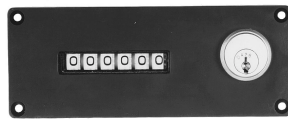# Factory Automation & Feedback Controls

2006 Product Catalog

- COUNTERS
- TIMERS
- PANEL METERS
- TACHOMETERS
- ACCESSORIES
and Other Devices

Veeder-Root™ brand

Eagle Signal™ brand

Dynapar™ brand

DANAHER
INDUSTRIAL CONTROLS

To Our Valued Customers . . .

INTRODUCING DANAHER INDUSTRIAL CONTROLS

Danaher Industrial Controls was formed through the merger of the Dynapar Corporation, the motion control specialists, the Veeder-Root Company, the best known name in counting, and Eagle Signal Controls, the premier name in timing. This total capability in factory automation brings you over 230 combined years of design, manufacturing, and applications experience – plus a commitment to service and quality unmatched in the industry. By pooling resources, we provide you with:

- A Broader Product Line
- An International, Well-Trained Distribution Organization
- Increased Availability and Service

ONE SOURCE FOR ALL YOUR NEEDS

The Danaher Industrial Controls catalog offers you one-stop shopping for all of your counting, motion control and timing needs.

Our Veeder-Root brand offers a full range of electronic, mechanical and electromechanical totalizing and preset counters, as well as production monitors and sensors – all proven worldwide, in thousands of plants.

Dynapar brand products are backed by our extensive experience in digital systems used for display and control of speed, length, position and motion. The Dynapar brand's complete line of encoders can meet your every need and includes the Rotopulser® Series – the leading choice when mill-duty strength is required in power transmission and variable speed drive applications.

Under the Eagle Signal brand, we provide timing and control products that reflect over 70 years of electromechanical and electronic design experience. In addition to a full range of panel-mount timers, an excellent selection of Eagle Signal brand time delay and general purpose relays may be found in this catalog.

TOTAL COMMITMENT TO THE CUSTOMER

Danaher Industrial Controls' dedication to customer service is unparalleled in the industry, with company wide commitment to *responsiveness, reliability, and attitude*:

Responsiveness starts by meeting your delivery needs – shipping your order quickly and correctly. But it goes beyond that . . . Every Danaher Industrial Controls employee takes pride in servicing your requests for price, delivery, or technical information in a fast, accurate manner.

Reliability starts by providing products that are designed, manufactured, and tested to the highest quality standards – shipped on our promised date. In addition, we believe that reliable service includes everything from correct answers to your application questions to the accuracy of the information in this catalog.

An *attitude* that is always direct and professional – reflecting our appreciation of your business.

Commitment to ISO-9000 practices assures our customers that we deliver world class products and customer service. ISO-9000 (International Organization for Standardization) is the quality standard developed by the European Economic Community and is intended to promote worldwide quality assurance and management systems standardization.

Every Danaher Industrial Controls field salesperson is an experienced application engineer able to provide sound technical guidance. Customer satisfaction training gives every member of our team an attitude that makes the customer come first. This means that you can expect excellent customer service from Danaher Industrial Controls today, and our program for continuous improvement means that you can expect it tomorrow as well.

DANAHER INDUSTRIAL CONTROLS AUTHORIZED DISTRIBUTORS

All of the products in this catalog are available from an Authorized Danaher Industrial Controls Distributor near you. Our worldwide distributor locations receive constant training in the application, installation and operation of our products. This means that they are readily available to assist you with product selection and application details. For additional information or the name of your nearest Danaher Industrial Controls Distributor, contact us at the telephone numbers listed below.

DANAHER INDUSTRIAL CONTROLS COMMUNICATIONS:

Customer Service:
Tel.: +1.800.390.6405
Fax: +1.910.879.5486
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www.eagle-signal.com • www.veeder-rootcounters.com • www.danaherindustrialcontrols.com

OUR MODERN MANUFACTURING FACILITIES

Danaher Industrial Controls constantly studies and refines the manufacturing methods and processes used to produce our Dynapar, Eagle Signal, and Veeder-Root brand products. Modern cellular manufacturing and Just-In-Time techniques provide you with impeccable product quality and fast, reliable deliveries.

Our two production facilities are located in Gurnee, Illinois and Elizabethtown, North Carolina. The Gurnee operation primarily manufactures Dynapar brand encoders and related products and is also the location of our world headquarters. Counters, timers, and related Veeder-Root, Dynapar, and Eagle Signal brand products are produced in Elizabethtown.

Customer visits are always welcome at

our Gurnee, Illinois facility   *or . . .*   *our plant in Elizabethtown, North Carolina.*

HOW TO USE THIS CATALOG

QUICK START

The Quick Choice "Trees" and Product Function Selector Guide that immediately follow can provide an easy way to select the best products within our counter, timer, and encoder product lines for your applications. Further definition of products can be found in the Selector Guides located at the beginning of each catalog section.

TABLE OF CONTENTS

You will find the Table of Contents for this Danaher Industrial Controls Catalog on the following two pages.
Products are sectioned by primary function. Each product section's Introduction and Selector Guide, as well as secondary product classifications, are listed in bold typeface.

PRODUCT INTRODUCTIONS

The introduction pages, at the beginning of each product section, provide you with a brief overview of the functions, capabilities, and applications of the cataloged products.

Various technologies utilized, display types, input/output requirements, and application considerations are discussed.

Reading the introduction pages can be very helpful in preparing to select the specific product for your application.
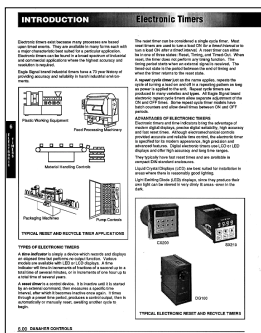
SELECTOR GUIDES

A Selector Guide follows the section's Introduction. The Selector Guide pages are a visual, "shortcut" representation of the products' major features and benefits. A definition of each product's functions and features and reference to its catalog page number is also provided.

The Selector Guide is the perfect overview for determining the scope of a section's listed products.
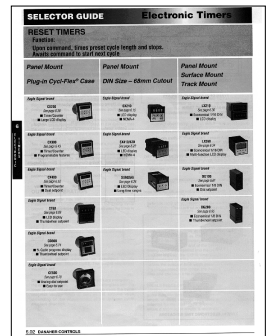
PRODUCT PAGES

The catalog's product pages provide function and feature descriptions, specifications, dimensions, and model and accessory part numbers.

Products that feature a wide range of wiring, programing, and/or operational options are presented in a condensed format. Additional information for such products is available in the form of technical bulletins or manuals. We will be happy to provide these documents upon request.

D DANAHER
INDUSTRIAL CONTROLS

Geting Started: Your product selection may be greatly simplified by refering to our *Quick Choice* and *Product Function* guides.

1 ELECTRONIC TOTALIZING COUNTERS

2 ELECTRONIC PREDETERMINING COUNTERS

3 MECHANICAL/ELECTRIC COUNTERS

See Section 15 for Alphanumerical Product-to-Page Index

4 RATE INDICATORS & CONTROLLERS

5 ELECTRONIC TIMERS

6 ELECTRIC TIMERS

**Request Separate Encoder
Catalog, Number E101**

See inside back cover for list of sales offices

Totalizing and Predetermining Counters

This Quick Choice Guide can assist you in determining the type of totalizing or predetermining counter that best fits your application requirements. Complete product information is available by turning to referenced page numbers. An overview of all products is located in the Selector Guide that is located at the begining of each catalog section. The ⭐ symbol denotes our "Star Products" which we recommend be given first consideration. They offer maximum functionality, performance, and value.

Control Output Required [?]

No → **Digital Wheel Display** [?]

Electronic Display [?]

- **LCD** [?]
  - **Input Scaling Required** [?]
    - **Yes** — *Series A103* ⭐ Page 1.03 — Ideal for most Applications; *Add/Subtract Input* A103-001; *Quadrature Input* A103-002
    - **No** — *A103-000* ⭐ Page 1.03 — Ideal for most Applications; *Series C342* ⭐ Page 1.04 — Ideal for most Applications
- **LED** [?]
  - **Input Scaling Required** [?]
    - **Yes** — *C628-0* ⭐ Page 1.02 — Ideal for most Applications
    - **No** — *Series C342* ⭐ Page 1.04 — Ideal for most Applications

Mechanical [?] — **Input**
- **Electric** — *Series 7790/91* ⭐ Page 3.21 — Ideal for most Applications
- **Mechanical** — *Series 1259 - 1262* ⭐ Page 3.09 — Ideal for most Applications

Yes → **Input Scaling Required** [?]

- **Yes** — **Form Factor** [?]
  - **1/16 DIN** — *C346* ⭐ Page 2.04 — Ideal for most Applications… but if special features are needed
  - **1/8 DIN** — *C628-7* ⭐ Page 2.08 — Ideal for most Applications
- **No** — *A103-007* ⭐ Page 2.07 — Ideal for most Applications

Special Features

- **Background Totalizer** / **40 kHz Count Speed** / **RS-485 Communications** — *MAX Count 2* Page 2.11
- **Position Control** — *MAX Position 1* Page 2.13
- **Batching** — *Squire* Page 2.06 / *V4545* Page 2.05
- **Additional Outputs**
  - *3 Preset* — *MAX Count 2* Page 2.11
  - *16 Preset* — *Max Count 6* Page 2.12

QUICK CHOICE

Timers

This Quick Choice Guide can assist you in determining the type of timer that best fits your application requirements. Complete product information is available by turning to referenced page numbers. An overview of all products is located in the Selector Guide that is located at the beginning of each catalog section. The ⚝ symbol denotes our "Star Products" which we recommend be given first consideration. They offer maximum functionality, performance, and value.

Control Output Required [?]

- **NO**
  - **A103-006** ⚝
    Page 5.44
    Ideal for most Applications
  - **C342** ⚝
    Page 5.13
    Ideal for most Applications
  - **C628** ⚝
    Page 5.11
    Ideal for most Applications
  - **EHM** ⚝
    Page 5.46
    Electronic Hourmeter

- **Yes**
  - **Display Required** [?]
    - **NO**
      - **Multifunction** [?]
      - **Repeat Cycle** [?]
        - **Series DA**
          Pages 5.36 & 5.38
          Ideal for most Applications
        - **Series B866** ⚝
          Pages 5.04
          Ideal for most Applications
    - **Yes**
      - **Display Type** [?]
        - **Pointer**
          - **Series HP5**
            Page 6.08
            Industry Standard
        - **Digital** [?]
          - **Digital Display** [?]
            - **LED**
              - **Dual Setpoint** [?]
                - **Series B506-2**
                  Page 5.08
                  Ideal for most Applications
              - **Repeat Cycle** [?]
                - **Series B506-7**
                  Page 5.08
                  Ideal for most Applications
              - **Multifunction** [?]
                - **Series B506-5**
                  Page 5.08
                  Ideal for most Applications
            - **LCD**
              - **Multifunction** [?]
              - **On-Delay / Interval** [?]
                - **Series B90D** ⚝
                  Page 5.10
                  DIN Rail Mount
                - **A103-008** ⚝
                  Page 5.12
                  Ideal for most Applications
                - **Series CX200**
                  Page 5.24
                  Ideal for most Applications
                - **Series B856** ⚝
                  Page 5.06
                  Ideal for most Applications
                - **Series CX300**
                  Page 5.26
                  Ideal for most Applications

DANAHER INDUSTRIAL CONTROLS II

QUICK CHOICE

Rate and Speed Control

This Quick Choice Guide can assist you in determining the type of rate or speed product that best fits your application requirements. Complete product information is available by turning to referenced page numbers. An overview of all products is located in the Selector Guide that is located at the beginning of each catalog section. The ⭐ symbol denotes our "Star Products" which we recommend be given first consideration. They offer maximum functionality, performance, and value.

External Drive Exists [?]

- **Yes** → **Motor Horsepower [?]**
  - **Fractional** → MDjr1 — Page 8.04 ⭐ — Ideal for most Applications
  - **1 to 2** → MDjr2 — Page 8.05 ⭐ — Ideal for most Applications

- **No** → **Motor Control Output [?]**
  - **Yes** →
    - MSjr4 — Page 8.02 ⭐ — Ideal for most Applications… *but if analog trim input is required* → MSjr5 — Page 8.03 ⭐ — Ideal for most Applications
  - **No** → **Alarm Output Required [?]**
    - **Yes** →
      - C628-4 — Page 4.04 ⭐ — Ideal for most Applications… *but if total is required* → C628-5 — Page 4.04 ⭐ — Ideal for most Applications… *but if special features are required* → Special Features — *More than 2 alarms* — MT1 — Page 4.10
    - **No** → **Display Type [?]**
      - **LED** → **Input Scaling Required [?]**
        - **Yes** → MCjr Tach — Page 4.09 — Ideal for most Applications
        - **No** → C342 — Page 4.08 ⭐ — Ideal for most Applications → SimTach D — Page 4.11 — Ideal for most Applications
      - **LCD** → **Input Scaling Required [?]**
        - **Yes** → A103-004 — Page 4.06 ⭐ — Ideal for most Applications… *but if background totals are required* → A103-005 — Page 4.07 ⭐ — Ideal for most Applications
        - **No** → A103-003 — Page 4.05 ⭐ — Ideal for most Applications → C342 — Page 4.08 ⭐ — Ideal for most Applications

DANAHER
INDUSTRIAL CONTROLS

Notes

Veeder-Root

Dynapar

Eagle Signal

Our catalog is organized by section relating to product function. This Selector Guide can assist you in determining the general product function for your application requirements. A detailed Selector Guide, located at the beginning of every section, will help you pick the item that best suits your specific needs. The ☆ symbol denotes our "Star Products" which we recommend be given first consideration. They offer maximum functionality, performance, and value.

