| Bearings | Oil-less, maintenance free |
| Figure size | 1/4 in (6.4 mm) high, black-on-white background |
| Finish | Black frame and cover |
| Reset | Wing nut |

## Dimensions

Approximate Dimensions in Inches (mm)

### D-6 Series




***Note***

① A = 1.85 in (46.9 mm) for 6 figures and 1.53 in (38.9 mm) for 5 figures.

## HDW Series

### Product Description

Model HDW Series are high speed, end drive revolution counters that have the rugged features of all "H" counters, with the addition of double worm drive that produces speeds up to 2000 cpm. Lightweight precision molded wheels reduce centrifugal force and eliminate slipping. They are particularly recommended for quick starting and stopping machines, such as coil winders and wire measuring or reeling equipment and on applications where continuous high speed measuring is required.

### Product Selection

***When Ordering Specify***

To determine a model number from the Product Selection table for Model HDW Series Revolution Counters, consider:

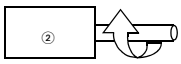
- Shaft drive
- Shaft rotation direction

**HDW Series Revolution Counter**

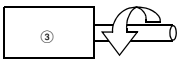
### HDW Series Revolution Counters

| No. of Figures | Drive | Rotation | Reset | Mounting ① | Catalog Number | Order Number |
|---|---|---|---|---|---|---|
| 5 | RH | Clockwise ② | Wing nut | Base | **5-HDW-7-1-R-CL** | **31050400** |
| 5 | RH | Anti-clockwise ③ | Wing nut | Base | **5-HDW-7-1-R-AC** | **31050401** |
| 5 | LH | Clockwise ④ | Wing nut | Base | **5-HDW-7-1-L-CL** | **31050402** |
| 5 | LH | Anti-clockwise ⑤ | Wing nut | Base | **5-HDW-7-1-L-AC** | **31050403** |

### Top View—Right-Hand Drive

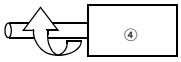



**Clockwise Shaft Rotation**

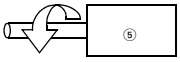



**Anti-Clockwise Shaft Rotation**

### Top View—Left-Hand Drive




**Clockwise Shaft Rotation**




**Anti-Clockwise Shaft Rotation**

***Notes***

When shaft is turned in the reverse direction of rotation, the counter will subtract.

① Mounting plate is adjustable for base or back mounting.
② Top view—right-hand drive with clockwise shaft rotation.
③ Top view—right-hand drive with anti-clockwise shaft rotation.
④ Top view—left-hand drive with clockwise shaft rotation.
⑤ Top view—left-hand drive with anti-clockwise shaft rotation.

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## Technical Data and Specifications

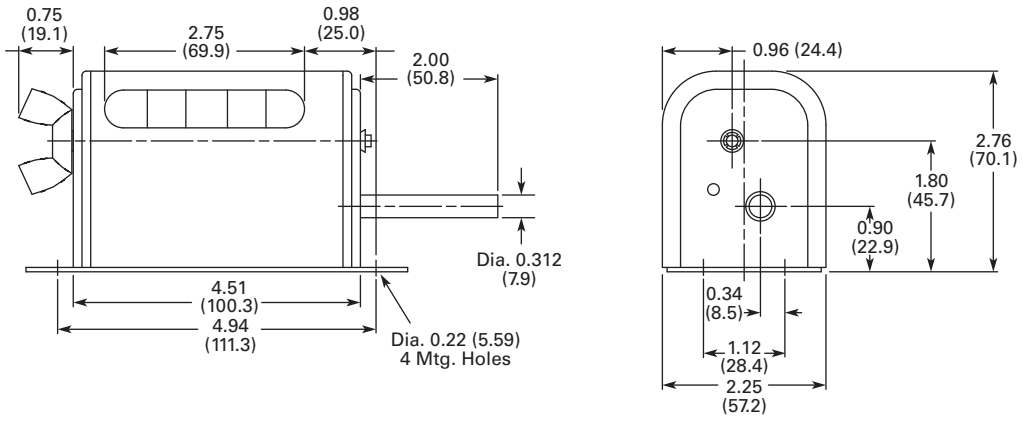
### General Specifications

| Description | Specification |
|---|---|
| Figures | 5 |
| Speed | Up to 2000 cpm |
| Rotation direction | Clockwise or anti-clockwise when viewed from right-hand end of counter |
| Ratio | 1:1 only |
| Shaft | 0.31 in (7.9 mm) diameter stainless steel; standard length 2 in (50.8 mm) |
| Drive | Right- or left-hand drive |
| Bearings | Oil-less, maintenance free |
| Figure size | 11/16 in (17.5 mm) high, white-on-black background |
| Reset | Wing nut or tumbler lock reset |
| Finish | Black frame and cover |

## Dimensions

Approximate Dimensions in Inches (mm)

### HDW Series



## T Series

### Product Description

Model T Series worm drive revolution counters are sturdy, high speed instruments used on many heavy machines, engines or motors. Variety of drive permits direct connection. Suitable for panel mounting.

### Product Selection

***When Ordering Specify***

To determine a model number from the Product Selection table for Model T Series Revolution Counters, consider:

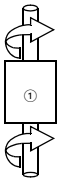
- Shaft rotation direction

**T Series Revolution Counter**

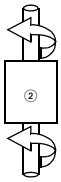
### T Series Revolution Counters

| No. of Figures | Drive | Rotation | Reset | Mounting | Catalog Number | Order Number |
|---|---|---|---|---|---|---|
| 5 | Top and bottom | Anti-clockwise ② | Wing nut | Back | **5-T-6-1-AC** | **40342401** |

### Top View of Counter




**Clockwise Shaft Rotation**




**Anti-Clockwise Shaft Rotation**

***Notes***

When shaft is turned in the reverse direction of rotation, the counter will subtract.

① Top view of counter—clockwise shaft rotation.
② Top view of counter—anti-clockwise shaft rotation.
③ Special feature: Measuring wheels and brackets available for lineal measurement in feet.
④ Special feature: Measuring wheels and brackets available for lineal measurement in yards and 1/8ths.
⑤ Special feature: Measuring wheels and brackets available for lineal measurement in yards.

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## Technical Data and Specifications

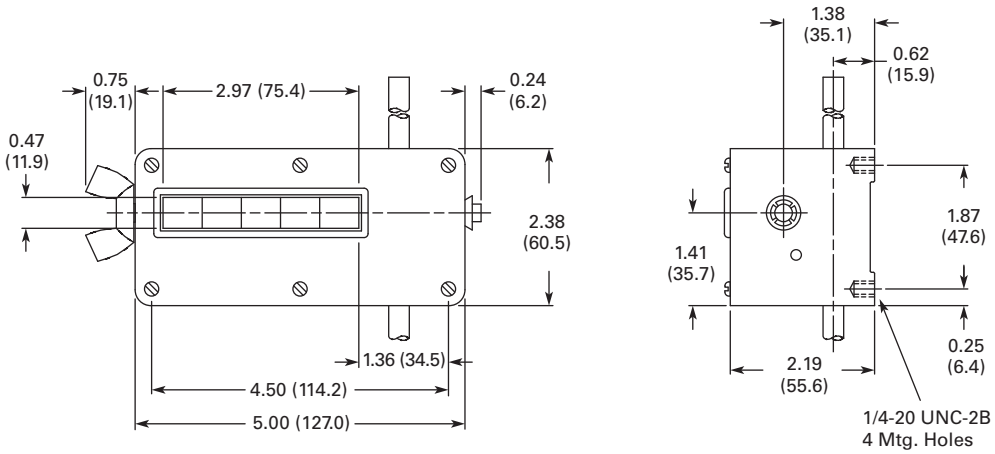
### General Specifications

| Description | Specification |
|---|---|
| Figures | 5 standard |
| Speed | 1500 cpm in 1:1 ratio |
| Rotation direction | Clockwise or anti-clockwise determined top looking down |
| Ratio | 1:1 standard |
| Shaft | 0.31 in (7.9 mm) diameter stainless steel; standard extends 2 in (50.8 mm) top and bottom |
| Drive | Hobbed steel and bronze worm gearing; subtracts when reversed |
| Bearings | Oil-less, maintenance free |
| Figure size | 11/32 in (8.7 mm) high, black-on-white background |
| Reset | Left-hand wing nut standard |
| Finish | Black frame and face plate |

## Dimensions

Approximate Dimensions in Inches (mm)

### T Series



## H Series

### Product Description

Model H Series are heavy-duty, end drive revolution counters designed for industrial use; suitable for speeds up to 800 cpm. They are available with either right- or left-hand drive, and with wing nut reset.

### Product Selection

***When Ordering Specify***

To determine a model number from the Product Selection table for Model H Series Revolution Counters, consider:

- Drive shaft location
- Shaft rotation direction

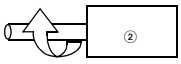
**H Series Revolution Counter**

### H Series Revolution Counters

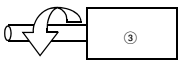
| No. of Figures | Drive | Rotation | Reset | Mounting ① | Ratio | Catalog Number | Order Number |
|---|---|---|---|---|---|---|---|
| 5 | LH | Clockwise ② | Wing nut | Base | 1.1 | **5-H-7-1-L-CL** | **00509400** |
| 5 | LH | Anti-clockwise ③ | Wing nut | Base | 1.1 | **5-H-7-1-L-AC** | **00510400** |
| 5 | RH | Clockwise ④ | Wing nut | Base | 1.1 | **5-H-7-1-R-CL** | **00513400** |
| 5 | RH | Anti-clockwise ⑤ | Wing nut | Base | 1.1 | **5-H-7-1-R-AC** | **00514400** |
| 5 | LH | Clockwise ⑥ | Wing nut | Base | 3.2 | **5-H-8-1-L-CL** ⑦ | **00601400** |
| 5 | LH | Anti-clockwise ⑧ | Wing nut | Base | 3.2 | **5-H-8-1-L-AC** ⑦ | **00602400** |
| 5 | RH | Clockwise ⑥ | Wing nut | Base | 3.2 | **5-H-8-1-R-CL** ⑦ | **00605400** |
| 5 | RH | Anti-clockwise ⑧ | Wing nut | Base | 3.2 | **5-H-8-1-R-AC** ⑦ | **00606400** |
| 5 | LH | Clockwise ⑥ | Wing nut | Base | 1.2 | **5-H-9-1-L-CL** ⑨ | **00619400** |
| 5 | LH | Anti-clockwise ⑧ | Wing nut | Base | 1.2 | **5-H-9-1-L-AC** ⑨ | **00620400** |
| 5 | RH | Clockwise ⑥ | Wing nut | Base | 1.2 | **5-H-9-1-R-CL** ⑨ | **00617400** |
| 5 | RH | Anti-clockwise ⑧ | Wing nut | Base | 1.2 | **5-H-9-1-R-AC** ⑨ | **00618400** |
| 5 | LH | Clockwise ⑥ | Wing nut | Base | 1.2 | **5-H-9-0-1-L-CL** ⑩ | **00611400** |
| 5 | RH | Clockwise ⑥ | Wing nut | Base | 1.2 | **5-H-9-0-1-R-CL** ⑩ | **00609400** |
| 5 | RH | Anti-clockwise ⑧ | Wing nut | Base | 1.2 | **5-H-9-0-1-R-AC** ⑩ | **00610400** |

For 5-H-8 and 5-H-9 Series Counters, drive shaft extends from both sides of the counter. Specifying RH or LH drive will determine the location of the reset (i.e. LH drive will have reset on the right-hand side of the counter, and RH drive will have reset on left-hand side of the counter).

**Top View—LH Drive**

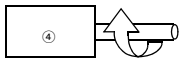



**Clockwise Shaft Rotation**

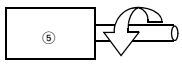



**Anti-Clockwise Shaft Rotation**

**Top View—RH Drive**

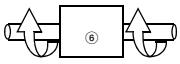



**Clockwise Shaft Rotation**




**Anti-Clockwise Shaft Rotation**

**Top View—RH and LH Drive**




**Clockwise Shaft Rotation**

**Anti-Clockwise Shaft Rotation**

***Notes***

When shaft is turned in the reverse direction of rotation, the counter will subtract.

① Mounting plate is adjustable for base or back mounting.
② Top view—left-hand drive with clockwise shaft rotation.
③ Top view—left-hand drive with anti-clockwise shaft rotation.
④ Top view—right-hand drive with clockwise shaft rotation.
⑤ Top view—left-hand drive with anti-clockwise shaft rotation.
⑥ Top view—right-hand and left hand drive with clockwise shaft rotation.
⑦ Special feature: Measuring wheels and brackets available for lineal measurement in feet.
⑧ Top view—right-hand and left hand drive with anti-clockwise shaft rotation.
⑨ Special feature: Measuring wheels and brackets available for lineal measurement in yards and 1/8ths.
⑩ Special feature: Measuring wheels and brackets available for lineal measurement in yards.

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## Technical Data and Specifications

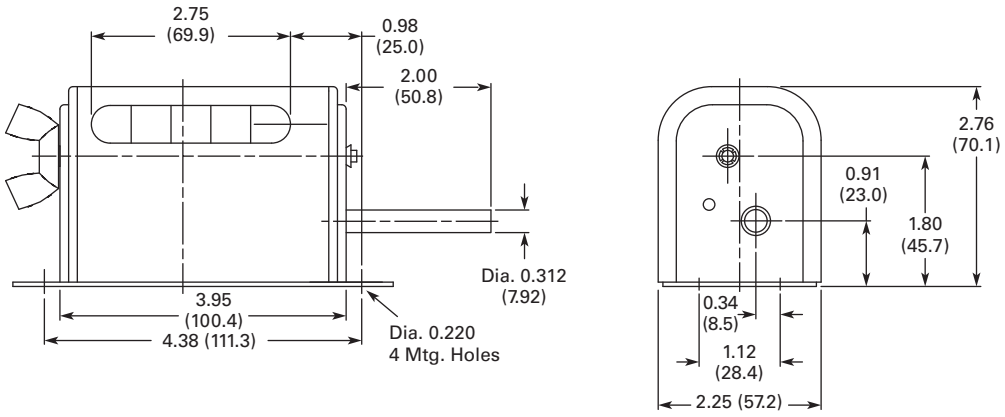
### General Specifications

| Description | Specification |
|---|---|
| Figures | 5 |
| Speed | Up to 800 cpm |
| Rotation direction | Clockwise or anti-clockwise when viewed from right-hand end of counter |
| Shaft | 0.31 in (7.9 mm) diameter stainless steel; standard length 2 in (50.8 mm) |
| Drive | Right- or left-hand drive |
| Bearings | Oil-less, maintenance free |
| Figure size | 11/32 in (8.7 mm) high, white-on-black background |
| Reset | Wing nut |
| Finish | Black frame and cover |
| Mounting bracket available | Order number 01465400 |

## Dimensions

Approximate Dimensions in Inches (mm)

### H Series



**Electromechanical Totalizers**

## Contents


| *Description* | *Page* |
|---|---|
| Mechanical Totalizers | |
| Stroke | **V13-T1-5** |
| Revolution | **V13-T1-14** |
| Electromechanical Totalizers | |
| Micro Display Counter | **V13-T1-30** |
| SE Series | **V13-T1-32** |
| MF Series | **V13-T1-34** |
| RMF Series | **V13-T1-36** |
| ME Series | **V13-T1-38** |
| Electronic Totalizers | **V13-T1-41** |


## Electromechanical Totalizers

### Product Overview

Eaton's electromechanical counters provide accurate counting from a variety of electrical signals and a display that is always readable, even when power is not present.

### Features

- Available with reset and without
- Always readable display
- Variety of mounting options

### Standards and Certifications

- UL certifications on some products (see individual product pages for details)

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## Micro Display Counter

### Product Description

Eaton's micro display counter is perfect for 12 Vdc applications where small size is important.

### Features

- Seven-digit micro adding counter
- High shock resistance
- Low power consumption; suitable for battery consumption
- Small dimensions
- Large optical figures
- Different viewing possibilities
- Flush mount with integrated spring clip
- Protection IP65
- Stores value also at power failure
- Long service life

### Standards and Certifications

- cRU®us certified
- CE marked

### Product Selection

**Micro Display Counter**

#### Micro Display Counter

| Description | Catalog Number |
|---|---|
| Micro display counter | **7-Y-3013PM-401** |

### Technical Data and Specifications

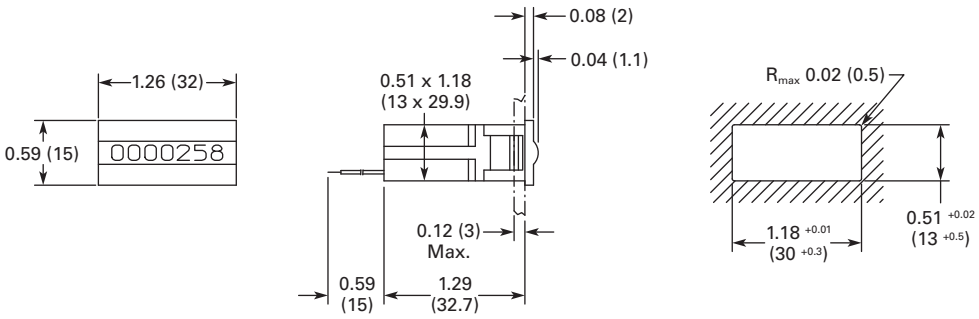
#### General Specifications

| Description | Specification |
|---|---|
| Electrical connections | Built-in counter, flying leads, AWG 22, approx. 5.9 in (150 mm) |
| Power consumption | At 68°F (20°C) and nominal voltage |
| | At 25 Imp/s: approx. 250 mW |
| Rated voltage | 12 Vdc ±10% |
| Counting frequency | 25 Imp/s |
| Pulse duration | Min. 20 ms |
| Pulse interval | Min. 20 ms |
| Cycle duration factor | 100% |
| Number of digits | 7 |
| Counting system | Adding |
| Figure size | 0.05 x 0.16 in (1.2 x 4 mm) high optical |
| Color of figures | White-on-black |
| Reset | No reset |
| Ambient temperature | 14° to 140°F (–10° to 60°C) |
| Mounting position | Any |
| Operating Life | >50 x $10^6$ pulses |
| Protection | IP65 (only front side) |
| Housing | Clear plastic |
| Weight | 0.53–0.71 oz (15–18g) |

## Dimensions

Approximate Dimensions in Inches (mm)

### Micro Display Counter



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## SE Series

### Product Description

Compact electromechanical counters.

### Features

- Low-cost electromechanical counter
- Multiple voltage ranges for almost any application
- Compact with various mounting options
- Wire leads for electrical connections

### Standards and Certifications

- UL recognized

### Product Selection

**SE Series Counter—Electromechanical**

#### SE Series Electromechanical Counters

| Description | Catalog Number | Order Number |
|---|---|---|
| **Six-Digit Electric Counter** | | |
| Bottom mount sub-miniature 12 Vdc | **6-Y-41610-401-SE** | **41610401** |
| Bottom mount sub-miniature 24 Vdc | **6-Y-41610-402-SE** | **41610402** |
| Bottom mount sub-miniature 120 Vac | **6-Y-41610-406-SE** | **41610406** |
| Bottom mount sub-miniature 240 Vac | **6-Y-41610-407-SE** | **41610407** |
| Base mount sub-miniature 12 Vdc | **6-Y-41611-401-SE** | **41611401** |
| Base mount sub-miniature 24 Vdc | **6-Y-41611-402-SE** | **41611402** |
| Base mount sub-miniature 120 Vac | **6-Y-41611-406-SE** | **41611406** |
| Base mount sub-miniature 240 Vac | **6-Y-41611-407-SE** | **41611407** |
| Panel mount sub-miniature 12 Vdc | **6-Y-41613-401-SE** | **41613401** |
| Panel mount sub-miniature 24 Vdc | **6-Y-41613-402-SE** | **41613402** |
| Panel mount sub-miniature 120 Vac | **6-Y-41613-406-SE** | **41613406** |
| Panel mount sub-miniature 240 Vac | **6-Y-41613-407-SE** | **41613407** |
| Special base mount sub-miniature 12 Vdc | **6-Y-41622-401-SE** | **41622401** |
| Special base mount sub-miniature 24 Vdc | **6-Y-41622-402-SE;** | **41622402** |
| Special base mount sub-miniature 120 Vac | **6-Y-41622-406-SE** | **41622406** |
| Special top mount sub-miniature 12 Vdc | **6-Y-41623-401-SE** | **41623401** |
| Special top mount sub-miniature 24 Vdc | **6-Y-41623-402-SE** | **41623402** |
| Special top mount sub-miniature 120 Vac | **6-Y-41623-406-SE** | **41623406** |
| Special top mount sub-miniature 240 Vac | **6-Y-41623-407-SE** | **41623407** |
| Snap-in mount sub-miniature 12 Vdc | **6-Y-42613-401-SE** | **42613401** |
| Snap-in mount sub-miniature 24 Vdc | **6-Y-42613-402-SE** | **42613402** |
| Snap-in mount sub-miniature 120 Vac | **6-Y-42613-406-SE** | **42613406** |
| Snap-in mount sub-miniature 240 Vac | **6-Y-42613-407-SE** | **42613407** |

## Technical Data and Specifications

### General Specifications

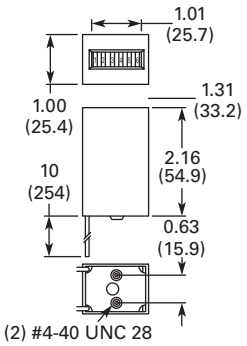
| Description | Specification |
|---|---|
| Figures | 6 |
| Count speed | 600 cpm |
| Figure size | 5/32 in (4.0 mm) |
| Reset | None |
| Mounting | Base, bottom, top, panel or snap-in |
| Finish | Black, self-extinguishing plastic |
| Power requirements | DC: 1.5W, AC: 5.0V |

## Dimensions

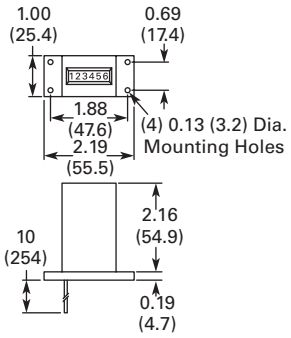
Approximate Dimensions in Inches (mm)

***SE Series***

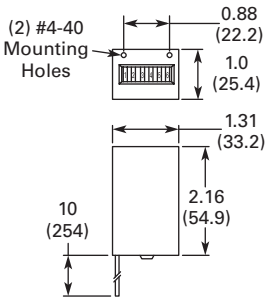
### Bottom Mount



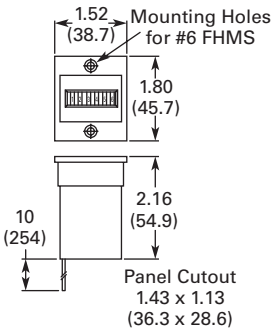

### Base Mount



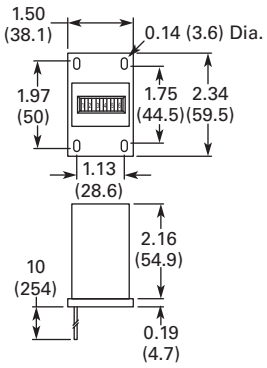

### Top Mount



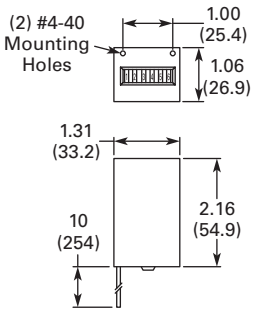

### Panel Mount



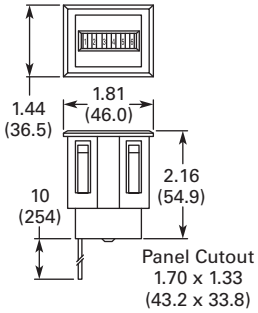

### Special Base Mount




### Special Top Mount




### Snap Mount



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## MF Series

### Product Description

Model MF Series are shaded pole electric counters with straight AC operation and feature a non-rectified, shaded pole coil designed to withstand transient, high voltage spikes. This feature, combined with a simplified, hinged escapement drive, also eliminates the possibility of miscounts and greatly adds to the life of the counter. Tallies at speeds up to 750 cpm.

### Product Selection

**MF Series Electric Counter**

#### MF Series Electric Counters

| No. of Figures | Voltage | Reset | Mounting | Catalog Number | Order Number |
|---|---|---|---|---|---|
| 7 | 120 Vac | Knob | Base | **7-Y-1-MF-120A** ① | **32650400** |
| 6 | 120 Vac | Knob | Base | **6-Y-1-MF-120A** ① | **32651400** |
| 7 | 120 Vac | Knob | Panel | **7-Y-1-MF-PM-120A** ① | **32652400** |
| 7 | 120 Vac | Non-reset | Panel | **7-Y-13-MF-PM-120A** ① | **32652402** |
| 6 | 120 Vac | Knob | Panel | **6-Y-1-MF-PM-120A** ① | **32653400** |
| 6 | 120 Vac | Non-reset | Panel | **6-Y-13-MF-PM-120A** ① | **32653405** |
| 6 | 120 Vac | Keylock reset | Panel | **6-Y-12-MF-PM-120A** ① | **32654400** |
| 6 | 24 Vac | Keylock reset | Panel | **6-Y-12-MF-PM-24A** | **32654403** |
| 7 | 120 Vac | Keylock reset | Panel | **7-Y-12-MF-PM-120A** ① | **32655400** |
| 6 | 120 Vac | Non-reset | Base | **6-Y-13-MF-120A** ① | **32658400** |

### Technical Data and Specifications

#### General Specifications

| Description | Specification |
|---|---|
| Figures | 6 or 7 |
| Speed | Up to 750 cpm |
| Figure size | 3/16 in (4.8 mm) high, white-on-black background |
| Reset | Knob, key or non-reset |
| Mounting | Base or panel mount |
| Finish | Black frame and side covers |
| Electrical connections | Two-wire leads, 9 in (229 mm) long, AWG 22 (0.34 $mm^2$), stripped 0.38 in (9.5 mm) |
| Power requirements | 12 watts |
| Coils | Various AC voltages and frequencies can be supplied on special order.<br>Count coils are designed for continuous duty at rated voltage. |

***Note***

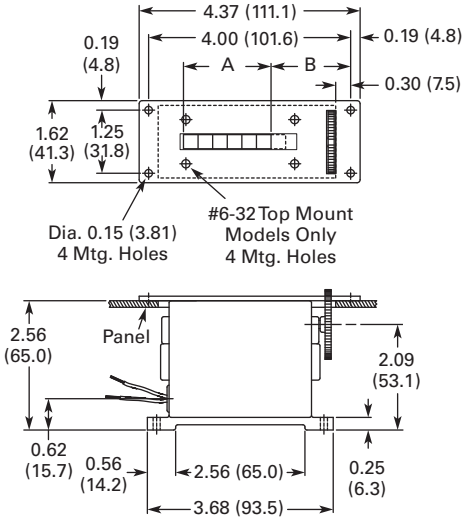
① UL Recognized.

## Dimensions

Approximate Dimensions in Inches (mm)

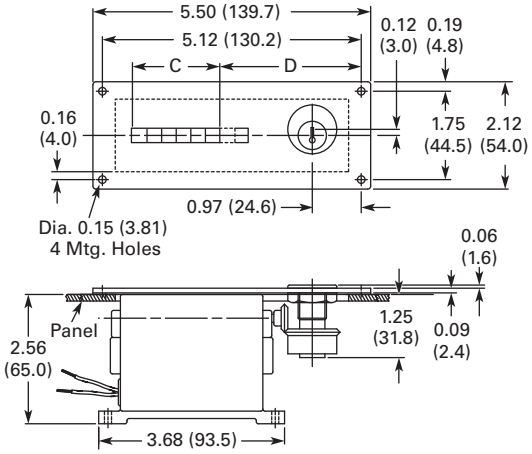
***MF Series***

### Panel Mounted



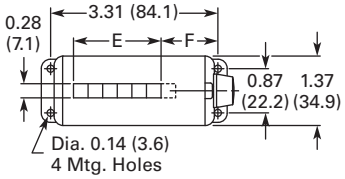

3.51 x 1.44 (89.3 x 36.5) Panel Opening

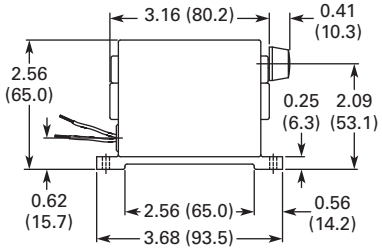
### Panel Mounted with Tumbler Lock




4.62 x 1.44 (117.3 x 36.5) Panel Opening

### Base Mounted




| Model | A | B | C | D | E | F |
|---|---|---|---|---|---|---|
| Six figures | 1.73 (44.0) | 1.58 (40.0) | 1.73 (43.9) | 2.80 (71.1) | 1.73 (44.0) | 1.12 (28.6) |
| Seven figures | 2.02 (51.4) | 1.29 (32.7) | 2.03 (51.6) | 2.50 (63.5) | 2.02 (51.4) | 0.84 (21.2) |

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## RMF Series

### Product Description

Model RMF Series of electric counters are designed to give accurate counts through a wide range of speeds up to 1000 cpm. It features a strong, silent, fast operating DC electromagnetic drive with a compact, dependable built-in higher capacity rectifier for AC operation. The counter has a minimum of moving parts that never need lubrication under normal operating conditions. Compact and rigid, it continues to operate dependably even when subject to severe shock and vibrations. Entirely enclosed to prevent damage from moisture and dust. Available in 6 or 7 figures.

### Product Selection

***When Ordering Specify***

To determine a model number from the Product Selection table for Model RMF Series Electronic Counters, consider:

- Number of figures
- Voltage
- Type of reset
- Type of mounting

**RMF Series Counter—Electromechanical**

### RMF Series Electromechanical Counters

| No. of Figures | Voltage | Reset | Mounting | Catalog Number | Order Number |
|---|---|---|---|---|---|
| 6 | 24 Vdc | Knob | Panel | **6-Y-1-RMF-PM-24D** | **31013400** |
| 7 | 24 Vdc | Knob | Panel | **7-Y-1-RMF-PM-24D** | **31019400** |
| 7 | 115 Vac | Knob | Base | **7-Y-1-RMF-115A** ① | **31025400** |
| 7 | 115 Vac | Non-reset | Base | **7-Y-13-RMF-115A** ① | **31026400** |
| 7 | 115 Vac | Knob | Panel | **7-Y-1-RMF-PM-115A** ① | **31026401** |
| 7 | 115 Vac | Non-reset | Panel | **7-Y-13-RMF-PM-115A** ① | **31026402** |
| 6 | 115 Vac | Non-reset | Base | **6-Y-13-RMF-115A** ① | **31039400** |
| 6 | 230 Vac | Knob | Panel | **6-Y-1-RMF-PM-230A** | **31066413** |
| 6 | 115 Vac | Knob | Panel | **6-Y-1-RMF-PM-115A** ① | **31066416** |
| 6 | 115 Vac | Keylock reset | Panel | **6-Y-12-RMF-PM-115A** ① | **31083403** |
| 6 | 230 Vac | Keylock reset | Panel | **6-Y-12-RMF-PM-230A** | **31083405** |
| 7 | 115 Vac | Keylock reset | Panel | **7-Y-12-RMF-PM-115A** ① | **31083409** |
| 6 | 24 Vac | Keylock reset | Panel | **6-Y-12-RMF-PM-24A** | **31083411** |
| 6 | 24 Vdc | Keylock reset | Panel | **6-Y-12-RMF-PM-24D** | **31083415** |
| 7 | 24 Vdc | Keylock reset | Panel | **7-Y-12-RMF-PM-24D** | **31083421** |
| 7 | 230 Vac | Keylock reset | Panel | **7-Y-12-RMF-PM-230A** | **31083427** |
| 6 | 24 Vac | Knob | Base | **6-Y-1-RMF-24A** | **31155400** |
| 6 | 240 Vac | Knob | Base | **6-Y-1-RMF-240A** | **31155401** |
| 6 | 115 Vac | Knob | Base | **6-Y-1-RMF-115A** ① | **31155402** |
| 6 | 115 Vac | Non-reset | Panel | **6-Y-13-RMF-PM-115A** ① | **31155405** |
| 7 | 24 Vdc | Non-reset | Panel | **7-Y-13-RMF-PM-24D** | **33183400** |

***Note***

① UL recognized.

## Technical Data and Specifications

### General Specifications

| Description | Specification |
|---|---|
| Figures | 6 or 7 |
| Speed | Up to 1000 cpm |
| Figure size | 3/16 in (4.8 mm) high, white-on-black background |
| Reset | Knob, key or non-reset |
| Mounting | Base or panel mount |
| Finish | Black frame and side covers |
| Electrical connections | Two-wire leads, 9 in (229 mm) long, AWG 22 (0.34 $mm^2$), stripped 0.38 in (9.5 mm) |
| Power requirements | 7 watts |
| Coils | Various voltages and frequencies can be supplied on special order.<br>Count coils are designed for continuous duty at rated voltage |

### Dimensions

Refer to table and illustrations on **Page V13-T1-35** for information.