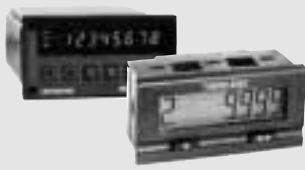|	*Product*	*Function*	*Applications*	*Location*
Totalizing Counters		A totalizer is a counter that sums the "total" number of cycles applied to its input. Many applications require only additive counting, but we also offer electronic totalizers with bidirectional (add and subtract) capability for specialized application.	Common totalizer applications are: item or piece counting, machine cycle counting, material length measurement, position display, and fluid or gas volume totalizing.	**Section 1:** Page 1 **Electronic** *Look for ☆ products* **Section 3:** Page 2 **Mechanical and Electric**
Preset Counters		Preset counters (or predetermining counters) are essentially totalizers that can control an external circuit when its counted total matches user-entered preset limits. While one or two presets are typical, we offer models with up to fifty presets.	Used in manufacturing and process applications to control batch lot size, material cut-lengths, punching or drilling, stacking, and many other count, position, or length related operations.	**Section 2:** Page 2 *Look for ☆ products*
Rate Indicators and Controllers		Basic tachometers display simple RPM. Rate indicators have calibration which scales the input signal to engineering units, rate controllers add the feature of user entered preset limits that actuate "alarm" outputs when the speed deviates above or below the limits.	Use for displaying the speed or rate of many industrial processes. Motor or shaft RPM, surface-speed of material or conveyors, production rates, and liquid flow rate are just a few examples. Models with preset alarms can initiate control functions based on speed setpoints.	**Section 4:** Page 2 *Look for ☆ products*
Time Indicators and Preset Timers		Preset timers offer various operating functions which enable the device to activate/deactivate control outputs based upon a preset time interval. Time indicators display an elapsed time and are available to register in seconds, minutes, or hours.	Time indicators are used for measurement of equipment running and cycle times, product testing, and time studies. Typical applications for preset timers are automatic control of machine cycles, event sequencing, malfunction detection, and process time regulation.	**Section 5:** Page 2 **Electronic** *Look for ☆ products* **Section 6:** Page 2 **Electric**
Multifunction Indicators/Controllers		Multifunction instruments are combinations of totalizer, predetermining counter, and rate measurement techniques described elsewhere in this catalog – with some unique functionality thrown in. They often can do the job of several instruments, saving time, money, and panel space, while reducing installation complexity.	When applications require multistep sequential operations by count and/or time, ideal choices are our Series 7920 or Series 79201. Series 7935 is a production monitor that collects and segregates data by up to 5 workshifts. The SFC40 is ideal for liquid transfer and dispensing operations, providing totals and rate functions.	**Section 7:** Page 2 *Look for ☆ products*
Motion Controls		Closed loop speed controls precisely regulate the speed of DC or AC motor drives to a preset value. Feedback control provides maximum accuracy under load and power line variations. Length and Position controls are used to move material in cut to length applications with high accuracy and fast cycle repetition rates.	Speed controls can be used with most AC and DC motors and drives. Processes that depend upon speed to maintain quality such as extruders, and pumps, are ideal applications for closed loop speed control. Length and position controls are used when maximum accuracy is needed in cutting, punching, bending, and similar applications.	**Section 8:** Page 2 *Look for ☆ products*

Product	Function	Applications	Location
Process Indicators	Volt, current and process meters display and/or control process variables where analog signals represent pressure, temperature, weight, etc.	Many applications in industrial machinery and processes including: molding and extruding equipment; textile, pharmaceutical, food and beverage processing; packaging machinery; and environmental testing. Unlike many competitive products, our Dynapar brand instruments are designed for use in harsh factory-floor installations.	**Section 9:** Page 2 *Look for ☆ products*
Encoders and Accessories	An encoder is a sensor/transducer for converting motion or position to a series of electronic pulses. All have a mechanical input and an electrical pulse output, the primary difference between various models being size and electrical features.	Frequently motor-mounted to provide signals for motor-drive feedback. When combined with a measuring wheel or coupled to a roller, will provide pulses equal to precise units of length. When coupled to a rack and pinion, it produces an output signal related to position. Encoders are popular input devices for electronic counters, motor drives, and PLCs.	**Request Separate Encoder Catalog, Number E101**
Proximity and Precision Switches	A proximity switch is a solid-state sensor that detects the presence of a "target" and produces an electrical output. Inductive types detect any metal target. Capacitive types can detect many materials and even can detect liquid or powder within a container. Our Precision Switches are ultra accurate mechanical limit switches.	An inductive switch is generally the choice when replacing mechanical switches that sequence or synchronize machinery. A capacitive switch can sense the presence of almost any material. It is especially useful for nonmetallic objects, or in determining additional information about the object, such as: is a box properly filled? is the material wet or dry?	**Section 11:** Page 2 *Look for ☆ products*
Operator Interface Products	Trackballs are precision "pointing" devices for graphical user interface applications. Console mounted or desktop trackballs take less space than a mouse and have a clean, modern appearance. Dynapar brand trackballs offer higher resolution than cheap consumer types and have the durability required for demanding industrial applications.	For industrial, commercial and medical applications. Our rugged, high quality trackballs have proven themselves in: medical imaging applications; radar installations; process control systems; and industrial computers as mouse alternatives.	**Section 12**
Digital Accessories	Our indicators and controllers incorporate features that satisfy typical applications yet are cost effective and easy to apply. Digital accessories offer added functionality, letting you accommodate the custom requirements of almost any application – without the need for third-party hardware.	These accessories have been specially selected for mechanical and electrical compatibility with Veeder-Root, Dynapar, and Eagle Signal brand products. There are five product categories: Input Modules; Output Modules; Power Supplies; Communications Converters; and Enclosures and Mounting Accessories.	**Section 13:** Page 2 *Look for ☆ products*
Relays and Accessories	Eagle Signal brand industrial control relays are available with contact ratings to 30 Amps. Choose from contact materials to best suit your needs. When your application requires time control, consider our time delay relays as an economical solution. Select an On-Delay, Interval, Pulse, Delay-on-Release, or Repeat Cycle relays.	These quality relays offer the same design and manufacturing reliability represented in our electric and electronic timers. Whether for a new application or field replacement, Eagle Signal brand relays and time delay relays are a cost effective solution for both industrial and commercial applications.	**Section 14:** Page 2 *Look for ☆ products*

A totalizer is a counter that sums the "total" number of cycles applied to its input. Many applications require only additive counting, but we also offer electronic totalizers with bidirectional (add and subtract) capability for specialized application.

Our brand names, VEEDER-ROOT and DYNAPAR and EAGLE SIGNAL, are recognized worldwide for their innovative designs, quality, durability, and accuracy – and are backed by over 120 years experience in development and application of counting and controlling instruments. This expertise has led to state-of-the art electronic totalizing counters as well as the mechanical and electrical designs provided in the preceding section.

Common totalizer applications are: item or piece counting, machine cycle counting, material length measurement, position display, and fluid or gas volume totalizing.

TOTALIZING COUNTER APPLICATIONS
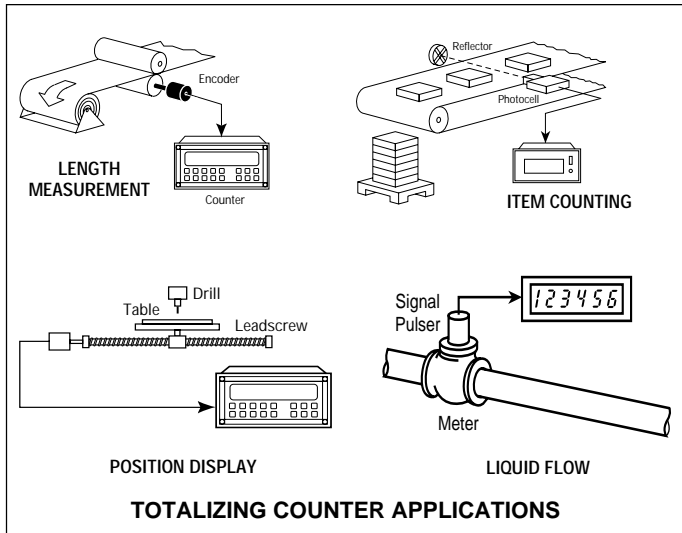
Today's electronic totalizers bring the advantages of modern digital displays, high counting speeds, silent operation and long life. Our general purpose types are comparably priced to other technologies and are very easy to install and use. Their high speed and compatibility with a variety of sensors makes them ideal for precise measurement of length or position, as well as totalization of fast moving items, liquid/gas volume, and other demanding tasks.

For your most challenging applications, consider our state-of-the-art programmable totalizers. They offer maximum flexibility through user selectable advanced features such as: input calibrators, movable decimal point, and bidirectional counting modes.

DISPLAY TYPES

While mechanical and electrical counters always present their count display as printed characters on mechanical wheels, electronic counters, provide solid-state display devices, the most popular being LCD and LED technology.

LCD Display	**Series 7999 MITE**	**Series A103**
LED Display	**Series C628 AWESOME Display**	**MAX JR. COUNT 1 (Programmable)**

Liquid Crystal Displays (LCD) are best suited for installation in areas where there is reasonably good lighting and are superior to most other display types when viewed in very bright ambient light; such as direct sunlight. They may be difficult to view in very dimly lit areas, but some counters overcome this problem through use of an internal light source.

Light Emitting Diode (LED) displays, since they produce their own light, can be viewed in very dimly lit areas – even in the dark. Their high contrast presentation makes them the preferred type when the display must be observed from a distance.

SPECIFYING A TOTALIZER

Considerations when selecting a totalizing counter for your application are:

- **Technology –** Mechanical, Electrical, Electronic
- **Input –** What is to be counted and from where will the counter's input be obtained?
- **Count Speed –** Speed ratings vary. Check Specifications.
- **Number of Digits –** Based on Maximum Count Value
- **Type and Size of Display –** Should accommodate operating environment's viewing and lighting conditions.
- **Packaging –** Mounting requirements and Enclosure Size
- **Environmental –** Temperature Specification

All of our totalizers provide a convenient push-button and remote signal input for resetting to zero. Some models provide a means to disable the reset function when security of totals is an application consideration.

ELECTRONIC INPUT SIGNALS

Electronic counters need a signal that represents the unit to be counted. This is often a voltage pulse or contact closure that already exists on your machine or process. However, for cases where no signal is available, a suitable sensor will have to be furnished. Anything that can be sensed can be counted and we offer several types of accessory sensors. There are four general categories of counting applications. Each has specialized sensing requirements:

Group	Example	Sensor
Item Counting	Cartons, Parts, Bottles, Cans, Sheets, Pencils, or any other item.	Inductive Proximity Capacitive Proximity Photoelectric.
Length Measuring	Paper, Cloth, Steel, Textiles, Lumber, or the linear measure of any other goods.	Rotary Encoders Inductive Proximity
Positioning	Assembly machinery, Drilling, Punching, Painting, or any other precision movement.	Rotary Encoders
Specialized	Fluid/Gas Volume, Medical, Scientific, or anything else that can be sensed.	Flowmeter, Particle sensor, or other special device.

SENSING DEVICES

This Selector Guide can assist you in determining the type of totalizing counter that best fits your application requirements. Condensed description and specification information is provided. Complete information is available by turning to the referenced page number that appears above each product's picture. The ⭐ symbol denotes our "Star Products" which we recommend be given first consideration. They offer maximum functionality, performance, and value.

Veeder-Root brand	Series C628	Series A103	Series C342	Series 7999
Page Number: The ⭐ symbol denotes our "Star Products" which we recommend be given first consideration. They offer maximum functionality, performance, and value. **Description and Features:** Condensed description and specification information is provided. Complete information is available by turning to the referenced page number that appears above each product's picture.	**Page: 1.02** ⭐ ■ AWESOME 0.71″ high digit LED display ■ Programmable color change display based on an event ■ Scalable, bidirectional input	**Page: 1.03** ⭐ ■ Economically priced unit with 8 large digits and a backlit LCD display ■ Choose from a basic plug-and play model, a scalable bidirectional unit, and a version that accepts encoder inputs	**Page: 1.04** ⭐ ■ Very compact and low priced. Choose LCD or LED display ■ Unidirectional or bidirectional (position indicator) models are standard	**Page: 1.05** ⭐ ■ Ultra-compact, low cost unit for production totalization applications where scaling is not required
Dimensions	48mm x 96mm	36mm x 72mm	24mm x 48mm	24mm x 48mm
Display Type	LED, Programmable Red or Green color	Backlit LCD Backlight with ext. 12 VDC	LCD or LED	LCD
Number of Digits	5 (0.71" high)	8 (0.47" high)	LCD: 8 (7.0mm high) LED: 6 (7.6mm high)	8 (0.315" high)
Power Supply	90-240 VAC, 20-50 VAC/DC 50/60 Hz, 4 Watts	3V replaceable lithium battery	Internal lithium battery or external DC	Internal lithium battery
Reset Method	Front Panel (Selectable), Remote	Front Panel (Selectable), Remote	Front Panel (Selectable Enable), Remote	Front Panel (Selectable Enable), Remote
Calibrator	Multiplier 0.0001 to 9.9999	Multiplier 0.0001 to 99.9999 (A103-001 & A103-002)	Optional	None
Max Count Speed	10 kHz	10 kHz 5 kHz in quadrature	7.5 kHz	10 kHz 2.5 kHz w/ quad. adaptor
Count Modes	Bidirectional	Unidirectional Add/Subtract, Quadrature	Unidirectional, Quadrature	Unidirectional Add/Subtract, Quadrature
Input Type	Sinking, Sourcing, Contact closure	Sinking, Sourcing, Contact closure	Sinking, Sourcing, Contact closure	Sinking, Sourcing, Contact closure
Sensor Power Supply	9 - 15 VDC	9 - 15 VDC (Option module required)	None	None
Front Panel Rating	NEMA 4X	NEMA 4X	IP65	NEMA 4

For locating products which do not appear in this selector guide, refer to the table of contents or the product to page number index in Section 15.

1

E L E C T R O N I C   T O T A L I Z I N G

Powerful, full-featured totalizer with large, blazing bright display… alerts by changing color

> **All in the family - Matching C628 series products in other sections of this catalog:**
>
> C628 Counters & Position Indicators: **Section 2**
> C628 Rate Meters: **Section 4**
> C628 Elapsed Timers: **Section 5**

CE

File No.: E185087

The Veeder-Root brand C628 Totalizer is a member of a family of 1/8 DIN instruments which offer breakthrough display technology as well as easy-to-program user setup. Its large LED display features the ability to change color based on process status such as exceeding the count preset. Therefore, when monitoring item or piece counting, length measurement, or other critical values, the C628 provides operators with an instant visual alert to changes in the application's status.

■ AWESOME 0.71" high digit LED display (27% larger than other 1/8 DIN units)

■ Programmable color change display based on an event

■ Programmable help function and secondary legend display

■ Choice of NPN or PNP primary input

■ Filter speed settable for 20, 200, or 10,000 Hz

■ Front panel reset enable and preset lockout

■ Optional RS-485 plug in card

■ CE approved, UL, CUL recognized

The bidirectional C628 totalizer provides count/direction operation and A+B or A-B operation, as well as a phased input from an encoder (quadrature). The front panel is rated NEMA 4X/IEC IP65 for use in washdown or dusty environments.

SPECIFICATIONS

Count Inputs: Sinking/Sourcing or Contact Closure
Frequency: 10 kHz max. (5 kHz in quadrature mode)
Logic Low ≤ 2.0 VDC, Logic High ≥ 3.0, 30V max.
Impedance: 10 KΩ to common - Sourcing; 4.7 KΩ to +Voltage - Sinking
Calibrator: Multiplier 0.0001 to 9.9999
Control Inputs: Sinking, Edge Sensitive
Logic Low ≤ 2.0 VDC, Logic High ≥ 3.0
Impedance: 4.7 KΩ to +Voltage
Response Time: 25 ms
Functions: Input 1 - Remote Reset; Input 2 - Security Lockout
Communication: RS-485; Serial asynchronous, UART to UART;
Open ASCII: One start bit, even parity seven data bits, one stop bit;
Baud Rate selectable from 9600, 4800, 2400, or 1200
Maximum Zones: 99
Supply Voltage: 90-264 VAC, 50/60 Hz, or 20-50 VAC/VDC; 4 Watts
Accessory Power Supply: 9-15 (unregulated VDC), 125 mA max.
Display: Red/Green, 7 segment LED
Primary display: 5 digits, 0.71" (18mm) height
Secondary display: single digit, 0.3" (7mm) height
Dimensions: 48mm x 96mm, 110mm deep

Mounting: Panel mount (mounting bracket supplied), 45mm x 92mm cutout
Connections: Screw type terminals - combination head
Front Panel Rating: NEMA 4X/IEC IP65
Case Material: GE Lexan 940
Weight: 0.56 lbs.
Operating Temp.: 0° to 55° Celsius, 32° to 131° Fahrenheit
Storage Temp.: -20° to 80° Celsius, -4° to 176° Fahrenheit
Relative Humidity: 20% to 95% non-condensing
Approvals: CE; UL, CUL recognized

Ordering Information:

Power Supply
0 90-264 VAC
2 20-50 VAC/VDC

C 6 2 8 – 1 0 0

Serial Communication Option
0 None
5 RS-485

Dimensions:

Panel Cutout: 45mm x 92mm (1.77" x 3.62")

9/24/98
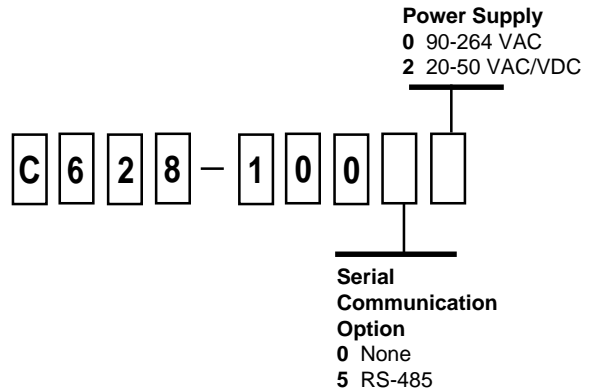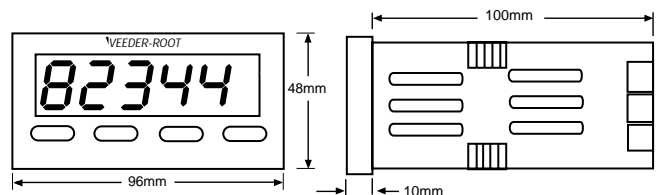
Cost effective, compact totalizer… large display with backlighting

All in the family - Matching A103 series products in other sections of this catalog:	
A103 Preset Counters:	**Section 2**
A103 Tachometers/Rate Indicators:	**Section 4**
A103 Time Indicators:	**Section 5**
A103 Preset Timers:	**Section 5**

CE

The A103 totalizers provide a range of capabilities unequaled in products of similar size and cost. In addition to the totalizing models shown here, the A103 series also includes matching indicators for timing and rate/speed metering and models with a preset output for control by count or time. All are in a uniform 36 x 72 millimeters bezel size package, enhancing your control panel with a family of devices that look and program alike.

A supertwist LCD display with thick 12mm (.47") high digits allows for easy viewing at a glance and feature display-backlight capability by simply connecting an external 12VDC supply.

Powered by an internal 3 volt battery, the A103's unique design has two battery slots; this allows battery changeover without loss of memory.

Numerous types of inputs can be accepted giving you a totally self-contained system not requiring external power.

■ Matching predetermining counter, time and rate indicators and controllers available – look great together on a panel

■ Bidirectional models with input scale multiplier, polarity sign, decimal point selection, and programmable reset value

■ High visibility 8-digit LCD display with backlighting capability standard

■ Long life 3 Volt lithium battery eliminates the need for external power

■ Accepts input signals from a variety of sources: Dry Contact, PNP or NPN Sensors, Encoders

■ High speed and low speed count inputs

■ Resettable remotely or from the front panel

■ Programmable security of front panel reset button

■ Option modules provide additional functionality and added convenience – fast, easy installation

■ NEMA 4X/IP65 rated front panel for use in washdown environments

The A103 totalizers are further enhanced by a series of quick-attach option modules. These can provide a power supply for sensors and display backlighting, and accept high or low voltage AC or DC input signals.

SPECIFICATIONS
High Speed Count Input: PNP or square wave pulse; 10 kHz max (50% duty cycle), 45 μsec min pulse width; Low State: < 1.0 VDC, High State: > 2.0 VDC (28VDC max)
Low Speed Count Input: NPN, Contact Closure; 30 Hz max (50% duty cycle), 12 ms min pulse width; Low State: < 1.0 VDC, High State: > 2.0 VDC (28VDC max)
Calibration: (Models A103-001 & A103-002) Programmable input scale multiplier. Range: 0.0001 to 99.9999)
Security Input: Allows access to panel reset and programming features
Reset Action: Reset to zero by panel button or remote input. Models A103-001 & A103-002: Programmabble for reset to a value of -999999 to 999999
Remote Reset Input: NPN or Contact Closure to common; edge sensitive
Power Source: Single or dual 3V Lithium battery; typical 5 years life w/single battery, 10 years w/dual batteries. Field-replaceable
Display: 12mm high, Supertwist LCD; 8 digits; "Low Bat" indicator. A103-001 and A103-002 have polarity sign to indicate counting below zero
Backlighting: Green Illumination over whole viewable area. Requires 10 to 28 VDC power source

Dimensions & Mounting: See dimensions figure. Panel Mount with supplied mounting bracket and gasket
Connections: Screw terminals
Operating Temperature: +32° to +131 °F (0° to +55°C)
Weight: Approximately 64 grams (2.25 ounces)

OPTION MODULE SPECIFICATIONS
Option modules accessories provide a convenient integrated solution to applications that require count signal voltage conditioning, and/or a voltage source for use with external sensors or the A103's display backlight feature. Specifications for each option module feature follow, while specific combinations of features are listed in the "Models" table, below.

High Voltage Input: Allows A103 to accept 100 to 260 Volt AC/DC for count input
Low Voltage Input: Allows A103 to accept 5 to 30 VAC or VDC for count input
AC Power Supply: Provides 10 - 20 VDC @ 50mA for display backlighting and/or sensor. Requires connection to 115 or 230 VAC, 50/60 Hz

Model No.	Description
A103-000	A103 Totalizer
A103-001	A103 Add/Subtract Totalizer
A103-002	A103 Position Indicator (encoder input only)

The following option modules attach to the rear of A103 totalizers:			
Model No.	AC Power Supply	Low Voltage Input	High Voltage Input
A103-A12	X		
A103-A17		X	
A103-A19	X	X	
A103-A10			X
A103-A14	X		X

Replacement Battery: 605472-0001
Panel Hole Punch: A103-A40

Dimensions:

72mm (2.83")
68mm (2.66")
36mm (1.42")
33mm (1.30")
A103 Rear View

Option Module Rear View

Depth Behind Panel
Without Adaptor Module: 39mm (1.54")
With Adaptor Module: 89mm (3.50")
Panel Cutout: 33mm x 68mm(1.30" x 2.66")

ELECTRONIC TOTALIZING

1

Ultra-compact 1/32 DIN totalizers… available with LCD or LED display and AC/DC inputs

All in the family - Matching C342 series products in other sections of this catalog:

C342 Tachometers/Rate Indicators:	Section 4
C342 Timers:	Section 5

CE

A very compact totalizing counter available standard with an 8 digit LCD display or 6 digit LED display. Chose from self powered models containing a 7 year lithium battery, or from models accepting an external 12 - 24 VDC power supply. Externally powered units utilize a nonvolatile RAM to keep counted data during absence of power.

Easy field programing allows interface to PNP or NPN count signals, or you may choose a model that directly accepts high voltage (12-250 VAC/DC) AC or DC pulses.

A bidirectional model, with 6 digit LED display, accepts signals from quadrature output encoders and is especially suited for positioning and length measuring applications.

LED models are available with an optional factory programmed preset limit (preset-count specified when ordered) and feature a transistor output that can perform control functions or interact with a PLC. A 6 character alphanumeric message (characters derived from seven segment pattern) can be programmed to appear when the preset count value is reached.

■ Available with a 8 digit LCD display or a 6 digit LED

■ LED units offer factory entered preset values, and transistor output

■ Bidirectional model suited for position and length measurements

■ Choose from internal battery or DC powered units

■ Field programmable to accept PNP or NPN signals, with models available for high voltage inputs

■ Compact 1/32 DIN bezel size and short depth

■ Display can be reset from the front panel or remotely; front reset button can be disabled

■ IP65 rated front panel for use in washdown environments

All units are packaged in a compact 1/32 DIN size case with depths as short as 32mm. The front panel is rated IEC IP65 for use in washdown environments. The C342 series also includes matching indicators for time-totalizing and rate metering, as well as an alphanumeric message display. All are in a uniform 24 x 48 millimeters bezel size package.

SPECIFICATIONS

Input, NPN/PNP models: Signal field selectable;
Logic Low < 0.7 VDC, Logic High > 5 VDC; 30 VDC max.

Count Speed: 7.5kHz max.; 30Hz for contact-closure signal

Input, AC/DC input models: 12 - 250 VAC/VDC

Count Speed: 20Hz max.

Optional Output: PNP, 10mA

Power Source:
  External Power Supply Models: 12 -24 VDC +20%/-10%
  Internally Powered Models: Lithium Battery, 7 years typical life

Display: LCD: 7.0mm high; LED: 7.6mm high

Operating Temperature: -10°C to 50°C

Front Panel Rating: IEC IP65

Approvals: CE

Model No.	Count Mode	Power Supply	Signal Input	Display Type/Digits	Control Output
C342-0464	Up	Lithium	NPN/PNP	LCD/8	
C342-0474	Up	Lithium	12 - 250AC/DC	LCD/8	
C342-0462	Up	12 - 24VDC	NPN/PNP	LCD/8	
C342-0562	Up	12 - 24VDC	NPN/PNP	LED/6	*C342-0562A
C342-8562	Up/Down	12 - 24VDC	Quadrature	LED/6	

* Optional factory programmed preset limit with transistor output. Preset limit value must be specified at time of order. A 6 character alphanumeric message (characters derived from seven segment pattern) may also be specified to appear when the preset count value is reached.