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## ME Series

### Product Description

Small in size and price, but large in design versatility and model variety is the ME Series of miniature electric counters. Models in most popular AC or DC voltages operate on as little as 3 watts, with the non-reset models measuring only 1 x 1.593 x 2.187 in (25.4 x 40.5 x 55.5 mm) and weighing just three ounces (85 grams).

Available in 4, 6 or 7 figures, the counters feature stainless steel self-lubricating shafts, nylatron pinions and a synchronous electromagnetic drive to assure accurate, reliable, long life operation. Designed for mounting flexibility and aesthetic attractiveness, the miniature electric counters are available with three types of mounting and a glare retarding finish Delrin, with crisp easy-to-read numerals set close to a tamper-proof sealed figure window.

### Standards and Certifications

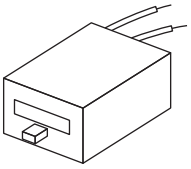
- UL recognized

### Product Selection

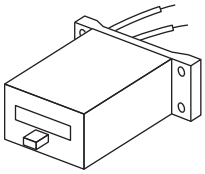
***When Ordering Specify***

When ordering ME Series Miniature Electric Counters, specify catalog numbers according to the features selected.

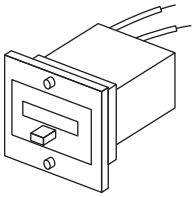
**Bottom Mount Wire Leads**



**Base Mount Wire Leads**



**Panel Mount Wire Leads**



**ME Series Miniature Electric Counter**

**ME Series Miniature Electric Counters**

| No. of Figures | Voltage | Reset | Mounting | Catalog Number | Order Number |
|---|---|---|---|---|---|
| 4 | 12 Vdc | Pushbutton | Bottom | **4-Y-41312-401-MEQ** | **41312401** |
| 4 | 24 Vdc | Pushbutton | Bottom | **4-Y-41312-402-MEQ** | **41312402** |
| 4 | 120 Vac | Pushbutton | Bottom | **4-Y-41312-406-MEQ** | **41312406** |
| 4 | 24 Vdc | Pushbutton | Base | **4-Y-41313-402-MEQ** | **41313402** |
| 4 | 120 Vac | Pushbutton | Base | **4-Y-41313-406-MEQ** | **41313406** |
| 4 | 240 Vac | Pushbutton | Base | **4-Y-41313-407-MEQ** | **41313407** |
| 4 | 12 Vdc | Pushbutton | Panel | **4-Y-41314-401-MEQ** | **41314401** |
| 4 | 24 Vdc | Pushbutton | Panel | **4-Y-41314-402-MEQ** | **41314402** |
| 4 | 120 Vac | Pushbutton | Panel | **4-Y-41314-406-MEQ** | **41314406** |
| 4 | 240 Vac | Pushbutton | Panel | **4-Y-41314-407-MEQ** | **41314407** |

**ME Series Miniature Electric Counter**

## ME Series Miniature Electric Counters, continued

| No. of Figures | Voltage | Reset | Mounting | Catalog Number | Order Number |
|---|---|---|---|---|---|
| 6 | 24 Vdc | Non-reset | Bottom | **6-Y-41119-402-ME** | **41119402** |
| 6 | 120 Vac | Non-reset | Bottom | **6-Y-41119-406-ME** | **41119406** |
| 6 | 12 Vdc | Non-reset | Base | **6-Y-41345-401-ME** | **41345401** |
| 6 | 24 Vdc | Non-reset | Base | **6-Y-41345-402-ME** | **41345402** |
| 6 | 120 Vac | Non-reset | Base | **6-Y-41345-406-ME** | **41345406** |
| 6 | 240 Vac | Non-reset | Base | **6-Y-41345-407-ME** | **41345407** |
| 6 | 12 Vdc | Non-reset | Panel | **6-Y-41346-401-ME** | **41346401** |
| 6 | 24 Vdc | Non-reset | Panel | **6-Y-41346-402-ME** | **41346402** |
| 6 | 120 Vac | Non-reset | Panel | **6-Y-41346-406-ME** | **41346406** |
| 6 | 240 Vac | Non-reset | Panel | **6-Y-41346-407-ME** | **41346407** |
| 7 | 12 Vdc | Non-reset | Bottom | **7-Y-41238-401-ME** | **41238401** |
| 7 | 24 Vdc | Non-reset | Bottom | **7-Y-41238-402-ME** | **41238402** |
| 7 | 120 Vac | Non-reset | Bottom | **7-Y-41238-406-ME** | **41238406** |
| 7 | 12 Vdc | Non-reset | Base | **7-Y-41337-401-ME** | **41337401** |
| 7 | 24 Vdc | Non-reset | Base | **7-Y-41337-402-ME** | **41337402** |
| 7 | 120 Vac | Non-reset | Base | **7-Y-41337-406-ME** | **41337406** |
| 7 | 12 Vdc | Non-reset | Panel | **7-Y-41349-401-ME** | **41349401** |
| 7 | 24 Vdc | Non-reset | Panel | **7-Y-41349-402-ME** | **41349402** |
| 7 | 120 Vac | Non-reset | Panel | **7-Y-41349-406-ME** | **41349406** |
| 7 | 240 Vac | Non-reset | Panel | **7-Y-41349-407-ME** | **41349407** |

## Technical Data and Specifications

### General Specifications

| Description | Specification |
|---|---|
| Figures | 4, 6 and 7 |
| Speed | Up to 1000 cpm |
| Figure size | 3/16 in (4.8 mm) high |
| Reset | Pushbutton and non-reset |
| Reset force | Pushbutton models only, 20 oz. (568 grams) maximum |
| Mounting | Base, bottom, panel |
| Finish | Black self-extinguishing plastic |
| Electrical connections | Wire leads, 10 in (254 mm) long, AWG 20, stripped 3/8 in (9.5 mm), and pin terminals |
| Power requirements | 3W |
| Coils | Count coils are designed for continuous duty at rated voltage |

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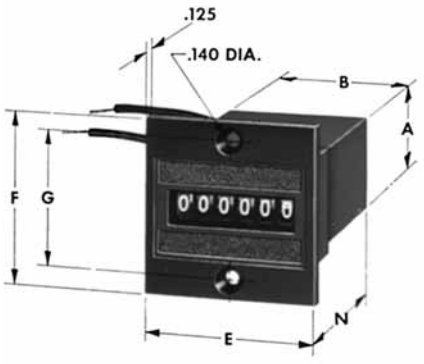
## Dimensions

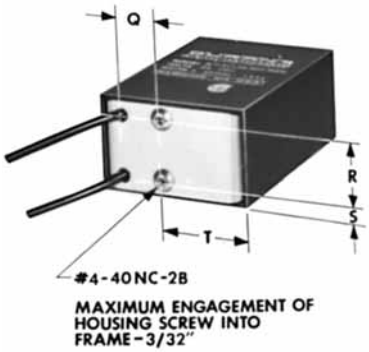
Approximate Dimensions in Inches (mm)

***ME Series Counters***

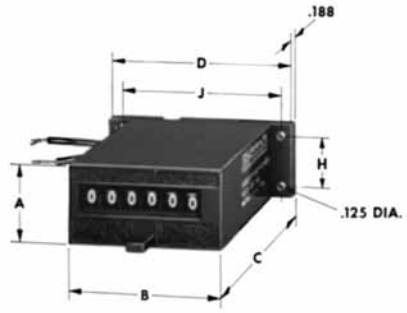
### Panel Mounted



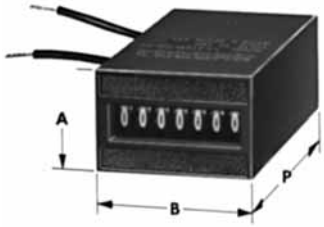

### Bottom Mounted




### Base Mounted




### Bottom Mounted




### ME Series Counters

| 4 Figure Pushbutton Reset Counters | | 6 and 7 Figure Non-Reset Counters | |
|---|---|---|---|
| **Dimension** | **Inches (mm)** | **Dimension** | **Inches (mm)** |
| A | 1.00 (25.4) | A | 1.00 (25.4) |
| B | 1.60 (40.6) | B | 1.60 (40.6) |
| C | 2.64 (67.1) | C | 2.38 (60.5) |
| D | 2.19 (55.6) | D | 2.19 (55.6) |
| E | 1.80 (45.7) | E | 1.80 (45.7) |
| F | 1.80 (45.7) | F | 1.80 (45.7) |
| G | 1.40 (35.6) | G | 1.40 (35.6) |
| H | 0.69 (17.5) | H | 0.69 (17.5) |
| J | 1.88 (47.8) | J | 1.88 (47.8) |
| K | 0.50 (12.7) | K | 0.50 (12.7) |
| L | 0.49 (12.4) | L | 0.49 (12.4) |
| M | 0.94 (23.9) | M | 0.94 (23.9) |
| N | 2.45 (62.2) | N | 2.19 (55.6) |
| P | 2.45 (62.2) | P | 2.19 (55.6) |
| Q | 0.45 (11.4) | Q | 0.45 (11.4) |
| R | 0.63 (16.0) | R | 0.63 (16.0) |
| S | 0.19 (4.8) | S | 0.19 (4.8) |
| T | 0.68 (17.3) | T | 0.88 (22.4) |

### Recommended Panel Mount Cut-Outs

| 4 Figure Counters | 6 and 7 Figure Counters |
|---|---|
| **Pushbutton Reset** | **Non-Reset** |
| 1.72 x 1.11 (43.7 x 28.2) | 1.72 x 1.11 (43.7 x 28.2) |

**Electronic Totalizers**

## Contents

| *Description* | *Page* |
|---|---|
| Mechanical Totalizers | |
| Stroke | **V13-T1-5** |
| Revolution | **V13-T1-14** |
| Electromechanical Totalizers | **V13-T1-29** |
| Electronic Totalizers | |
| 1/32 DIN LCD Totalizers | **V13-T1-42** |
| 1/32 DIN LED Multifunction Totalizer/Timer/Ratemeter | **V13-T1-44** |
| Courier Series | **V13-T1-46** |
| 1/8 DIN LED Multifunction Totalizer/Timer/Ratemeter | **V13-T1-49** |

# Electronic Totalizers

### Product Overview

Eaton's electric totalizers provide a flexible and accurate method of displaying count and measurement data in an easily readable format.

### Features

- LED and LCD readouts
- Variety of sizes and packages
- Programmable inputs and displays available

### Standards and Certifications

- Most products are UL certified (see individual product pages for details)
- CE

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## 1/32 DIN LCD Totalizers

### Product Description

Compact battery powered totalizers where AC power is unavailable.

### Features

- Low price and high efficiency
- Large eight-digit LCD display, height of the figures 0.31 in (8 mm)
- Various counting modes like up/down differential available
- High voltage input for 10–260 Vac/Vdc voltage pulses
- IP65
- Screw terminals, RM 5 mm
- Lifetime of the battery approximately eight years
- Locking of the reset key
- Operating temperature 14° to 140°F (–10° to 60°C)
- All version of positive or negative counting edge
- Filter function for bounce-free counting with mechanical contacts

### Standards and Certifications

- UL recognized
- CE marked

### Product Selection

**E5-024-C04_**

#### 1/32 DIN LCD Totalizers

| Description | Catalog Number |
|---|---|
| **Eight-Digit LCD Totalizer, Battery Power** | |
| 4–30 Vdc powered, NPN/PNP 0.94 x 1.89 in (24 x 48 mm) | **E5-024-C0400** |
| 10–120V input AC/DC powered, NPN only 0.94 x 1.89 in (24 x 48 mm) | **E5-024-C0408** |
| Count up/down 4–30 Vdc powered, NPN only, 0.94 x 1.89 in (24 x 48 mm) | **E5-024-C0410** |

### Technical Data and Specifications

#### 1/32 DIN LCD Totalizers

| Description | Specification |
|---|---|
| Power supply | Non-replaceable lithium battery (lifetime approximately eight years at 68°F (20°C) |
| Display | LCD, eight-digits |
| Figure size | 0.31 in (8 mm) high |
| Mode | Adding or subtracting (selectable), counting direction, differential counting or phase discriminator single or dual evaluation (selectable) |
| Display range | –9999999 to 99999999, with overflow display |
| Reset | Manual and electrical |
| Interference emissions | EN 55011 Class B, EN 61 000-6-2, EN 61010 Section 1 (only AC versions) |
| Housing | Dark gray RAL 7021 |
| Operating temperature | 14° to 131°F (–10° to 55°C) |
| Ambient temperature | 14° to 140°F (–10° to 60°C) |
| Storage temperature | –4° to 158°F (–20° to 70°C) |
| Protection | IP65 (from front) |
| Weight | Approx. 1.76 oz (50g) |

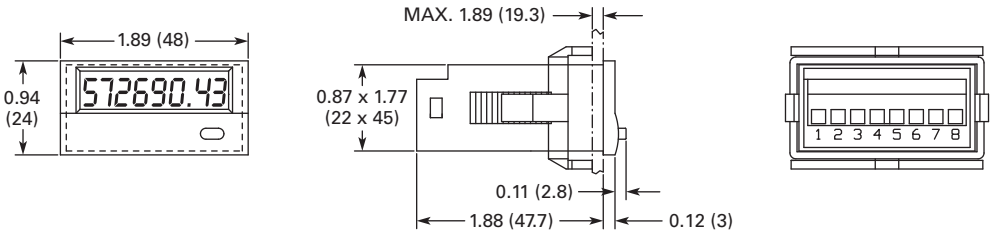
### 1/32 DIN LCD Totalizers, continued

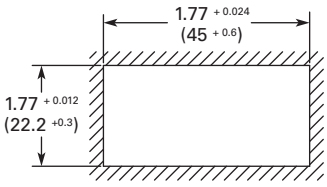
| Description | Specification |
|---|---|
| Counting inputs: | |
| Counting input of the DC version | Max. 30 Vdc |
| Slow counting input | Max. 30 Hz (NPN) |
| Fast counting input | Max. 12 kHz (PNP) |
| Switching level | NPN: Low 0–0.7V, High 3–30 Vdc |
| | PNP: Low 0–0.7V, High 3–30 Vdc |
| Counting Input of the high voltage versions | 10–260 Vac/Vdc |
| Counting input | Optocoupler input, max. 30 Hz |
| Min. pulse time | 16 ms |
| Switching level | Low: 0–2 Vac/Vdc |
| | High: 10–260 Vac/Vdc |
| Counting direction switching (only DC versions) | Contact input, open collector NPN (switching at 0 Vdc) |
| | Switching level, NPN—Low, 0–0.7V, High 3–5 Vdc |
| Reset input (only DC and high voltage)— | |
| Minimum pulse time | DC: 50 ms; high voltage: 16 ms |
| Contact input NPN | Low: 0–0.7V |
| | High: 3–30 Vdc |
| High voltage input | 10–260 Vac/Vdc |
| Electrical reset key locking (for DC and AC) | Contact input, open collector NPN (switching at 0V) |
| | Switching level, NPN—Low, 0–0.7V, High 3–5 Vdc |

## Dimensions

Approximate Dimensions in Inches (mm)

### 1/32 DIN LCD Totalizers



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## 1/32 DIN LED Multifunction Totalizer/Timer/Ratemeter

### Product Description

Compact LED display for a variety of input signals.

### Features

- Display counter adding and subtracting
- Position display
- Frequency counter/ ratemeter
- Timer
- Display range: –199.999 to 999.999 with zero blanking
- Screw terminal
- Locking SET-key

### Standards and Certifications

- UL recognized
- CE marked

## Product Selection

**E5-024-C04_**

### 1/32 DIN LED Multifunction Totalizer/Timer/Ratemeter

| Description | Catalog Number |
|---|---|
| LED Single channel totalizer, 10–30 Vdc power<br>0.94 x 1.89 in (24 x 48 mm) | **E5-024-E0402** |
| LED multifunction totalizer/timer/ratemeter 10–30 Vdc power<br>0.94 x 1.89 in (24 x 48 mm) | **E5-424-E0402** |
| LED double-function totalizer/timer/ratemeter 10–30 Vdc power<br>0.94 x 1.89 in (24 x 48 mm) | **E5-524-E0402** |
| LED totalizer with quadrature, 10–30 Vdc power<br>0.94 x 1.89 in (24 x 48 mm) | **E5-024-E0432** |

## Technical Data and Specifications

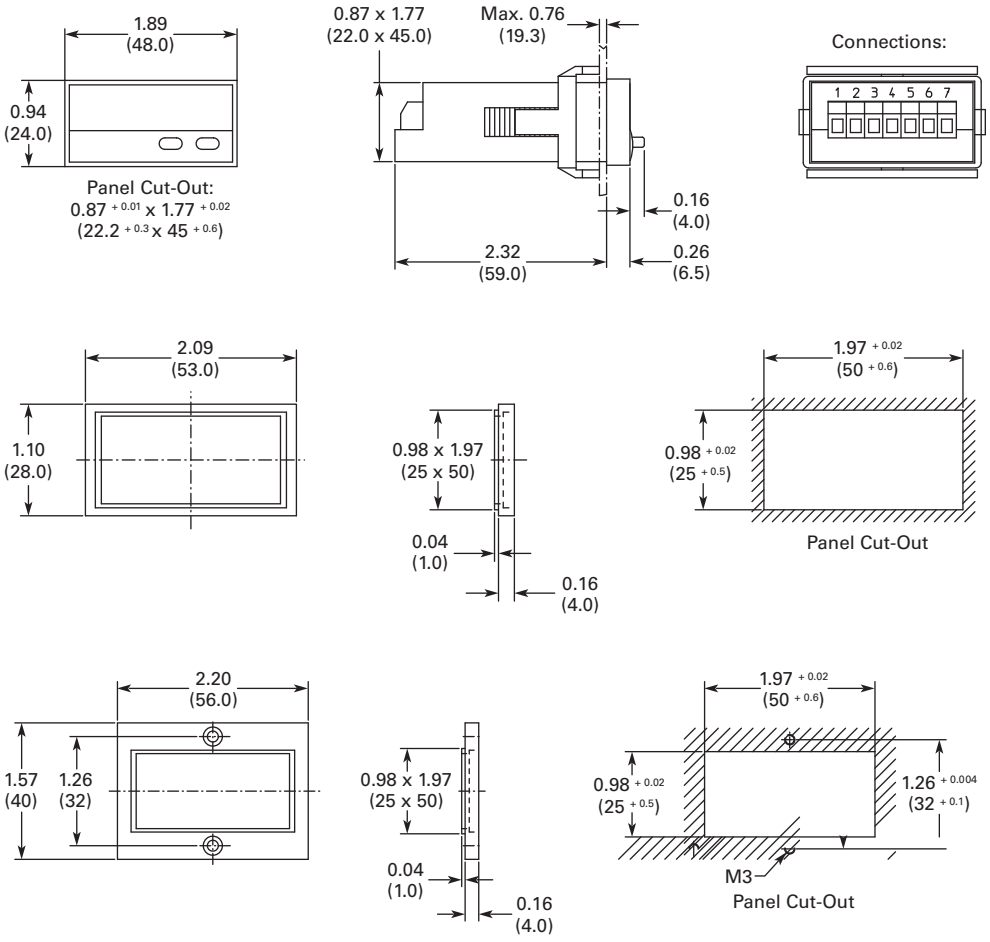
### General Specifications

| Description | Specification |
|---|---|
| Supply voltage | 10–30 Vdc with reverse polarity protection |
| Current consumption | Max. 55 mA |
| Display | Six-digit red, seven-segment LED display |
| Figure size | 0.31 in (8 mm) high |
| Data backup | EEPROM |
| Housing | Dimension 3.78 x 1.89 in (48 x 24 mm) according to DIN 43 700; RAL 7021 gray |
| Polarity of inputs | Programmable, NPN or PNP |
| Input resistance | Approx. 10k ohms |
| Counting frequency | 60 kHz, can be damped to 30 Hz, position display max. 25 kHz |
| Resolution | Timer 0.001 sec. |
| Reset time | 5 ms |
| Level of inputs | |
| High | 0.6 x $U_B$–30 Vdc |
| Low | 0–0.2 x $U_B$ (Vdc) |
| Error | |
| Tachometer | <0.1% |
| Timer | <50 ppm |
| Ambient temperature | 4° to 131°F (–20° to 55°C) |
| Storage temperature | –13° to 167°F (–25° to 75°C) |
| EMC | According to EC EMC directive 89/36/EWG |
| Immunity to interference | EN 61 000-6-4/ EN 55011 Class B |
| Emitted interference | EN 61 000-6-2 |
| Protection | IP65 (from front) |
| Weight | Approx. 5.29 oz (150g) |

## Dimensions

Approximate Dimensions in Inches (mm)

### 1/32 DIN LED Multifunction Totalizer/Timer/Ratemeter



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## Courier Series

### Product Description

Eaton's Courier Series is a high quality totalizer powered by a replaceable lithium battery.

### Features

- Eight-digit totalizer
- 1/Tau ratemeter
- Scaling capabilities
- Remote reset terminal
- 0.43 in (10.9 mm) display
- Front panel reset
- NEMA 4X

### Standards and Certifications

- CE marked

CE

### Product Selection

***When Ordering Specify***

When ordering Courier Series Electronic Totalizers and Ratemeters, specify order numbers according to the features selected.

**Courier Series**

### Courier Series, Eight-Digit LCD

| Description | Catalog Number |
|---|---|
| Totalizer, battery | **53300400** |
| Add/subtract (10k Hz, PNP input) totalizer, battery | **53300401** |
| Add/subtract (20 Hz, NPN/contact input) totalizer, battery | **53300402** |
| Quadrature (10k Hz, PNP input) totalizer, battery | **53300403** |
| Totalizer/ratemeter, battery | **53300405** |
| Totalizer/ratemeter at 100 Hz, battery | **53300465** |
| RMF panel mount totalizer, key reset, 60–160 Vac/Vdc count input | **53300800** |
| RMF panel mount totalizer, dry contact input | **53300850** |
| RMF panel mount totalizer, 60–160 Vac/Vdc count input | **53300851** |
| Totalizer—extended temperature range, battery | **53301400** |
| Totalizer—1/Tau ratemeter—extended temperature range | **53301404** |
| Totalizer/ratemeter—extended temperature range, battery | **53301405** |
| Totalizer/ratemeter, mag pickup, battery | **53301475** |
| Backlight totalizer, battery | **53302400** |
| Backlight add/subtract (10k Hz, PNP input) totalizer, battery | **53302401** |
| Backlight add/subtract (20 Hz, NPN/contact input) totalizer, battery | **53302402** |
| Backlight quadrature (10k Hz, PNP input) totalizer, battery | **53302403** |
| Backlight totalizer/ratemeter, battery | **53302405** |

## Technical Data and Specifications

### General Specifications

| Description | Specification |
|---|---|
| **Power** | |
| Internal battery | 3V, lithium |
| Life expectancy | 5 years + |
| Replacement part | 36367-202 |
| **Backlight** | |
| Backlight | 10–30 Vdc at 30 mA max. ① |
| | Reverse polarity protected |
| **Physical** | |
| Operating temperature | –4° to 158°F (–20° to 70°C) |
| Storage temperature | –4° to 158°F (–20° to 70°C) |
| Operating humidity | 60% non-condensing |
| Weight | 2.2 oz (62g) net |
| Figure size | 0.43 in (10.9 mm) high |
| Front panel rating | NEMA 4X when mounted with gasket provided |
| Case material | Cycolac X-17 |
| **Totalizer** | |
| Type | UP counting |
| Digits | Eight |
| **Count Accuracy** | |
| Operated within specifications | 100% |
| **DC Common (Terminal 1) Count Inputs** | |
| Input B (terminal 2) low speed input designed for contact closures to DC common | |
| Speed | 0 to 20 Hz |
| Min. low time | 10 ms |
| Min. high time | 40 ms |
| Input impedance | 101k ohms |
| Voltage thresholds | |
| Low | 0–0.4 Vdc |
| High | 2.0–28 Vdc |
| Max. high | 28 Vdc |
| Input A (terminal 3) high speed input requiring a voltage source such as a current sourcing sensor or a current sinking sensor used with the provided pull up resistors | |
| Speed | 0 to 10 kHz |
| Min. low time ② | 80 ms |
| Min. high time ② | 20 ms |
| Input impedance | 2k ohms above 5 Vdc |
| Voltage thresholds | |
| Low | 0–1.2 Vdc |
| High | 2.0–28 Vdc |
| Max. high | 28 Vdc |
| **Reset Input** | |
| Reset input (terminal 4) designed for contact closures to DC common | |
| Min. low ③ | 0.25 to 1 sec. (reset is maintained) |
| Voltage thresholds | |
| Low | 0–0.4 Vdc |
| High | 2.0–28 Vdc |
| **Front Panel Reset Enable** | |
| Front panel reset enable (terminal 5) | |
| Operation | Level sensitive (maintained) |

***Notes***

① Derate operating temperature 1°C/volt above 17 Vdc.
② The times are with a 0–5.0V swing.
③ The required pulse width varies with count speed, scale factor and number of digits displayed.

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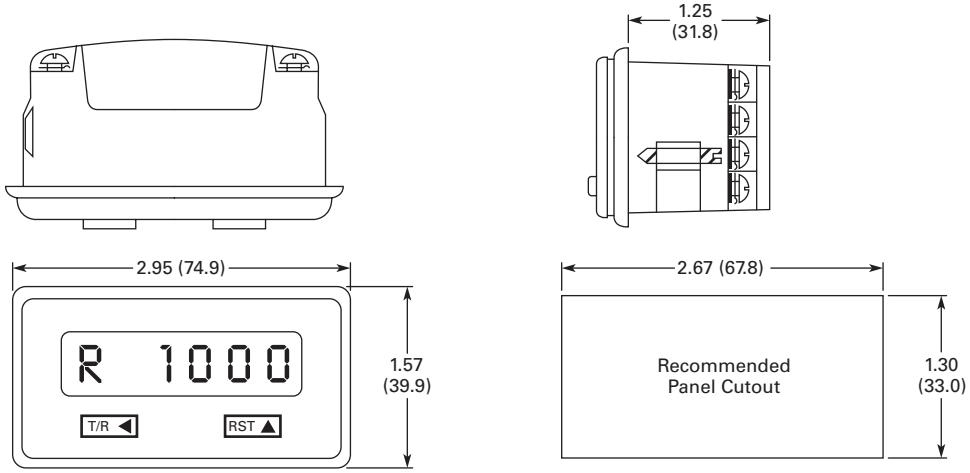
## Dimensions

Approximate Dimensions in Inches (mm)

### Courier Series



## 1/8 DIN LED Multifunction Totalizer/Timer/Ratemeter

### Product Description

LED display for a variety of input signals.

### Features

- Display counter adding and subtracting
- Position display
- Frequency counter/ ratemeter
- Timer, res. up to 0.001 second
- Programmable mode
- Display range: –199.999 to 999.999 with zero blanking
- Connection with screw terminal
- Locking SET-key for reset

### Standards and Certifications

- UL recognized
- CE marked

### Product Selection

**E5-496-E040_**

#### 1/8 DIN LED Multifunction Totalizer/Timer/Ratemeter

| Description | Catalog Number |
|---|---|
| **LED Multifunction Counter/Timer/Ratemeter** | |
| 90–260 Vac power 3.78 x 1.89 in (96 x 48 mm) | **E5-496-E0401** |
| 10–30 Vdc power 3.78 x 1.89 in (96 x 48 mm) | **E5-496-E0402** |

### Technical Data and Specifications

#### General Specifications

| Description | Specification |
|---|---|
| Supply voltage | 10–30 Vdc with reverse polarity protection; 90–260 Vac |
| Current consumption | Max. 50 mA 6 VA |
| Display | Six-digit red, seven-segment LED display |
| Figure size | 0.55 in (14 mm) high |
| Data backup | EEPROM |
| Housing | Dimension 3.78 x 1.89 in (96 x 48 mm) according to DIN 43 700; RAL 7021 gray |
| Polarity of inputs | Programmable, NPN or PNP for all inputs |
| Input resistance | Approx. 10k ohms |
| Counting frequency | 60 kHz, can be damped to 30 Hz depending on operating mode at position display max. 25 kHz ① |
| Reset time | 5 ms |
| Resolution timer | Up to 0.001 second |
| Input switching level | |
| DC version (standard version) | High: 0.6 x $U_B$–30 Vdc |
| | Low: 0–0.2 x $U_B$ (Vdc) |
| AC version | High: 12–30 Vdc |
| | Low: 0–4 Vdc |
| Voltage supply for sensors | 24 Vdc ±15%/100 mA at AC versions |
| Accuracy | |
| Tachometer | <0.1% |
| Timer | <50 ppm |
| Ambient temperature | –4° to 149°F (–20° to 65°C) |
| Storage temperature | –13° to 167°F (–25° to 75°C) |
| EMC | According to EC EMC directive 89/36/EWG |
| Immunity to interference | EN 61 000-6-4/ EN 55011 Class B |
| Emitted interference | EN 61-000-6-2 |
| Protection | IP65 (from front) |
| Weight | Approx. 5.29 oz (150g) |

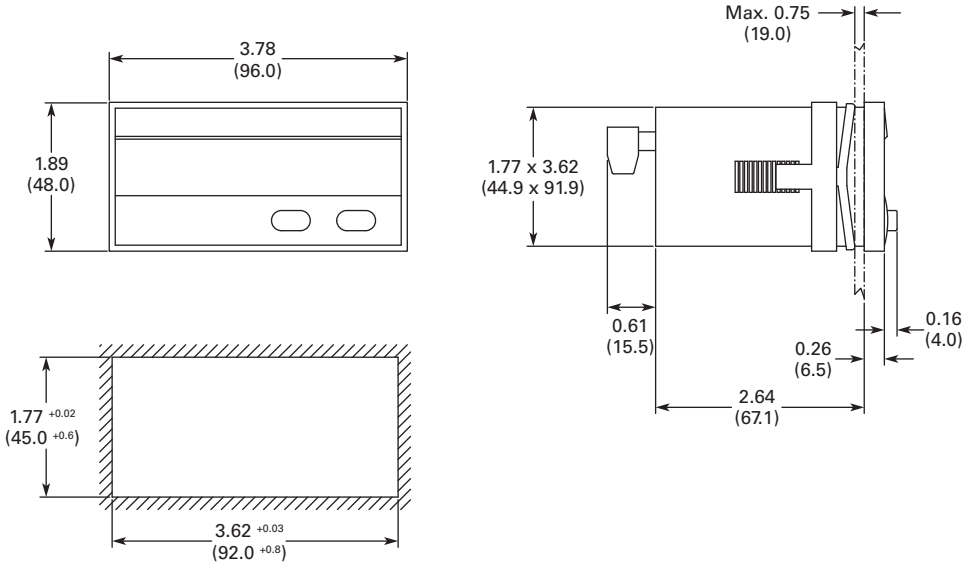
***Note***

① For further specifications, please refer to the user manual.

## 1 Dimensions

Approximate Dimensions in Inches (mm)

### 1/8 DIN LED Multifunction Totalizer/Timer/Ratemeter



**Count Controls/Preset Counters**

## Contents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| Count Controls/Preset Counters | |
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| 1/16 DIN Battery Powered LCD Count Control | **V13-T1-53** |
| 1/16 DIN LCD Preset Counters with Rate and Time | **V13-T1-55** |
| Eclipse Series | **V13-T1-57** |
| President Series (Totalizers) | **V13-T1-60** |
| Ambassador Series (Totalizers) | **V13-T1-69** |
| Ambassador Series (Count Control) | **V13-T1-72** |
| President Series (Count Control) | **V13-T1-64** |
| PD-Q and PD-ER Series | **V13-T1-76** |


Learn Online

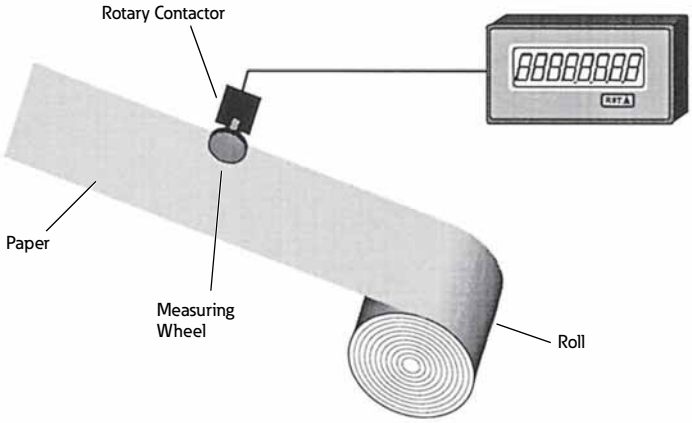
## Product Overview

Count controls are counters that provide output signal(s) at preset count value(s). Typical applications include cut-to-length, batching, filling, mixing and dispensing. A variety of count controls in different sizes, display types and feature sets are available from Eaton.

## Application Description

The illustration shows a simple cut-to-length application. The roll of paper is measured using a measuring wheel and rotary contactor (or encoder). Once the desired length is reached, an output signal may be directed to a shear for activation. Following the cut-off, the count control will reset to zero and begin measurement of the next piece. Options such as batch counting, where the number of cut pieces is counted, are also typical of this application.

### Application Example



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## Product Selection Guide

### Count Controls/Preset Counters/Totalizers

| | Characteristics | Panel Cutout in Inches (mm) | Page |
|---|---|---|---|
| **E5-148-C** | Low cost, simple count control<br>Battery operated<br>Easy-to-change preset values<br>Two-line display: input and preset values | 1.772 x 1.772<br>(45 x 45) | **V13-T1-53** |
| **E5-648-C** | Two-line display: counter, timer or tachometer<br>AC or DC power options<br>Wide choice of count modes for pulse inputs, time or frequency<br>Two or four presets | 1.772 x 1.772<br>(45 x 45) | **V13-T1-55** |
| **Eclipse** | Six-digit, super bright LED display<br>Multiple models available: totalizers, ratemeters, count controls, digital panel meters and flow controls | 1.772 x 3.780<br>(45 x 96) | **V13-T1-57** |
| **Ambassador** | Six-digit, high-visibility, two-line LCD display<br>User-configurable control inputs<br>Highly flexible control/display | 2.667 x 2.667<br>(68 x 68) | **V13-T1-72** |
| **President** | Bright LED display with 14 mm characters<br>Simple configuration with 14-button tactile keypad<br>Many different versions fit almost any application | 2.667 x 5.433<br>(68 x 138) | **V13-T1-64** |
| **PD-Q and PD-ER** | Electromechanical pre-set counter<br>Easy setpoint adjustment using pushbuttons<br>Base mount or panel mount | 272 x 1.59<br>(69 x 40.5)<br>(panel mount model) | **V13-T1-76** |
| **Fusion** | Integrated controller combines operator interface, ladder logic and high-speed counting | 2.667 x 5.433<br>(68 x 138) | **V13-T1-119** |

# 1/16 DIN Battery Powered LCD Count Control

## Product Description

Battery-powered electronic preset counter.

## Features

- Replacement for electromechanical preset counters
- No power supply necessary (battery operated)
- Count and reset input electrically separated from counter through optocoupler input range 12–250 Vac/Vdc
- Two-line LC display count, preset and level of the output
- Screw terminal
- Data security, through two exchangeable lithium batteries, lifetime minimum eight years
- Easy programming
- Counter presets easily via presetting keys allocated to each decade
- Output: Potential free relay, programmable normally open or normally closed contact

## Standards and Certifications

- cRU®us approval
- CE marked

## Product Selection

**E5-148-C1400**

### 1/16 DIN Battery Powered LCD Count Control

| Description | Catalog Number |
|---|---|
| **Single Preset Count Control** | |
| Battery power 1.89 x 1.89 in (48 x 48 mm) | **E5-148-C1400** |

## Technical Data and Specifications

### General Specifications

| Description | Specification |
|---|---|
| Power supply | 2 pcs user exchangeable lithium batteries, type 1/2 AA lithium 3.6V |
| Display | Two-line LCD display, six digits; 999999 |
| Figure size | 0.28 in (7 mm) or 0.18 in (4.5 mm) high |
| Input | Reset, count and keylock inputs |
| Input polarity | Bi-directional optocoupler input for the reset count inputs; reset, count and keyboard lock is connected to 3 Vdc |
| Input min. pulse duration | Reset input 50 ms; keyboard lock input 15 ms |
| Input switching levels | |
| Low | <3 Vac/Vdc |
| High | 12–250 Vac/Vdc |
| Input frequency | Max. 25 Hz |
| Input resistance | 110k ohms |
| Output | Bistable relay with potential free contact (programmable as normally closed or normally open contact) |
| Max. switching voltage | 250 Vac/220 Vdc |
| Max. switching current | 2A |
| Max. switching capacity | 60 VA/30W |
| Output response time | <20 ms, max. 4 Hz |
| Data retention | Via two batteries, eight years or $5x10^6$ power operations of the output relay and an ambient temperature of 77°F (25°C) |
| Ambient temperature | 14° to 122°F (–10° to 50°C) |
| Storage temperature | –13° to 140°F (–25° to 60°C) |
| EMC | According to EC EMC directive 89/36/EWG, EN 61 000-6-4/ EN 55011 Class B, EN 61 000-6-2 |
| Protection | IP65 (front) |
| Weight | Approx. 2.82 oz (80g) |

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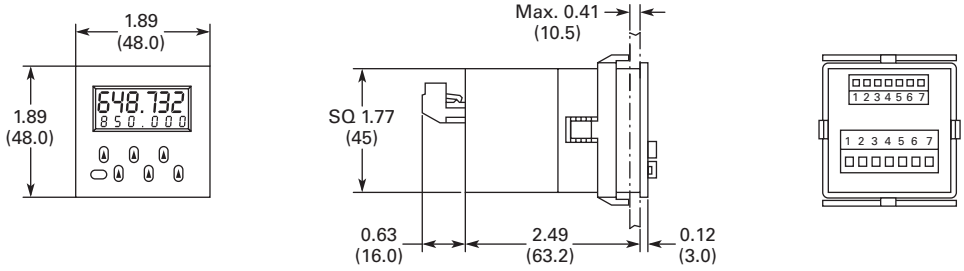
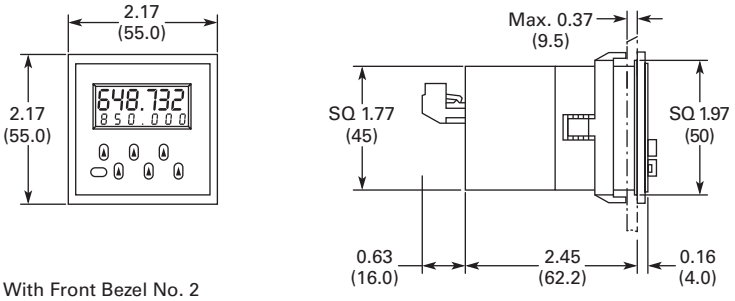
## Dimensions

Approximate Dimensions in Inches (mm)

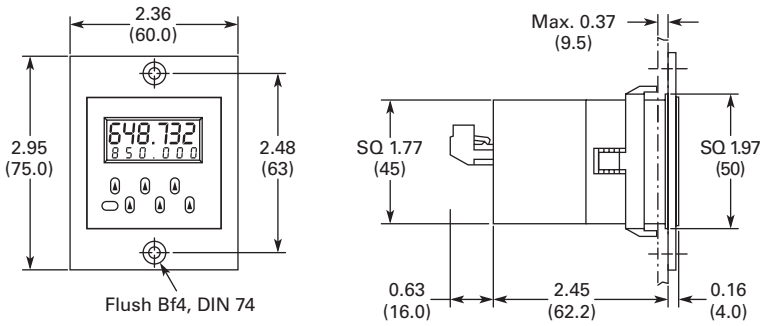
### 1/16 DIN Battery Powered LCD Count Control




Panel Cut-Out 1.77 x 1.77 (45 x 45)




With Front Bezel No. 2
Panel Cut-Out 1.97 x 1.97 (50 x 50)




With Front Bezel No. 3
Panel Cut-Out 1.97 x 1.97 (50 x 50)

## 1/16 DIN LCD Preset Counters with Rate and Time

### Product Description

AC or DC powered preset counters that can function as timer or tachometer/ratemeter.

### Features

- Two-line display with green backlight (E5-648-C2421 and E5-648-C2422) or multi-color red/green LED backlighting (E5-648-C4461 and E5-648-C4462)
- Programmable as preset counter, batch counter or totalizer
- Power supply: 90–260 Vac or 10–30 Vdc
- Direct input of the presets via front keys or Teach-In input
- Relay outputs
- Scaling by multiplication and division factors 0.0001 to 99.999
  - Two preset values, two outputs
  - Four preset values, four outputs

### Standards and Certifications

- cRU®us approval
- CE marked

### Product Selection

**E5-648-C_**

#### 1/16 DIN Two-Line LCD Count Control

| Description | Catalog Number |
|---|---|
| **Two Preset LCD Count Control with Backlighting** | |
| 90–260 Vac power 1.89 x 1.89 in (48 x 48 mm) | **E5-648-C2421** |
| 10–30 Vdc power 1.89 x 1.89 in (48 x 48 mm) | **E5-648-C2422** |
| **Four Preset LCD Count Control with Multi-Color Display** | |
| 90–260 Vac power 1.89 x 1.89 in (48 x 48 mm) | **E5-648-C4461** |
| 10–30 Vdc power 1.89 x 1.89 in (48 x 48 mm) | **E5-648-C4462** ① |

### Technical Data and Specifications

#### General Specifications

| Description | Specification |
|---|---|
| Power supply | 10–30 Vdc external fuse protection |
| | 90–260 Vac max. 8 VA external fuse protection |
| Display | Two-line LCD display, six digits with programmable decimal point |
| Figure size | 0.35 in (9 mm) high upper line |
| | 0.28 in (7 mm) high lower line |
| Count inputs | Two count inputs (A and B), programmable for count/count direction, up/up, up/down, quadrature, quad2, quad4, A/B or (A-B)/A x 100% |
| Input polarity | Programmable for all inputs in common NPN/PNP |
| Input resistance | Approx. 5k ohms |
| Count frequency | Max. 55 kHz with programmable filter for 30 Hz (see manual for details) |
| Input min. pulse duration | 10 ms for control inputs/1 ms for reset input |
| Switching levels | |
| DC supply voltage | |
| High | 0.6 x UB–30 Vdc |
| Low | 0–0.2 x UB (Vdc) |
| AC supply voltage | |
| High | 12–30 Vdc |
| Low | 0–4 Vdc |
| Pulse shape | Variable (Schmitt-Trigger characteristics) |

***Note***

① Not a stocked product, contact Eaton Care for assistance.

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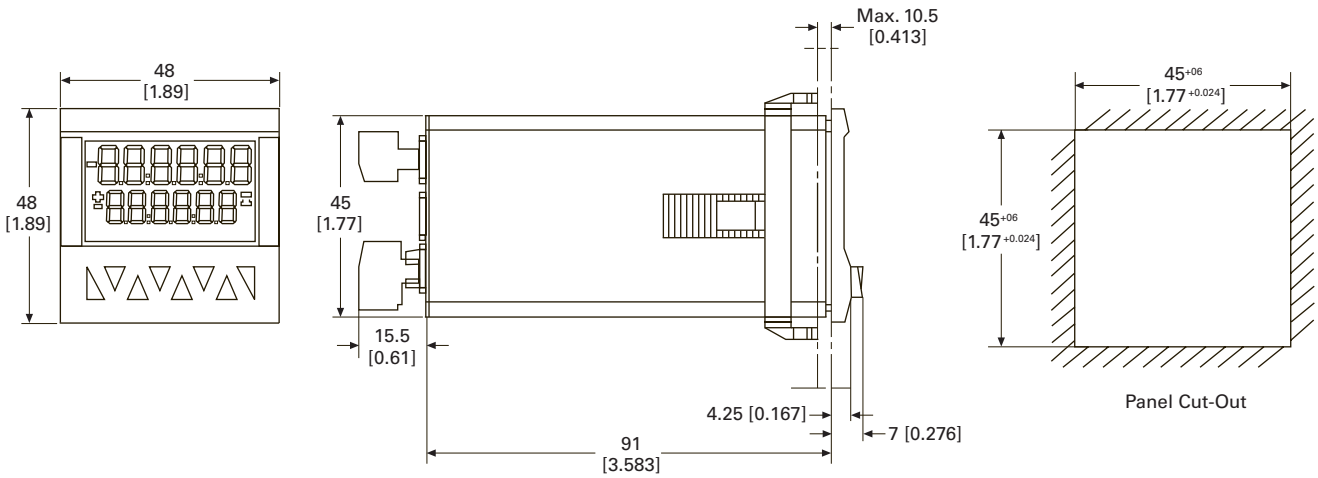
## General Specifications, continued

| Description | Specification |
|---|---|
| Output 1 | |
| Relay | Programmable as normally open or normally closed |
| Switching voltage max. | 250 Vac/110 Vdc |
| Switching current max. | 3A Vac/3A Vdc |
| Switching current at DC min. | 30 mA Vdc |
| Switching power at DC | 90W |
| Switching power at AC max. | 750 VA |
| Output 2 | |
| Relay | Relay with changeover/Form C contact |
| Switching voltage max. | 250 Vac/110 Vdc |
| Switching current max. | 3A Vac/3A Vdc |
| Switching current at DC min. | 30 mA Vdc |
| Switching power at DC | 90W |
| Switching power at AC max. | 750 VA |
| Reaction time of the outputs | Approximately 10 ms |
| Data retention | Min. 10 years or 1 million memory cycles |
| Sensor supply voltage | |
| AC powered unit | 24 Vdc ±15%, 80 mA |
| DC powered unit | Max. 80 mA, DC voltage is connected through |
| Ambient operating temperature | –4° to 149°F (–20° to +65°C) |
| Storage temperature | –13° to 167°F (–25° to 75°C) |
| EMC | |
| Emitted interference | EN 55011 Class B |
| Immunity to interference | EN 61000-6-2 |
| Protection | IP65 (front) |
| Weight | Approx. 4.4 oz (125g) |

## Dimensions

Approximate Dimensions in mm [Inches]

### 1/16 DIN Two-Line LCD Count Control



# Eclipse Series

## Product Description

High visibility LED interface available with a variety of output options

## Features

- 1/8 DIN cutout
- NEMA 4X front panel
- Universal AC power supply (85–265 Vac)
- DC power models (9–30 Vdc)
- Removable screw terminals
- Short depth: 3.6 in (91 mm)
- Front panel programming

## Standards and Certifications

- UL and cUL listed
- CE marked

Listed Listed

## Product Selection

**57700481**

### LED Count Control, Six-Digit

| Description | Catalog Number |
|---|---|
| Relay out, 9–30 Vdc power | **57700481** |
| Relay out, 85–265 Vac power | **57701481** |
| Relay and analog out, 9–30 Vdc power | **57700483** |
| Relay and analog out, 85–265 Vac power | **57701483** |
| Relay and RS-485 out, 9–30 Vdc power | **57700485** |
| Relay and RS-485 out, 85–265 Vac power | **57701485** |
| Relay, analog and RS-485 out, 9–30 Vdc power | **57700487** |
| Relay, analog and RS-485 out, 85–265 Vac power | **57701487** |

**Eclipse Series**

### Totalizers

| Description | Catalog Number |
|---|---|
| 9–30 Vdc power | **57700480** |
| Analog out, 9–30 Vdc power | **57700482** |
| 85–265 Vac power | **57701480** |
| Analog out, 85–265 Vac power | **57701482** |

## Technical Data and Specifications

### General Specifications

| Description | Specification |
|---|---|
| **Mechanical** | |
| Cutout dimensions | 3.62 in W x 1.77 in H (92 mm x 45 mm) DIN standard |
| Outline dimensions | 4.04 in W x 2.19 in H x 3.87 in D (103 mm x 56 mm x 98 mm) 3.60 in (92 mm) maximum depth in panel |
| Enclosure | Plastic with polyester front label |
| Connectors | Up to six depluggable terminal blocks |
| **Environmental** | |
| Operating environment | Indoor use to 2000 meters |
| Temperature | |
| Operating | 32° to 122°F (0° to 50°C) |
| Storage | –4° to 158°F (–20° to 70°C) |
| Humidity | 0 to 85% RH, non-condensing |
| Vibration | 2.5 Gs, 30 to 200 Hz |
| Shock | 30 Gs, 11 ms half sinewave |
| EMC | Immunity to EN 50082-2 (heavy industrial) |
| | Emissions to EN 50081-2 (heavy industrial) |
| Front panel | NEMA 4X when mounted with gasket provided |
| CE EMC immunity and emissions requirements | Met using shielded wiring on the RS-485, analog output and pulse input/ power lines. The shields were connected to earth ground at the Eclipse end of the shields. |
| Pollution degree 2 | Overvoltage Category II |

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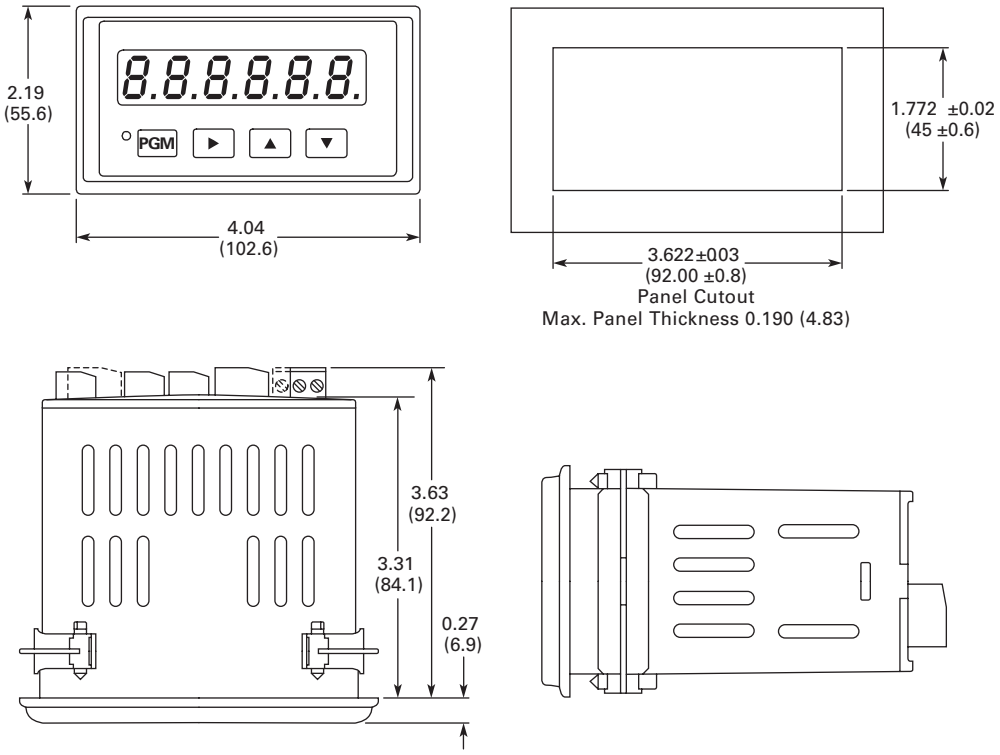
## General Specifications, continued

| Description | Specification |
|---|---|
| **Input Power** | |
| AC powered models (57701-4XX) | |
| Input power | 85–295 Vac, 47–63 Hz, 20V A |
| External fuse | 0.2A, 250 Vac, time delay (T200 mA, 250V) |
| Isolation dielectric strength | 2300 Vac |
| DC powered models (57700-4XX) | |
| Input power | 9–30 Vdc, 12V A |
| External fuse | 2.0A, 50 Vdc, time delay (T2A, 50V) |
| Reverse voltage protection | Yes |
| Isolation dielectric strength | 2300 Vac to signal outputs and relays, 500 Vac to RS-485 and analog outputs |
| **Human Interface** | |
| Display | +6, –5 digits |
| Type | 0.56 in (14.2 mm) high, seven segment, red LED |
| **Data Retention** | |
| Memory type | EEPROM, no batteries required |
| Duration | 100 years |
| **Count Signal Input** | |
| Sensor type | Sink or source, DIP switch selectable |
| Input impedance | 4.75k ohms to +5 Vdc or 34.9k ohms to ground |
| Thresholds | |
| High | 3.5–28 Vdc |
| Low | 0–1.9 Vdc, for single ended signals |
| Magnetic pickup range | 200 mV p-p to 65V rms into 34.9k ohms |
| Slow response | 200 Hz max. (DIP switch 2 and/or 5 ON) |
| Fast response | |
| Count mode | A or B |
| Add/add, add/subtract, add w/Inh | 8250/8250 |
| Fast response | |
| Count mode | A and B |
| Add/add, add/subtract, add w/Inh | 3000/3000 |
| Quad x1, quad x2 | 3250 |
| Quad x4 | 2000 |
| **Control Inputs** | |
| Sensor type | Sink only |
| Input impedance | 4.75k ohms to +5 Vdc |
| Thresholds | |
| High | 3.5 to 28 Vdc |
| Low | 0–1.9 Vdc |
| Response | 25 ms maximum (5V signal) |
| **Accessory Power Output** | |
| Voltage | 12 Vdc +10%/–13% |
| Current | 75 mA max. |
| Protection | Short-circuit protected |

## Dimensions

Approximate Dimensions in Inches (mm)

### Eclipse Series



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## President Series (Totalizers)

### Product Description

Eaton's President Series totalizers are heavy-duty electronic totalizers with two available sizes.

### Features

- Eight-digit, LED display, 0.56 in (14 mm)
- Programmable decimal point and count and rate scaling
- 15 Vdc at 100 mA output power
- Rear panel screw terminals
- NEMA 4 front panel

### Standards and Certifications

- UL listed
- CSA marked
- CE marked

### Product Selection

**President Series**

#### President Series Totalizers

| Description | Catalog Number |
|---|---|
| 115/230 Vac, LED red display | **58811400** |
| 115/230 Vac, LED red display, 1/Tau ratemeter | **58815400** |
| 115 Vac, seven-digit LED red display, basic pulse count | **57810400** |
| 115/230 Vac, LED red display | **58810400** |
| Feet/inches totalizer | **57810402** |

### Technical Data and Specifications

#### General Specifications

| Description | Specification |
|---|---|
| **Power Requirements** | |
| AC operation | 115/230 Vac (+10%, –20%) 47–63 Hz |
| DC operation | 11–28 Vdc |
| Power | 18 watts |
| DC power output ① | 15 Vdc (+1, –2). |
| | 150 mA if powered from AC or less than 24 Vdc |
| | 100 mA if powered from 24 Vdc or greater |
| **Environment** | |
| Operating temperature | 32° to 130°F (0° to 55°C) |
| Storage temperature | –40° to 160°F (–40° to 70°C) |
| Operating humidity | 85% non-condensing relative |
| **Physical** | |
| Memory types | PROM, RAM, non-volatile NVRAM |

***Note***

① DC power output is only regulated if unit is powered by AC or greater than 18.5 Vdc.

## General Specifications, continued

| Description | Specification |
|---|---|
| **Counter** | |
| Count range | Eight digits (0 to 99,999,999) with rollover |
| Offset range | Eight digits (0 to 99,999,999) (offset is used to reset to a non-zero number) |
| Count modes | Count with add and subtract inputs |
| | Count with up/down direction input (hardware doubling for above modes is provided) |
| | Count with count inhibit input |
| | Quadrature |
| | Doubled quadrature |
| Count speed (scale factor of 1.0000 assumed) | |
| 58811400 and 58815400 | 0 to 7,500 counts per second (CPS) with shaft encoders or solid-state sensors |
| | 0 to 3,750 CPS when hardware doubling is implemented or when quadrature shaft encoders are used |
| | 0 to 150 CPS when low frequency is selected |
| 57810400, 58810400 and 57810-402 | 0 to 10,000 counts per second (CPS) with shaft encoders or solid-state sensors with internal pull-up resistor |
| | 0 to 7,500 CPS minimum for sensors with open collector transistor output |
| | 0 to 5,000 CPS when hardware doubling is implemented |
| **Count Input Ratings** ① | |
| Input voltage | |
| High state (logical "1", sensor off or contact open) | 10.5–24.5 Vdc when control is powered by AC line |
| | 7.0–24.5 Vdc when control is powered by 11 Vdc |
| | 11.0–24.5 Vdc when control is powered by 16 Vdc |
| Low state (logical "0", sensor on or contact closed) | 0–4.5 Vdc when control is powered by AC line |
| | 0–3.3 Vdc when control is powered by 11 Vdc |
| | 0–4.8 Vdc when control is powered by 16 Vdc |
| Input impedance | 6800 ohms to 15 Vdc when control is powered by AC line |
| | 6800 ohms to 10 Vdc when control is powered by DC supply |
| Input current | 20 mA peak, 3 mA steady state |
| Input response | |
| High state (logical "1", sensor off or contact open) | High speed (low speed jumpers not connected) |
| | 110 µS minimum at 15 Vdc (6,800 ohms to +DC) |
| | 160 µS minimum at 13.5 Vdc (50,000 ohms to +DC) |
| High state (logical "1", sensor off or contact open) | Low speed (low speed jumpers connected) |
| | 5.5 ms minimum at 15 Vdc (6,800 ohms to +DC) |
| | 7.5 ms minimum at 13.5 Vdc (50,000 ohms to +DC) |
| Low state (logical "0", sensor on or contact closed) | High speed (low speed jumpers not connected) |
| | 20 µS minimum at 0.1 Vdc (0 ohms to DC common) |
| | 45 µS minimum at 1.5 Vdc (500 ohms to DC common) |
| Low state (logical "0", sensor on or contact closed) | Low speed (low speed jumpers connected) |
| | 1.0 ms minimum at 0.1 Vdc (0 ohms to DC common) |
| | 2.0 ms minimum at 1.5 Vdc (500 ohms to DC common) |

***Note***

① The count inputs are designed to work with current sinking sensors (open-collector NPN transistor output with or without passive pull-up resistor) or contact closures to DC common.

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## General Specifications, continued

| Description | Specification |
|---|---|
| **Scale Factor** | |
| Range | Five digits (0.0001 to 9.9999) |
| **Control Inputs** | |
| Input voltage | |
| High state (logical "1", contact open) | 15 Vdc maximum |
| Low state (logical "0", contact closed) | 1.2 Vdc maximum |
| Input impedance | 4.75k ohms to +5 Vdc |
| Threshold | |
| High | +3.5 to +22 Vdc |
| Low | +0.0 to +1.0 Vdc |
| Response time ① | |
| Min. high | 5.3 ms |
| Min. low | 3.9 ms |
| **Diagnostic Modes** | |
| Diagnostic modes | ROM checksum |
| | RAM bit test |
| | NVRAM read/write test |
| | NVRAM store test |
| | NVRAM checksum |
| | Watchdog timer |
| | Display and LED indicator test |
| **Counter Operating Modes** | |
| Reset | Reset to zero |
| | Reset to offset value |
| Maintained | Reset |
| Momentary | Reset |
| **Communications** | |
| Interface type | Dual port 20 mA current loop |
| Speed | 110, 300 and 1200 baud, user selectable |
| Data type | Standard ASCII code |
| Format | Start bit, 7 ASCII data bits, parity bit, one or two stop bits (even parity for serial data output, no parity for serial data input) |
| Information transmitted | Count value |
| | Offset value |
| | Scale factor |
| Information received | Print request |
| | Offset value |
| | Scale factor |

***Note***

① The reset and unlatch signals will both occur in less than 200 microseconds after the input signal is detected. The start of the print will occur within 2 milliseconds after the input is detected if the unit is not counting.

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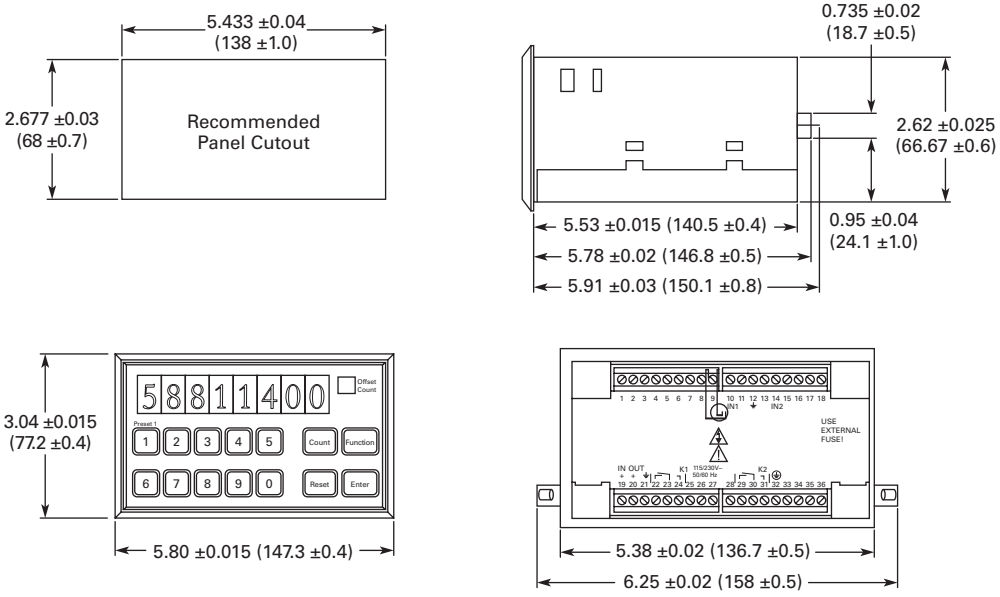
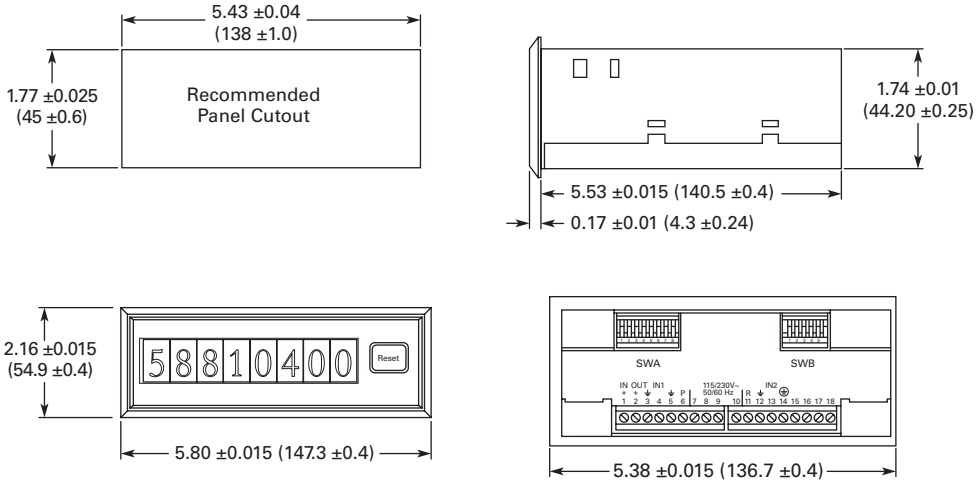
## Dimensions

Approximate Dimensions in Inches (mm)

### Standard President Size




### Compact President Size



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## President Series (Count Control)

### Product Description

Eaton's President Series features an easy-to-read LED and a simple preset input by means of the large keypad.

### Features

- Five- or six-digit, LED display, 0.56 in (14 mm)
- 1, 2 or 3 presets
- 15 Vdc at 100 mA output power
- Rear panel screw terminals
- 20 mA current loop communications
- 2 Form C relays
- Tactile keypad NEMA 4 front panel

### Standards and Certifications

- UL listed
- CSA marked
- CE marked

Listed

### Product Selection

**58831400**

#### President Series Count Control

| Description | Features: Totalizer | Batch Counter | Rate | Scaler | Crop-Cut | Main Counter | Presets | Digits | Catalog Number |
|---|---|---|---|---|---|---|---|---|---|
| 120 Vac, no communications | — | — | ✓ | — | — | 1 | 1 | 5 | **57820400** |
| Single preset | — | — | — | — | — | 1 | 1 | 5 | **58821400** |
| Single preset with rate | — | — | ✓ | ✓ | — | 1 | 1 | 5 | **58825400** |
| Dual preset | — | — | — | ✓ | — | 1 | 2 | 5 | **58831400** |
| Dual preset with batch | — | ✓ | — | ✓ | ✓ | 1 | 2 | 6 | **58841400** |
| Dual preset with totalizer or batch counter | ① | ① | — | ✓ | ✓ | 1 | 2 | 6 | **58851400** |
| Three presets with floating pre-warn | — | — | — | ✓ | — | 1 | 3 | 6 | **58861400** |
| Main counter, batch and totalizer presets | ② | ② | ✓ | ✓ | — | 3 | 1 ea. | 6 | **58827400** |
| Two independent count registers | ③ | ③ | ✓ | ✓ | — | 3 | 1 ea. | 6 | **58827410** |
| High-speed count control—30 kHz max. | — | ✓ | ✓ | ✓ | — | 1 | 2 | 6 | **58867400** |
| President position controller | For more details, see **Page V13-T1-124** | | | | | | | | **58868400** |

***Notes***

① These models have, in addition to the main count register, a register that may be configured to be used as either a totalizer or single preset batch counter. These two functions are mutually exclusive.

② The model 58827-400 has both a totalizer and a batch counter, each with a single preset. In addition, the batch counter may be configured as an additional totalizer with control instead of batch counter.

③ The model 58827-410 has two completely independent count input channels feeding two independent, single preset count registers. In addition, a third single preset register may be used as either a totalizer or a batch counter for one or both of the two main counters.