Dimensions:

VEEDER-ROOT

48 mm

24 mm

8 mm   See Note

Mounting Grooves

Bracket Arm

Panel Cutout: 22, ±0.3mm x 45, ±0.6mm
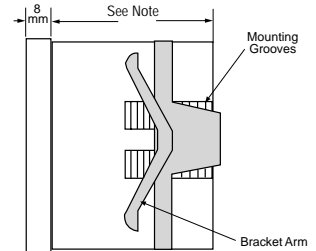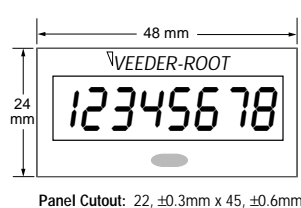
Note: C342-0464, -0462= 32mm
C342 -0474, -0562, -8562= 60mm

VEEDER-ROOT brand
Electronic Totalizing Counters

7999 Mite

A modern compact electronic totalizer . . . self-powered with 8 large LCD figures and choice of unidirectional or bidirectional models

Specific Models

UL RECOGNIZED   **CSA** CERTIFIED

CE

The MITE Series is a versatile family of LCD totalizers that includes unidirectional and bidirectional models. Based on the latest CMOS circuitry, they feature a long-life internal power source, high count-speed capability, and eight-digit liquid crystal display.

The bidirectional MITE totalizer provides count/direction operation – one input receives count pulses, while a second input controls counting direction.

- Front panel and remote reset
- NEMA-4/IP65 environmental sealing
- Easy-to-read, high contrast Liquid Crystal Display (LCD)
- UL recognized, CSA Certified
- 10-year battery life
- Quick and easy panel mounting with slide-on clips
- Supplied with prewired plug-in connector
- Accessory snap-on adaptors for high voltage count signals
- Small overall size – minimal 1.2" (30mm) depth behind panel
- Very low priced – without sacrifice of performance or reliability

MITE totalizers are rated NEMA-4/IP65 for water and dust-proof integrity of their front panels when mounted with the provided gasket. Instant reset to zero is accomplished via its front panel push-button or remote-reset command. For non-reset applications, the panel reset can be disabled.

For selectable decimal point or input scaling, see Series A103
For heavy duty construction, see Series 7997

SPECIFICATIONS

Display: 7 mm character height; eight-digit LCD
Power: Internal lithium battery; Ten-year typical life
Operating Temperature: +14° to +144 °F (–10° to +60°C)
Storage Temperature: +4° to +144 °F (–20° to +60°C)
Environmental Integrity: Front panel meets NEMA-4/IP65 requirements, when used with clip mount and gasket provided
Reset: Front panel push-button and remote reset; Panel Reset Enable: Link to common to enable front-panel reset button; Remote Reset: Provides reset via remote contact closure or open collector transistor
Connection: Integral plug; Mating connector provided; Accessory screw termination available

Signal Inputs for 79998D-110:
High-Speed Input: For use with logic level voltage, TTL, CMOS open collector NPN transistor
Frequency Response: 10,000 Hz, 50 µsec minimum pulse length.
Input Voltage: Logic 0: <0.7 volts DC; Logic 1: >2.4 volts DC; Maximum Input: 18 volts DC; NOTE: Accessory modules may be used for high voltage input signals
Low-speed Input: For use with isolated switch/relay contact.
Frequency Response: 30 Hz maximum

Signal Input for 79998D-410 (Bidirectional Totalizer)**:** To be used only with electronic inputs, TTL/CMOS compatible
Frequency: 10 kHz maximum, minimum pulse length 50 µsec.
Input Voltage: Logic 0: <0.7 volts DC; Logic 1: >2.4 volts DC; Maximum input: 18 volts DC
Direction Input: Add: No connection; Subtract: Connect to common

Approvals: CE; UL recogniced; CSA certified

Model No.	Description
079998D-110	MITE Totalizer
079998D-410	MITE Totalizer, Add/Subtract

ACCESSORIES

AC/DC Input Module: Allows use of high voltage input signal of 5 to 240 VAC/DC. Impulse frequency is 0 to 18 Hz. Connections are via screw terminations. Part Number 108938-0001

Screw Terminal Adaptor: Provides the convenience of screw terminal connection of input signal and remote reset. Part Number 108937-0001

Dimensions:

48mm
24mm
88888888
44.9mm
REAR
21.9mm
Behind panel depth: 30.5mm
With adaptor installed: 47mm
Adaptor
4mm
SIDE
Mounting Clip
Panel Cutout: 45mm x 22mm (+0.5, -0)

1

E L E C T R O N I C
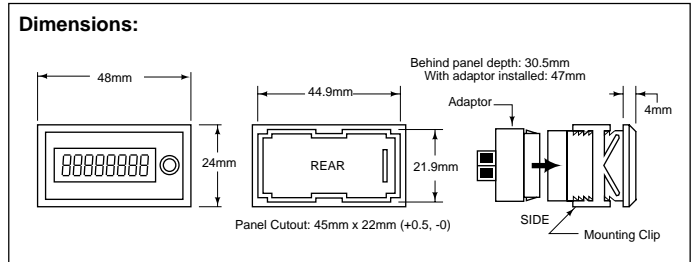
T O T A L I Z I N G

Compact LCD bi-directional counter modules available with or without front panel reset pushbutton

A very compact totalizing counter module for printed circuit board mounting. 8 digit, 8mm high, LCD display. Powered by an external lithium battery (not supplied), memory and operation are maintained for a typical life of 8 to 10 years.

Its bidirectional counting inputs, accepts count pulses on one input while a second input commands the counting direction.

PCB solder-pins are provided for electrical connections and molded posts are provided to align mounting position with holes in the host printed circuit board.

- ■ 8 digit high contrast LCD characters
- ■ Leading zero blanking
- ■ Add & subtract operation
- ■ Available with or without front panel reset
- ■ Remote reset input
- ■ External battery life of 8 to 10 years when using 1/2 AA, 900mAH, 3 volt lithium cell

Standard models are available with, or without, a front panel reset button. All models feature remote electronic reset to zero

SPECIFICATIONS

Supply voltage: 2.6 - 3.4VDC

Current consumption: Less than 10µA, typically 5µA

Display: 8 digit, 8mm high contrast LCD characters with leading zero blanking

High Speed Count Input: 5kHz maximum, positive edge triggered, 0.7v threshold, 100µS minimum pulse length, TTL/CMOS Compatible

Low Speed Count Input: Contact closure/open collector input, 20Hz maximum, negative edge triggered, 0.7v threshold, 25mS minimum pulse length

Reset Input: Contact closure/open collector, negative edge triggered, 0.7v threshold, 15mS minimum pulse length

Direction Input: Electronic input TTL/CMOS Compatible. Add=logic 1, Subtract=logic 0(0V)

Operating temperature: -10°C to +60°C

Storage temperature: -20°C to +70°C

Dimensions:
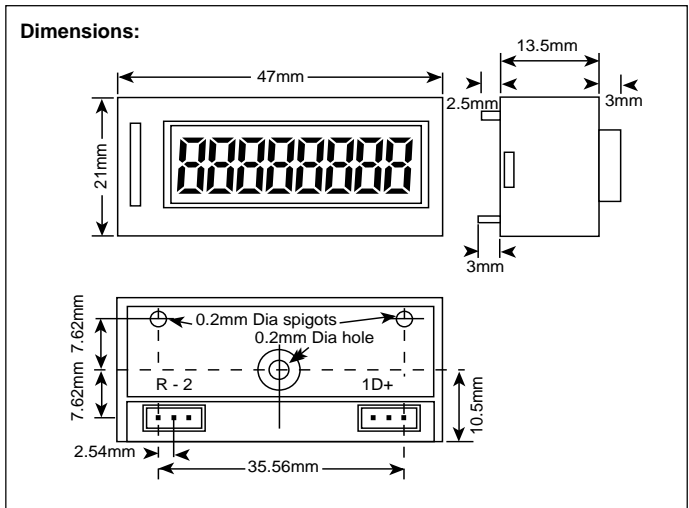
Model Number	Description
0799988-412	Totalizing Counter, with reset button
0799988-402	Totalizing Counter, without reset button

Ultra-compact, 6 digit counter modules… PCB mount or in panel with provided bezel

Ultraminiature totalizing counter module for printed circuit board mounting. 6 digit, 6mm high, LCD display. May be powered by an external lithium battery (not supplied), memory and operation are maintained over long life.

A bidirectional counting model, accepts count pulses on one input while a second input commands the counting direction.

PCB solder-pins are provided for electrical connections. An attractive panel mount installation can be made using the provided bezel.

- 6 digit, 6mm high LCD digits
- Quiescent current less than 5μA
- Very long operation on external battery
- Panel mounting bezel provided
- Bidirectional model available
- Remote reset input

Count speeds to 10kHz are accepted. All models feature remote electronic reset to zero.

An ideal choice where a low cost, high performance totalizing counter is required. Typical applications include metering and dispensing, operation or event counting and electronic distance measurement (odometer).

Dimensions:
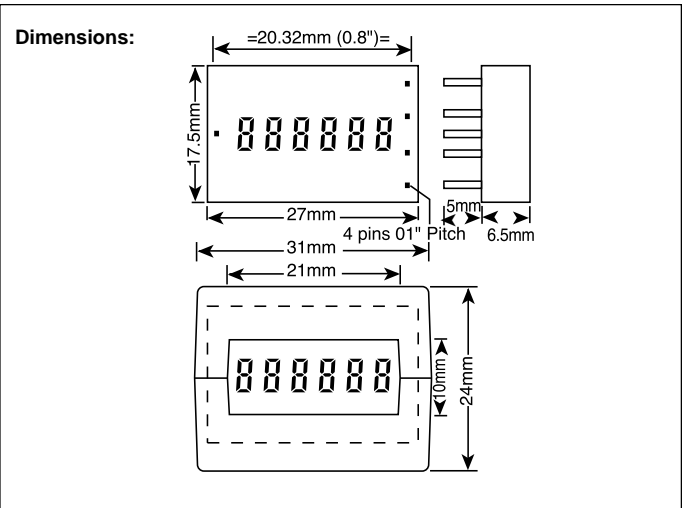
SPECIFICATIONS

Power Source: External, 2.6 - 3.4VDC (not provided)

Current consumption: 5μA quiescent, 10μA at 10kHz

Display: 6 digit black LCD, 6mm characters with leading zero blanking

Count Range: 999999 display rollover to 0

Count Input: 10kHz maximum, negative edge triggered, 0.7v threshold, 50μS minimum pulse length, TTL/CMOS Compatible

Reset Input: Negative edge triggered, 0.7v threshold, 15mS minimum pulse length, TTL/CMOS Compatible

Direction Input (799986-402): Add=logic 1, Subtract=logic 0 (0v)

Operating temperature: -10°C to +60°C

Storage temperature: -10°C to +60°C

Material: Clear polycarbonate

Environmental Protection: IP40/DIN40050

Weight: 7.5 grams

Model Number	Description
0799986-302	Totalizing Counter, unidirectional
0799986-402	Totalizing Counter, bidirectional

Ultra-compact, self powered 4 digit totalizing counter… PCB mount or in panel with provided bezel

Ultraminiature totalizing counter module for printed circuit board mounting. 4 digit, 6mm high, LCD display. Powered by an internal button-cell (provided/replaceable), typically supporting memory and operation for 3 to 4 years.

An integral switch-bounce filter allows error free counting from the mechanical contacts of switches or relays.

PCB solder-pins are provided for electrical connections. An attractive panel mount installation can be made using the provided bezel.

- ◼ Internal 1.5v button cell
- ◼ Battery life of 3 to 4 years
- ◼ 4 digit, 6mm high LCD display
- ◼ Integral switch-debounce circuitry
- ◼ Panel mounting bezel provided

An ideal choice where a very low cost, self-powered totalizing counter is required. Typical applications include dispensing, and operation or event counting.

Dimensions:

28mm | 6.5mm
18mm
Rear view | Battery
4.2mm
31mm
21mm
24mm | 10mm | 1234
Front view showing bezel
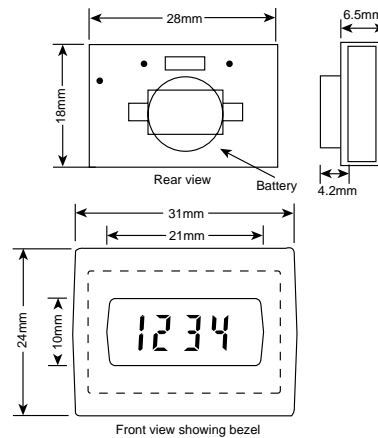
SPECIFICATIONS

Supply Voltage: Replaceable 1.5v button cell type 386 or SR43 (provided)

Expected battery life: 3 - 4 years at 20˚C

Display: 4 digit LCD, 6mm characters

Count Range: 9999 display rollover to 0

Count Input: 12Hz maximum, contact closure. Operates on contact opening

Reset: to zero on insertion of battery. Remote reset can be accommodated

Operating Temperature: 0˚C to 50˚C

Storage Temperature: -10˚C to +60˚C

Material: Clear polycarbonate, black ABS bezel

Environmental Protection: IP40/DIN40050

Weight: 7.5 grams

Lead Length: 24cm

Model Number	Description
0799984-322	Totalizing Counter, with button battery

VEEDER-ROOT brand
Electronic Totalizing Counters

MicroMITE 7999F8-302

High speed totalizing counter with backlighted display… maximum visual impact in a small package

A compact totalizing counter module for printed circuit board or panel mounting. 8 digit, 8mm high, LCD display with backlight capability. An external lithium battery (not supplied), is normally used to support memory and counting. Current demand is typically 3µA quiescent, 6µA counting. Backlight requires additional current.

Count speeds to 10kHz are possible. An internal contact-bounce filter allows accurate counting from switch or relay contacts.

Electrical connections are made via rear pins which may be soldered to a host printed circuit board or connected by pin terminals. A remote electronic reset to zero is provided.