## Technical Data and Specifications

### President Series—Count Control

| Description | Model 57820400 | 57820401 | 58821400 | 58825400 | 58831400 |
|---|---|---|---|---|---|
| AC power requirements | 120V ±10% | 240V ±10% | 120V/240V +10%/-20%, 47–63 Hz | | |
| DC power requirements | 11–30 Vdc | 11–30 Vdc | 11–28 Vdc | 11–28 Vdc | 11–28 Vdc |
| Power consumption | 8 watts max. | 8 watts max. | 18 watts max. | 18 watts max. | 18 watts max. |
| DC power output ① | 15 Vdc +1/-2 at 85 mA max. | | 15 Vdc +1/-2; 150 mA if powered from AC or less than 24 Vdc, 100 mA if powered from 24 Vdc or greater | | |
| Operating temperature | 32° to 130°F (0° to 55°C) | 32° to 130°F (0° to 55°C) | 32° to 130°F (0° to 55°C) | 32° to 130°F (0° to 55°C) | 32° to 130°F (0° to 55°C) |
| Operating humidity | 85% relative, non-condensing | 85% relative, non-condensing | 85% relative, non-condensing | 85% relative, non-condensing | 85% relative, non-condensing |
| Storage temperature | –10° to 160°F (–40° to 71°C) | –10° to 160°F (–40° to 71°C) | –10° to 160°F (–40° to 71°C) | –10° to 160°F (–40° to 71°C) | –10° to 160°F (–40° to 71°C) |
| Front panel rating | NEMA 4 rating when mounted with gasket provided | | | | |
| Main counter scaler range | N/A | N/A | 5 Digits (0.0001 to 9.9999) | 5 Digits (0.0001 to 9.9999) | 5 Digits (0.0001 to 9.9999) |
| Count input frequency | 10 kHz (5 kHz in quadrature) | 10 kHz (5 kHz in quadrature) | See table on **Page V13-T1-66** | See table on **Page V13-T1-67** | See table on **Page V13-T1-66** |
| Count input impedance | 6.8k ohms to 15 Vdc when control is powered by AC line; 6.8k ohms to 10 Vdc when control is powered by DC line | | | | |
| Control input threshold | High 10.5 to 24.5 Vdc; Low 0.0 to 4.5 Vdc when powered by AC | | | | |
| Control input impedance | 4.5k ohms to +5 Vdc | 4.5k ohms to +5 Vdc | 4.5k ohms to +5 Vdc | 4.5k ohms to +5 Vdc | 4.5k ohms to +5 Vdc |
| Control input response time | Min. high 5.3 ms; min. low 3.9 ms | | | | |
| Relay contact output ratings | SPDT Form C; 10 amps resistive at 24 Vdc or 230 Vac; 1/3 hp at 115 Vac or 230 Vac; 150 Vdc max switched voltage; 5,000,000 operations mechanical life, 100,000 operations at resistive rating | | | | |
| Transistor output ratings | Open collector NPN transistor with Zener diode transient surge protection; 30 Vdc max. load; 300 mA max. per transistor; 480 mA total for all transistors. Use 5 mA per relay coil when calculating total transistor current | | | | |
| Communications | N/A | N/A | Dual port 20 mA current loop, standard ASCII code | | |

### President Series—Count Control, continued

| Description | Model 58841400 | 58851400 | 58827400 | 58827410 | 58867400 |
|---|---|---|---|---|---|
| AC power requirements | 120V/240V +10%/-20%, 47–63 Hz | | | | |
| DC power requirements | 11–28 Vdc | 11–28 Vdc | 11–28 Vdc | 11–28 Vdc | 11–28 Vdc |
| Power consumption | 18 watts max. | 18 watts max. | 18 watts max. | 18 watts max. | 18 watts max. |
| DC power output ① | 15 Vdc +1/-2; 150 mA if powered from AC or less than 24 Vdc, 100 mA if powered from 24 Vdc or greater | | | | |
| Operating temperature | 32° to 130°F (0° to 55°C) | 32° to 130°F (0° to 55°C) | 32° to 130°F (0° to 55°C) | 32° to 130°F (0° to 55°C) | 32° to 130°F (0° to 55°C) |
| Operating humidity | 85% relative, non-condensing | | | | |
| Storage temperature | –10° to 160°F (–40° to 71°C) | –10° to 160°F (–40° to 71°C) | –10° to 160°F (–40° to 71°C) | –10° to 160°F (–40° to 71°C) | –10° to 160°F (–40° to 71°C) |
| Front panel rating | NEMA 4 rating when mounted with gasket provided | | | | |
| Main counter scaler range | 5 digits (0.0001 to 9.9999) | 5 digits (0.0001 to 9.9999) | 5 digits (0.0001 to 9.9999) | 5 digits (0.0001 to 9.9999) | 6 digits (0.00001 to 9.99999) |
| Count input frequency | See table on **Page V13-T1-66** | See table on **Page V13-T1-66** | See table on **Page V13-T1-66** | See table on **Page V13-T1-67** | See table on **Page V13-T1-67** |
| Count input impedance | 6.8k ohms to 15 Vdc when control is powered by AC line; 6.8k ohms to 10 Vdc when control is powered by DC line | | | | |
| Control input threshold | High 10.5 to 24.5 Vdc; Low 0.0 to 4.5 Vdc when powered by AC | | | | |
| Control input impedance | 4.5k ohms to +5 Vdc | 4.5k ohms to +5 Vdc | 4.5k ohms to +5 Vdc | 4.5k ohms to +5 Vdc | 4.5k ohms to +5 Vdc |
| Control input response time | Min. high 5.3 ms; min. low 3.9 ms | | | | |
| Relay contact output ratings | SPDT Form C; 10 amps resistive at 24 Vdc or 230 Vac; 1/3 hp at 115 Vac or 230 Vac; 150 Vdc max switched voltage; 5,000,000 operations mechanical life, 100,000 operations at resistive rating | | | | |
| Transistor output ratings | Open collector NPN transistor with Zener diode transient surge protection; 30 Vdc max. load; 300 mA max. per transistor; 480 mA total for all transistors. Use 5 mA per relay coil when calculating total transistor current | | | | |
| Communications | Dual port 20 mA current loop, standard ASCII code | | | | |

***Note***

① DC power output is only regulated if unit is powered by AC or greater than 18.5 Vdc.

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## 58821400 Count Frequency

| Scale Factor | Count Speed (Pulses per Second) Nominal Count | Quadrature and/or Doubled Count |
|---|---|---|
| <1.0000 | 6,250 | 3,125 |
| 1.0000 | 7,500 | 3,750 |
| 1.9999 | 5,000 | 2,500 |
| 2.0000 | 6,250 | 3,125 |
| 9.0000 | 2,500 | 1,250 |
| 9.9999 | 2,000 | 1,000 |

## 58831400, 58841400, 58861400 Count Frequency

| Scale Factor | Count Speed (Pulses per Second) Nominal Count | Quadrature and/or Doubled Count |
|---|---|---|
| <1.0000 | 5,000 | 2,500 |
| 1.0000 | 7,500 | 3,750 |
| 1.9999 | 4,000 | 2,000 |
| 2.0000 | 6,000 | 3,000 |
| 9.0000 | 2,000 | 1,000 |
| 9.9999 | 1,500 | 750 |

## 58851400 Count Frequency

| | Count Speed (Pulses per Second) Function 61 value = "0" | | Function 61 value = "1" | |
|---|---|---|---|---|
| Scale Factor | Nominal Count | Quadrature and/or Doubled Count | Nominal Count | Quadrature and/or Doubled Count |
| <1.0000 | 5,000 | 2,500 | 3,500 | 1,750 |
| 1.0000 | 7,500 | 3,750 | 4,500 | 2,250 |
| 1.9999 | 4,000 | 2,000 | 2,400 | 1,200 |
| 2.0000 | 6,000 | 3,000 | 3,600 | 1,800 |
| 9.0000 | 2,000 | 1,000 | 1,100 | 550 |
| 9.9999 | 1,500 | 750 | 1,000 | 500 |

## 58827400 Count Frequency

| | Count Speed (Pulses per Second) | | |
|---|---|---|---|
| Scale Factor | Count Up | Count Down | Quadrature |
| 0.999 | 4,000 | 2,250 | 2,000 |
| 1.000 | 5,000 | 3,500 | 3,500 |
| 1.999 | 3,500 | 2,000 | 1,250 |
| 2.000 | 4,000 | 3,000 | 2,750 |
| 9.000 | 1,500 | 1,500 | 1,500 |
| 9.999 | 1,250 | 1,000 | 1,000 |

## 58867400 Count Frequency ①

| Count Mode | Count Speed (Pulses per Second) X1 | X2 | X3 |
|---|---|---|---|
| High speed | 30,000 | 15,000 | 7,500 |
| Low speed | 200 | 200 | 200 |

## 58827410 Count Frequency

| Sample Scale Factor | Count Speed (Pulses per Second) Typical Combinations of Features ② C1 = ON C2 = OFF C3 = OFF RM = OFF | C1 = ON C2 = ON C3 = OFF RM = OFF | C1 = ON C2 = ON C3 = ON RM = OFF | C1 = ON C2 = ON C3 = OFF RM = ON | C1 = ON C2 = ON C3 = ON RM = ON |
|---|---|---|---|---|---|
| 0.0001–0.9999 | 6,000 | 3,000 | 2,300 | 2,600 | 2,000 |
| 1.0000 | 9,000 | 4,500 | 3,500 | 4,000 | 3,000 |
| 5.0000 | 4,500 | 2,250 | 1,000 | 2,000 | 750 |
| 9.9999 | 1,500 | 1,000 | 500 | 750 | 550 |

## 58825400 Count Frequency

| Scale Factor | Count Speed (Pulses per Second) Nominal Count | Quadrature and/or Doubled Count |
|---|---|---|
| <1.0000 | 4,200 | 2,100 |
| 1.0000 | 7,500 | 3,750 |
| 1.9999 | 3,450 | 1,720 |
| 2.0000 | 6,250 | 3,120 |
| 9.0000 | 2,500 | 1,250 |
| 9.9999 | 1,800 | 900 |

***Notes***

① The maximum count input frequency depends only on the selected count mode (doubled or quadrature x4). The maximum input frequencies shown are with square wave (50% duty cycle) input.

② C1: Counter #1; C2: Counter #2; C3: Counter #3; RM: Ratemeter.

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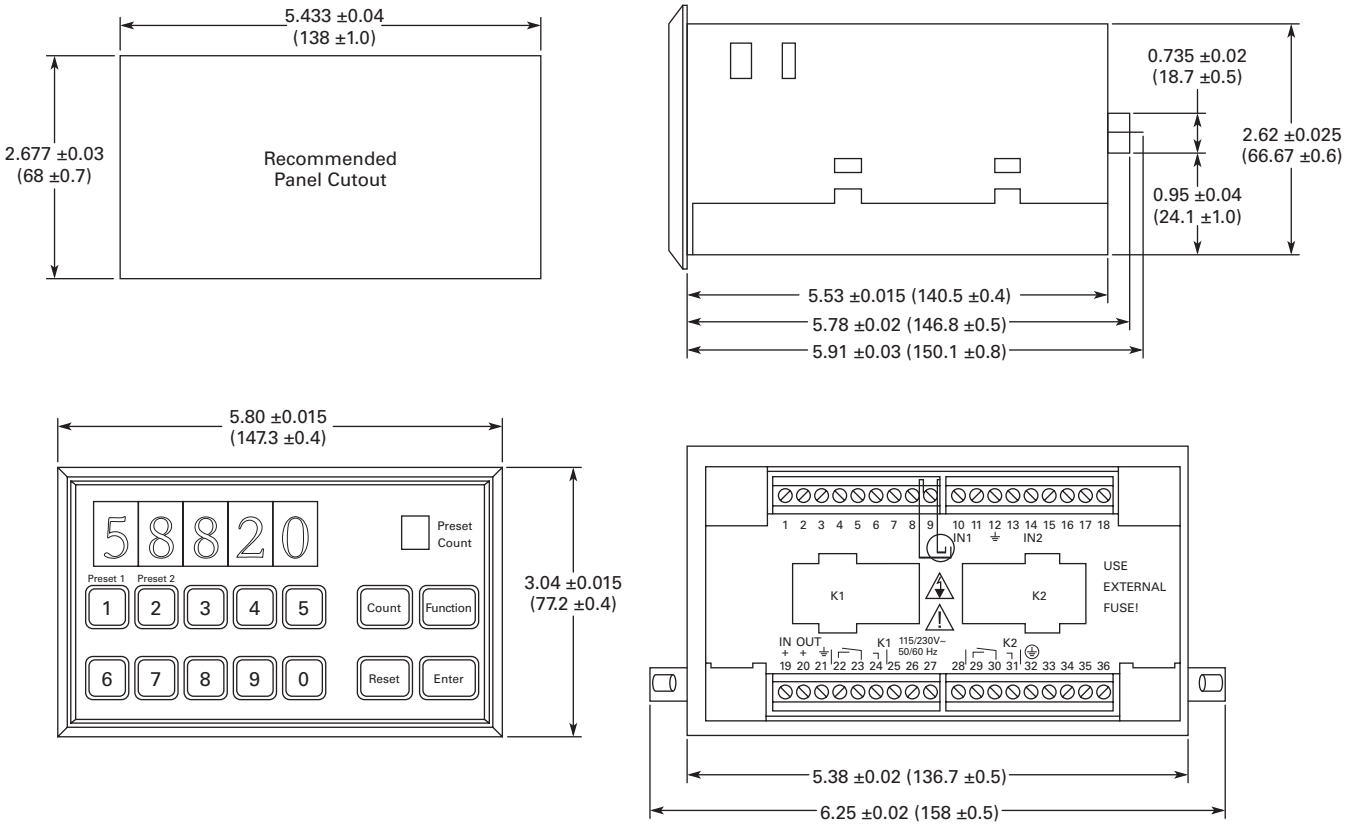
## Dimensions

Approximate Dimensions in Inches (mm)

### President Series Count Control



## Ambassador Series (Totalizers)

### Product Description

Eaton's Ambassador Series is our most noise-immune totalizer available. Various counting modes can be set by the user.

### Features

- AC/DC powered, two-line LCD display
- Eight-digit totalizer
- 1/Tau ratemeter
- Totalizer and ratemeter scaling
- Four user-configurable control inputs
- Two solid-state outputs
- RS-485 serial communications

### Standards and Certifications

- UL listed
- CE marked

### Product Selection

**Ambassador Series**

#### Ambassador Series Totalizers

| Description | Catalog Number |
|---|---|
| 10–15 Vdc LCD | **57600400** |
| 115 Vac LCD | **57601400** |
| 230 Vac LCD | **57602400** |

### Technical Data and Specifications

#### General Specifications

| Description | Specification |
|---|---|
| **Power Input** | |
| AC operation | 115 Vac (±15%) std., 50 to 60 Hz, 7W |
| | 230 Vac (±15%) opt., 50 to 60 Hz, 7W |
| DC operation | 10–15 Vdc opt., 300 mA maximum |
| DC power output | 12 Vdc (±25%), 100 mA maximum (includes all line and load variations) |
| **Environmental** | |
| Operating temperature | 32° to 131°F (0° to 55°C) |
| Storage temperature | –4° to 158°F (–20° to 70°C) |
| Operating humidity | 85% relative, non-condensing |
| Rating | NEMA 4 when mounted with gasket provided |
| **Totalizer** | |
| Type | Bi-directional |
| Digits | Eight |
| Scaler range | 0.00001 to 9.99999 |
| Decimal point | Five positions, programmable |
| **Totalizer Count Speeds** ① | |
| Maximum speed—solid-state (high speed) | |
| Mode | Input A/Input B |
| Add/sub | 20 kHz |
| Add/add | 20 kHz |
| Count/direction | 15 kHz |
| Count x 2/direction | 7.5 kHz |
| Quadrature | 6.5 kHz |
| Quadrature x 2 | 6.5 kHz |
| Maximum speed—contact (low speed) | |
| Mode | Input A/Input B |
| Add/sub | 40 kHz |
| Add/add | 40 kHz |
| Count/direction | 0 kHz |

***Note***

① The maximum count speed depends on the selected count mode. All maximum speeds are shown with square waves (50% duty cycle) input.

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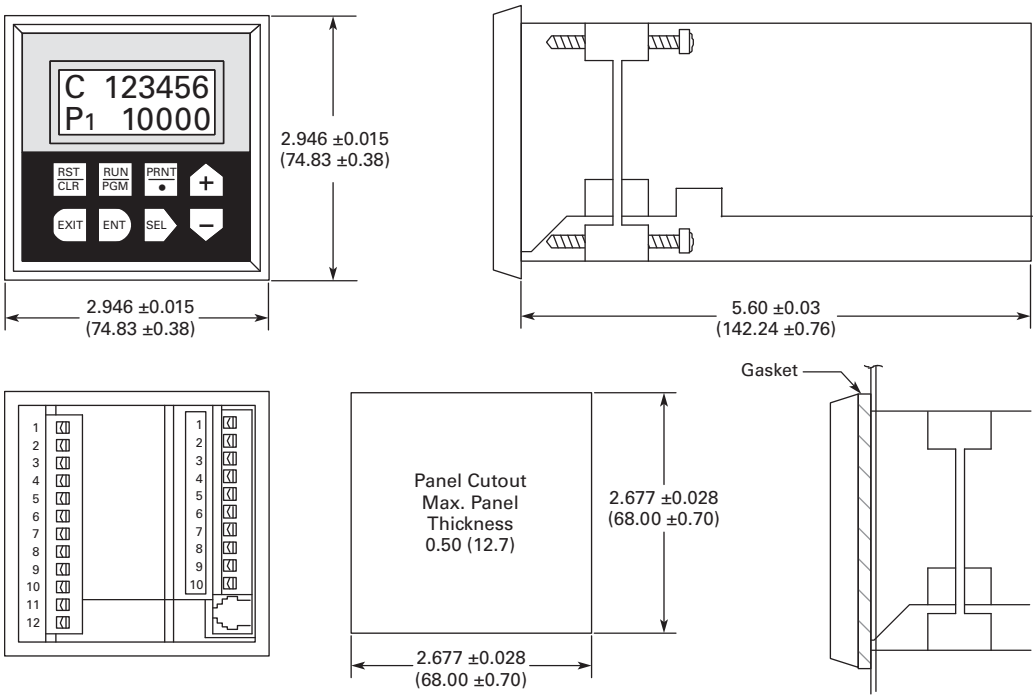
## General Specifications, continued

| Description | Specification |
|---|---|
| **Count Inputs** | |
| Sink | |
| Impedance | 4.6k ohms to +5 Vdc |
| Voltage | |
| High | 3.5 to 34.0 Vdc |
| Low | 0.0 to 1.9 Vdc |
| Source (high) | |
| Impedance | 2.3k ohms to common |
| Voltage | |
| High | 3.5 to 17.0 Vdc (100% duty cycle) |
| Low | 0.0 to 1.9 Vdc |
| Source (low) | |
| Impedance | 2.3k ohms to common |
| DC voltage | |
| High | 0.6 to 17.0 Vdc |
| Low | –17.0 to –0.6 Vdc |
| AC voltage | 17 Vac (48V peak-peak) maximum |
| **Control Inputs** | |
| Impedance | 4.7k ohms to +5 Vdc |
| Voltage | |
| High | +3.7 to +24 Vdc |
| Low | 0.0 to 0.9 Vdc |
| Response | Minimum low 15 ms, minimum high 15 ms |
| **Transistor Outputs (2)** | |
| Type | NPN open collector with transient protection |
| Maximum voltage (OFF state) | 30 Vdc |
| Maximum current (ON state) | 200 mA at 1.3 Vdc |
| **Communication** | |
| Type | RS-485 |
| Format | 1 start bit, 7 data bits (ASCII), 1 parity bit, 1 stop bit |
| Protocol | Opto-22 compatible |
| Speed | 300, 1200, 2400, 4800, 9600 and 19200 baud |
| Parity | Odd, even, none (space transmitted, ignore received) |
| **Count Accuracy** | |
| Operating within specifications | 100% when operated within the specified count speeds and count signal high and low times |
| **Rate Indicator** | |
| Type | 1/Tau |
| Digits | Six |
| Scaler range | 0.00001 to 99999 |
| Decimal point | Five positions, programmable |
| Accuracy | ±0.015% of reading |
| Update time | 1 second, fixed |
| Zero time | 10 seconds, fixed |
| **Connections** | |
| Type | Dual depluggable screw terminal strips |
| Conductor size | 14–22 AWG (2.1–0.38 $mm^2$), 600V, solid, stranded or fused (preferred) |

## Dimensions

Approximate Dimensions in Inches (mm)

### Ambassador Series Totalizer



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## Ambassador Series (Count Control)

### Product Description

Eaton's Ambassador Series provides up to four presets in one of the most noise-immune packages available.

### Features

- AC/DC powered, two-line LCD display
- Eight-digit totalizer
- 1/Tau ratemeter
- Totalizer and ratemeter scaling
- Four user-configurable control inputs
- Up to two output relays
- Two solid-state outputs
- RS-485 serial communications
- Feet/inches control available

### Standards and Certifications

- UL listed
- CE marked

UL Listed

### Product Selection

**57601401**

#### Ambassador Series Count Control

| Description | Catalog Number |
|---|---|
| Single preset with rate, 115 Vac | **57601401** |
| Single preset with rate, batch and totalizer, 115 Vac | **57601402** |
| Dual preset with rate, 115 Vac | **57601403** |
| Dual preset with rate, batch and totalizer, 115 Vac | **57601404** |
| Four preset with rate, batch and totalizer, 10–15 Vdc | **57600405** |
| Four preset with rate, batch and totalizer, 115 Vac | **57601405** |
| Four preset with rate, batch and totalizer, 230 Vac | **57602405** |
| Feet/inches control, 115 Vac | **57601415** |
| Feet/inches control, 230 Vac | **57602415** |

### Technical Data and Specifications

#### General Specifications

| Description | Specification |
|---|---|
| **Power Input** | |
| AC operation | 115 Vac (±15%) std., 50 to 60 Hz, 7W |
| | 230 Vac (±15%) opt., 50 to 60 Hz, 7W |
| DC operation | 10–15 Vdc opt., 300 mA maximum |
| **Power Output** | |
| DC operation | 12 Vdc (±25%), 100 mA maximum (includes all line and load variations) |
| **Environmental** | |
| Operating temperature | 32° to 131°F (0° to 55°C) |
| Storage temperature | –4° to 158°F (–20° to 70°C) |
| Operating humidity | 85% relative, non-condensing |
| NEMA 4 rating | When mounted with gasket provided |
| **Main Counter** | |
| Type | Bi-directional |
| Digits | Six |
| Presets | Varies by model |
| Reset modes | Auto or manual reset to zero or preset |
| Scaler range | 0.00001 to 9.99999 |
| Decimal point | Five positions (six on four-preset models) |
| Output latency | See table on **Page V13-T1-74** |
| **Batch Counter** | |
| Type | Increment with main counter recycle or final preset signal |
| Digits | Six |
| Presets | One |
| Output latency | <1 ms |

## General Specifications, continued

| Description | Specification |
|---|---|
| **Totalizer** | |
| Type | Bi-directional, same or opposite of main counter |
| Digits | Eight |
| Scaler | Shared with main counter |
| Decimal point | Tracks main counter |
| **Count Input Speeds** | |
| See tables on **Page V13-T1-74** | |
| **Count Inputs** | |
| Sink | |
| Impedance | 4.6k ohms to +5 Vdc |
| Voltage | |
| High | 3.5 to 34.0 Vdc |
| Low | 0.0 to 1.9 Vdc |
| Source (high) | |
| Impedance | 2.3k ohms to common |
| Voltage | |
| High | 3.5 to 17.0 Vdc (100% duty cycle) |
| Low | 0.0 to 1.9 Vdc |
| Source (low) | |
| Impedance | 2.3k ohms to common |
| DC voltage | |
| High | 0.6 to 17.0 Vdc |
| Low | –17.0 to –0.6 Vdc |
| AC voltage | 17 Vac (48V peak-peak) maximum |
| **Control Inputs** | |
| Impedance | 4.7k ohms to +5 Vdc |
| Voltage | |
| High | +3.7 to +24 Vdc |
| Low | 0.0 to 0.9 Vdc |
| Response | Minimum low 15 ms, minimum high 15 ms |
| **Relay Outputs** | |
| Type | SPDT contacts |
| UL ratings | 250 Vac, 360V A pilot duty |
| **Transistor Outputs (2)** | |
| Type | NPN open collector with transient protection |
| Maximum voltage (OFF state) | 30 Vdc |
| Maximum current (ON state) | 200 mA at 1.3 Vdc |
| **Communication** | |
| Type | RS-485 |
| Format | 1 start bit, 7 data bits (ASCII), 1 parity bit, 1 stop bit |
| Protocol | Opto-22 compatible |
| Speed | 300, 1200, 2400, 4800, 9600 and 19200 baud |
| Parity | Odd, even, none (space transmitted, ignore received) |
| **Rate Indicator (Not available on models 57601-415 and 57601-485)** | |
| Type | 1/Tau |
| Digits | Six |
| Presets | Two |
| Scaler range | 0.00001 to 99999 |
| Decimal point | Five positions, programmable |
| Accuracy | ±0.015% of reading |
| Update time | See table on **Page V13-T1-74** |
| Zero time | See table on **Page V13-T1-74** |
| **Connections** | |
| Type | Dual depluggable screw terminal strips |
| Conductor size | 14–22 AWG (2.1–0.38 $mm^2$), 600V, solid, stranded, or fused (preferred) |

## Output Latency for Ambassador Control

| Style Number | Output Latency |
|---|---|
| **5760X401** | 0.7 to 2 ms |
| **5760X402** | 0.7 to 2 ms |
| **5760X403** | 0.7 to 2.7 ms |
| **5760X404** | 0.7 to 2.7 ms |
| **5760X405** | <1 ms |
| **5760X415** | <1 ms |

## Rate Indicator Specs for Ambassador Control

| Style Number | Update Time | Zero Time |
|---|---|---|
| **5760X401** | 1 second, fixed | 10 seconds, fixed |
| **5760X402** | 1 second, fixed | 10 seconds, fixed |
| **5760X403** | 1 second, fixed | 10 seconds, fixed |
| **5760X40** | 1 second, fixed | 10 seconds, fixed |
| **5760X405** | 0.1 to 99.9 seconds, programmable | 0.1 to 99.9 seconds, programmable |
| **5760X415** | 0.1 to 999.9 seconds, programmable | 0.1 to 999.9 seconds, programmable |

## Ambassador Count Input Speeds—5760X405, 5760X415 ①

| Solid-State | A or B | A and B |
|---|---|---|
| A – B | 8250/8250 | 3000/3000 |
| A + B | 8250/8250 | 4000/4000 |
| –A + B | 8000/8000 | 3000/3000 |
| A, B Dir | 8000/40 | — |
| 2A, B Dir | 4500/40 | — |
| A, B Rst | 8250 | — |
| Quad x 1 | — | 3250 |
| Quad x 2 | — | 3250 |
| Quad x 4 | — | 2000 |
| Tot A/Cnt B | 14000/9000 | 6500/6500 |
| Tot + Cnt B | 16000/8500 | 6500/6500 |

## Ambassador Count Input Speeds—5760X401, 5760X402, 5760X403, 5760X404

| | Maximum Speed ② | |
|---|---|---|
| **Mode Input A/B** | **Solid-State (High Speed)** | **Contact (Low Speed)** |
| Add/sub | 20 kHz | 40 kHz |
| Add/add | 20 kHz | 40 kHz |
| Count/direction | 15 kHz | 40 kHz |
| Count x 2/direction | 7.5 kHz | — |
| Quadrature | 6.5 kHz | — |
| Quadrature x 2 | 6.5 kHz | — |

***Notes***

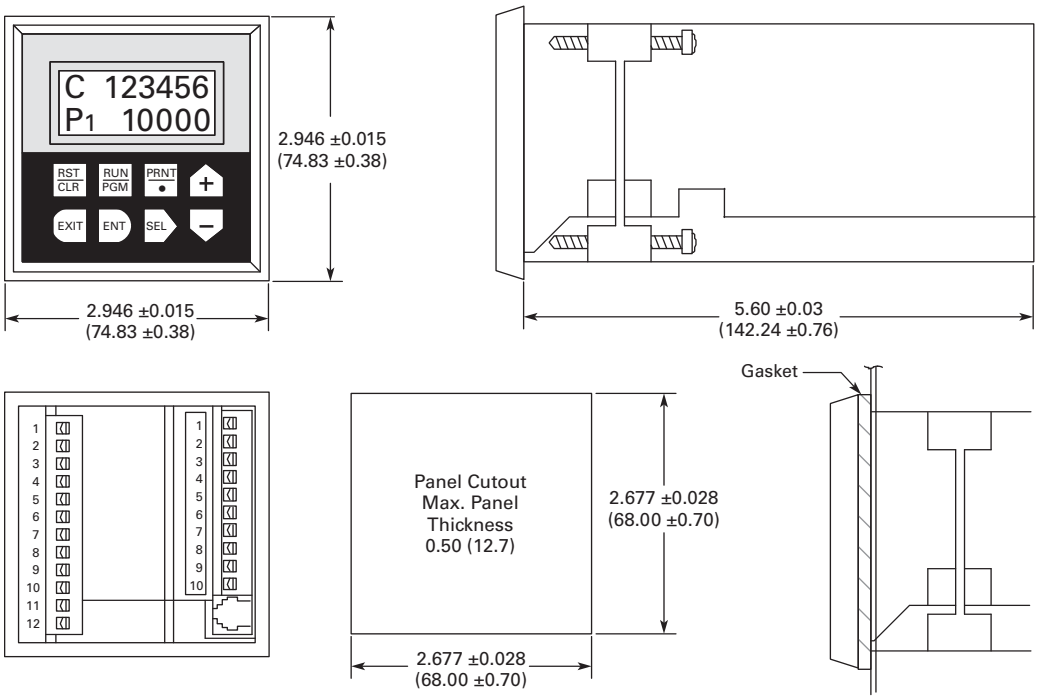
① Contact inputs = 40 Hz; B direction inputs = 40 Hz and B reset input = 10 µS min. low. Input A not active on ft/in control.

② The maximum count speed depends on the selected count mode. All maximum speeds are shown with square waves (50% duty cycle) input.

## Dimensions

Approximate Dimensions in Inches (mm)

### Ambassador Series



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## PD-Q and PD-ER Series

### Product Description

The PD-Q Series is a five-digit, true subtracting electric predetermined counter that features pushbutton operation of both predetermined count settings and reset. The predetermined count is set by holding the RESET button in and then depressing the easy to operate pushbutton selectors under each digit. The unit subtracts, one count for each contact closure or impulse and actuates a 4 ampere, 250 Vac switch when zero is reached.

The output signal from this switch can be used to halt or change the flow of items being counted, and/or operate other electrical apparatus. The counter returns to the predetermined number when the RESET button is depressed and it is immediately ready to control the next lot or batch.

The PD-ER Series is identical to the PD-Q Series, except that it has electric reset (ER) for remote operation, allowing either local or remote use.

### Features

- Easy setpoint adjustment
- Available in base mount or panel mount configurations

### Standards and Certifications

- UL recognized as indicated

### Product Selection

***When Ordering Specify***

When ordering PD-Q and PD-ER Series Predetermined Counters, specify catalog numbers according to the features selected.

**5-Y-41433-*-PD-Q**

**PD-Q and PD-ER Series Predetermined Counters**

| Voltage | Mounting | Wire Leads | Catalog Number | Order Number |
|---|---|---|---|---|
| 12 Vdc | Panel | Rear | **5-Y-41433-401-PD-Q** | **41433401** |
| 24 Vdc | Panel | Rear | **5-Y-41433-402-PD-Q** | **41433402** ① |
| 120 Vac | Panel | Rear | **5-Y-41433-406-PD-Q** | **41433406** ① |
| 240 Vac | Panel | Rear | **5-Y-41433-407-PD-Q** | **41433407** |
| 24 Vac | Panel | Rear | **5-Y-41433-408-PD-Q** | **41433408** |
| 24 Vdc | Base | Rear | **5-Y-41469-402-PD-Q** | **41469402** ① |
| 120 Vac | Base | Rear | **5-Y-41469-406-PD-Q** | **41469406** ① |
| 240 Vac | Base | Rear | **5-Y-41469-407-PD-Q** | **41469407** |
| 24 Vdc | Base | Side | **5-Y-41470-402-PD-Q** | **41470402** ① |
| 120 Vac | Base | Side | **5-Y-41470-406-PD-Q** | **41470406** ① |
| 240 Vac | Base | Side | **5-Y-41470-407-PD-Q** | **41470407** |
| 24 Vdc | Panel | Rear | **5-Y-41625-402-PD-ER** | **41625402** ① |
| 120 Vac | Panel | Rear | **5-Y-41625-406-PD-ER** | **41625406** ① |
| 240 Vac | Panel | Rear | **5-Y-41625-407-PD-ER** | **41625407** |

***Note***

① UL recognized.