■ 8 digit high contrast LCD characters

■ 8mm high digit size

■ Quiescent current less than 3µA

■ Display backlight capability

■ Remote reset input

An ideal choice where maximum display impact is wanted in a small area. Typical applications include test instruments, and cycle or event counting.

Dimensions:

SPECIFICºATIONS

Supply voltage: 2.7 - 3.3VDC

Current consumption: 3µA quiescent, 6µA counting (typical); backlight 80mA

Display: 8 digit black LCD, 8mm characters with leading zero blanking

Count Range: 99999999 display rollover to 0

Count Inputs: *Low Speed:* contact closure/open collector, 30Hz maximum, negative edge triggered, 0.7v threshold, 25mS minimum pulse length;
High Speed: TTL/CMOS compatible, 10kHz maximum, positive edge triggered, 0.7v threshold, 18v maximum, 50µS minimum pulse width

Reset Input: Contact closure/open collector, negative edge triggered, 0.7v threshold, 18V maximum, 15mS minimum pulse

Operating temperature: 0°C to +50°C

Storage temperature: -20°C to +70°C
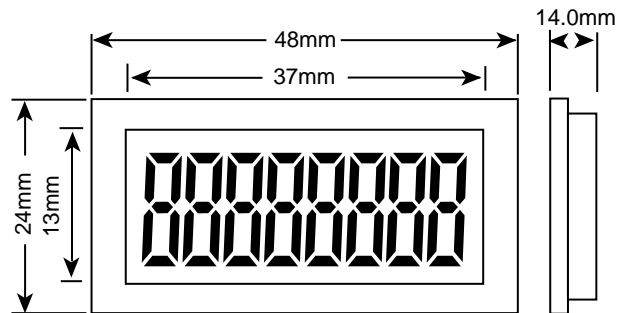
Model Number	Description
07999F8-302	Totalizing Counter, unidirectional, display backlight

*An easy-to-use,
8-digit LED display
totalizer . . . with a full
complement of powerful
programmable features.*

MAXjr Count 1 provides the flexibility needed for the most demanding item counting and length measurement applications. Its bidirectional operation, high contrast display with ± polarity indicator, and reference preset function make it especially well suited for use as a low cost position indicator.

- Calibrator scales input signal for display in engineering units
- Add/Subtract and quadrature counting modes – solid-state or contact input
- Selectable decimal point positioning
- 8 digit, red LED display with polarity and overflow indication
- Non-volatile memory retains count and program during power loss
- Panel mounts in 1/8 DIN cut-out – NEMA-4 water and oil integrity
- Friendly menu-driven programming with display prompting – sealed tactile response keys
- Reference preset allows reset to a value other than zero
- Security locks for program and reset
- Accessory 12 VDC power supply supports external sensors

The **MAXjr** Count 1 includes many advanced convenience features, such as: switch-selectable 115/230 VAC operating power, self-diagnostics, and display-prompted program editing – making it a "best value" industrial totalizer.

For totalizer plus rate indicator, see MAXjr Count 4
For matching predetermining counter, see MAXjr Count 2, MAXjr Count 3

SPECIFICATIONS

Input Power: Switch selectable, 115 (95 to 130) VAC, or 230 (190 to 260) VAC; 50/60 Hz, 6 VA; Optional: 10 to 26 VDC, 0.4 A maximum

Accessory Power: DC output provided for transducer, 12 VDC ±25%, 125 mA maximum

Display: 8 digit, 0.3" (7.6 mm) red LED with ± polarity indicator; legends for PGM (program mode), REF (reference preset), and OVF (overflow)

Decimal Point: Selectable decimal point (XXXX.X.X.X.X.)

Keyboard: Sealed, 6 tactile response keys

Calibration: Input scaling common to inputs A and B; range 0.0001 to 9.9999

Reference Preset: Allows reset to any value 0 to ±99999999

Counting Modes: Add/Subtract: Input A adds, B subtracts; Quadrature: Inputs A and B count bidirectionally from quadrature signal source

Signal and Count Rate: Add/Subtract Mode: X1 input logic, 10 kHz maximum signal and count rate; Quadrature Mode: X2 input logic (counts input A, both edges); Maximum 10 kHz count rate, 5 kHz signal rate

Signal Inputs: Open collector (sinking or sourcing), magnetic, or contact closure (input speed limited to 20 Hz)

Control Inputs: RESET to reference preset, and **STOP COUNT**

Security: Selectable locks for reset, reference preset, and program mode

Diagnostics: Tests for signal and control inputs, panel keys, and display

Operating Temperature: +32° to +122°F (0 to +50°C)

Weight: 1.4 lbs (453.6 g)

Model No.	Description
MCJR1S00	**MAXjr** Count 1 (115/230 VAC, 50/60 Hz)
MCJR1D00	**MAXjr** Count 1 (10-26 VDC operation)

Typical Applications:

Drill
Table
Leadscrew

Roll
Goods

Pinch
Rollers

Positioning

Length Measuring

Dimensions:

3.78"
96 mm

.39"
10 mm

5.20"
132 mm

.50"
13 mm

3.54"
90 mm

FRONT

1.98"
50 mm

SIDE

1.67"
42 mm

Panel Dims: Cutout: 3.58" x 1.78". Thickness: 1/16" to 1/4". Depth: 5.68" min.

Use totalizers, tachometers, hourmeters, or precision elapsed timers?
. . . just one FLEX model replaces any one of these functions at a very low price

Highly versatile, the **FLEX** can be programmed at installation to operate as a totalizer, tachometer (Model 0799008-201 only), or elapsed time meter. Use two or three of them and have matching control panel instrumentation for count, speed, and time. Standardize them throughout your plant, and reduce inventory by stocking just one indicator instead of several.

- Large, easy to read 8-digit LCD (4-digit, tachometer mode)
- Heavy, die-cast enclosure for industrial duty application
- Simple programming procedure selects operating mode and other functions
- Tamper proof programming mode lock
- Operates without external power – long life lithium battery
- Totalizer mode has input scaling and selectable decimal point
- Tachometer mode (Model 0799008-201) has input scaling, and decimal point
- Timer modes for hours, minutes, seconds with choice of time increment
- Front panel reset, remote reset, or nonreset operation
- NEMA-4 rated front panel – sealed against water and dust

Many convenience features are included, such as adhesive labels preprinted with popular engineering unit identifiers, security locks for reset and programming, and accessory snap-on adaptor modules for screw-terminal wire connection or converting high-voltage input signals.

For LED display, see Series 7995
For LED display, multifunction total & rate, see MAXjr Count 4

SPECIFICATIONS
Display: Eight-digit LCD (four-digit in rate mode), 0.35" (8.9 mm) high characters
Power Source: Internal lithium battery; eight-year typical life
Temperature Range: +32° to +167°F (0° to +75°C)
Time Base Accuracy: ±0.01%, ±1 count (time and rate modes only)
Environmental Integrity: NEMA 4 when using panel gasket provided

Typical Applications:

Weight: 5.5 oz. (156 g)
Signal Inputs: High Speed: For use with logic level voltage, TTL, CMOS, open collector NPN transistor, or magnetic sensor; Frequency Response: 10 kHz (50% duty cycle); Low Speed: For use with isolated switch/relay contact; Frequency Response: 25 Hz (50% duty cycle)
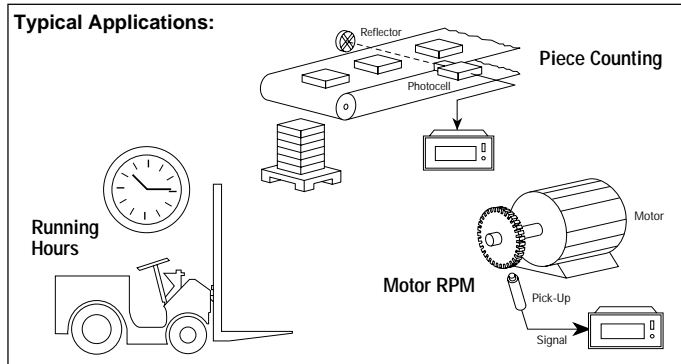**Input Count Logic:** Programmable choice of X1 or X2
Reset: Front panel push-button (may be disabled) and remote reset for counter and elapsed time modes
Connections: Integral plug; mating connector provided (accessory screw-termination adaptor available)
Function Selection: Access set-up mode through recessed stylus switch on front panel; jumper connection can restrict access to the set-up mode
Operating Functions: Totalizer: Eight-digit capacity, programmable prescaler (divide by 1 to 9,999); programmable decimal point
Elapsed Time Indicator: Eight-digit capacity; programmable ranging for resolution of hours, minutes, (decimal placement for whole units, tenths, or hundredths); or seconds
Hour Meter: Eight-digit capacity; registers hours in while units, tenths, or hundredths (no reset function)
Rate Indicator (0799008-201 only): Four-digit capacity; registers in RPM or other engineering unit; prescaler allows multiplication of input signal by 0.001 to 9,999; programmable decimal point

Model No.	Description
0799008-101	Totalizer, Elapsed Time Indicator, Hourmeter
0799008-201	As above plus Tachometer/Rate Indicator Function
0328992-010	Screw terminal adaptor
0328992-020	AC/DC voltage adaptor; allows signal input from 24 to 270 volts AC/DC; 10 Hz, maximum
0328992-030	TRIAC voltage adaptor; allows signal input from solid-state 115 VAC switching devices; 10 Hz maximum
0328992-120	PANEL OPENING ADAPTOR; lets flex fit in 3.78"x1.75" cut-outs; retrofit Series 7443, 1205, 7997 or 7995 (except lock & Key reset types)
0328992-110	PANEL OPENING ADAPTOR; same as above except accommodates retrofit of lock & key reset models of Series 7443, 1205, 7995, or 7997

Dimensions:

Panel Dims: Cutout: 2.63" x 1.31". Thickness: 0.08" to 0.25". Depth: 0.70" min.

The original LCD miniature totalizer . . . its uncompromised design means extra reliability

The choice of the U.S. Military and other discriminating customers when nothing less than absolute accuracy and reliability is acceptable. A time proven, no-shortcuts design, the MINI-LX keeps on working – even when subjected to application hazards such as high levels of electrical "noise."

- Self-powered by a 10 year rated lithium cell
- Compact size – fits in 25x50 mm cut-out
- Available in 6 and 8 figure models
- Always on, high contrast liquid crystal display
- Digital input-filter keeps interference out
- Switch-input models count from contact closures
- AC/DC-input models count pulse voltage – 6 to 250 volts, AC or DC
- A 10 year history of satisfied customers
- Fully self-contained – no external adapters or extra wiring

6 digit models feature pushbutton and remote reset; 8 digit models have remote reset only – ideal for nonreset applications.

For heavy duty die-cast construction, see Series 7990
For LED display, see Series 7995

SPECIFICATIONS

Number Decades: 6 or 8

Display: 0.2" (5.1 mm) LCD

Count Input Characteristics:
AC/DC Input Models: Maximum Count Speed: AC – 3000 cpm (50 Hz); Impulse Voltage: 6 to 250 VAC/VDC; Minimum Impulse On Time: AC – 10 milliseconds, DC – 7 milliseconds; Minimum Impulse Off Time: AC – 10 milliseconds, DC – 9 milliseconds; Input Current: 2.5 milliamps, maximum, drawn from external circuit
Switch Input Models: Maximum Count Speed: 3000 cpm; Contact Burden: 3 VDC 500 microamperes; Minimum Contact Open or Closed Dwell Time: 0.01 second (10 milliseconds)

Reset: Pushbutton or remote on 6-decade models; remote on 8-decade models; remote reset via rear connection by isolated switch contact only; requires 50 milliseconds minimum closure

Power: Self-contained, 10-year lithium power source; rated at 10 years typical life; actual service life varies

Connections: Via rear 0.062" (1.6 mm) diameter pins; remote reset input via pin positions 3 and slide-on contact terminals supplied

Operating Temperature: +32° to +122° F (0° to +50° C)

Materials: Case: Molded black modified polyphenylene; Crystal: Clear polycarbonate

Net Weight: 2.0 oz. (57 g).

Model No.	Description
0799806-212	6-Decade, Panel/Remote Reset, AC/DC Input (stock)
0799806-222	6-Decade, Panel/Remote Reset, Switch Input (stock)
0799808-312	8-Decade, Remote Reset, AC/DC Input (stock)

Typical Applications:

Printing Press

Photocopier
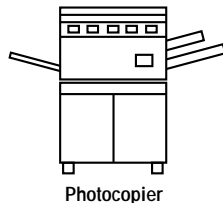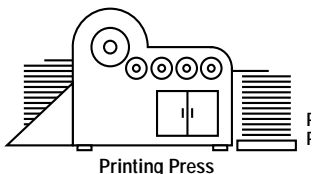
Ideal for graphic arts, printing, and photographic equipment applications.

Dimensions:

2.200"
55.9 mm

1.210"
30.8 mm

Panel Cutout: 50.0mm x 25.0mm

0.082"
2.1 mm

2.303" R
58.5 mm

Push-on Wire-Crimp Terminals

Wire Ref.