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## Technical Data and Specifications

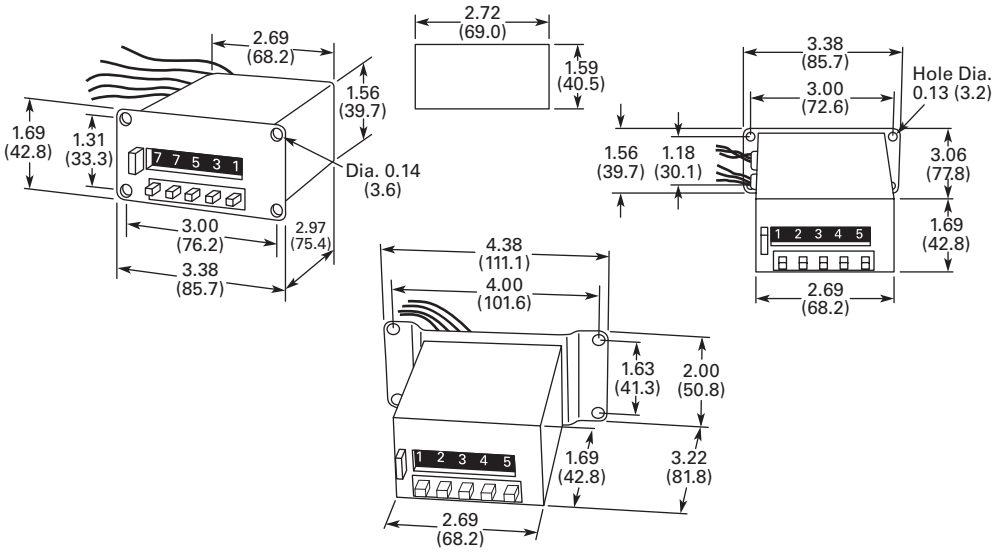
### General Specifications

| Description | Specification |
|---|---|
| Number of digits | Five |
| Speed | 1000 cpm |
| Window | Acrylic |
| Shaft | Stainless steel |
| Frame | Zinc alloy die cast |
| Digit size | 3/16 in high by 7/64 in wide (4.8 x 2.8 mm) |
| Weight | |
| Series PD-Q | 0.53 lb (0.24 kg) |
| Series PD-ER | 1.06 lb (0.48 kg) |
| Finish | Dull Instrument black with red RESET button |
| Power consumption | |
| Series PD-Q | 9 watts |
| Series PD-ER | Count coil 9 watts, reset coil 20 watts |
| Switch rating | SPDT, 4 amperes at 250 Vac |

## Dimensions

Approximate Dimensions in Inches (mm)

### PD-Q and PD-ER Series



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**Tachometers/Ratemeters**

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| Product Selection Guide | **V13-T1-79** |
| Courier Series | **V13-T1-80** |
| Eclipse Series | **V13-T1-82** |
| Ambassador Series | **V13-T1-85** |


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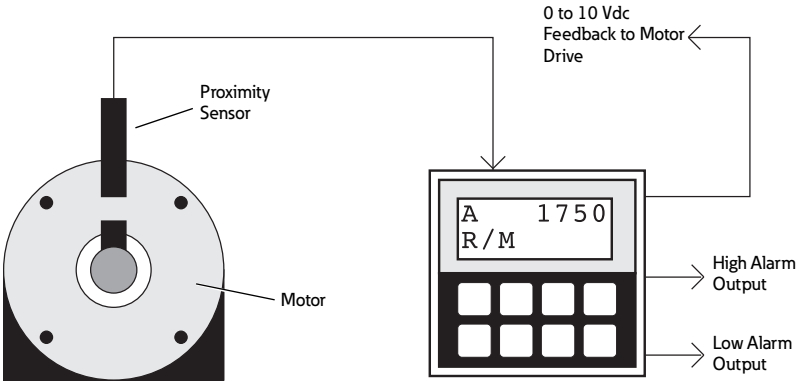
## Product Overview

Ratemeters are used in a variety of applications where it is necessary to monitor the speed of a process. Conveyors, baking ovens, material flow and motor speed are typical uses for ratemeters. Models with alarm outputs can be used to detect high or low rates. Rate indicators are often included as a standard feature on totalizers and count controls.

## Typical Application

One of the most common ratemeter applications is a tachometer. A tachometer displays motor or shaft RPM. The inductive proximity sensor detects the key on the shaft and the meter calculates the rate at which the shaft is turning based on a user-defined scaling factor. Signals from encoders, mag pickups, Hall effect sensors, etc. may also be used as inputs.

### Application Example



## Product Selection Guide

### Tachometers/Ratemeters

| | Characteristics | Panel Cutout in Inches (mm) | Page |
|---|---|---|---|
| **E5-_24-E** | Compact device with bright, LED display<br>Multiple functions available: count, time, rate, multifunction, double-function<br>24 Vdc Power | 0.870 x 1.772 (22 x 45) | **V13-T1-44** |
| **E5-496-E** | Economical, multifunction display<br>Large, LED characters<br>AC or DC power options | 1.772 x 3.780 (45 x 96) | **V13-T1-49** |
| **President** | Bright LED display with 14 mm characters<br>Simple configuration with 14-button tactile keypad<br>Many different versions fit almost any application | 2.667 x 5.433 (68 x 138) | **V13-T1-60** |
| **E5-148-C** | Low cost, simple count control<br>Various power options: battery, AC, DC<br>Easy-to-change preset values<br>Two-line display: input and preset values | 1.772 x 1.772 (45 x 45) | **V13-T1-53** |
| **Courier** | Replaceable lithium battery<br>Eight-digit, high-visibility LCD display<br>Optional backlighting<br>Various input options available | 1.299 x 2.677 (33 x 68) | **V13-T1-80** |
| **Eclipse** | Six-digit, super bright LED display<br>Multiple models available: totalizers, ratemeters, count controls, digital panel meters and flow controls | 1.772 x 3.780 (45 x 96) | **V13-T1-82** |
| **Ambassador** | Six-digit, high-visibility, two-line LCD display<br>User-configurable control inputs<br>Highly flexible control/display | 2.667 x 2.667 (68 x 68) | **V13-T1-85** |
| **Fusion** | Integrated controller combines operator interface, ladder logic and high-speed counting | 2.667 x 5.433 (68 x 138) | **V13-T1-119** |

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## Courier Series

### Product Description

Eaton's Courier Series is powered by a replaceable lithium battery.

### Features

- 1/Tau ratemeter
- Scaling capabilities
- Remote reset terminal
- 0.43 in (10.9 mm) display
- Front panel reset
- NEMA 4X

### Standards and Certifications

- CE marked

CE

### Product Selection

**Courier Series**

**LCD 1/Tau Ratemeter** ①

| Description | Catalog Number |
|---|---|
| Battery | **53300404** |
| Extended temperature range, battery | **53301404** |
| Backlight, battery | **53302404** |

### Technical Data and Specifications

#### General Specifications

| Description | Specification |
|---|---|
| **Power** | |
| Internal battery | 3V, Lithium |
| Life expectancy | 5 years + |
| Replacement part | 35367-202 |
| **Backlight** | |
| Backlight | 10–30 Vdc at 30 mA max. ② |
| | Reverse polarity protected |
| **Physical** | |
| Operating temperature | |
| Model 53300-404 | 32° to 131°F (0° to 55°C) |
| Model 53301-404 | –4° to 158°F (–20° to 70°C) |
| Model 53302-404 | 32° to 131°F (0° to 55°C) |
| Storage temperature | –4° to 158°F (–20° to 70°C) |
| Operating humidity | 60% RH (non-condensing) |
| Weight | 2.2 oz. (62g) net |
| Display size | 0.43 in (10.9 mm) high |
| Front panel rating | NEMA 4X when mounted with gasket provided |
| Case material | Cycolac X-17 |
| **Rate Indicator** | |
| Type | 1/Tau |
| Digits | 4/5 (four calculated, five displayed with fixed 0 in LSD) |
| Scaler range | 0.001 to 9999 |
| Decimal point | Five positions, programmable |
| Accuracy | ±0.2% |
| Update time | 0.7 seconds |
| Zero time | 10 seconds |

***Notes***

① For units with rate and total, see Totalizers.
② Derate operating temperature 1°C/Volt above 17 Vdc.

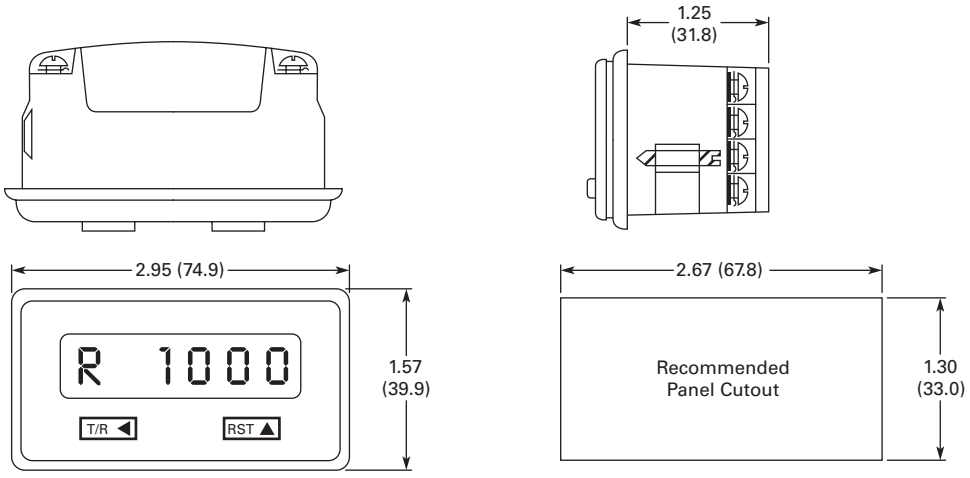
## General Specifications, continued

| Description | Specification |
|---|---|
| **DC Common (Terminal 1) Rate Inputs** | |
| Input B (terminal 2) low speed input designed for contact closures to DC common | |
| Speed | 0 to 20 Hz |
| Min. low time | 10 ms |
| Min. high time | 40 ms |
| Input impedance | 101k ohm |
| Voltage thresholds | |
| Low | 0–0.4 Vdc |
| High | 2.0–28 Vdc |
| Max. high | 28 Vdc |
| Input A (terminal 3) high speed input requiring a voltage source such as a current sourcing sensor or a current sinking sensor used with the provided pull up resistors | |
| Speed | 0 to 10 Hz ① |
| Min. low time | 80 ms ① |
| Min. high time | 20 ms ① |
| Input impedance | 2k ohms above 5 Vdc |
| Voltage thresholds | |
| Low | 0–1.2 Vdc |
| High | 2.0–28 Vdc |
| Max. high | 28 Vdc |
| **Programmable Enable Input (Terminal 5)** | |
| Operation | Level sensitive (maintained) |
| **Count Accuracy** | |
| Operated within specifications | 100% |

## Dimensions

Approximate Dimensions in Inches (mm)

### Courier Series Ratemeter




***Note***

① Times are with a 0–5.0V swing.

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## Eclipse Series

### Product Description

Eaton's Eclipse Series offers a high visibility LED and a variety of optional outputs.

### Features

- 1/8 DIN cutout
- NEMA 4X front panel
- Universal AC power supply (85–265 Vac)
- DC power modules (9–30 Vdc)
- Removable screw terminals
- Short depth: 3.6 in (91 mm)
- Front panel programming

### Standards and Certifications

- UL and cUL listed
- CE marked

UL Listed c UL Listed CE

### Product Selection

**57700470**

#### Eclipse Series Five-Digit LED Ratemeter

| Description | Catalog Number |
|---|---|
| 9–30 Vdc | **57700470** |
| 9–30 Vdc, alarms | **57700471** |
| 9–30 Vdc, analog out | **57700472** |
| 9–30 Vdc, alarms, analog out | **57700473** |
| 9–30 Vdc, RS-485 | **57700474** |
| 9–30 Vdc, alarms, RS-485 | **57700475** |
| 9–30 Vdc, alarms, analog out, RS-485 | **57700477** |
| 85–265 Vac | **57701470** |
| 85–265 Vac, alarms | **57701471** |
| 85–265 Vac, analog out | **57701472** |
| 85–265 Vac, alarms, analog out | **57701473** |
| 85–265 Vac, RS-485 | **57701474** |
| 85–265 Vac, alarms, RS-485 | **57701475** |
| 85–265 Vac, analog out, RS-485 | **57701476** |
| 85–265 Vac, alarms, analog out, RS-485 | **57701477** |

### Technical Data and Specifications

#### General Specifications

| Description | Specification |
|---|---|
| **Input Power** | |
| AC powered models (57701-4XX) | |
| Input power | 85–265 Vac, 47–63 Hz, 20V A |
| External fuse | 0.2A, 250 Vac, time delay (T200 mA, 250V) |
| Isolation dielectric strength | 2300 Vac |
| DC powered models (57700-4XX) | |
| Input power | 9–30 Vdc, 12 VA |
| External fuse | 2.0A, 50 Vdc, time delay, (T2A, 50V) |
| Reverse voltage protection | Yes |
| Isolation dielectric strength | 2300 Vac to signal inputs and relays, 500 Vac to RS-485 and analog outputs |
| **Human Interface** | |
| Display | Five digits |
| Type | 0.56 in high, seven segment, red LED |
| Indicator | One red LED program/calibration indicator |
| Update time | 0.1 to 99.9 seconds minimum |

## General Specifications, continued

| Description | Specification |
|---|---|
| **Data Retention** | |
| Memory type | EEPROM, no batteries required |
| Duration | 100 years |
| **Signal Input** | |
| Rate/process time | Signal in |
| Sensor type | Sink or source, DIP switch selectable |
| Input impedance | 4.75k ohms to +5 Vdc or 34.9k ohms to ground |
| Thresholds | |
| High | 3.5 to 28 Vdc |
| Low | 0 to 1.9 Vdc, for single ended signals |
| Magnetic pickup range | 200 mV p-p to 65V rms into 34.9k ohms |
| Frequency response | 200 Hz max. or 10 kHz max. (5V signals), DIP switch selectable |
| **Program Enable Input** | |
| Sensor type | Sink only |
| Input impedance | 4.75k ohms to +5 Vdc |
| Thresholds | |
| High | 3.5 to 28 Vdc |
| Low | 0 to 1.9 Vdc |
| Response | 25 ms max. (5V signal) |
| **Accessory Power Output** | |
| Voltage | 12 Vdc ±12% |
| Current | 75 mA max. |
| Protection | Short-circuit protected |
| **Optional Outputs** | |
| Relay board | |
| Number of relays | Two |
| Contact type | 1 set Form C per relay |
| Contact rating | 5A, 250 Vac or 30 Vdc |
| Isolation dielectric strength | 2300 Vac |
| Analog retransmission | |
| Output signals | 4–20 mA (<750 ohms) and 0–10V (>2500 ohms) |
| Accuracy | 0.13% full scale and 100 PPM/°C (and 0.07% full scale change over 4–20 mA load ranges) |
| Isolation dielectric strength | 2300 Vac to signal inputs, relays and AC power inputs; 500 Vac to RS-485 and DC power inputs |
| RS-485 serial communications | |
| Baud rate | 1200, 2400, 4800, 9600, or 19,200, programmable |
| Parity | Even, odd or no parity |
| Address range | 00 to 99 decimal |
| Protocol | Opto 22® compatible |
| Isolation dielectric strength | 2300 Vac to signal inputs, relays and AC power inputs; 500 Vac to analog outputs and DC power inputs |
| **Environmental** | |
| Operating environment | Indoor use to 2000 meters |
| Temperature | |
| Operating | 32° to 122°F (0° to 50°C) |
| Storage | –4° to 158°F (–20° to 70°C) |
| Humidity | 0 to 85% RH, non-condensing |
| Vibration | 2.5 Gs, 30 to 200 Hz |
| Shock | 30 Gs, 11 ms half sinewave |
| EMC | Immunity to EN 50082-2 (heavy industrial) |
| | Emissions to EN 50081-2 (heavy industrial) |
| Front panel | NEMA 4X when mounted with gasket provided |
| CE EMC immunity and emissions requirements | Met using shielded wiring on the RS-485, analog output and pulse input/ power lines. The shields were connected to earth ground at the Eclipse end of the shields. |
| Pollution degree 2 | Overvoltage Category II |

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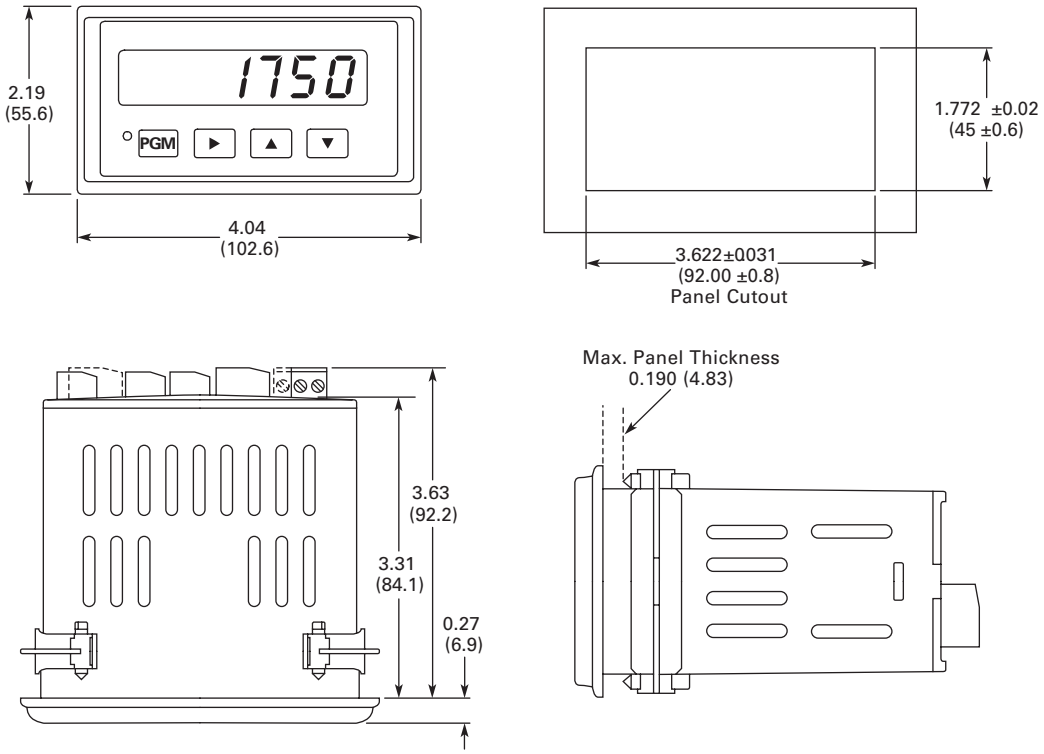
## Dimensions

Approximate Dimensions in Inches (mm)

### Eclipse Series Ratemeter



## Ambassador Series

### Product Description

Eaton's most noise-immune ratemeter with an easy-to-read two-line LCD.

### Features

- AC/DC powered, two-line LCD display
- Two-line, five-digit, high visibility, 0.3 in (7.5 mm) characters, backlit display
- One or two rate inputs
- Two rate alarms
- Dual rate unit ratio calculations—A/B, A-B or draw
- Programmable average and zero times
- Programmable decimal point
- 12 Vdc, 100 mA max. output power
- Removable screw terminals
- RS-485 communications
- NEMA 4 front panel

### Standards and Certifications

- UL and cUL listed
- CE marked

UL Listed  cUL Listed  CE

### Product Selection

**57150400**

#### Ambassador Series Ratemeter

| Description | Catalog Number |
|---|---|
| **Single Input** | |
| LCD rate indicator, 2 rate alarms, 10–15 Vdc | **57150400** |
| LCD rate indicator, 2 rate alarms, 115 Vac | **57151400** |
| LCD rate indicator, 2 rate alarms, 230 Vac | **57152400** |
| **Dual Input** ① | |
| Rate/ratio/draw with alarms and analog out, 10–15 Vdc | **57150405** |
| Rate/ratio/draw with alarms and analog out, 115 Vac | **57151405** |
| Rate/ratio/draw with alarms and analog out, 230 Vac | **57152405** |

### Technical Data and Specifications

#### General Specifications

| Description | Specification |
|---|---|
| **Power Input** | |
| Model 57150-40X | 10 to 15 Vdc, 300 mA maximum |
| Model 57151-40X | 115 Vac (±15%) 50–60 Hz, 7W |
| Model 57152-40X | 230 Vac (±15%) 50–60 Hz, 7W |
| **DC Power Output (AC Models Only)** | |
| Output | 12 Vdc (±25%), 100 mA maximum (includes all line and load variations) |
| **Environment** | |
| Operating temperature | 32° to 131°F (0° to 55°C) |
| Storage temperature | –4° to158°F (–20° to 70°C) |
| Operating humidity | 85% relative, non-condensing |
| NEMA 4 rating | When mounted with gasket provided |
| **Ratemeter** | |
| Type | 1/Tau |
| Digits | Five with overrange indication |
| Scaler range | 0.00001 to 99999 |
| Decimal point | Five positions, programmable |
| Average time | 0.1 to 99.9 seconds, programmable |
| Zero time | 0.1 to 99.9 seconds, programmable |
| Accuracy | ±0.015% of reading |

***Note***

① The accuracy of the ratio calculation is dependent upon the resolution of the displayed rates, which are calculated as rounded integers. The ratio calculation treats the displayed rate as integers and the result is displayed as a rounded integer. A and B scalers should be adjusted for maximum resolution.

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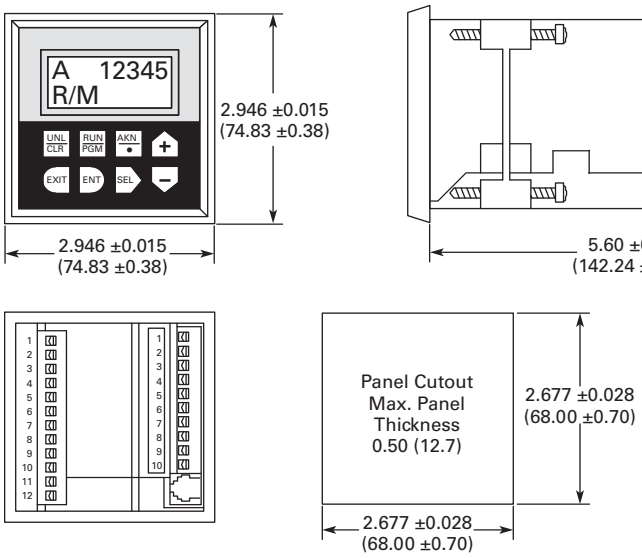
## General Specifications, continued

| | |
|---|---|
| **Maximum Rate Input Frequencies** | |
| Maximum frequencies | All maximum frequencies listed are with a square wave input (50-50 duty cycle) |
| **Contact Input** | |
| Contact input | 40 Hz |
| **Solid-State Input** | |
| Sinking sensor (all DIPs off) | 7.3 kHz |
| Sourcing sensor (push-pull output) | |
| High threshold (DIPs 1 and 2 on, 3 and 4 off) | 0–5V, single input 50 kHz |
| | 0–5V, two inputs 30 kHz (each input) |
| | 0.5–4.5V, single input 40 kHz |
| | 0.5–4.5V, two inputs 30 kHz (each input) |
| | 0–15V, two inputs 22 kHz (each input) |
| Low threshold (all DIPs on) | –1 to +1V, single input 27 kHz |
| | –2 to +2V, single input 43 kHz |
| | ≤–3 to ≥+3V, single input 60 kHz |
| | ≤–2 to ≥+2V, two inputs 30 kHz (each input) |
| **Rate Inputs** | |
| Sink | |
| Impedance | 4.6k ohms to +5 Vdc |
| Voltage | High 3.5 to 34.0, low 0.0 to 1.9 Vdc |
| Source (high) | |
| Impedance | 2.3k ohms to common |
| Voltage | High 3.5 to 17.0 Vdc, low 0.0 to 1.9 Vdc |
| Source (low) | |
| Impedance | 2.3k ohms to common |
| DC voltage | High 0.63 to 17.0 Vdc, low –17.0 to –0.6 Vdc |
| AC voltage | 17 Vac (48V peak-peak) maximum |
| **Control Inputs** | |
| Impedance | 4.7k ohms to +5 Vdc |
| Voltage | High +3.7 to +24 Vdc, low 0.0 to 0.9 Vdc |
| Response | Min, low 15 ms, min, high 15 ms |
| **Transistor Outputs (x2 for 5715X-401; x4 for 5715X-405)** | |
| Type | NPN open collector with transient protection |
| Max. voltage (OFF state) | 30 Vdc |
| Max. current (ON state) | 200 mA at 1.3 Vdc |
| **Communication** | |
| Type | RS-485 |
| Format | One start bit, seven data bits (ASCII), one parity bit, one stop bit |
| Protocol | Opto-22® compatible |
| Speed | 300, 1200, 2400, 4800, 9600, 19200 baud |
| Parity | Odd, even, none (space transmitted, ignore received) |
| **Analog Output (Models 5715X-401 Only)** | |
| Range | 0–10 Vdc ± 0.2% at 5 mA |
| DAC resolution | 12 bit |
| **Connections** | |
| Type | Dual depluggable screw terminal strips |
| Conductor size | 14–22 AWG (2.1–0.38 $mm^2$), 600V, solid, stranded or fused (preferred) |

## Dimensions

Approximate Dimensions in Inches (mm)

### Ambassador Series Ratemeters



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**Digital Panel Meters**

## Contents


| *Description* | *Page* |
|---|---|
| Count Controls/Preset Counters | |
| E5-324-E Series | **V13-T1-89** |
| Eclipse Series | **V13-T1-91** |


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## Product Overview

Digital Panel Meters are found anywhere a process variable needs to be indicated. Volts, current, pressure, volume, temperature and frequency are typical applications. The product's short depth makes it flexible and accommodating to panel builder needs. A variety of input and output options allows DPMs to be used virtually anywhere.

### Typical Application

- Monitor current draw from motor to identify potential failures
- Display pressure reading from transducer with high-pressure alarm
- Display system voltage and detect under voltage or over voltage conditions

## Product Selection Guide

### Digital Panel Meters

| | Characteristics | Panel Cutout in Inches (mm) | Page |
|---|---|---|---|
| **E5-324-E** | Bright, easy-to-read LED in 1/32 DIN package<br>Programmable scaling of inputs<br>Input for display-hold<br>24 Vdc power | 0.870 x 1.772 (22 x 45) | **V13-T1-89** |
| **Eclipse** | Six-digit, super bright LED display<br>Multiple models available: DC voltage, AC voltage, DC current, AC current, 5A AC current, 4–20 mA/0–10V process meter<br>Various output options including relay, analog and RS-485 | 1.772 x 3.780 (45 x 96) | **V13-T1-91** |

## E5-324-E Series

### Product Description

Eaton's most compact panel meter provides an easy-to-read LED in a very small package.

### Features

- Galvanic isolation with protection against incorrect polarity
- Automatic MIN/MAX value detection
- Freely programmable characteristic curve end points
- Input Range—
  - Single current measuring input (0/4–20 mA)
  - Single voltage measuring input (0/2–10V)
- Compact display for analog standard signals
- Display range –19.999 to 99.999 with zero blanking
- Modern industrial design
- Input for display-hold

### Standards and Certifications

- UL recognized
- CE marked

### Product Selection

**E5-324-E0402**

**E5-324-E0402 Digital Panel Meter**

| Description | Catalog Number |
|---|---|
| LED digital panel meter, 24 x 48 mm | **E5-324-E0402** |

### Technical Data and Specifications

#### General Specifications

| Description | Specification |
|---|---|
| Supply voltage | 10–30 Vdc, galvanically isolated with integrated protection against incorrect polarity |
| Current consumption | Max. 50 mA |
| Display | Five-digit display, red seven-segment LEDs; 0.31 in (8 mm) high |
| Measuring rate | Two measurements/second |
| Data backup | EEPROM |
| Housing | Housing for control panel 1.898 x 0.94 in (48 x 24 mm); acc. to DIN 43 700, RAL 7021, dark gray |
| Ambient temperature | 14° to 122° F (–10° to 50°C) |
| EMC | According to EC EMC directive 89/36/EEC |
| Interference emissions | EN 61 000-6-4/EN 55011 Class B |
| Interference resistance | EN 61 000-6-2 |
| Protection | IP65 (front) |
| Input current measurement | 0–20 mA, 4–20 mA, voltage drop max. 1.5 Vdc |
| Input voltage measurement | 0–10V, 2–10V |
| Input resistance approx. | 1M ohm |
| Max. input signal level | 30 Vdc |
| Control inputs | |
| High | 4–30 Vdc |
| Low | 0–2 Vdc |
| Resolution | 14 bits |
| Error | <0.1% for the whole measuring range at an ambient temperature of 68°F (20°C) |
| Weight: Approx | 1.76 oz (50g) |
| Connection technique | Screw terminal, pitch 0.2 in (5.08 mm), seven-poles |

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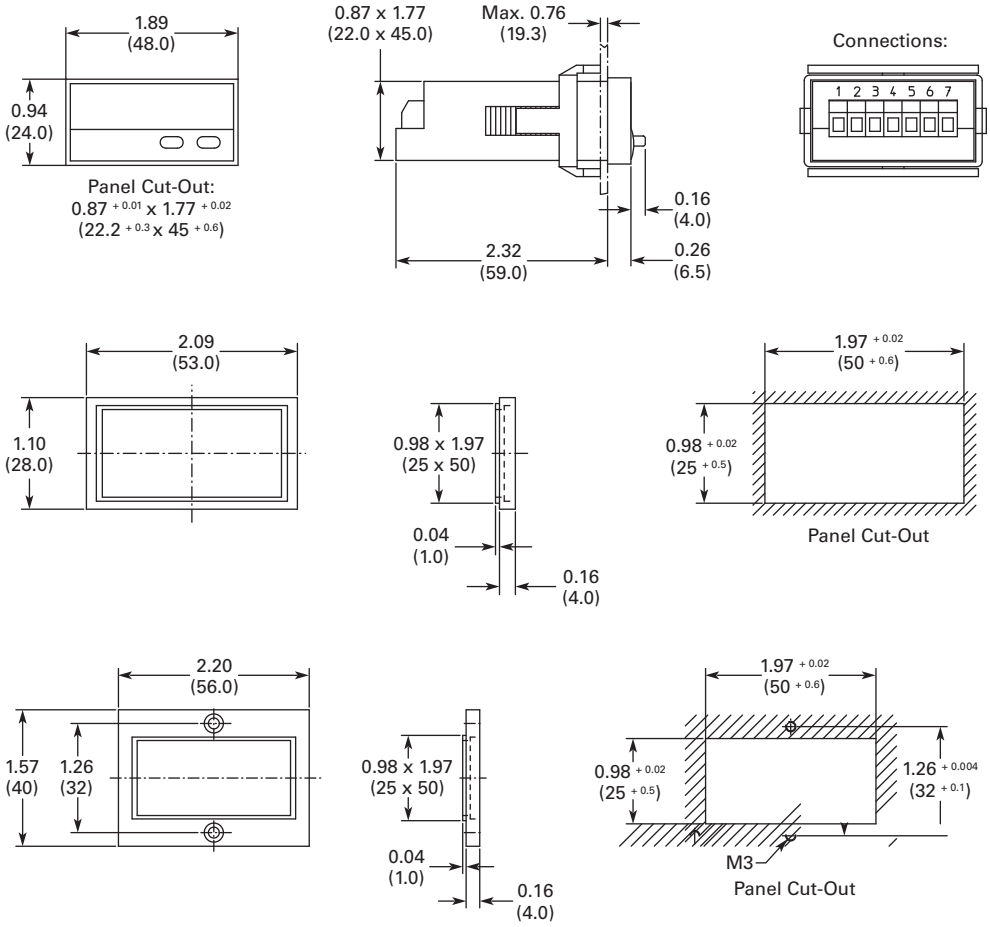
## Dimensions

Approximate Dimensions in Inches (mm)

### E5-324-E Series



## Eclipse Series

### Product Description

Eaton's Eclipse Series panel meter features a high-visibility LED and is available with a variety of input and scaling options.

### Features

- Four full digits
- 1/8 DIN Size
- Red, LED display
- 0.56 in (14 mm) high characters
- Scalable display
- Flashing alarms
- Maximum/minimum data hold
- Optional analog, relay and RS-485 outputs
- NEMA 4X
- Depluggable terminal blocks

### Standards and Certifications

- UL and cUL listed
- CE marked

UL Listed  cUL Listed  CE

### Eclipse Series Panel Meter

### Catalog Number Selection

#### Eclipse Series

5770 X – 4 X X

**Power Supply**

| |
|---|
| **0** = DC (9–30 Vdc) |
| **1** = AC (85–265 Vac) |

**Input Option**

| | |
|---|---|
| **0** = DC volt | **4** = 5A AC TRMS |
| **1** = AC volt TRMS | **5** = Process (4–20 mA, 0–10V, 1–5V) |
| **2** = DC amp | **6** = Temperature (J, K, T, PT100 RTD) |
| **3** = AC amp TRMS | |

**Output Option** ①

| |
|---|
| **0** = No option |
| **1** = Dual relay |
| **2** = Analog output (4–20 mA and 0–10V) |
| **3** = Dual relay, analog output (4–20 mA and 0–10V) |
| **4** = RS-485 communications |
| **5** = Dual relay, RS-485 |
| **6** = Analog, RS-485 (4–20 mA and 0–10V) |
| **7** = Dual relay, analog, RS-485 (4–20 mA and 0–10V) |

***Note***

① Output options 0, 2, 4 are not available for models -41X and -43X.

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## Product Selection

**Eclipse Series Panel Meter**

### Eclipse Digital Panel Meter

| Description | Catalog Number |
|---|---|
| 9–30 Vdc, DC volt | **57700400** |
| 9–30 Vdc, DC volt, relay out | **57700401** |
| 9–30 Vdc, DC volt, analog out | **57700402** |
| 9–30 Vdc, DC volt, relay out, analog out | **57700403** |
| 9–30 Vdc, DC volt, RS-485 | **57700404** |
| 9–30 Vdc, DC volt, RS-485, relay out | **57700405** |
| 9–30 Vdc, AC volt, relay out, analog out | **57700413** |
| 9–30 Vdc, DC amp | **57700420** |
| 9–30 Vdc, DC amp, relay out | **57700421** |
| 9–30 Vdc, DC amp, analog out | **57700422** |
| 9–30 Vdc, AC amp, relay out | **57700431** |
| 9–30 Vdc, 5A AC | **57700440** |
| 9–30 Vdc, 5A AC, relay out | **57700441** |
| 9–30 Vdc, 5A AC, analog out | **57700442** |
| 85–265 Vac, DC volt | **57701400** |
| 85–265 Vac, DC volt, relay out | **57701401** |
| 85–265 Vac, DC volt, analog out | **57701402** |
| 85–265 Vac, DC volt, analog out, relay out | **57701403** |
| 85–265 Vac, DC volt, RS-485 | **57701404** |
| 85–265 Vac, DC volt, RS-485, relay out | **57701405** |
| 85–265 Vac, AC volt | **57701410** |
| 85–265 Vac, AC volt, relay out | **57701411** |
| 85–265 Vac, AC volt, analog out | **57701412** |
| 85–265 Vac, AC volt, relay out, analog out | **57701413** |
| 85–265 Vac, AC volt, RS-485, analog out, relay out | **57701417** |
| 85–265 Vac, DC amp | **57701420** |
| 85–265 Vac, DC amp, relay out | **57701421** |
| 85–265 Vac, DC amp, analog out | **57701422** |
| 85–265 Vac, DC amp, relay out, analog out | **57701423** |
| 85–265 Vac, DC amp, RS-485, analog out, relay out | **57701427** |
| 85–265 Vac, AC amp | **57701430** |
| 85–265 Vac, AC amp, relay out | **57701431** |
| 85–265 Vac, AC amp, analog out | **57701432** |
| 85–265 Vac, AC amp, analog out, relay out | **57701433** |
| 85–265 Vac, AC amp, RS-485 | **57701434** |
| 85–265 Vac, 5A AC | **57701440** |
| 85–265 Vac, 5A AC, relay out | **57701441** |
| 85–265 Vac, 5A AC, analog out | **57701442** |
| 85–265 Vac, 5A AC, analog out, relay out | **57701443** |
| 85–265 Vac, 5A AC, RS-485, analog out | **57701446** |

## Eclipse Process

| Description | Catalog Number |
|---|---|
| 9–30 Vdc | **57700450** |
| 9–30 Vdc, relay out | **57700451** |
| 9–30 Vdc, analog out | **57700452** |
| 9–30 Vdc, relay out, analog out | **57700453** |
| 9–30 Vdc, RS-485 | **57700454** |
| 85–265 Vac | **57701450** |
| 85–265 Vac, relay out | **57701451** |
| 85–265 Vac, analog out | **57701452** |
| 85–265 Vac, analog out, relay out | **57701453** |
| 85–265 Vac, RS-485 | **57701454** |
| 85–265 Vac, RS-485, relay out | **57701455** |
| 85–265 Vac, RS-485, analog out | **57701456** |
| 85–265 Vac, relay out, analog out, RS-485 | **57701457** |

## Eclipse Temperature

| Description | Catalog Number |
|---|---|
| 9–30 Vdc | **57700460** |
| 9–30 Vdc, relay out | **57700461** |
| 9–30 Vdc, relay out, analog out | **57700463** |
| 85–265 Vac | **57701460** |
| 85–265 Vac, relay out | **57701461** |
| 85–265 Vac, analog out | **57701462** |
| 85–265 Vac, relay out, analog out | **57701463** |
| 85–265 Vac, RS-485 | **57701464** |
| 85–265 Vac, RS-485, analog out, relay out | **57701467** |

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## Technical Data and Specifications

### General Specifications

| Description | Specification |
|---|---|
| **Input Power** | |
| AC powered models (57751-4XX) | |
| Input power | 85–265 Vac, 47–63 Hz, 20 VA |
| External fuse | 0.2A, 250 Vac, time delay (T200 mA, 250V) |
| Isolation dielectric strength | 2300 Vac |
| DC powered models (57750-4XX) | |
| Input power | 9-30 Vdc, 12 VA |
| External fuse | 2.0A, 50 Vdc, time delay (T2A, 50V) |
| Reverse voltage protection | Yes |
| Isolation dielectric strength | 2300 Vac to signal inputs and relays, 500 Vac to RS-485 and analog outputs |
| **Human Interface** | |
| Display | ±4 full digits |
| Type | 0.56 in (14 mm) high, seven segment, red LED |
| Update time | 0.4 seconds |
| Alarm | Flashing display |
| Indicator | One red LED program/calibration indicator with max./min. capture and hold |
| **Data Retention** | |
| Memory type | EEPROM, no batteries required |
| Duration | 100 years |
| **Signal Input** | |
| DC voltage models (5770X-40X) | |
| Range | ±199.9m Vdc, ±1.999 Vdc, ±19.99 Vdc, ±199.9 Vdc, DIP switch selectable |
| Impedance | 1M ohm |
| Overrange | 750 Vdc/530 Vac except 220 Vdc/Vac on 199.9 mV range |
| Accuracy | ±0.1% of reading, ±0.03% FS, ±0.5 digit, and ±80 PPM/°C |
| AC voltage models (5770X-41X) | |
| Range | 199.9 m Vac, 1.999 Vac, 19.99 Vac, 199.9 Vac, DIP switch selectable, all ranges true rms |
| Frequency | 40 to 1000 Hz |
| Impedance | 1M ohm (capacity coupled) |
| Overrange | 750 Vdc/530 Vac except 220 Vdc/Vac on 199.9 mV range |
| Accuracy | ±0.5% of reading, ±0.13% FS, ±0.5 digit, ±180 PPM/°C for crest factor = 1; plus ±0.7% for crest factor = 1 to 3; and ±2.5% for crest factor = 5 |
| DC current models (5770X-42X) | |
| Range | ±199.9 µA DC, ±1.999 mA DC, ±19.99 mA DC, ±199.9 mA DC, DIP switch selectable |
| Impedance | 199.9 mV/selected range |
| Overrange | 30 mA (199.9 µA range), 100 mA (1.999 mA range), 300 mA (19.99 mA range), 1A (199.9 mA range) |
| Accuracy | ±0.1% of reading, ±0.03% FS, ±0.5 digit, and ±120 PPM/°C |
| AC current models (5770X-43X) | |
| Range | 199.9 µA AC, 1.999 mA AC, 19.99 mA AC, 199.9 mA AC, DIP switch selectable, all ranges true rms |
| Frequency | 40 to 1000 Hz |
| Impedance | 199.9 mV/selected range (shunt output capacitive coupled) |
| Overrange | 30 mA (1199.9 µA range), 100 mA (1.999 mA range), 300 mA (19.99 mA range), 1A (199.9 mA range) |
| Accuracy | ±0.5% of reading, ±0.13% FS, ±0.5 digit, and ±200 PPM/°C for crest factor = 1; plus ±0.7% for crest factor = 1 to 3; and ±2.5% for crest factor = 5 |

## General Specifications, continued

| Description | Specification |
|---|---|
| **Signal Input, continued** | |
| 5A AC models (5770X-44X) | |
| Range | 5A AC, true rms |
| Frequency | 40 to 1000 Hz |
| Impedance | 0.02 ohm (shunt output capacitive coupled) |
| Overrange | 10A maximum |
| Accuracy | ±0.4% of reading, ±0.13% FS, ±0.5 digit, and ±200 PPM/°C for crest factor = 1; plus ±0.7% for crest factor = 1 to 3; and ±2.5% for crest factor = 5 |
| Process models (5770X-45X) | |
| Range | 4–20 mA DC, 0–10 Vdc, 1–5 Vdc; separate input terminals for voltage and current signals |
| Impedance | 100 ohms (current input) and 1.27M ohms (voltage input) |
| Overrange | 50 mA maximum (current input) and 100V maximum (voltage input) |
| Power output | 24 Vdc ±10%, 90 mA max, short-circuit protected |
| Accuracy | ±0.1% of reading, ±0.03% FS, ±0.5 digit, and ±80 PPM/°C |
| **Optional Outputs** | |
| Relay board | |
| Dual relay | 1 set of Form C contacts each |
| Contact rating | 5A, 250 Vac or 30 Vdc |
| Isolation dielectric strength | 2300 Vac |
| Analog retransmission | |
| Output signals | 4–20 mA (<750 ohms) and 0–10V (>2500 ohms) |
| Accuracy | 0.13% FS, 100 PPM/°C, 0.07% FS change with 4–20 mA load, ±0.3% FS for 4–20 mA output, only after exposure to 85% relative humidity |
| Isolation dielectric strength | 2300 Vac to signal inputs, relays and AC power input; 500 Vac to RS-485 and DC power inputs |
| RS-485 serial communication | |
| Baud rate | 1200, 2400, 4800, 9600 or 19,200, programmable |
| Parity | Even, odd or no parity |
| Address range | 00 to 99 decimal |
| Protocol | Opto 22® compatible |
| Isolation dielectric strength | 2300 Vac to signal inputs, relays, and AC power input; 500 Vac to analog outputs and DC power inputs |
| **Environmental** | |
| Operating environment | Indoor use to 2000 meters |
| Temperature | |
| Operating | 32° to 122°F (0° to 50°C) |
| Storage | –4° to 158°F (–20° to 70°C) |
| Humidity | 0 to 85% RH, non-condensing |
| Vibration | 2.5 Gs, 30 to 200 Hz |
| Shock | 30 Gs, 11 ms half sinewave |
| EMC/EMI | Per EN 61326-1 industrial |
| Front panel | NEMA 4X when mounted with gasket provided |
| Agency approval | CE EMC immunity and emissions requirements were met using shielded wiring on the RS-485, analog output and signal input lines. The shields were connected to earth ground at the Eclipse end of the shields. |
| | Conducted emissions requirements were met assuming that the AC signal input would not be connected directly to the AC mains. |
| | The measurement error during RF immunity testing was less than ±5% of full scale. In addition, models with an AC signal input had measurement error of less than +25% of full scale during RF immunity testing of the RS-485 at frequencies below 1 MHz. |
| Pollution degree 2 | Overvoltage Category II |

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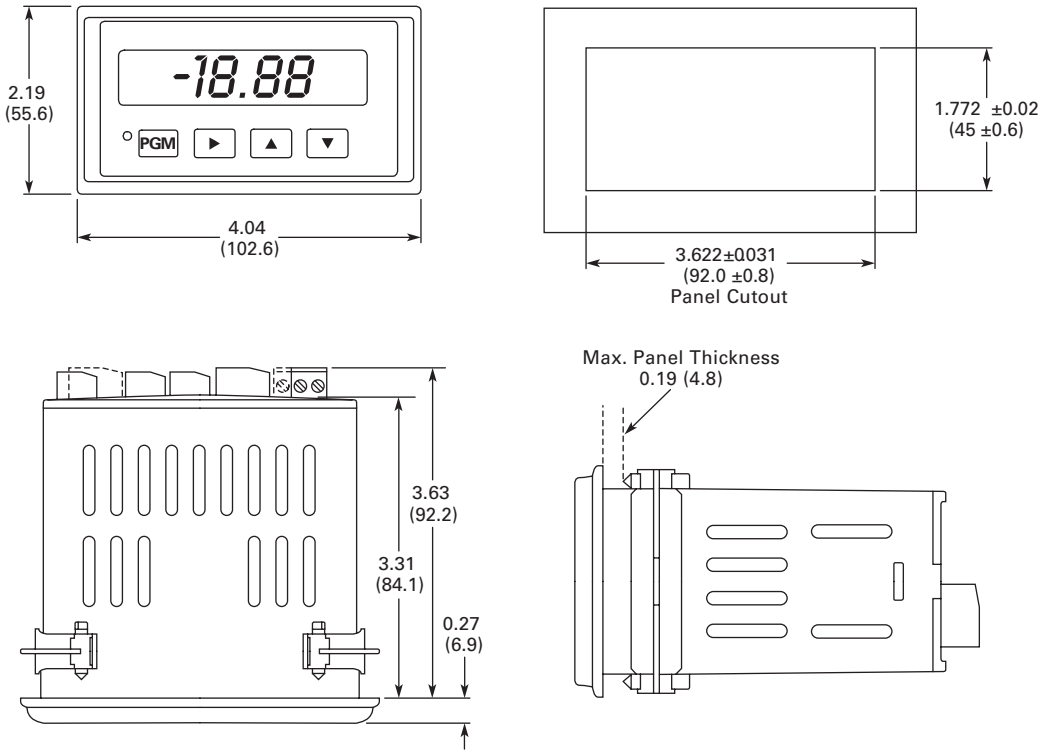
## Dimensions

Approximate Dimensions in Inches (mm)

### Eclipse Series



**Timers/Hour Meters**

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- Product Selection Guide . . . . . **V13-T1-98**
- Electronic Timers/Hour Meters . . . . . **V13-T1-99**
- Electromechanical Timers/Hour Meters . . . . . **V13-T1-105**

Learn Online

## Product Overview

Timers are used in applications where time itself is the main focus. These include simple knowledge of how long a machine has been running to determine machine maintenance, for example, (elapsed time) to knowing when to change an elevator cable (cable life and safety). Timers generally have the ability to stop and then to continue on from the point at which they stopped. Timer relays are used in applications where an output is required to make something happen at a predetermined point in time (to stop or start the process).

## Typical Application

- Elapsed time indication for interval maintenance of construction and agricultural equipment
- Usage metering for determining charges on rental equipment
- Controlled process timing for adhesive application/ curing equipment

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## Product Selection Guide

### Timers/Hour Meters

| | Characteristics | Panel Cutout in Inches (mm) | Page |
|---|---|---|---|
| **E5-_24-E** | Compact device with bright, LED display<br>Multiple functions available: count, time, rate, multifunction, double-function<br>24 Vdc Power | 0.870 x 1.772 (22 x 45) | **V13-T1-44** |
| **E5-496-E** | Economical, multifunction display<br>Large, LED characters<br>AC or DC power options | 1.772 x 3.622 (45 x 92) | **V13-T1-49** |
| **E5-224-C** | Non-replaceable battery (minimum eight-year life)<br>Compact, low cost and high efficiency<br>Eight-digit LCD timer<br>Manual or electrical reset<br>Various timing modes (Hr/Min/Sec) | 0.870 x 1.772 (22 x 45) | **V13-T1-100** |
| **Hour Meters** | Compact, low-cost LCD and electromechanical elapsed time meters<br>Various power options for almost any power supply | Various | **V13-T1-105** |
| **Hour Meter/Counter** | Combination counter consists of time meter and adding counter in one<br>Without reset<br>High shock resistance<br>Magnified figures<br>Protection IP52 (front)<br>Data retention if power is lost<br>Long service life<br>UL Approved | 1.988 (50.5) dia. or DIN rail | **V13-T1-111** |

**Electronic Timers/Hour Meters**

## Contents

| *Description* | *Page* |
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| Electronic Timers/Hour Meters | |
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| E42DI24/E42DIR Series | **V13-T1-103** |
| Electromechanical Timers/Hour Meters | **V13-T1-105** |

## Electronic Timers/Hour Meters

### Product Overview

Eaton's electronic hour meters are a simple and effective way to monitor equipment on time.

### Features

- Reset or non-reset
- Variety of power options
- LCD displays

### Standards and Certifications

- UL recognized
- CE

1

## 1/32 DIN LCD—Timers

### Product Description

Simple battery-powered timers provide an easy-to-read LCD and a variety of timing display options.

### Features

- Low price and high efficiency
- Large eight-digit LCD display, height of the figures 0.31 in (8 mm)
- Different time ranges from 0.1 second to 100,000 hours
- 0.1 second synchronization makes it suitable for very short activation times
- High voltage input for 10–260 Vac/Vdc voltage pulses
- IP65
- Screw terminals, RM 5 mm
- Lifetime of the battery approximately eight years
- Locking of the reset key
- Operating temperature 14° to 140°F (–10° to 60°C)

### Standards and Certifications

- UL recognized
- CE marked

## Product Selection

**E5-224-C04_**

### 1/32 DIN LCD Timers

| Description | Catalog Number |
|---|---|
| **Eight-Digit LCD Timer, Battery Power** | |
| Hours/minutes, 0.94 x 1.89 in (24 x 48 mm) | **E5-224-C0440** |
| Hours/minutes, 10–260V input, 0.94 x 1.89 in (24 x 48 mm) | **E5-224-C0448** |
| Minutes/seconds, 0.94 x 1.89 in (24 x 48 mm) | **E5-224-C0450** |
| Minutes/seconds, 10–260V input 0.94 x 1.89 in (24 x 48 mm) | **E5-224-C0458** |

## Technical Data and Specifications

### General Specifications

| Description | Specification |
|---|---|
| Power supply | Non-replaceable lithium battery (lifetime approximately eight years at 68°F (20°C) |
| Display | LCD, eight-digits |
| Figure size | 0.31 in (8 mm) high |
| Counting direction | Adding |
| Display range | |
| Time range | 99999h 59m (134) |
| Display | 99999 - 59 |
| Time range | 99999.99h (134) |
| Display | 99999 - 99 |
| Time range | 9999h 59m 59s (135) |
| Display | 9999.59.59 |
| Time range | 9999999.9s (135) |
| Display | 9999999.9 |
| Reset | Manual and electrical |

## General Specifications, continued

| Description | Specification |
|---|---|
| Timer inputs, DC versions (max. 30 Vdc) | |
| Timer input | NPN or PNP depending on the type |
| Switching level | |
| NPN low | 0–0.7V |
| NPN high | 3–30 Vdc |
| PNP low | 0–0.7V |
| PNP high | 4–30 Vdc |
| Counting start | |
| NPN | For low signal at the timer input |
| PNP | For high signal at the timer input |
| Timer inputs, high voltage version (10–260 Vdc/Vac) | |
| Timer input | Optocoupler input max. 30 Hz |
| Min. pulse time | 16 ms |
| Switching level | |
| Low | 0–2 Vdc/Vac |
| High | 10–260 Vdc/Vac |
| Counting start | For high signal at the timer input |
| Time range change (mode) | |
| Contact input—open collector (switching at 0V) | |
| NPN low | 0–0.7V |
| NPN high | 3–5 Vdc |
| Time range | Depending on the circuit |
| Reset Input (only DC and high voltage) | |
| Minimum pulse time | |
| DC | 50 ms |
| High voltage | 10 ms |
| Contact input (DC) | |
| NPN low | 0–0.7V |
| NPN high | 3–30 Vdc |
| High voltage input | 10–260 Vdc/Vac |
| Reset locking input (for DC and AC), electrical reset key locking | |
| Input not active | Reset key locked |
| Contact input | Open collector NPN (switching at 0V) |
| Switching level | |
| NPN low | 0–0.7V |
| NPN high | 3–5 Vdc |
| Interference emissions | EN 55011 Class B, EN 61 000-6-2, EN 61010 Section 1 (only AC versions) |
| Housing | Dark gray RAL 7021 |
| Operating temperature | 14° to 131°F (–10° to 55°C) |
| Ambient temperature | 14° to 140°F (–10° to 60°C) |
| Storage temperature | –4° to 158°F (–20° to 70°C) |
| Protection | IP65 (from front) |
| Weight | Approx. 1.76 oz (50g) |

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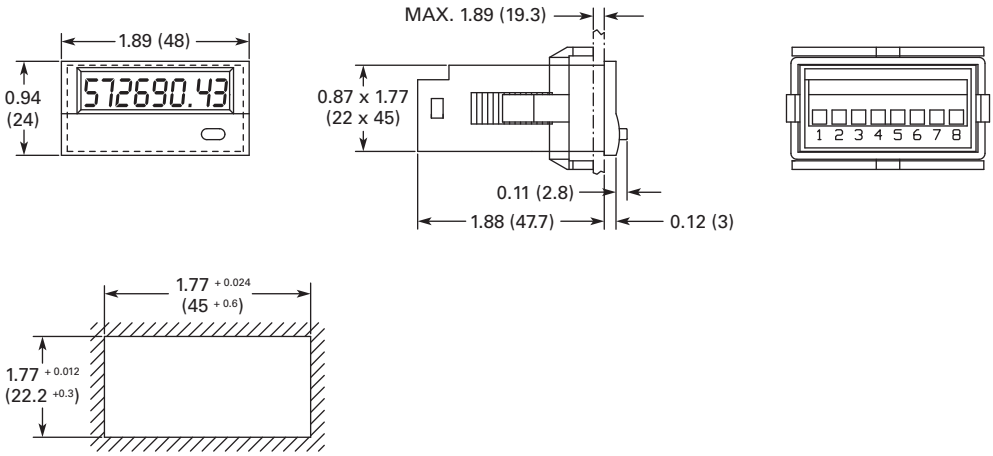
## Dimensions

Approximate Dimensions in Inches (mm)

### 1/32 DIN LCD Timers



## E42DI24/E42DIR Series

### Product Description

Simple LCD hour meters with flexible input voltages

### Features

- Solid-state hour meters
- Record and display up to 99,999.9 hours, rollover and continue timing
- EEPROM memory can retain data for 25+ years
- Time accumulation indicated by flashing hourglass icon
- Memory will arm only when power has been applied for 5 seconds

### Standards and Certifications

- UL recognized
- CE compliant

### Product Selection

#### E42DI24/E42DIR Series Elapsed Time Meters

| | Description | Catalog Number |
|---|---|---|
| **E42DIR_** | **Round LCD** | |
| | Elapsed hour meter, 48–150 Vdc/100–230 Vac | **E42DIR48230** |
| | Elapsed hour meter with reset, 48–150 Vdc/100–230 Vac | **E42DIR48230R** |
| | Elapsed hour meter, 12–48 Vdc/20–60 Vac | **E42DIR1260** |
| **E42DI24_** | **Rectangular LCD** | |
| | Elapsed hour meter, 48–150 Vdc/100–230 Vac | **E42DI2448230** |
| | Elapsed hour meter, with reset, 48–150 Vdc/100–230 Vac | **E42DI2448230R** |
| | Elapsed hour meter, 12–48 Vdc/20–60 Vac | **E42DI241260** |

### Technical Data and Specifications

#### General Specifications

| Description | Specification |
|---|---|
| Function | Solid-state hour meter |
| Power supply | |
| E42DIXX1260X | 12–48 Vdc ±25%/20–60 Vac ±25% |
| E42DIXX48230X | 48–150 Vdc +23%–25%/100–230 Vac +17%–25% |
| Frequency range | 48–440 Hz |
| Display | Six-digit LCD, 0.20 in (5 mm) |
| Accuracy | ±0.1% |
| Recording/display capacity | 99,999.9 hours |
| Resolution | 0.1 hour (6 minutes) |
| Current consumption max. at nominal voltage | |
| E42DIXX1260X | 0.8 mA at 12 Vdc |
| | 5.0 mA at 48 Vdc |
| | 0.5 mA at 20 Vac |
| | 2.5 mA at 60 Vac |
| E42DIXX48230X | 0.8 mA at 48 Vdc |
| | 2.5 mA at 150 Vdc |
| | 0.9 mA at 100 Vac |
| | 2.0 mA at 230 Vac |
| Input impedance minimum (pins 3 and 4) | |
| E42DIXX1260X | 70k ohms |
| E42DIXX48230X | 480k ohms |
| Operating temperature | –40° to 185°F (–40° to 85°C) |
| Storage temperature | –58° to 194°F (–50° to 90°C) |
| Weight | |
| E42DIRXXXXXX | 1.94 oz (55g) |
| E42DI24XXXXXX | 0.78 oz (22g) |

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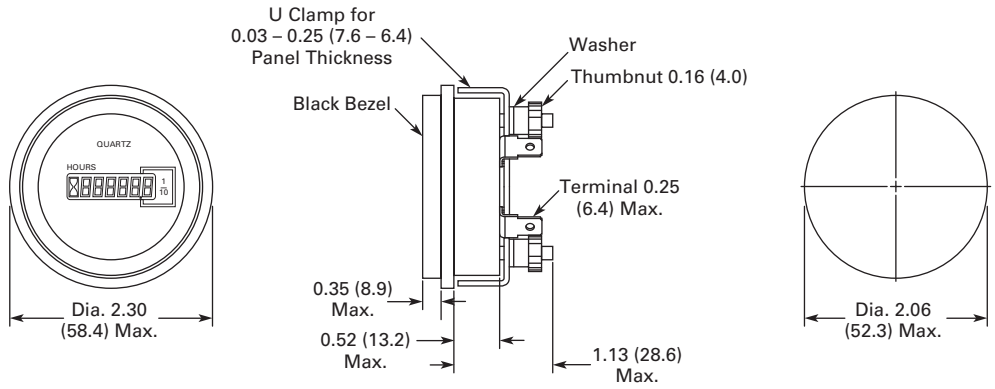
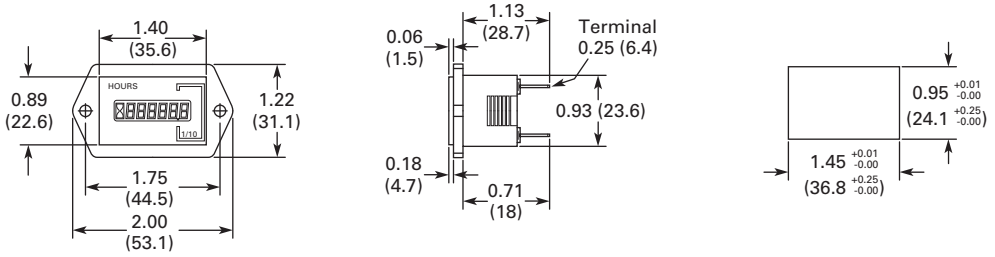
## Dimensions

Approximate Dimensions in Inches (mm)

### E42DI24/E42DIR Series



**Electromechanical Timers/Hour Meters**

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| 71.1 Round Hour Meters | **V13-T1-109** |
| Hour Meter/Counter | **V13-T1-111** |

## Electromechanical Timers/Hour Meters

### Product Overview

Eaton's electromechanical hour meters are available in a variety of configurations and provide a cost-effective way to monitor equipment on time.

### Features

- Non-resettable
- Always readable display

### Standards and Certifications

- UL recognized
- CE

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## 1/16 DIN Hour Meters

### Product Description

Eaton's most cost-effective elapsed time meter. Features IP65 protection against water intrusion.

### Typical Application

- General elapsed time
- Service interval for measurement systems—
  - Respiratory ventilators
  - Oxygen machines
  - Dialysis machines
- Small appliances
- UV lamps
- Display panels in cars

### Features

- High shock resistance
- Without reset
- Small dimension
- Magnified figures
- Protection IP65
- Data retention if power is lost
- Long service life
- Optional mounting position

### Standards and Certifications

- UL recognized

### Product Selection

**7-T-65-4848PM-40_**

#### 1/16 DIN Hour Meters

| Description | Catalog Number |
|---|---|
| 10–30 Vdc, 1.89 x 1.89 in (48 x 48 mm) | **8-T-65-4848PM-402** |
| 100–130 Vac, 1.89 x 1.89 in (48 x 48 mm) | **7-T-65-4848PM-406** |

**T4848DINADAPT**

#### DIN Rail Adapter

| Description | Catalog Number |
|---|---|
| DIN rail adapter for DIN electromechanical hour meter | **T4848DINADAPT** |

## Technical Data and Specifications

### General Specifications

| Description | Specification |
|---|---|
| Electrical connection | Clamp terminal for cable diameter up to 14 AWG (2.5 $mm^2$), tightening torque max. 0.59 lb-ft (0.8 Nm) |
| Power consumption | |
| 10–30 Vdc | Approx. 500 mW |
| 100–130 Vdc | Approx. 750 mW |
| Rated voltages | 100–130 Vac, 50 or 60 Hz |
| | 10–30 Vdc |
| On time | 100% |
| Display | |
| Seven at AC | 99999.99 |
| Eight at DC | 999999.99 |
| Accuracy | |
| AC | Supply frequency + 30 ms |
| DC | <0.003% (24h) |
| Count mode | Adding |
| Figure size | 0.16 in (4 mm) high |
| Color of figures | White and red-on-black |
| Ambient temperature | 5° to 122°F (–15° to 50°C) |
| Mounting position | Any |
| Protection | IP65 |
| Housing | Plastic |
| Weight | 1.7 oz (48g) |
| Operating indicator of the running time meter | |
| AC | Fast rotating wheel with red dashes |
| DC | 1/100h display turns continuously by 1-digit in 36 seconds |
| Test voltage | 2000 Vac, 50 Hz for AC counters |
| Options | Further voltages on request |
| Color of housing | Gray |

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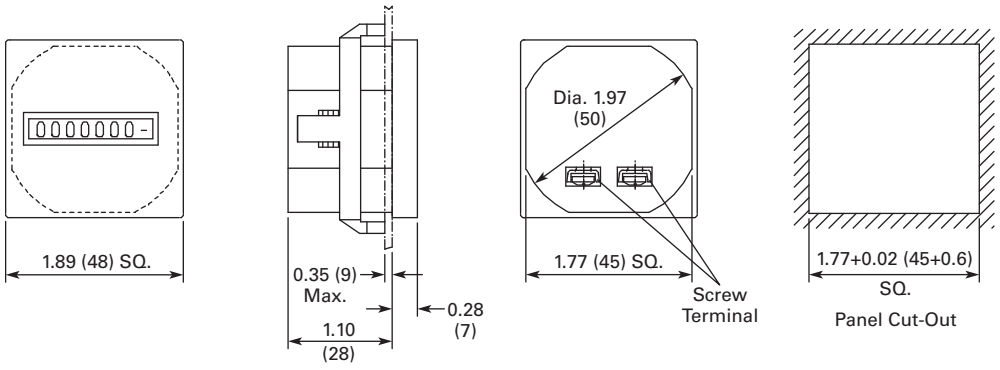
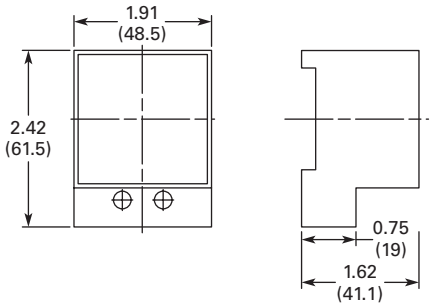
## Dimensions

Approximate Dimensions in Inches (mm)

### 1/16 DIN Hour Meters




### DIN Rail Adapter



## 71.1 Round Hour Meters

### Product Description

Eaton's 6-T-3H hour meters are heavy-duty elapsed time meters with NEMA 4X protection.

### Typical Application

- General elapsed time
- Utility vehicles
- Construction machines
- Generators
- Fork-lift trucks
- Car washes
- Outside areas

### Features

- Six-digit hour meter for round panel cut-out
- Low cost
- High shock resistance
- Low power consumption
- Small dimension
- Magnified figures
- Waterproof
- NEMA Type 4X rating
- Data retention if power is lost
- Available in 50 pc. bulk package

### Standards and Certifications

- UL recognized

### Product Selection

**6-T-3H-508RPM-40_**

#### 71.1 Round Hour Meters

| Description | Catalog Number |
|---|---|
| 115 Vac, 2.80 in (71.1 mm) round | **6-T-3H-508RPM-406** |
| 10–80 Vdc, 2.80 in (71.1 mm) round | **6-T-3H-508RPM-402** |

### Technical Data and Specifications

#### General Specifications

| Description | Specification |
|---|---|
| Electrical connection | Flat pins 0.8 x 6.3 |
| Power consumption | |
| AC | Max. 0.4 VA |
| 12 Vdc | Max. 0.08W |
| 48 Vdc | Max. 0.7W |
| Rated voltages | 115 Vac ±10%, 50/60 Hz, 10–80 Vdc |
| On time | 100% |
| Display | Six-digits, 99999.9h |
| Count mode | Adding |
| Figure size | 0.14 in (3.5 mm) high |
| Reset | None |
| Ambient temperature | –22° to 149°F (–30° to 65°C) |
| Mounting position | Any |
| Protection | IP65 |
| Housing | Plastic |
| Error | <0.02% over the full range |

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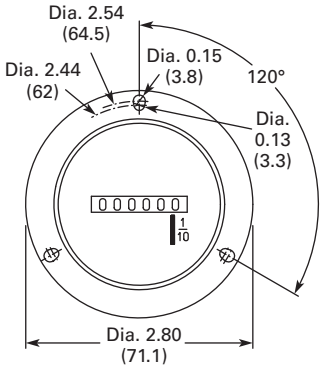
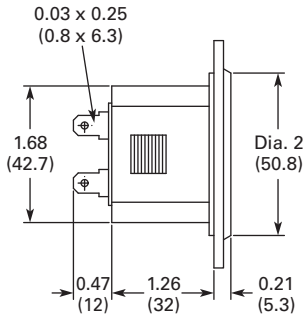
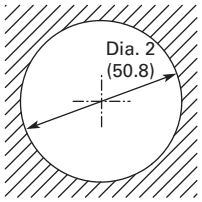
## Dimensions

Approximate Dimensions in Inches (mm)

### 71.1 Round Hour Meter




Panel Cut-Out

## Hour Meter/Counter

### Product Description

Eaton's CEC series combination meters provide an event counter and elapsed time meter is one compact unit.