0.250"
6.4 mm

Max. Panel Thickness

2.500"
63.5 mm

0.780"
19.8 mm
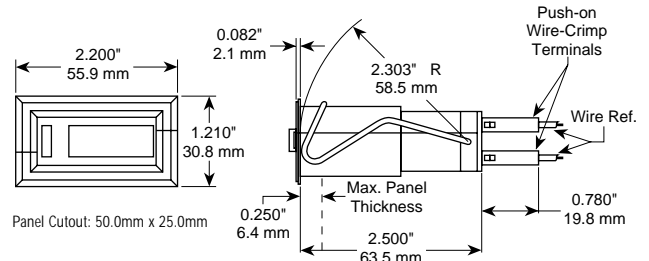
Totalizes count or elapsed time… convienient surface mount in relay socket or panel mount

®RU RECOGNIZED

The DX100 is a solid state time/count totalizer. Its features include:

■ Housed in 1/16 DIN molded NORYL® case

■ 0.5 inch high, 4 1/2 digit liquid crystal display

■ Annunciators on front panel indicate time/count operating mode and time range

■ 6 time ranges from 1999.9 sec. to 19999 hrs. and count range of 19999 counts

■ Surface mounted using standard square base relay socket (accessories available for fixed or plug-in panel mounting)

OPERATION

Timing is referenced to the service line frequency. The line frequency is counted and internal divider networks determine one of six available time ranges.

Two count modes are available and determined by external wiring. **Mode 1:** Line voltage is applied to the count input. The count is registered when the line voltage is removed from the count input (trailing edge). **Mode 2:** Contact closure across the internal count circuit registers a count (leading edge).

All units have remote reset capability through external wiring.

NOTE: The cable from the totalizer to the remote reset switch must be a twisted pair with a maximum length of 5 feet.

The 02 option features a manual reset push-button on the front of the unit in addition to the remote reset capability.

The DX100 Totalizer has an internal, replaceable battery. The charge on the battery is maintained at a constant level by a trickle charge circuit. A fully charged battery will maintain memory and readout for a minimum of 650 hours with power disconnected. It is recommended that the battery be replaced every two years. Initial slow response of the LCD readout indicates a low battery charge. To charge battery to full capability, apply line voltage to the unit for 48 hours.

SPECIFICATIONS

Time/Count Ranges:

Sym.	Time Range
00	19999 Ct.
01	1999.9 Sec.
02	19999 Sec.
03	1999.9 Min.
04	19999 Min.
05	1999.9 Hr.
06	19999 Hr.
07	Factory Programmed

Repeatability: Timing is based on service line frequency

Count Accuracy: 100%

Count Speed: 2500 per min. with voltage application:
8 ms "ON" 16 ms "OFF"
5000 per min. with switch closure: 4 ms "ON" 8 ms "OFF"

Reset Time: 10 ms

Cycle Progress: 4 1/2 digit liquid crystal display, .5" high (12.7 mm)

Voltage/Frequency: 120 VAC, 60 Hz (Can be field modified for 50 Hz operation)

Burden: 120 VAC, 1.2 Watts
120 VDC, 1.2 Watts (Counter only)

Current Required to Energize Count Line: 16.4 microamperes

Power Interruption: Line voltage interruptions will not reset timer or counter. Battery life is a minimum of 2 years (field-replaceable).

Temperature Range: 32˚ to 140˚F (0˚ to 60˚C)

Transient Voltage Immunity: Performance unaffected by 50 microseconds, 600 V peak transients superimposed on line input.
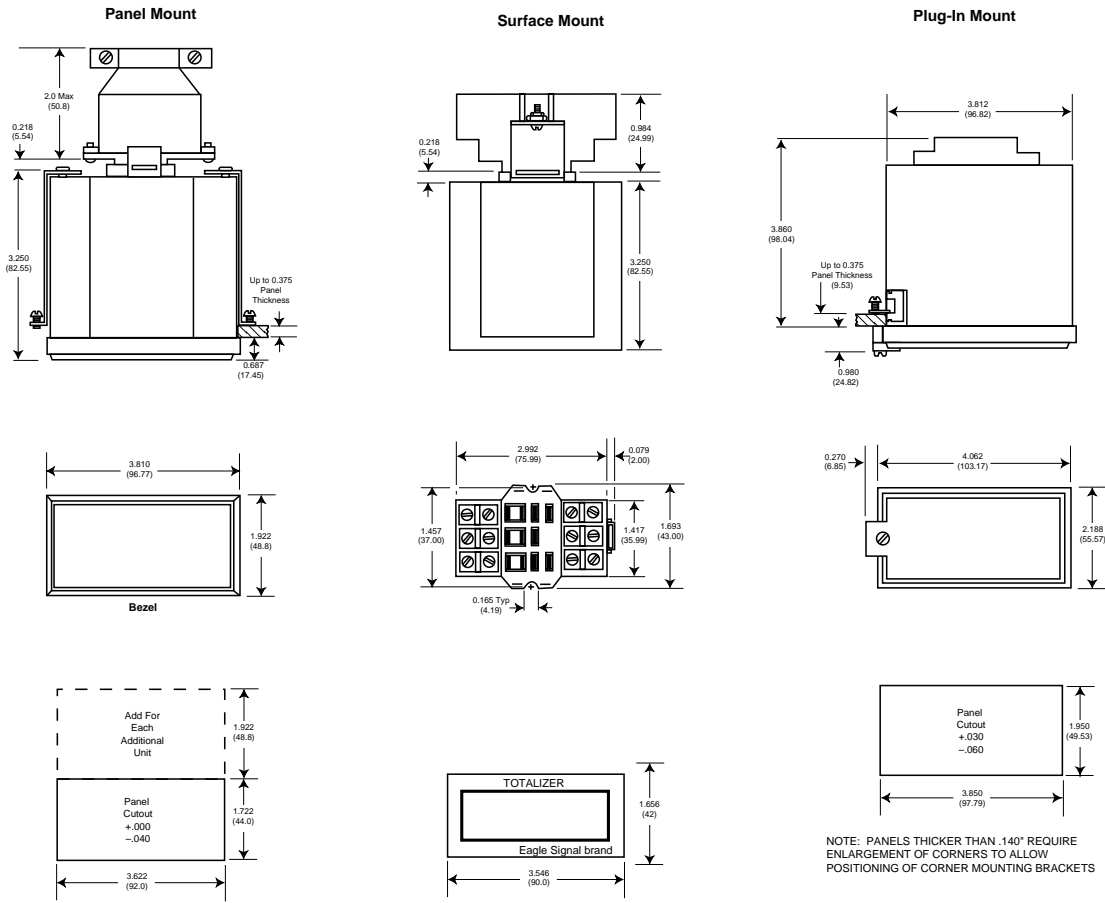
Vibration: Unaffected by 2.5G sinusoidal vibration magnitudes in both directions of three perpendicular mounting axes imposed from 20 to 900 Hz

Approvals: UL Recognition E96337

ACCESSORIES

Model No.	Description
DZ100-51	Bezel Kit for panel mounting
DZ100-52	Strain Relief Kit
DZ100-54	Plug-In Housing for panel mounting units
DZ100-56	Latch and Latch Release Kit for surface mounting
60SR3BO5	Square Base Relay Socket

MOUNTING

Panel Mount

2.0 Max (50.8)
0.218 (5.54)
3.250 (82.55)
Up to 0.375 Panel Thickness
0.687 (17.45)

3.810 (96.77)
1.922 (48.8)
Bezel

Add For Each Additional Unit
Panel Cutout +.000 –.040
1.922 (48.8)
1.722 (44.0)
3.622 (92.0)

Surface Mount

0.218 (5.54)
0.984 (24.99)
3.250 (82.55)

2.992 (75.99)
0.079 (2.00)
1.457 (37.00)
1.417 (35.99)
1.693 (43.00)
0.165 Typ (4.19)

TOTALIZER
1.656 (42)
Eagle Signal brand
3.546 (90.0)

Plug-In Mount

3.812 (96.82)
3.860 (98.04)
Up to 0.375 Panel Thickness (9.53)
0.980 (24.82)

0.270 (6.85)
4.062 (103.17)
2.188 (55.57)

Panel Cutout +.030 –.060
1.950 (49.53)
3.850 (97.79)

NOTE: PANELS THICKER THAN .140" REQUIRE
ENLARGEMENT OF CORNERS TO ALLOW
POSITIONING OF CORNER MOUNTING BRACKETS

ORDERING INFORMATION

DX1   01   A6   02

TIME RANGE

Sym.	Description	Annunciator
00	19999 Ct.	CTS
01	1999.9 Sec.	SEC and Decimal
02	19999 Sec.	SEC
03	1999.9 Min.	MIN and Decimal
04	19999 Min.	MIN
05	1999.9 Hr.	HR and Decimal
06	19999 Hr.	HR
07	19999 Ct. 1999.9 Sec. 19999 Sec.	Annunciators are not programmed. All annunciators are displayed.

VOLTAGE & FREQUENCY

Sym.	Description
A6	120 VAC, 60 Hz*

*Unit can be modified to 50 Hz operation.

FEATURES

Sym.	Description
	Standard Remote Reset ONLY
02	Reset Pushbutton on Front Panel (May be wired for Remote Reset)

Replacement Battery: Part No: PBB-9

DANAHER CONTROLS has representatives and distributors located in major cities within the United States and throughout the world. For information about the distributor or sales office nearest you, contact our customer service department:

Customer Service	**Internet Presence**
call Toll Free 800.873.8731	E-Mail: dancon@dancon.com
or 847.662.2666	Worldwide Web: http://www.dancon.com

Veeder-Root
Dynapar
Eagle Signal

2
P R E D E T E R M I N I N G
E L E C T R O N I C

Predetermining counters (or preset counters) are essentially totalizers that can switch an external circuit when its counted total matches a user-entered preset limit. They can be used in manufacturing and process applications to control batch lot size, cutting material to length, punching or drilling, and many other count, position, or length related operations.
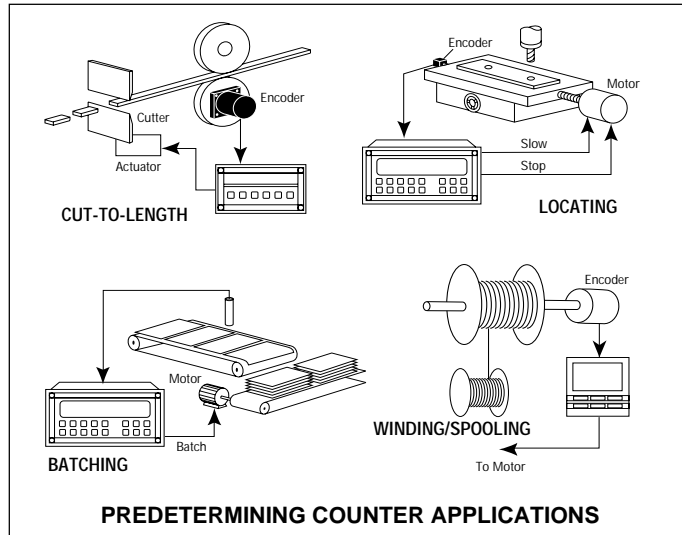
PREDETERMINING COUNTER APPLICATIONS

Our brand names, VEEDER-ROOT and DYNAPAR, are recognized worldwide for innovative designs, quality, durability, and accuracy – and are backed by over 120 years experience in development and application of counting and controlling instruments. This expertise has led to a product range that spans all counting technologies – mechanical, electric, and electronic.

Electronic predetermining counters bring the advantages of modern digital displays, high counting speeds, multiple presets, silent operation, and long life. Our general purpose types are comparably priced to other technologies and are very easy to install and use. An important, powerful feature provided by electronic designs is the automatic reset function. The counter is instantly recycled when its output occurs – permitting control of repetitive operations without human intervention. The electronic predetermining counter's high speed and compatibility with a variety of sensors makes them ideal for length-cutting, positioning, or liquid/gas flow applications that demand precise, repeatable control.
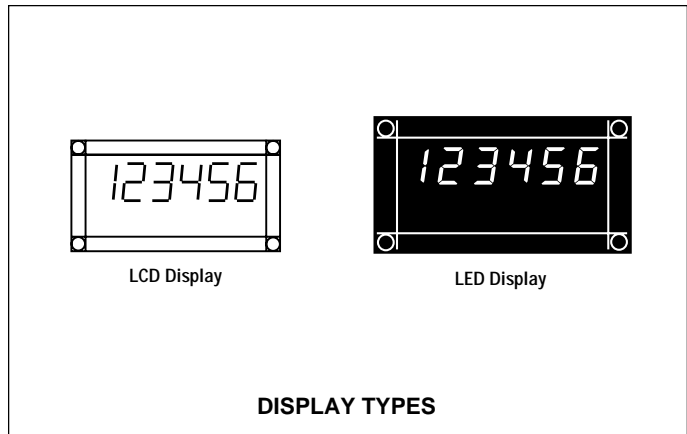
For your most challenging applications, consider our state-of-the-art programmable counters. They offer maximum flexibility through user selected advanced features such as: input calibrators, movable decimal point, bidirectional counting modes, and output logic options.

In some applications they may actually replace two or more individual counters – providing cost effective, customized solutions to your counting and controlling problems.

DISPLAY TYPES

Liquid Crystal Displays (LCD) are best suited for installation in areas where there is reasonably good lighting and are superior to most other display types when viewed in very bright ambient light; such as direct sunlight. They may be difficult to view in very dimly lit areas, but some counters overcome this problem through use of an internal light source.

Light Emitting Diode (LED) displays, since they produce their own light, can be viewed in very dimly lit areas – even in the dark. Their high contrast presentation makes them the preferred type when the display must be observed from a distance. Our Series C628 "AWESOME" products feature display color change at alarm presets.

LCD Display   **LED Display**

DISPLAY TYPES

SPECIFYING A PREDETERMINING COUNTER

Basic considerations when selecting a predetermining counter for your application are:

■ **Input –** What is to be counted and from where will the counter's input be obtained?

■ **Count Speed –** Speed ratings vary. Check Specifications.

■ **Number of Digits –** Based on Maximum Count Value

■ **Type and Size of Display –** Should accommodate operating environment's viewing and lighting conditions

■ **Packaging –** Mounting requirements and Enclosure Size

■ **Environmental –** Temperature Specification

Additional selection criteria for predetermining counters include:

■ **Number of Preset Limits:E**lectronic preset counters are available with one, two, or more preset limits. Each preset limit can detect a specific count value and actuate its own independent output.

  Although simple single limit types will suffice for many applications, there are times when additional preset limits can greatly enhance the operation of a machine or process. For example, a two limit electronic counter can be used for cutting material to a length controlled by its first preset, while a second preset is used as a "prewarn" that reduces the machine's speed prior to making the cut – permitting increased accuracy.

■ **Output Device:** Most predetermining counters include internal contacts that can switch a wide voltage range of AC or DC circuits that draw moderate power. The relay is capable of directly controlling solenoids, valves, shears, lights, buzzers, etc.

  Some electronic types provide a transistor output. These are capable of switching low power DC loads only. They are ideal for direct connection to solid-state devices such as programmable logic controllers. Transistor output devices provide the advantages of reliability and fast switching speed.

■ **Output Action:** Many electronic predetermining counters incorporate user selectable output action features. Our simplest types provide choice of a fixed duration momentary output or latched output. Our programmable models have additional flexibility allowing custom setting of momentary output times, as well as logic functions that can enhance the counter's contribution to the overall application.

SERIES A103

SERIES V4545

C628 AWESOME SERIES

POPULAR PREDETERMINING COUNTERS

DATA COMMUNICATIONS

There is an increasing demand for counters that can communicate with printers, computers or other electronic systems. Such counters provide a serial-data-communications port which allows remote access to counted data and preset limit registers. With this feature, the data can be included on printed forms or receipts, or made available to management information or process control systems.
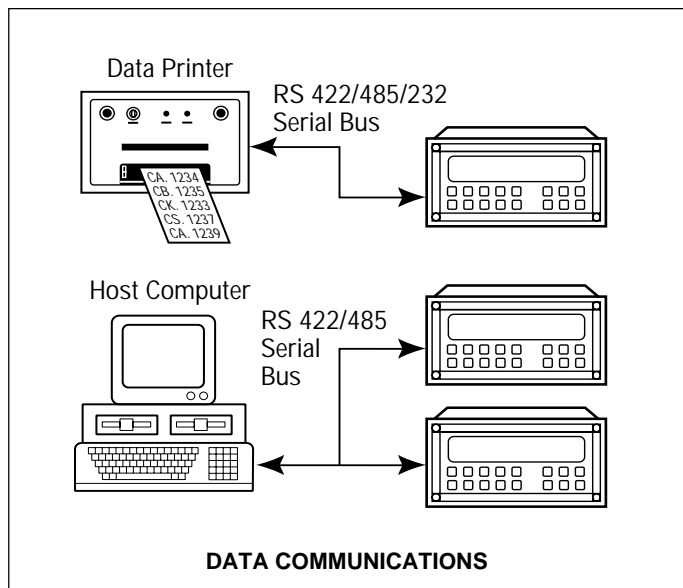
There are two serial data communication interfaces offered:

- ■ **RS-232 –** Intended for connection to a simple paper-tape, or multi-copy form printer. May also be used to communicate with a nearby programmable-logic-controller (PLC), or other system component. The distance between the external device and counter should be limited to 50 feet.

- ■ **RS-422/485 –** Allows communication between multiple counters and an external system over a single buss. Operating distances of up to a mile can be maintained – even in severe industrial environments. Data collection and control tasks can be distributed between a PC, or other computer, and our totalizers and predetermining counters.

ELECTRONIC INPUT SIGNALS

Electronic counters need a signal that represents the unit to be counted. This is often a voltage pulse or contact closure that already exists on your machine or process. However, for cases where no signal is available, a suitable sensor will have to be furnished. Anything that can be sensed can be counted and we offer several types of accessory sensors. There are four general categories of counting applications. Each has specialized sensing requirements:

Group	Example	Sensor
Item Counting	Cartons, Parts, Bottles, Cans, Sheets, Pencils, or any other item.	Inductive Proximity Capacitive Proximity Photoelectric.
Length Measuring	Paper, Cloth, Steel, Textiles, Lumber, or the linear measure of any other goods.	Rotary Encoders Inductive Proximity
Positioning	Assembly machinery, Drilling, Punching, Painting, or any other precision movement.	Rotary Encoders
Specialized	Fluid/Gas Volume, Medical, Scientific, or anything else that can be sensed.	Flowmeter, Particle sensor, or other special device.

DATA COMMUNICATIONS

SELECTOR GUIDE — Electronic Predetermining Counters

This Selector Guide can assist you in determining the type of predetermining counter that best fits your application requirements. Condensed description and specification information is provided. Complete information is available by turning to the referenced page number that appears above each product's picture. The ⭐ symbol denotes our "Star Products" which we recommend be given first consideration. They offer maximum functionality, performance, and value.

Veeder-Root brand	*Series C346*	*Series V4545*	*SQUIRE*	*Series A103*
Page Number: The ⭐ symbol denotes our "Star Products" which we recommend be given first consideration. They offer maximum functionality, performance, and value. **Description and Features:** Condensed description and specification information is provided. Complete information is available by turning to the referenced page number that appears above each product's picture.	Page: 2.04 ⭐ ■ Simple button per digit setting and choice of single line 6 digit LED or LCD display allow optimum operator interface ■ Very flexible input circuit with scaling feature accepts signals from encoders, NPN (sinking), PNP (sourcing), and contact-closure inputs ■ The right choice for most preset counting applications	Page: 2.05 ⭐ ■ Dual-line 4 digit LED display in a compact 1/16 DIN package ■ Scalable input allows display in engineering units such as feet, yards, meters, gallons, or most any other unit of measure ■ Batch and dual preset model available	Page: 2.06 ⭐ ■ Proven favorite with back-lit LCD provides simultaneous display of count value and preset	Page: 2.07 ⭐ ■ Compact, economical pre-set counter perfect for unidirectional event counting applications which don't require scaling ■ Internally Powered ■ Prices start below $100
Dimensions	1/16 DIN (48mm x 48mm)	1/16 DIN (48mm x 48mm)	1/16 DIN (48mm x 48mm)	36mm x 72mm
Display Type	LED or LCD	LED	Backlit LCD	Backlit LCD (Backlight requires external 12 VDC)
Number of Digits	6	4	6	7
Power Supply	120, 240 , 24 VDC models	90 -264 VAC	85-260VAC; 10-26VDC	3V replaceable lithium battery
Number of Presets	1 or 2	1 or 2	1 or 2	1
Batch Counting	No	Yes	Yes	No
Calibrator	Multiplier 0.001 to 9.999	Multiplier 0.001 to 9.999	Multiplier 0.0001 to 9.9999	No
Max Count Speed	5 kHz	10 kHz	2.4 kHz	10 kHz
Count modes	Add/Subtract, Add/ Add, Quad	Add/Subtract, Quad	Add/Subtract, Quad	Unidirectional
Input Type	Sinking, Sourcing, contact closure	Sinking, Sourcing, contact closure	Sinking, Sourcing, contact closure	Sinking, Sourcing, contact closure
Control Output	1amp Relay and NPN transistor	5 amp Relay and NPN transistor	5 amp Relay and NPN transistor	0.1 amp SSR
Sensor Power Supply	12 - 24 VDC	12 VDC	12 VDC	9 - 15 VDC (Option module required)
Front Panel Rating	NEMA 4X	NEMA 4X	NEMA 4X	NEMA 4X
Serial Communication	No	No	No	No

For locating products which do not appear in this selector guide, refer to the table of contents or the product to page number index in Section 15. Additional specialized products that perform predetermining operations can be found in Section 7, Multifunction Products.

Series C628	MAX Count Jr 2	MAX Count 2	MAX Count 6	MAX Position 1
Page: 2.08, 2.09	Page: 2.10	Page: 2.11	Page: 2.12	Page: 2.13
■ AWESOME 0.71″ high digit LED display ■ Programmable color change display based on an event ■ Available models include single, dual and batch preset, and position indicator with high/low alarms	■ 1/8 DIN unit with 5 digit input scaler offers transistor outputs	■ Functions as 3 counters at once, handling preset & batch counting and background totals ■ Full numeric keypad is well suited for applications which require frequent operator interaction ■ Extra high speed (40 kHz) input capability handles the fastest cutting and converting applications with utmost precision	■ Our most powerful preset counter provides a simple solution for logic control of multistep sequential operations ■ 16 preset values as well as batch counting and background totalization ■ Models for sequential or ascending processing of preset values	■ Specifically designed for precise position control ■ 8 outputs send logic information to a motor controller indicating whether the current position is greater than or less than each of the 4 presets
48mm x 96mm	50mm x 96mm	74mm x 144mm	74mm x144mm	74mm x 144mm
LED, Programmable Red or Green color	LED	LED	LED	LED
5 (0.71" high)	5 (0.56" high)	6 (0.6" high)	6 (0.6" high)	8 (0.6" high)
90-240 VAC, 20-50 VAC/DC 50/60 Hz, 4 Watts	115, 230 VAC (switch selectable) or 10-26 VDC	115, 230 VAC (switch selectable) or 10-26 VDC	115, 230 VAC (switch selectable) DC Available	115, 230 VAC (switch selectable) DC Available
2	2	3	16	4
Yes (C628-9X0XX)	No	Yes	Yes	No
Multiplier 0.0001 to 9.9999	Multiplier 0.0001 to 9.9999	Multiplier 0.0001 to 9.9999	Multiplier 0.0001 to 9.9999	Multiplier 0.00001 to 9.99999
10 kHz	5 kHz	40 kHz	20 kHz	40 kHz
Bidirectional	Add/Subtract, Quad	Add/Subtract, Quad	Add/Subtract , Add/Add, Quadrature	Add/Subtract, Quadrature
Sinking, Sourcing, Contact closure	Sinking, Sourcing, contact closure, Magnetic	Sourcing, Contact Closure,	Sourcing, Contact Closure	Sinking, Sourcing, contact closure
2 amp relays, NPN transistors	NPN transistors	NPN transistors 5 amp relay optional	8 NPN transistors	8 NPN transistors
9 - 15 VDC	12 VDC	12 VDC	12 VDC	12 VDC
NEMA 4X	NEMA 4	NEMA 4	NEMA 4	NEMA 4
Optional RS-485	No	RS-422/485	RS-422/485	RS-422/485

LCD Models   **LED Models**

CE

Powerful Preset Counter in Compact 1/16 DIN Package… Available with LED or LCD Display

In addition to being used in counting applications, the C346 can also be utilized for its rate and timing functions.

File No.: E96337

RECOGNIZED   RECOGNIZED

Never has so much performance been packed into such a small package. The Veeder-Root Brand C346 is a full featured preset counter that can be field configured to perform as a rate meter or an elapsed time counter, both with outputs. Chose an LCD display or the industry's only 6 digit, 48mm x 48mm preset counter, with an LED display.

Functionality and simplicity go hand in hand – all models can be configured through the front panel to accept inputs from dry contacts, encoders, or photoelectric or proximity switches with either PNP or NPN outputs. Its input can be easily scaled using a multiplier constant, allowing display in Feet, Meters, Gallons, etc.

Important parameters such as the presets and the prescale value can be called up with direct access keys. Preset values can be quickly entered or changed using a simple button-per-digit method.

■ Choice of LED or LCD display to meet any viewing requirement

■ Scale Function enables display of Engineering Units (Length, Volume)

■ Button-per-digit setting and direct access keys simplify setup and operation

■ Add/Subtract, Add/Add, and quadrature input modes

■ Accepts input signals from a variety of sources: Dry Contact, PNP or NPN Sensors, Encoders

■ Can be field configured to perform rate metering or timing functions (timing resolution of 0.001 second)

■ Relay and transistor outputs programmable for latching or timed operation

■ Reset via Front Panel, Remote Input or Automatic

■ 12 - 24 VDC auxiliary supply for powering input devices

■ NEMA 4X/IP65 rated front panel for use in washdown environments

Single or dual preset models are available. Each preset features a transistor output, which can interface to an external SSR or a PLC, and a relay output for directly driving a load . Outputs can be programmed for latching or timed operation.
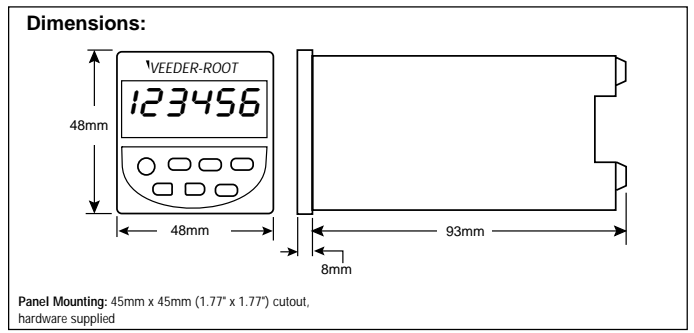
An auxiliary power supply simplifies wiring of inputs, and the draw-out case enhances serviceability. The NEMA 4X rated front panel enables use in washdown environments.