### Typical Application

- General counting
- Pump control panels
- Service interval for measurement systems (respiratory ventilators, oxygen machines, dialysis machines)
- Small appliances
- UV lamps
- Display panels in cars

### Features

- Combination counter consists of time meter and adding counter in one
- Without reset
- High shock resistance
- Magnified figures
- Protection IP52 (front)
- Data retention if power is lost
- Long service life

### Standards and Certifications

- cRU®us certified
- CE marked

c US CE

### Product Selection

**CEC-…-406**

#### Hour Meter/Counters

| Description | Catalog Number |
|---|---|
| Combination hour meter/counter, 55 mm square front panel mount, 100–130 Vac, 60 Hz | **CEC-55PM-406** |
| Combination hour meter/counter, 48 mm DIN rail mount, 100–130 Vac, 60 Hz | **CEC-48DR-406** |

### Technical Data and Specifications

#### General Specifications

| Description | Specification |
|---|---|
| Electrical connection | Flat pin 0.8 x 6.3 mm with screw terminal, tightening torque max. 0.8 Nm |
| Power consumption | |
| 100–130 Vac | 60 Hz, approx. 1.43 VA |
| Count mode | Adding |
| Figure size | 0.16 x 0.07 in (4 x 1.7 mm) |
| Color of figures | |
| Hour | White on black |
| Decimal | Red on black |
| Running time meter operating indicator | Fast rotating wheel with red dashes; 99999.99 hour |
| Accuracy AC | Supply frequency ±30 ms |
| Reset | None |
| Ambient temperature | 5° to 122°F (–15° to 50°C) |
| Mounting position | Any |
| Color of housing | Black |

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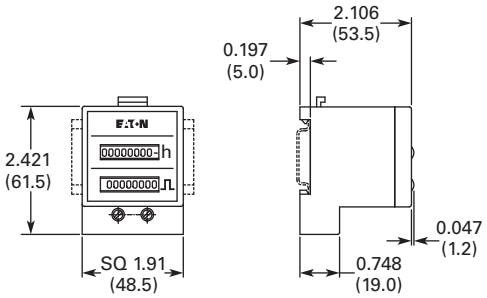
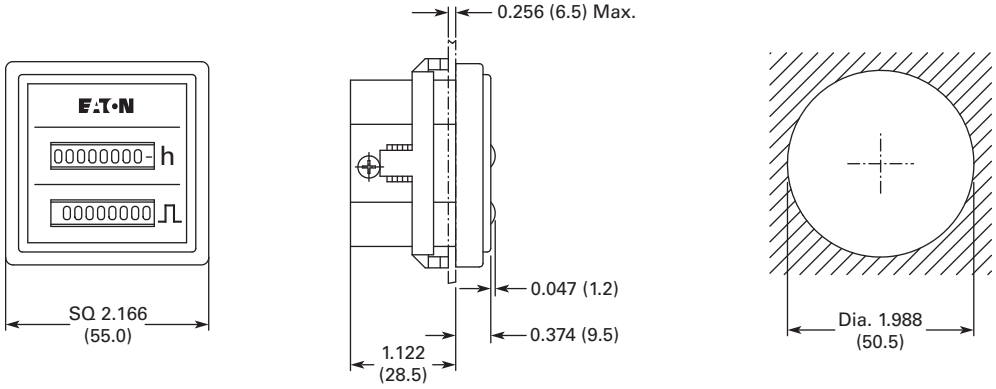
## Dimensions

Approximate Dimensions in Inches (mm)

### DIN Rail Mount




### Front Panel Mount



**Flow Totalizers, Transmitters and Controls**

## Contents


| *Description* | *Page* |
|---|---|
| Flow Totalizers, Transmitters and Controls | |
| Product Selection Guide | **V13-T1-113** |
| Eclipse Series | **V13-T1-114** |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## Product Overview

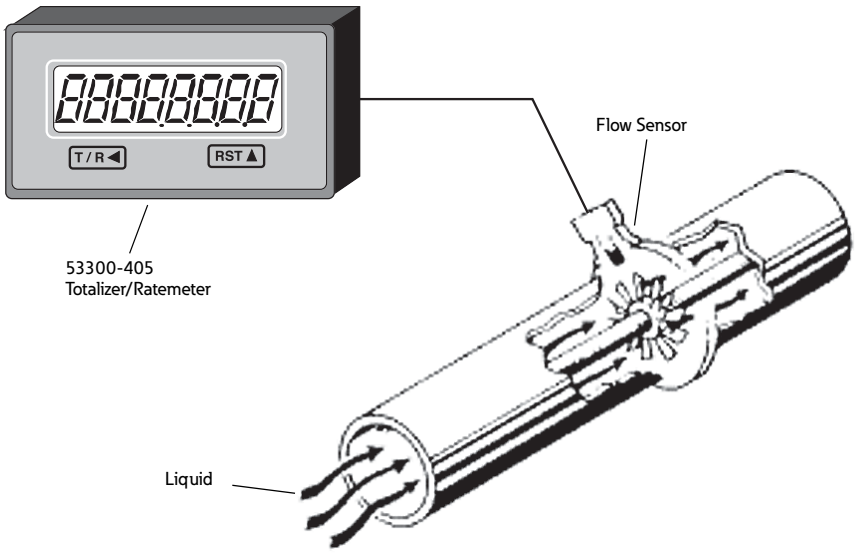
Flow products are used in a variety of applications where liquid gas flow needs to be monitored or controlled. Eaton offers models for flow total, flow rate and flow batch control. Several optional outputs allow great flexibility to meet most application needs.

## Typical Application

In many processes, it is desirable to know both the total quantity of product being produced and the rate at which the product is being produced.

In the illustration at right, the output of a turbine flow sensor is connected to a totalizer/ratemeter. The flow sensor produces a known number of pulses per gallon (or other unit of measure). The instrument scales these pulses into the desired units of flow volume (gallons, liters, barrels, etc.), and flow rate (gallons/minute, barrels/hour, etc.).

### Application Example




## Product Selection Guide

### Totalizers

| | Characteristics | Typical Applications | Panel Cutout in Inches (mm) | Page |
|---|---|---|---|---|
| **Eclipse** | Six-digit, super bright LED display<br>Multiple models available: totalizers, ratemeters, count controls, digital panel meters and flow controls | Length measurement and control<br>Flow monitoring and control<br>Process monitoring and display<br>Voltage and current monitoring and display | 1.772 x 3.780 (45 x 96) | **V13-T1-114** |

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## Eclipse Series

### Product Description

Eaton's Eclipse series flow totalizer and controller can accept signals from analog flow meters and display flow rates and volumes on a high-visibility LED.

### Features

- Six- or 10-digit display
- 1/8 DIN size
- Red, LED display
- 0.56 in (14 mm) high characters
- Scalable display
- Analog or pulse input versions
- Accessory power output
- 15-point linearization available
- Dual valve pre-warn available
- Optional analog, relay and RS-485 outputs
- NEMA 4X
- Depluggable terminal blocks

### Standards and Certifications

- UL and cUL listed
- CE marked

Listed Listed

**Eclipse Series**
**Flow Totalizer and Control**

### Catalog Number Selection

**Eclipse Flow Model**

5775 X – 4 X X

**Power Supply**
**0** = DC (9–30 Vdc)
**1** = AC (85–265 Vac)

**Input Option**
**0** = Pulse input totalizer/ratemeter
**1** = Pulse input batch control
**2** = Analog input totalizer/ratemeter
**3** = Analog input batch control

**Output Option** ①
**0** = No option
**1** = Dual relays (standard or batch)
**2** = Analog output (4–20 mA and 0–10V)
**3** = Dual relays and analog output
**4** = RS-485 communications
**5** = Dual relay and RS-485
**6** = Analog output and RS-485
**7** = Dual relays, analog output and RS-485
**A** = One relay, one transistor
**B** = One relay, one transistor, analog output
**C** = One relay, one transistor, RS-485
**D** = One relay, one transistor, analog output and RS-485

***Note***

① Output options 0, 2, 4 are not available for models -41X and -43X.

## Product Selection



**Eclipse Series Totalizer Display Preset Counter**

### Eclipse Series Totalizer Display Preset Counters

| Description | Catalog Number |
|---|---|
| Flow total rate, DC, pulse input | **57750400** |
| Flow total rate, DC, pulse input, dual relay out | **57750401** |
| Flow total rate, DC, pulse input, analog out | **57750402** |
| Flow total rate, DC, pulse input, dual relay out, analog out | **57750403** |
| Flow total rate, DC, pulse input RS-485 | **57750404** |
| Flow batcher, DC, pulse input, dual relay out | **57750411** |
| Flow batcher, DC, pulse input, dual relay out, RS-485 | **57750415** |
| Flow total/rate, DC, analog input | **57750420** |
| Flow total/rate, DC, analog input, dual relay out | **57750421** |
| Flow total/rate, DC, analog input, analog out | **57750422** |
| Flow total/rate, AC, pulse input | **57751400** |
| Flow total/rate, AC, pulse input, dual relay out | **57751401** |
| Flow total/rate, AC, pulse input, analog out | **57751402** |
| Flow total/rate, AC, pulse input, dual relay out, analog out | **57751403** |
| Flow total/rate, AC, pulse input, analog out | **57751404** |
| Flow batcher, AC, pulse input, dual relay out | **57751411** |
| Flow batcher, AC, pulse input, dual relay out, analog out | **57751413** |
| Flow batcher, AC, pulse input, dual relay out, RS-485 | **57751415** |
| Flow total/rate, AC, analog input | **57751420** |
| Flow total/rate, AC, analog input, dual relay out | **57751421** |
| Flow total/rate, AC, analog input, analog out | **57751422** |
| Flow total/rate, AC, analog input, dual relay out, analog out | **57751423** |
| Flow total/rate, AC, analog input, analog out, RS-485 | **57751426** |
| Flow batcher, AC, analog input, dual relay out | **57751431** |
| Flow total/rate, AC, pulse input, relay/transistor out | **5775140A** |
| Flow total/rate, AC, pulse input, relay/transistor out, analog out, RS-485 | **5775140D** |
| Flow total/rate, AC, analog input, relay/transistor out | **5775142A** |
| Flow total/rate, AC, analog input, relay/transistor out, analog | **5775142D** |
| Flow batcher, AC, analog input, relay/transistor out, analog | **5775143D** |

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## Technical Data and Specifications

### General Specifications

| Description | Specification |
|---|---|
| **Input Power** | |
| AC powered models (57751-4XX) | |
| Input power | 85–265 Vac, 47–63 Hz, 20 VA |
| External fuse | 0.2A, 250 Vac, time delay (T200mA, 250V) |
| Isolation dielectric strength | 2300 Vac |
| DC powered models (57750-4XX) | |
| Input power | 9–30 Vdc, 12 VA |
| External fuse | 2.0A, 50 Vdc, time delay (T2A, 50V) |
| Reverse voltage protection | Yes |
| Isolation dielectric strength | 2300 Vac to signal inputs and relays, 500 Vac to RS-485 and analog outputs |
| **Human Interface** | |
| Display | Six digits |
| Type | 0.56 in high, seven segment, red LED |
| **Data Retention** | |
| Memory type | EEPROM, no batteries required |
| Duration | 100 years |
| **Count Signal Input/Count Inhibit Signal Input** | |
| Sensor type | Sink or source, DIP switch selectable |
| Input impedance | 4.75k ohms to +5 Vdc or 34.9k ohms to ground |
| Thresholds | |
| High | 3.5 to 28 Vdc |
| Low | 0 to 1.9 Vdc, for single ended signals |
| Magnetic pickup range | 50 mV p-p to 65V rms into 34.9k ohms |
| Slow response | 50 Hz max. (DIP switch 2 and/or 5 ON) |
| Flat response | 10 kHz |
| **Flow Signal Input (Analog Input Models)** | |
| Types | 4–20 mA and 0–10 Vdc |
| Input impedance | 100 ohms (current input), 1.27M ohms (voltage input) |
| Overrange | 50 mA max. (current input), 100V max. (voltage input) |
| Accuracy | ±0.1% of reading, ±1 digit, and ±80 PPM/°C |
| **Control Inputs** | |
| Sensor type | Sink only |
| Input impedance | 4.75k ohms to +5 Vdc |
| Thresholds | |
| High | 3.5 to 28 Vdc |
| Low | 0 to 1.0 Vdc |
| Response | 25 ms maximum (5V signal) |
| **Accessory Power Output (Pulse Input Models)** | |
| Voltage | 12 Vdc +10%/–13% |
| Current | 75 mA max. |
| Protection | Short-circuit protected |
| **Accessory Power Output (Analog Input Models)** | |
| Voltage | 24 Vdc ±10% |
| Current | 90 mA max. |
| Protection | Short-circuit protected |

## General Specifications, continued

| Description | Specification |
|---|---|
| **Relay/Transistor Outputs (Standard on Batch Controls, Optional on Totalizers)** | |
| Number | Two relays or one relay and one transistor |
| Relay contact type | One set Form C per relay |
| Relay contact rating | 5A, 250 Vac or 30 Vdc |
| Transistor type | NPN, opto isolated |
| OFF state block | 30 Vdc max., 0.1 mA max. leakage current |
| ON state conduct | 50 mA max., 1.2 Vdc max. C-E drop |
| Max. switching frequency | 4 kHz (50-50 duty cycle) |
| Isolation dielectric strength | 2300 Vac |
| **Optional Outputs** | |
| Analog retransmission | |
| Output signals | 4–20 mA (<750 ohms) and 0–10V (>2500 ohms) |
| Accuracy | 0.13% full scale and 100 PPM/°C (and 0.07% full scale change over 4–20 mA load ranges |
| Isolation dielectric strength | 2300 Vac to signal inputs, relays and AC power inputs; 500 Vac to analog outputs and DC power inputs |
| RS-485 serial communications | |
| Baud rate | 1200, 2400, 4800, 9600, or 19,200, programmable |
| Parity | Even, odd or no parity |
| Address range | 00 to 99 decimal (00 indicates off line) |
| Protocol | Opto 22® compatible |
| Isolation dielectric strength | 2300 Vac to signal inputs, relays and AC power inputs; 500 Vac to analog outputs and DC power inputs |
| **Environmental** | |
| Operating environment | Indoor use to 2000 meters |
| Temperature | |
| Operating | 32° to 122°F (0° to 50°C) |
| Storage | –4° to 158°F (20° to 70°C) |
| Humidity | 0 to 85% RH, non-condensing |
| Vibration | 2.5 Gs, 30 to 200 Hz |
| Shock | 30 Gs, 11 ms half sinewave |
| EMC | Immunity to EN 50082-2 (heavy industrial) |
| | Emissions to EN 50081-2 (heavy industrial) |
| Front panel | NEMA 4X when mounted with gasket provided |
| Agency approval | CE EMC immunity and emissions requirements were met using shielded wiring on the RS-485, analog output and pulse input/power lines. The shields were connected to earth ground at the Eclipse end of the shields. |
| Pollution degree 2 | Overvoltage Category II |

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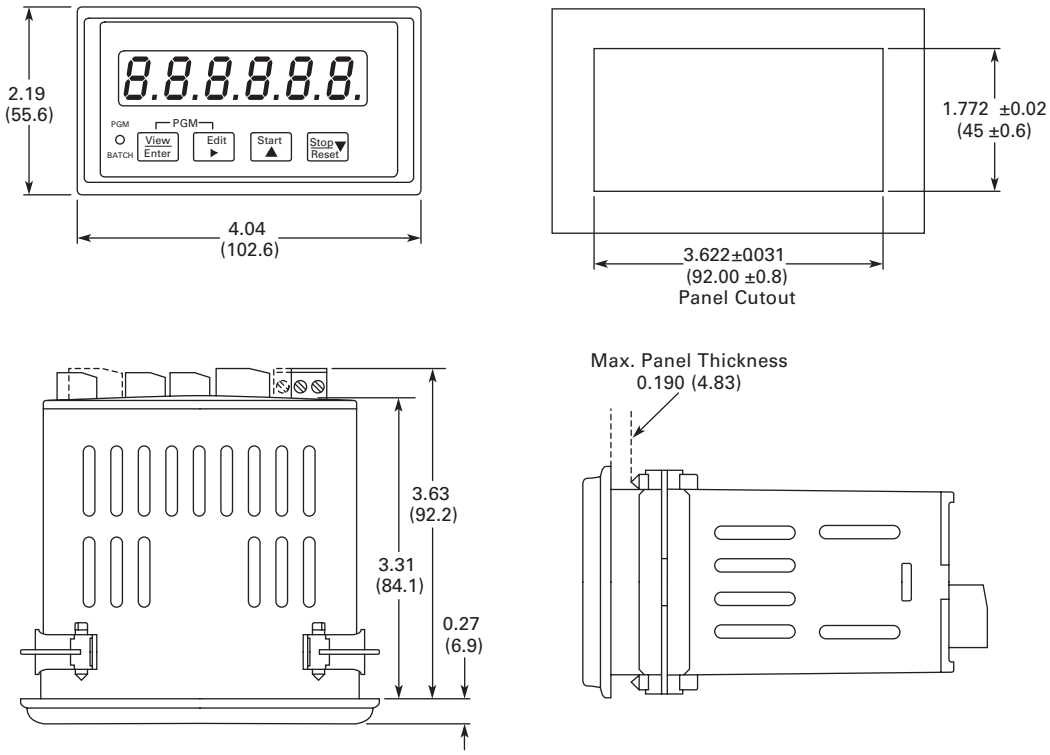
## Dimensions

Approximate Dimensions in Inches (mm)

### Eclipse Flow Models



**Fusion Integrated Machine Control**

## Contents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| Fusion Integrated Machine Control | |
| Standards and Certifications | **V13-T1-120** |
| Product Selection | **V13-T1-120** |
| Technical Data and Specifications | **V13-T1-121** |
| Dimensions | **V13-T1-123** |


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## Fusion Integrated Machine Control

### Product Description

The Fusion® Integrated Machine Control has advanced features, including a five-preset high speed counter with pre-warn, a totalizer with preset, a batch counter with preset and a ratemeter with high and low setpoints. Unique to the count control world, the Fusion has five output relays (rather than two), along with two transistors and two analog setpoint or follower outputs. Its ten available parameter sets of pre-loaded values are useful as recipes, for job-stacking or for a variety of application-specific purposes.

The Fusion has a multi-line alphanumeric display which can be programmed to show text messages, logic-generated prompts, alarms and machine status. Up to eight screens can be shown or optionally locked out. Count and time presets can be made view-only or editable. Preset entry is achieved with simple 0-9 keys on the front panel rather than complicated scrolling methods. The Fusion's real time clock/calendar may be displayed and/or used to time and date stamp printouts.

With its ladder logic, the Fusion is actually a 26 I/O controller, making it a complete control for many machines and processes, integrating the functions of external timers, pushbuttons, power supplies, indicating lights, control relays and other components in the same box.

### Features

- User-configurable operator interface with back-lit LCD display and 18-button tactile feedback keypad
- High speed counter with five presets and pre-warn, totalizer, batch counter and ratemeter
- 10 parameter sets
- 13 digital inputs
- (2) 4–20 mA inputs
- (2) 0–10V input
- (3) Form C, 2 Form A, 2 NPN transistor, (1) 4–20 mA, and (1) 0–10V outputs
- RS-232 and RS-485 serial communications
- 100-line ladder logic processor for ultimate flexibility
- Configuration software included
- NEMA 4X enclosure

## Features and Benefits

| Feature | Customer Benefit |
|---|---|
| High speed count functions; including scaling, main counter, five presets, pre-warn, totalizer, batch and rate | "Canned" count functions offer flexibility and ease of setup in the desired units of measure. |
| High speed counting independent of ladder scan time | Precise and repeatable output response for high performance applications. |
| Flexible display with selectable character sizes (large, medium, small), run screens and ladder triggered messages | Minimizes confusion and operator errors as information can be tailored to what they need and in their language. Maintenance/management data can be separated. Different character sizes allow optimization of information displayed. Machine status information can be displayed allowing operators to take action. |
| Simple front panel layout and keypad. Four soft keys and six function keys can be used as inputs | Ease of use for operator. Numeric keypad allows for ease of preset and machine parameter entry. Function keys and soft keys allow easy and quick access to information and/or parameters needed by the operator and don't require using additional inputs. Eliminates cost associated with external pushbuttons and inputs. |
| Parameter sets | Allows for predefined recipes/jobs to be preloaded for the operator. Simplifies operator interaction and minimizes errors. |
| Programmable relay logic | Well understood programming method that allows flexibility in control functionality. Easy to tailor the control to various applications. |
| 26 I/O (digital and analog) | Provides application flexibility. Analog inputs allow monitoring key process parameters. Analog outputs allow interfacing to drives and other control products. |
| Integrated solution | Reduced overall control costs, installation and commissioning. More flexible and capable than traditional count/control solutions but less complex than many PLC solutions. |
| Windows® and front panel programming | Ease of programming and configuration control. |
| RS-232 and RS-485 serial communication ports | Allow for direct connection to PC for programming, connection to Modbus® networks, interface to serial printer. |
| Robust type 4X package. DIN cutout and short depth 2.82 in (71.6 mm) | Suited for wet applications. Same cutout as the President Series—easing the migration. Short depth minimizes the cost and size of the machine panel or control enclosure. |
| Input power: 85–265 Vac 50/60 Hz or 10–30 Vdc models | Greatly reduces models required for different control voltages. |
| Output power: 12 Vdc at 75 mA, 24 Vdc at 100 mA | Eliminates the need for an external power supply for encoders, analog transducers, etc. |
| Depluggable screw terminals | Allows for ease of wiring and removal of control. Terminals are different sizes to error-proof installation. |
| Non-volatile memory and capacitor backed real time clock | Don't have to worry about a battery failing down the road. |
| Real time clock | Allows for control functions to be performed on day/time and allows for date/time stamping on printouts. |
| UL, cUL and CE marked | Ease of meeting machine agency requirements and robust EMC performance. |

## Standards and Certifications

- UL and cUL listed
- CE marked

Listed Listed

## Product Selection

**57550400**

### Fusion Integrated Machine Control

| Description | Catalog Number |
|---|---|
| Fusion integrated machine control—10–30 Vdc power | **57550400** |
| Fusion integrated machine control—85–265 Vac power | **57551400** |
| Fusion configuration software | **57590400** |

## Technical Data and Specifications

### General Specifications

| Description | Specification |
|---|---|
| **Environmental** | |
| Operation | Indoor use to 2000m |
| Temperature | 32° to 122°F (0° to 50°C) operating |
| | –4° to 158°F (–20° to 70°C) storage |
| Humidity | 0 to 85% RH, non-condensing |
| Vibration | 2.5 Gs, 30–200 Hz |
| Shock | 30 Gs, 11 ms half sinewave |
| EMC | EN61326:1997 |
| | All I/O lines except RS-485 <30m |
| Front panel | Type 4X indoor use only, when mounted with gasket provided |
| Safety | UL and cUL listed, CE compliant |
| **Input Power** | |
| AC model | 85–265 Vac, 47–63 Hz, 20 VA; isolation 2300 Vac |
| DC model | 10–30 Vdc, 15 VA |
| **Inputs** | |
| Control | |
| Number | 10 |
| Impedance | 4.75k ohms to +5 Vdc |
| Thresholds | |
| High | 3.5–30 Vdc |
| Low | 0–1.0 Vdc |
| Counter | |
| Number | Three (including reset) |
| Impedance | 4.75k ohms to +5 Vdc or 26.9k ohms to ground |
| Thresholds | |
| High | 3.5–30V |
| Low | 0–1.5V, or 200 mV p-p to 50V rms at 26.9k ohms (mag pickup) |
| Response | 140 Hz or 14 kHz for sinking, push-pull or mag pickup inputs |
| | 60 Hz or 6 kHz for sourcing only inputs |
| | All frequencies based on 50-50 duty cycle |
| | 6 kHz maximum sustained count speed |
| Analog | |
| Number | 4 |
| Type | 4–20 mA and two 0–10 Vdc |
| Accuracy | ±0.5% FS and ±200 PPM/°C |
| Impedance | 100 ohms (current input), 1.27M ohms (voltage input) |
| Overrange | 45 mA max. (current input), 20V max. (voltage input) |

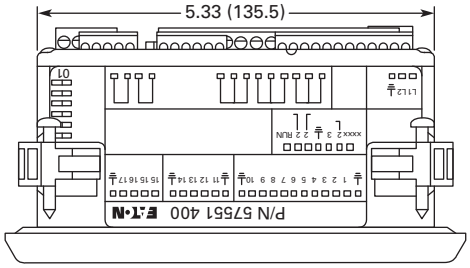
## General Specifications, continued

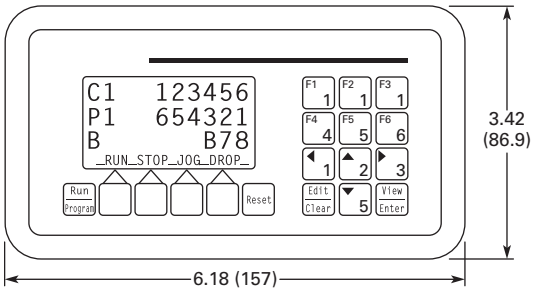
| Description | Specification |
|---|---|
| **Outputs** | |
| Power (AC input model only) | 24 Vdc ±15%, 100 mA max., short-circuit protected |
| | 12 Vdc ±10%, 75 mA max., short-circuit protected |
| Relays | |
| Number | 3 (Form C), 2 (Form A) |
| Contacts | 5A, 250 Vac, 30 Vdc |
| Isolation | 2300 Vac |
| Transistors | |
| Number | 2 |
| Type | NPN Darlington |
| Ratings | 150 mA max. ON current, 30 Vdc max. OFF voltage |
| Analog | |
| Number | 2, short-circuit protected |
| Type | 4–20 mA (<450 ohms), 0–10V (>2500 ohms) |
| Accuracy | ±0.5% FS and ±200 PPM/°C |
| Common mode voltage rating | 250 Vac |
| Isolation | 2300 Vac |
| RS-232 | |
| Connector | DB-9S |
| Polarity | DCE |
| Baud rate | 1200–19200 |
| RS-485 | |
| Connector | Six-wire RJ-12 phonejack |
| Baud rate | 1200–19200 |
| **Data Retention** | |
| Program data | |
| Type | Non-volatile |
| Duration | 100 years, no batteries |
| Real time clock | |
| Type | Capacitor |
| Charge time | Three minutes |
| Retention | 1–5 days |
| **Human Interface** | |
| Display | |
| Type | 128 x 64 pixel graphic LCD with LED backlight |
| Figure size | 0.12 in (3 mm) high, 21 characters per line, 6 lines maximum |
| | 0.24 in (6 mm) high, 10 characters per line, 3 lines maximum |
| | 0.35 in (9 mm) high, 7 characters per line, 2 lines maximum |
| Keys | |
| Number | 18 |
| Type | Membrane switches with tactile feedback |
| Real time clock format | Seconds, minutes, hours, day and date |

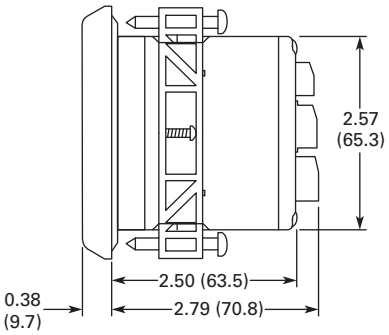
## Dimensions

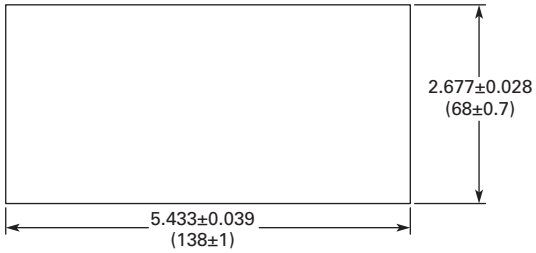
Approximate Dimensions in Inches (mm)

### Fusion Integrated Machine Control ①




***Note***

① Recommended panel cutout is 0.375 in (9.5 mm) max. panel thickness.

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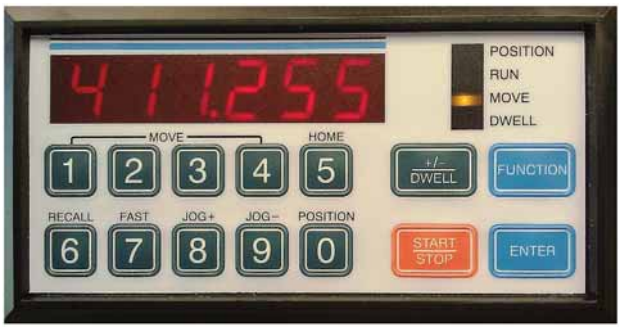
**President Position Controller**

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| Technical Data and Specifications . . . . . | **V13-T1-125** |
| Dimensions . . . . . | **V13-T1-127** |

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## President Position Controller

### Product Description

The 58868400 closed-loop position control provides digital output signals (run, direction and fast/slow) to a drive to cause a motor-driven tool to be positioned along a single axis. These signals can also be used to control values in a hydraulic positioning system. Typically, a quadrature encoder, coupled to the drive mechanism, provides the feedback signal to the position control. Up to five destinations can be automatically sequenced through in a move-and-dwell process, or the operator can select a single destination for move-and-stop positioning.

### Features

- 6-digit, LED display, 14 mm (0.56 in) high characters
- 4 move registers plus home
- 2 Form C relays and 5 NPN transistor outputs
- 28 kHz count speed
- 5 dwell time settings
- 15 Vdc at 100 mA power output
- Manual or automatic operation
- Programmable offset, prewarn and kerf values
- Backlash compensation
- Programmable high/low limits
- 20 mA current loop communications
- NEMA 4X front panel

### Standards and Certifications

- UL Listed

UL Listed

### Product Selection

**58868400**

**President Position Control**

| Description | Catalog Number |
|---|---|
| Single-axis position control | **58868400** |

## Technical Data and Specifications

### General Specifications

| Description | Specification |
|---|---|
| **Power Input** | |
| AC operation | 120/240 Vac (±10%, –20%), 47 to 63 Hz |
| DC operation | 11 to 16 Vdc (0.7A maximum) |
| Power consumption | 18 watts maximum |
| **DC Power Output** | |
| Output | 15 Vdc (+1, –2), 100 mA maximum |
| **Environment** | |
| Operating temperature | 32° to 130°F (0° to 55°C) |
| Storage temperature | –40° to 160°F (–40° to 71°C) |
| Operating humidity | 85% relative, non-condensing |
| Rating | NEMA 4 rating when mounted with gasket provided |
| **Control Input Response** | |
| START/STOP | 1 mS |
| Go home input | 5 mS |
| Load position | 5 mS |
| Reference input | 1.7 mS |
| **Input Voltage** | |
| Count Inputs | |
| High | 10.5 to 24.5 Vdc |
| Low | 0 to 4.5 Vdc |
| Control Inputs | |
| High | 3.8 to 15.0 Vdc |
| Low | 0 to 1.2 Vdc |
| **Input Impedances** | |
| Count inputs | 6.8k ohms to +15 Vdc (2.2 mA at 0 Vdc) |
| Control inputs | 2.2k ohms to +5 Vdc (2.3 mA at 0 Vdc) |
| **Relay Outputs (2)** | |
| Type | Form C contacts |
| Load voltage | Up to 240 Vac or 280 Vdc |
| Load current | 5A resistive, 1.5A at 80% PF |
| **Transistor Outputs (5)** | |
| Type | NPN open collector with surge protection |
| Load voltage | 30 Vdc maximum |
| Load current | 300 mA maximum |
| Saturation | 1.5V maximum at 300 mA |
| Latency | 150 +5 µS/1 kHz input speed ±10 µS |
| **Communication** | |
| Type | 20 mA loop (active transmit, passive receive) |
| Speed | 110, 300 or 1200 baud |
| Parity | Odd, even, space |
| Format | 1 start bit, 7 data bits (ASCII), 1 parity bit, 1 stop bit (110 baud uses 2 stop bits) |
| Load voltage | 30 Vdc maximum |
| Load current | 300 mA maximum |
| Saturation | 1.5V maximum at 300 mA |
| Latency | 150 +5 µS/1 kHz input speed ±10 |

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## General Specifications, continued

| Description | Specification |
|---|---|
| **Input Frequency** ① | |
| Quadrature selection ② | |
| X1 ③ | |
| High speed | 28 kHz |
| Low speed | 150 Hz |
| X2 ③ | |
| High speed | 14 kHz |
| Low speed | 150 Hz |
| X4 ③ | |
| High speed | 7 kHz |
| Low speed | 150 Hz |
| **Position Control Features** | |
| Setpoints | Four move setpoints plus one home setpoint |
| Range (all setpoints) | –99999 to 999999 |
| Decimal point | Four positions, programmable |
| Dwell times | Five, one for each setpoint |
| Dwell time range | 00.01 to 99.98 seconds |
| Scale factor range | 0.00100 to 9.999999 |
| Accuracy | 100% when the position control is operated within the specified speeds and input voltages |

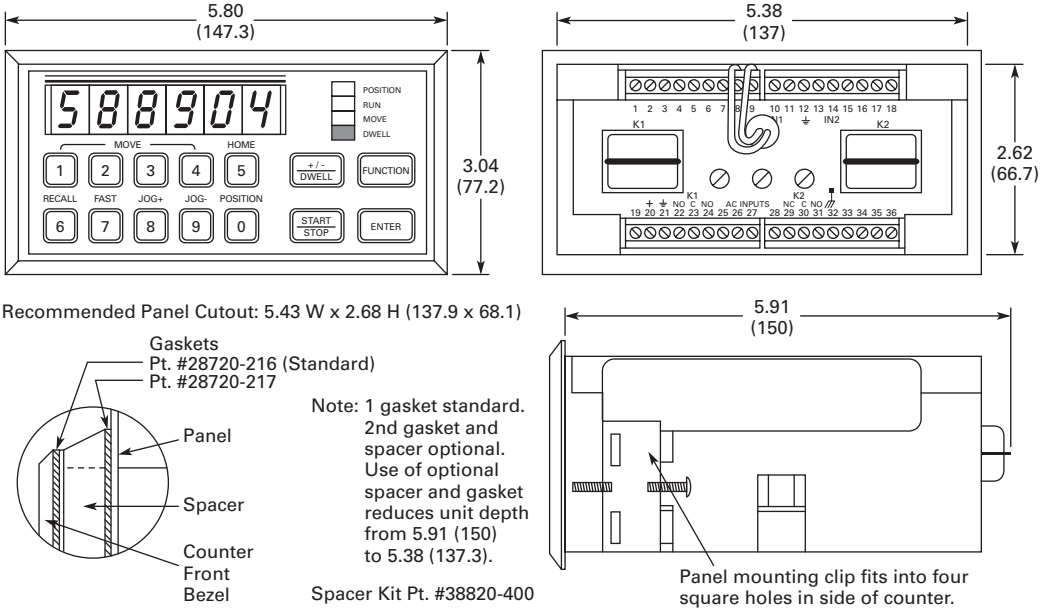
***Notes***

① Only function 60 and the double jumper affect the maximum input speed. The scale factor does not affect the input speed.
② The maximum input frequency only on the selected quadrature operation.
③ Low speed jumper installed.

## Dimensions

Approximate Dimensions in Inches (mm)

### President Position Controller




Recommended Panel Cutout: 5.43 W x 2.68 H (137.9 x 68.1)




Note: 1 gasket standard. 2nd gasket and spacer optional. Use of optional spacer and gasket reduces unit depth from 5.91 (150) to 5.38 (137.3).

Spacer Kit Pt. #38820-400




Panel mounting clip fits into four square holes in side of counter.

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TC Series

## Contents


| *Description* | *Page* |
|---|---|
| TC Series | |
| Product Selection | **V13-T1-129** |
| Technical Data and Specifications | **V13-T1-129** |
| Special Control Function Inputs | **V13-T1-130** |


## TC Series

### Product Description

Temperature controllers for a wide range of applications including heat treating, baking, packaging, furnace control, and chillers.

### Features and Benefits

- Universal temperature inputs allow user to select from PT100 or J, K, T, E, B, R, S, N, L thermocouples without modification to the unit
- Advanced fuzzy modified PID technology minimizes overshoot/undershoot and allows quick and accurate responses
- Fast sampling rate of up to five times per second ensures accuracy in fast processes
- Standard IP65 front panel (TC48) provides protection in wash-down and other challenging environments

### Standards and Certifications

- UL recognized
- CSA certified
- CE marked
- RoHS compliant

## Product Selection

**TC24411100**

**TC484120001**

**TC964110100**

### TC Series

| Description | Normally Stocked Item | Catalog Number |
|---|---|---|
| Temperature control, 24 x 48 mm, two relay out, 90–250 Vac | Yes | **TC24411100** |
| Temperature control, 24 x 48 mm, SSR driver/relay out, 90–250 Vac | Yes | **TC24412100** |
| Temperature control, 48 x 48 mm, one relay out, relay alarm, 90–250 Vac | Yes | **TC484110101** |
| Temperature control, 48 x 48 mm, SSR driver out, 90–250 Vac | Yes | **TC484120001** |
| Temperature control, 48 x 48 mm, SSR driver out, relay alarm, 90–250 Vac | Yes | **TC484120101** |
| Temperature control, 48 x 48 mm, analog out, relay alarm, 90–250 Vac | Yes | **TC484130101** |
| Temperature control, 96 x 48 mm, one relay out, relay alarm, 90–250 Vac | Yes | **TC964110100** |
| Temperature control, 24 x 48 mm, two relay out, 11–26 Vac/Vdc | — | **TC24511100** |
| Temperature control, 48 x 48 mm, one relay out, relay alarm, 11–26 Vac/Vdc | — | **TC485110101** |
| Process control, 24 x 48 mm, analog/relay out, 90–250 Vac | — | **PC24463100** |
| Temperature control, 48 x 48 mm, analog out, relay alarm, 90–250 Vac | — | **TC24413100** |

## Technical Data and Specifications

### General Specifications

| Description | Specification |
|---|---|
| **Power** | |
| Power | 90–250 Vac, 47–63 Hz, 10 VA (TC24), 12 VA (TC48/TC96), 5W maximum (TCxx4) |
| | 11–26 Vac/Vdc, 10 VA (TC24), 12 VA (TC48/TC96), 5W maximum (TCxx5) |
| **Input** | |
| Resolution | 18 bits |
| Sampling rate | 5 times/second |
| Temperature effect | ±1.5 µV/°C for all inputs except mV input |
| | ±3.0 µV/°C for mV input |
| Sensor lead resistance effect | |
| T/C | 0.2 µV/ohm |
| Three-wire RTD | 2.6°C/ohm of resistance difference of 2 leads |
| Two-wire RTD | 2.6°C/ohm of resistance sum of 2 leads |
| Burn-out current | 200nA |
| Common mode rejection ratio (CMRR) | 120dB |
| Normal mode rejection ratio (NMRR) | 55dB |
| Sensor break detection | Sensor open for TC, RTD and mV inputs, sensor short for RTD input, below 1 mA for 4–20 mA, below 0.25V for 1–5V input |
| Sensor break response time | Within 4 seconds for TC, RTD, and mV inputs; 0.1 second for 4–20 mA and 1–5V inputs |
| **Output** | |
| Relay rating | 2A/240 Vac; 200,000 life cycles for resistive load |
| Pulsed voltage | Source voltage 5V, current limiting resistance of 66 ohms |
| Linear output | |
| Resolution | 15 bits |
| Output regulation | 0.02% for full load change |
| Output setting time | 0.1 sec. (stable to 99.9%) |
| Isolation breakdown voltage | 1000 Vac |
| Temperature effect | ±0.01% of SPAN/°C |

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### General Specifications, continued

| Description | Specification |
|---|---|
| **Alarm** | |
| Alarm relay | Form C rating; 2A/240 Vac; 200,000 life cycles for resistive load |
| Alarm functions | Dwell timer, deviation high/low alarm, deviation band high/low alarm, PV high/low alarm |
| Alarm mode | Normal, latching, hold, latching/hold |
| Dwell timer | 0.1 to 4553.6 minutes |
| **Environmental and Physical** | |
| Operating temperature | 14° to 122°F (–10° to 50°C) |
| Storage temperature | –40° to 140°F (–40° to 60°C) |
| Humidity | 0–90% RH (non-condensing) |
| Altitude | 2000m max. |
| Pollution | Degree 2 |
| Insulation resistance | 20M ohms min. (at 500 Vdc) |
| Dielectric strength | 2000 Vac, 50/60 Hz for 1 minute |
| Vibration resistance | 10–55 Hz, 10 $m/s^2$ for 1 minute |
| Moldings | Flame resistant polycarbonate |
| Dimensions | TC96 = 1.88 in (48 mm) (W) x 3.77 in (96 mm) (H) x 3.15 in (80 mm) (D) |
| | TC48 = 1.88 in (48 mm) (W) x 1.88 in (48 mm) (H) x 4.56 in (116 mm) (D) |
| | TC24 = 1.96 in (50 mm) (W) x 1.04 in (26.5 mm) (H) x 4.35 (110.5 mm) (D) |

## Special Control Function Inputs

### Input Characteristics

| Type | Range | Accuracy at 25°C | Input Impedance |
|---|---|---|---|
| J | –120° to 1000°C (–184° to 1832°F) | ±2°C | 2.2M ohms |
| K | –200° to 1370°C (–328° to 2498°F) | ±2°C | 2.2M ohms |
| T | –250° to 400°C (–418° to 752°F) | ±2°C | 2.2M ohms |
| E | –100° to 900°C (–148° to 1652°F) | ±2°C | 2.2M ohms |
| B | 0° to 1800°C (32° to 3272°F) | ±2°C (–200° to 1800°C) | 2.2M ohms |
| R | 0° to 1767.8°C (32° to 3214°F) | ±2°C | 2.2M ohms |
| S | 0° to 1767.8°C (32° to 3214°F) | ±2°C | 2.2M ohms |
| N | –250° to 1300°C (–418° to 2372°F) | ±2°C | 2.2M ohms |
| L | –200° to 900°C (–328° to 1652°F) | ±2°C | 2.2M ohms |
| PT100 (DIN) | –210° to 700°C (–346° to 1292°F) | ±0.4°C | 1.3k ohms |
| PT100 (JIS) | –200° to 600°C (–328° to 1112°F) | ±0.4°C | 1.3k ohms |
| mV | –8 mV to 70 mV | ±0.05% | 2.2M ohms |
| mA | –3 mA to 27 mA | ±0.05% | 70.5 ohms |
| V | –1.3V to 11.5V | ±0.05% | 650k ohms |

**Accessories and Encoders**

## Contents


| *Description* | *Page* |
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| Accessories and Encoders | |
| DIN Rail Adapter | **V13-T1-132** |
| C-Face Ring Tachometer | **V13-T1-133** |
| Magnetic Pickup Sensor and Gear | **V13-T1-134** |
| Rotary Contactor—ES9513/ES9513RS | **V13-T1-134** |
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| Cube Style Shaft Encoders | **V13-T1-136** |
| Heavy-Duty Shaft Encoders | **V13-T1-139** |
| Right Angle, Size 20 Shaft Encoders | **V13-T1-142** |


# Accessories and Encoders

### Product Overview

Eaton offers a variety of accessories to complement our counting and control product offering.

### Features

- Easy integration with Eaton counters

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## DIN Rail Adapter

### Product Description

Allows mounting of 1/32 DIN front panel mounted products to DIN rail inside panel.

### Features

- For panel-mounting all DIN size counters, timers and process indicators 0.94 x 1.89 in (24 x 48 mm) or 1.97 x 0.98 in (50 x 25 mm)
- Cut-out: 0.98 x 1.97 in (25 x 50 mm)
- For snap-on fitting to 35 mm top hat DIN rails
- Construction—
  - Mounting panel for counter: Chrome-plated sheet steel
  - Top hat DIN rail adapter: Glass fiber reinforced polymide

### Product Selection

**A2448DINADAPT**

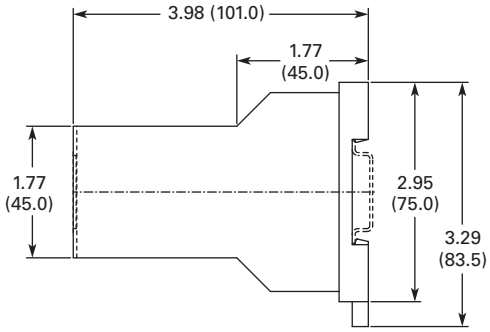
#### DIN Rail Adapter

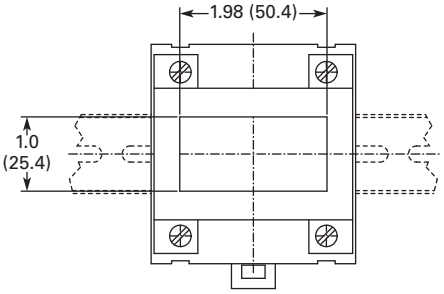
| Description | Catalog Number |
|---|---|
| DIN rail adapter for 1/32 DIN panel mount devices | **A2448DINADAPT** |

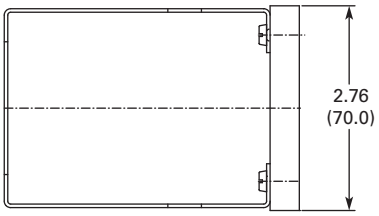
### Dimensions

Approximate Dimensions in Inches (mm)

#### DIN Rail Adapter



## C-Face Ring Tachometer

### Product Description

Provides sensing of motor speed when used with ratemeter/tachometer.

### Features

- 5–16 Vdc input power
- NPN transistor output, 20 mA sinking capacity
- 60 pulses per resolution
- Zero speed pickup
- Variety of motor C-face sizes: 56, 184, 254, 256
- 39° to 225°F (4° to 107°C) operating temperature

### Product Selection

**47007_**

#### C-Face Sensor

| Description | Normally Stocked Item | Catalog Number |
|---|---|---|
| Motor size 56C | Yes | **47007056** |
| Motor size 143TC, 145TC, 182C, 184C | Yes | **47007184** |
| Motor size 184TC, 213C, 215C, 254C | Yes | **47007215** |

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## Magnetic Pickup Sensor and Gear

### Product Description

Sensor ideal for use with a variety of Eaton counters to show motor/shaft speed or measurement.

### Features

***Magnetic Pickup***

- 0.25 in (6.4 mm) diameter
- Ideal for tachometer and rate control applications
- –40° to 298°F (–40° to 148°C) operating temperature
- Output is AC signal, amplitude proportional to speed of target
- 10 ft (3m) cable attached
- L-mounting bracket included

***30-Tooth Gear Accessory***

- 1.6 in (41 mm) diameter
- 0.275 in (7 mm) bore diameter
- Mounting set screw included

### Product Selection

**47004400 and 28433400**

#### Magnetic Pickup Sensor and Gear

| Description | Catalog Number |
|---|---|
| Magnetic pickup | **47004400** |
| 30-tooth gear for magnetic pickup | **28433400** |

## Rotary Contactor—ES9513/ES9513RS

### Product Description

Simple reed switch circuit to provide a contact closure for counting.

### Features

- No power required
- Reed switch output models for electronic counters
- Contact closure output
- Leaf switch output models for electromechanical counters
- 5/16 in (7.9 mm) double shaft, 2400 rpm max. at 1:1 ratio
- 12 in (304.8 mm) wire leads

### Product Selection

**3910040**

#### Rotary Contactor

| Description | Rotary Contactor | Catalog Number |
|---|---|---|
| 12:1 ratio reed switch output | ES9513RS | **39100400** |
| 10:1 ratio reed switch output | ES9513RS | **39100401** |
| 1:1 ratio reed switch output | ES9513RS | **41100400** |
| 1:3 ratio reed switch output | ES9513RS | **41100401** |
| 1:3.28 ratio reed switch output | ES9513RS | **41100402** |
| 1:10 ratio reed switch output | ES9513RS | **41100403** |
| 1:10 ratio leaf switch output | ES9513 | **40892400** |
| 1:1 ratio leaf switch output | ES9513 | **40891400** |
| 1:3 ratio leaf switch output | ES9513 | **40892401** |

## Measuring Wheels

### Product Description

Measuring wheel mounts to Eaton encoders and rotary contactor to allow for accurate measurement.

### Features

- For use with shaft encoders and rotary contactors
- 12 in (304.8 mm) meter circumference
- Urethane, rubber and knurled edges available

### Product Selection

**Measuring Wheel**

#### 1 Ft Circumference Measuring Wheels

| Description | Normally Stocked Item | Catalog Number |
|---|---|---|
| 5/16 in bore, urethane rim | Yes | **20144300KIT** |
| 3/8 in bore, urethane rim | — | **20144303KIT** |
| 5/16 in bore, rubber rim | Yes | **20154300KIT** |
| 3/8 in bore, rubber rim | Yes | **20154301KIT** |
| 5/16 in bore, knurled rim | Yes | **20156300KIT** |
| 3/8 in bore, knurled rim | — | **20156301** |

## Mounting Bracket

### Product Description

Mounting bracket for Eaton D-Series counters and rotary contactors.

### Product Selection

**Mounting Bracket**

#### Mounting Bracket

| Description | Normally Stocked Item | Catalog Number |
|---|---|---|
| Mounting bracket | Yes | **40460400** |

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## Cube Style Shaft Encoders

### Product Description

Provides accurate pulse outputs for use with PLCs and counters.

### Features

- 5–28 Vdc input power
- 80 mA current draw
- NPN transistor output, 250 mA sinking capacity
- Square wave output; (50-50 duty cycle)
- Single channel and quadrature models
- Up to 600 pulses per revolution
- 3/8 in (9.5 mm) double ended shaft
- ABEC three double sealed ball bearings
- Tapped holes for face or base mounting
- Military style connector

### Product Selection

**Cube Shaft Encoder**

#### Cube Shaft Encoders

| Description | Normally Stocked Item | Catalog Number |
|---|---|---|
| **Single Channel** | | |
| 60 pulses per revolution | — | **38150060** |
| 100 pulses per revolution | Yes | **38150100** |
| 120 pulses per revolution | — | **38150120** |
| 600 pulses per revolution | Yes | **38150600** |
| **Quadrature** | | |
| 60 pulses per revolution | — | **38151060** |
| 100 pulses per revolution | Yes | **38151100** |
| 120 pulses per revolution | — | **38151120** |
| 600 pulses per revolution | Yes | **38151600** |

### Accessory

**Mounting Bracket**

#### Mounting Bracket ①

| Description | Normally Stocked Item | Catalog Number |
|---|---|---|
| Mounting bracket | — | **40460402** |

***Note***

① 40460400 is shown, 40460402 has additional mounting plate for encoders.

## Technical Data and Specifications

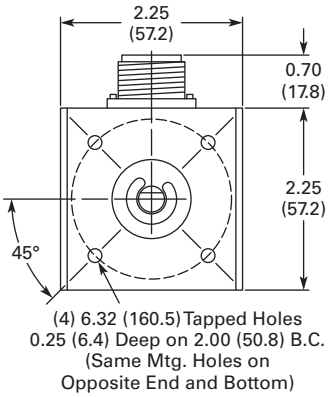
### General Specifications

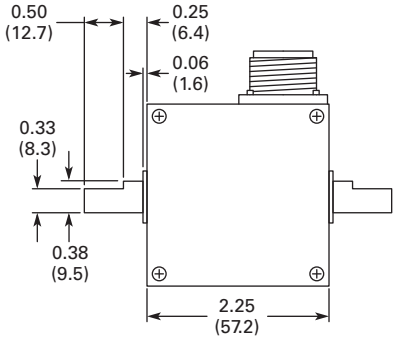
| Description | Specification |
|---|---|
| **Electrical** | |
| Input (38150) | |
| Voltage | 9 to 16 Vdc |
| Current | 60 mA max. at 16 Vdc |
| Ripple | 2% |
| Input (38151) | |
| Voltage | 5 to 28 Vdc |
| Current | 60 mA nom., 100 mA max. |
| Ripple | ≤2% |
| Output | |
| Type | Current sinking transistor with 1.5k ohms pull-up |
| Sinking current | 100 mA max. |
| Max. voltage at 100 mA | 1.3 Vdc |
| Blocking voltage | 40 Vdc max. |
| Polarity | Positive |
| Wave shape | Square wave |
| Pulse rate | |
| 38150 | 1 to 20,000 pulse per second |
| 38151 | 1 to 10,000 pulse per second |
| Rise time | <1 µS |
| Pulses per rev. | 1 to 1270 |
| Accuracy | Within ±0.1° |
| **Environmental** | |
| Operating temperature | 32° to 167°F (0° to 75°C) |
| Vibration | 3 Gs at 5 to 1000 cps |
| Shock | 20 Gs, 10 ms |
| **Mechanical** | |
| Shaft speed | 6000 RPM max. |
| Shaft rotation | CW or CCW |
| Bearings | Sealed ball bearings |
| Starting torque | 0.1 oz-in |
| Moment of inertia | 0.0025 ounce in-sec$^2$ |
| Radial loading | 40 pounds operating |
| Axial loading | 30 pounds operating |
| Shaft | 3/8 in (9.5 mm) dia. |
| Operating life | Up to 100,000 hours, depending on speed |
| Housing | Aluminum with black anodized finish. Sealed against dust, oil, vapor and moisture. |
| Mounting | Bottom or front face |
| Weight | 1 lb (0.5 kg) max. |
| Connector | MS-3102E-14S-6P |
| Mating connector | MS-3106A-14S-6S with 10 ft (3m) shielded cable and termination for electronic controls |

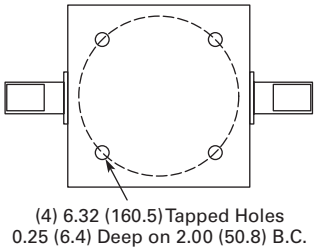
## 1 Dimensions

Approximate Dimensions in Inches (mm)

### Cube Shaft Encoders



# Heavy-Duty Shaft Encoders

## Product Description

Provides accurate pulse outputs for use with PLCs and counters.

## Features

- 5–28 Vdc input power
- 80 mA current draw
- NPN transistor output, 250 mA sinking capacity
- Square wave output
- Single channel and quadrature models
- 3/8 in (9.5 mm) single ended shaft
- ABEC 3 double sealed ball bearings
- Tapped holes for face or base mounting
- Military style connector

## Product Selection

**Heavy-Duty Shaft Encoder**

### Heavy-Duty Encoder

| Description | Normally Stocked Item | Catalog Number |
|---|---|---|
| **Single Channel** | | |
| 60 pulses per revolution | Yes | **48370060** |
| 100 pulses per revolution | — | **48370100** |
| 120 pulses per revolution | Yes | **48370120** |
| 600 pulses per revolution | Yes | **48370600** |
| **Quadrature** | | |
| 60 pulses per revolution | Yes | **48371060** |
| 100 pulses per revolution | Yes | **48371100** |
| 100 pulses per revolution | Yes | **48371120** |
| 600 pulses per revolution | Yes | **48371600** |

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## Technical Data and Specifications

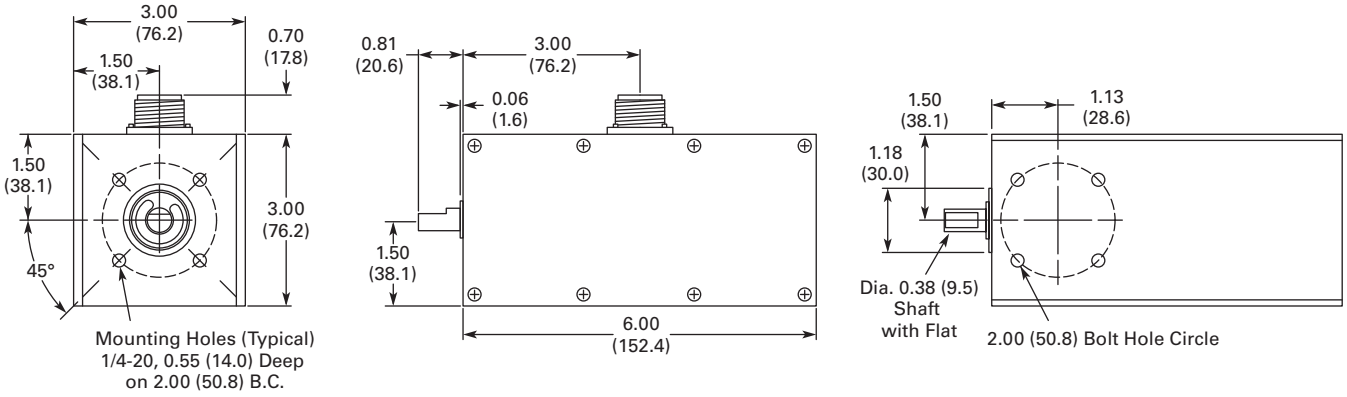
### General Specifications

| Description | Specification |
|---|---|
| **Electrical** | |
| Input | |
| Voltage | 5 to 28 Vdc |
| Current | 60 mA nom., 100 mA max. |
| Ripple | –2% |
| Output | |
| Type | Current sinking transistor with 1.5k ohms pull-up |
| Sinking current | 100 mA max. |
| Max. voltage at 100 mA | 1.3 Vdc |
| Blocking voltage | 40 Vdc max. |
| Polarity | Positive |
| Wave shape | Square wave (50-50 duty) |
| Pulse rate | 0 to 20,000 pulse per second |
| Rise time | <1 µS |
| Pulses per rev. | 1 to 1270 |
| Accuracy | Within ± 0.1° or 6 arc minutes |
| **Environmental** | |
| Operating temperature | 32° to 167°F (0° to 75°C) |
| Vibration | 3 Gs at 58 to 500 cps |
| Shock | 50 Gs, 11 ms duration |
| **Mechanical** | |
| Shaft speed | 6000 RPM max. |
| Shaft rotation | CW or CCW |
| Bearings | Sealed ball bearings |
| Starting torque | 1.0 oz-in |
| Radial loading | 50 pounds operating |
| Axial loading | 35 pounds operating |
| Shaft | 3/8 in (9.5 mm) dia. |
| Housing | Aluminum with black painted finish. Sealed against dust, oil, vapor and moisture. |
| Mounting | Provisions for bottom or front face |
| Weight | 3.25 lbs (1.47 kg) max. |
| Connector | MS-3102E-14S-6P |
| Mating connector | MS-3106A-14S-6S with 10 ft (3m) shielded cable and termination for electronic controls (Part No. 29665-300) |
| | Connector, clamp and bushing only (Part No. 29729-300) |

## Dimensions

Approximate Dimensions in Inches (mm)

### Heavy-Duty Encoder



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## Right Angle, Size 20 Shaft Encoders

### Product Description

Provides accurate pulse outputs for use with PLCs and counters.

### Features

- 5–28 Vdc input power
- 100 mA current draw
- NPN transistor output, 100 mA sinking capacity
- Quadrature output, two square waves
- Up to 1800 pulses per revolution
- Flange mounting
- 3/8 in (9.5 mm) shaft diameter
- Double shielded ball bearings
- Military style connector

### Product Selection

**38159_**

#### Right-Angle Shaft Encoder, Size 20

| Description | Catalog Number |
|---|---|
| 100 pulses per revolution | **38159100** |
| 120 pulses per revolution | **38159120** |
| 600 pulses per revolution | **38159600** |
| 1000 pulses per revolution | **381591000** |
| 1800 pulses per revolution | **381591800** |

#### Encoder Cables

| Description | Catalog Number |
|---|---|
| 10 ft encoder cable | **29665300** |
| 15 ft encoder cable | **29665315** |
| 20 ft encoder cable | **29665320** |
| 25 ft encoder cable | **29665325** |
| 30 ft encoder cable | **29665330** |
| 35 ft encoder cable | **29665335** |
| 40 ft encoder cable | **29665340** |
| 50 ft encoder cable | **29665350** |
| 75 ft encoder cable | **29665375** |
| 100 ft encoder cable | **29665400** |

## Technical Data and Specifications

### General Specifications

| Description | Specification |
|---|---|
| **Electrical** | |
| Input | |
| Voltage | 5 to 28 Vdc (4.75 min., 28.0 max.) |
| Current | 100 mA max. with no output load |
| Ripple | –2% peak to peak at 5 Vdc |
| Output | |
| Type | Quadrature current sinking transistors with 2.2k ohms pull-up |
| Sinking current | 100 mA max. |
| Max. voltage at 100 mA | 1.3 Vdc |
| Blocking voltage | 40 Vdc max. |
| Polarity | Positive |
| Wave shape | Square wave (50-50 duty cycle) |
| Pulse rate | 0 to 100,000 pulses per second |
| Noise immunity | Tested to BS EN6100-4-2; IEC801-3; BS EN61000-4-4; DDENV 50141; DDENV 50204; BS EN55022 (with European compliance option) |
| Symmetry | 180 electrical degrees ±18 |
| Quadrature phasing | 90 electrical degrees ±36 |
| Minimum edge separation | 54 electrical degrees |
| Rise time | <1 µS |
| Pulses per rev. | 1 to 1270 |
| Accuracy | Within ±0.1° |
| **Environmental** | |
| Operating temperature | 32° to 158°F (0° to 70°C) |
| Vibration | 20 Gs at 50 to 500 cps |
| Shock | 75 Gs, 11 ms |
| **Mechanical** | |
| Shaft speed | 8000 RPM max. |
| Shaft rotation | CW or CCW |
| Bearings | Double shielded ball bearings |
| Starting torque | 1.0 oz-in typical |
| Moment of inertia | $5.2 \times 10^4$ ounce in-sec$^2$ |
| Radial and axial loading | (80 lbs max.) 20–40 lbs for bearing life of $1.5 \times 10^9$ revolutions |
| Maximum acceleration | $1 \times 10^5$ radians/second$^2$ |
| Shaft | 0.375 in (9.5 mm) dia. |
| Housing | Black non-corrosive finish. Sealed against dust, oil, vapor and moisture. |
| Mounting | Flange mount |
| Weight | 11 oz (312g) |
| Connector | MS-3102E-14S-6P |
| Mating connector | MS-3106A-14S-6S with 10 ft (3m) shielded cable and termination for electronic controls (Part No. 29665-300) |
| | Connector, clamp and bushing only (Part No. 29729-300) |

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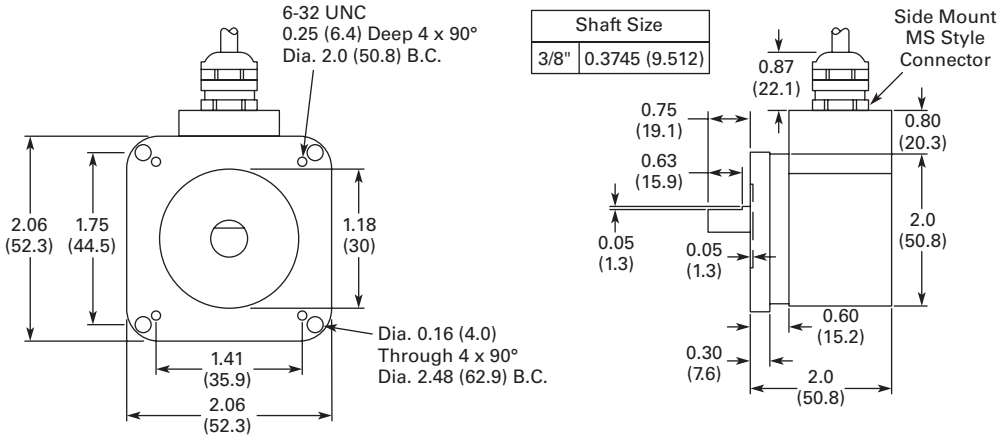
## Dimensions

Approximate Dimensions in Inches (mm)

### Right-Angle Shaft Encoder



## Spare Parts

| Style Number | Description |
|---|---|
| 36172202KIT | Front panel gasket |
| 48369200KIT | Mounting clip |
| 28748200KIT | Screw for mounting clip |
| 48355110KIT | Terminal strip—10 position |
| 48355112KIT | Terminal strip—12 position |
| 58802420 | Desk kit for President Series (part numbers 5882–5886 and 5782) |
| 29729300 | Accessories connector |
| 56460400 | Sequence control |
| 57044200KIT | 6460 keypad |
| 57740290KIT | Mounting clip |
| 46066220KIT | Gasket |
| 48720623KIT | Ambassador front keypad |
| 28720400KIT | Kit mounting Ambassador Series |
| 48720614KIT | Label position control |
| 48720280KIT | Label membrane switch, Ambassador |

## General Accessories

| Style Number | Description |
|---|---|
| 48160400 | Input signal conditioner |
| 48160440 | Timer module (selectable time base oscillator) |
| 48160451 | Analog to frequency converter |
| 499904xx(08/16) | Simultaneous input processor (anti-coincidence counting from multiple input devices) 8 inputs/16 inputs |
| 38091400 | RC surge suppressor |
| 3605945x(0/1) | Solid-state I/O modules (AC input and output, DC input and output) 0 = DC, 1= AC |
| 36059201 | Plug-in-module, 10–32 Vdc or 15–32 Vac input |
| 36059202 | Plug-in-module, 12–140 Vac output |

## Fusion

| Style Number | Description |
|---|---|
| 47590200 | Front overlay label |

## Ambassador Family Accessories

| Style Number | Description |
|---|---|
| 48183401 | Desk mount kit (enclosure for flat surface mounting) |
| 58801460 | RS-485 to RS-232 communications converter |
| 58801461 | RS-485 to RS-232 communications converter (Europe) |
| 38145400 | RS-485 interconnect kit |
| 38146xxxx | RS-485 cable—xxxx is length in feet, specify with 4 digits (0500 = 500 ft) ① |

## President

| Style Number | Description |
|---|---|
| 28720302KIT | Mounting kit |
| 28720301KIT | Kit mounting clip and gasket |
| 48720410 | 5881-0 President replace label |
| 48720420 | Label kit |
| 48720430 | Kit label replace Lexan to Mylar |
| 48720440 | 5884 President replace label |
| 48720450 | 5885 President replace label |
| 48720460 | 5886 President replace label |

***Note***

① Call EatonCare.