For ultra-compact size, See A103
For three presets, see MAX Count 2

SPECIFICATIONS
Count Modes: Add/Subtract, Add/Add, Count/Direction, or Quadrature, field selectable
Count Speed: 30 Hz or 5kHz, field selectable
Presets: 6 digit; Single (C346-0_1), Dual (C346-0_2)
Reset: Front panel (selectable enable), remote input or automatic
Calibrator: 0.001 to 9.999 multiplier common to inputs A and B
Decimal Point: Selectable from XXXXXX to XXX.XXX
Count Inputs: Contact Closure, Sourcing, Sinking; low < 2.0 VDC, high > 8.0 VDC; 40 VDC max.
Control Inputs: Remote Reset and Program Enable; low < 2.0 VDC, high > 8.0 VDC; 40 VDC max.
Outputs: 1 relay and 1 transistor per preset
   Relay(s): SPDT 1A resistive @ 250 VAC, 2A @ 24VDC
   Transistor: PNP open collector, 24 VDC max, 10 mA max
Dimensions: 48mm x 48mm, 93.5mm deep
Mounting: Panel mount (mounting bracket supplied), 45mm x 45mm cutout
Terminals: Screw Type
Display: Single line seven segment LED, 7.6mm high or Single line LCD, 9mm high
Supply Voltage: 115 VAC, 230 VAC 50/60Hz; 12 - 24 VDC
Accessory Power: 12 to 24 VDC, 0 - 50mA
Ambient Temperature - Operating: 0 to 50˚ Celsius, 32 to 122˚ Fahrenheit
Ambient Temperature - Storage: -20 to 60˚ Celsius, -4 to 140˚ Fahrenheit
Front Panel Rating: NEMA 4X/IP65
Approvals: CE, UL & CUL recognized

Model No.	Description
C346-0411	LCD/Single Preset/AC115
C346-0413	LCD/Single Preset/AC230
C346-0412	LCD/Single Preset/DC 12-24
C346-0421	LCD/Dual Preset/AC115
C346-0423	LCD/Dual Preset/AC230
C346-0422	LCD Dual Preset/DC 12-24
C346-0511	LED/Single Preset/AC115
C346-0513	LED/Single Preset/AC230
C346-0512	LED/Single Preset/DC 12-24
C346-0521	LED/Dual Preset/AC115
C346-0523	LED/Dual Preset/AC230
C346-0522	LED/Dual Preset/DC 12-24

Dimensions:

VEEDER-ROOT

123456

48mm

48mm   93mm

8mm

Panel Mounting: 45mm x 45mm (1.77" x 1.77") cutout, hardware supplied

2

ELECTRONIC

PREDETERMINING

Big, bright LED display and advanced functionality… fits 1/16 DIN panel cutout

File No.: E185087

CE

The Veeder-Root brand V4545 Preset Counter breaks new ground for counters with LED displays. By providing capabilities well beyond event counting, the new V4545 Counter offers greater functionality along with the high visibility of an LED display.

Able to accept inputs from a wide variety of sources including encoders, and scale those signals into meaningful units of measure, the V4545 Preset Counter is well suited for applications such as cut-to-length and filling. Dual input channels, which can be used for reversible or quadrature counting, enhance the unit's versatility.

Single or preset models are available, as is a model that can be used to direct batching operations. Each preset value features both a transistor, which can interface to an external SSR or a PLC, and a relay output for directly driving a load. Outputs can be programmed for latching or timed operation.

- Large Dual-line LED Display for easy preset and count value viewing
- Scale Function allows display of Engineering Units (length, volume)
- High Speed Counting up to 10kHz
- Dual Input Channels for reversible or quadrature counting
- Input Signals accepted from a variety of sources: dry contact, PNP or NPN sensors, encoders
- Dual Preset and Batch Counting Models provide additional functions
- Relay and Transistor Outputs programmable for latching or timed operation
- Reset Capability from front panel, remote input or automatic
- Auxiliary 9-15 VDC supply for powering input devices
- Multilevel Security prevents unauthorized parameter changes
- NEMA 4X/IP65 Rated Front Panel for use in washdown environments

Ease of use is designed into the V4545 with setup being menu driven through the front panel. An auxiliary power supply simplifies wiring of inputs, and the draw-out case enhances serviceability. A universal AC power supply meets global power requirements, while the NEMA 4X/IP65 rated front panel enables use in washdown environments.

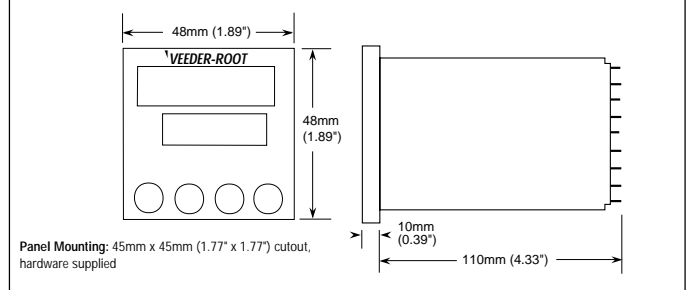**For LCD display, see SQUIRE**
For three presets, see MAX Count 2
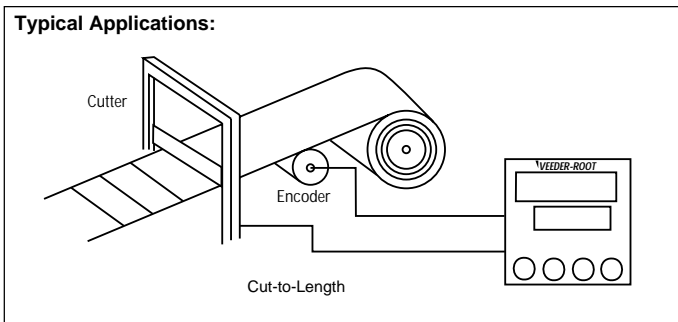
SPECIFICATIONS

Count Modes: Add/Subtract (A-B) or quadrature field selectable
Count Speed: 20 Hz, 200 Hz, or 10kHz (5kHz, quadrature) field selectable
Presets: 4 digit, Single (V45450-1); Dual (V45450-2); or Single with Batch (V45450-3)
Reset: Front panel (selectable enable); remote input; or automatic
Calibrator: 0.001 to 9.999 multiplier common to inputs A and B
Decimal Point: Selectable from XXXX to X.XXX
Count Inputs: Sourcing low <2.0 VDC or open; high >3.0 VDC; Sinking low <2.0 VDC; high >3.0 or open
Control Inputs: Remote Reset and Program Enable; low <2.0 VDC, high >3.0
Number: One relay and one transistor per preset
Relay(s): SPDT 5A resistive @ 110 VAC
Transistor: NPN open collector; 30 VDC maximum; 100mA maximum
Dimensions: 48mm x 48mm; 110mm deep
Weight: Approximately 198 grams; 7 ounces
Mounting: Panel mount (mounting bracket supplied), 45mm x 45mm cutout
Terminals: Screw Type - combination head
Display: Dual line, seven segment LED; 10mm high top display; 7mm high bottom display
Supply Voltage: 90 - 264 VAC, 50/60 Hz
Accessory Power: 9 to 15 VDC, 0 - 100mA
Ambient Temperature - Operating: 0 to 55˚ Celsius; 32 to 131˚ Fahrenheit
Ambient Temperature - Storage: -20 to 80˚ Celsius; -4 to 176˚ Fahrenheit
Front Panel Rating: NEMA 4X/IP65
Approvals: CE, UL & CUL recognized

Model No.	Description
V45450-1	V4545 Counter, Single Preset
V45450-2	V4545 Counter, Dual Preset
V45450-3	V4545 Counter, Single Preset w/Batch

Typical Applications:

Cutter

Encoder

Cut-to-Length

Dimensions:

48mm (1.89")

48mm (1.89")

10mm (0.39")

110mm (4.33")

Panel Mounting: 45mm x 45mm (1.77" x 1.77") cutout, hardware supplied

VEEDER-ROOT brand
Electronic Predetermining Counters

SQUIRE Full Featured

Two-line LCD display with LED backlighting… compact, fits 1/16 DIN panel cutout.

Now operates from 85-260VAC, 50/60Hz or 10-26VDC power source.

A new standard of performance and functionality in a compact preset counter. Four models offer single or dual preset count capability, or a single preset counter with a presettable batch counter.

The backlit LCD display provides simultaneous count and preset indication. The use of annunciators and simple key sequences makes operator changes quick and easy. A variety of count sources are accommodated, including relay and push-button contacts, photocells and proximity switches, and uni- or bidirectional incremental encoders. The solid state outputs can interface to light duty devices and PLCs, while the relay contacts offer heavy duty load switching. Setup and installation is simplified through configuration switches, pluggable terminal strip connectors and a unique "no tools required" panel mount clamp.

- Two line display indicates Count and Preset values simultaneously
- Backlit LCD provides high visibility in high or low ambient light environments
- Removable terminal strip connectors for easy installation and service
- Compact design requires only 48 mm of panel space
- Built-in medium duty, form C (SPDT) relays
- Accessory sensor power supply
- Reset to zero or set to a number operation
- Two level program and preset data security
- Accepts current sinking or sourcing devices
- Key reset, remote reset and auto reset available
- Add / subtract or bidirectional count inputs
- Nonvolatile RAM provides 10+ years data retention
- NEMA 4X/IP65 front panel sealing

The Squire family of preset counters combines state of the art circuitry and electronic assembly techniques with an ergonomic package design that results in the most cost effective, high performance counter value on the market.

For LED display, see Series C346
For three presets, see MAX Count 2

SPECIFICATIONS

Display: Transflective LCD, LED backlight; Counter: 6 digit, 7 mm; Preset/Batch Count: 6 digit, 4 mm; 14 input/output/status indicators

Presets: 6 digits

Power Supply: 85 to 260 VAC, 50/60 Hz, 6 VA max.; 10 to 26 VDC, 0.4 A max.

Count Input: Switch Input: contact closure; 20 Hz max.; 25 ms min. pulse width

Pulse Input: Sourcing, low: < 2 VDC or open, high: > 3 VDC; 2.4 kHz max.; 200 µs min. pulse width; 10 kΩ to Common

Pulse Input: Sinking, low: < 2 VDC, high: > 3 VDC or open; 2.4 kHz max.; 200 µs min. pulse width; 4.7 kΩ to +VDC

Count Modes: Add/Subtract (anti-coincidence): Signal A input adds; Signal B subtracts

Bidirectional Quadrature: Adds when A leads B

Calibrator: 0.0001 to X.XXXX input pulse multiplier

Output: Relay output: Form C, 5 amp resistive at 24 VDC or 120 VAC; 3 amp resistive at 240 VAC; 1/8 H.P. at 120/240 VAC

Solid State: NPN Open Collector transistor; 100 mA max.; 30 VDC max.

Assignment: Output 1 turns on at Preset 1, turns off at manual Reset; Output 2 turns on at Preset 2, turns off at manual Reset; (Output 2 turns on at Counter=0, turns off at Reset if switch #3 is down)

Output Time: 0.01 to 99.99 seconds momentary, or latch

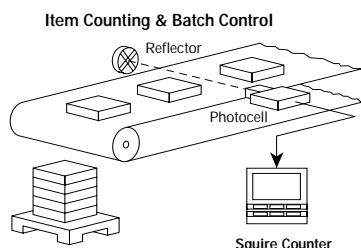**Reset:** Push-button (selectable enable), remote or automatic

Accessory Power: 12 VDC ± 25%, 100 mA maximum (AC operation only)

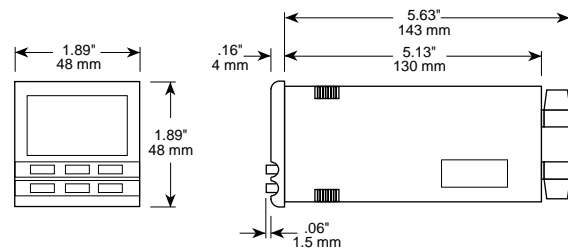**Operating Temperature:** 32° to 122 °F (-0 to 50 °C)

Electrical Connections: Pluggable screw terminals

Model No.	Count Rate	Count Modes	Preset 1	Preset 2	Batch Preset	Calibrator & Dec. Pt.
SQC11000	20 Hz	add/sub	yes	no	no	no
SQC12000	2.4 kHz	a/s, quad	yes	no	no	yes
SQC22000	2.4 kHz	a/s, quad	yes	yes	no	yes
SQB22000	2.4 kHz	a/s, quad	yes	no	yes	yes

Typical Applications:

Item Counting & Batch Control

Reflector

Photocell

Squire Counter

Dimensions:

1.89"
48 mm

.16"
4 mm

5.63"
143 mm

5.13"
130 mm

1.89"
48 mm

.06"
1.5 mm

Panel Cutout: 1.77" x 1.77" (45 mm x 45 mm).

CE

Ultra-compact, cost effective control by count… large display with backlighting

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All in the family - Other matching A103 series products in this catalog:

A103 Totalizing Counters:	**Section 1**
A103 Tachometers/Rate Indicators:	**Section 4**
A103 Time Indicators:	**Section 5**
A103 Preset Timers:	**Section 5**

The A103 Preset Counters are amazingly compact in size and low in cost, with a full complement of popular features. In addition to the preset counter models shown here, the A103 series also includes matching indicators for count-totalizing, timing, and rate/speed metering, as well as preset-timer models. All are in a uniform 36 x 72 millimeters bezel size package, enhancing your control panel with a family of devices that look and program alike.

A supertwist LCD display with thick 12mm (.47") high digits allows for easy viewing at a glance and feature display-backlight capability by simply connecting an external 12VDC supply.

Powered by an internal 3 volt battery, the A103's unique design has two battery slots; this allows battery changeover without loss of memory.

Numerous types of inputs can be accepted giving you a totally self-contained system not requiring external power.

- Matching totalizing counter, time and rate indicators and controllers available – look great together on a panel
- SSR relay output – selectable normally-open or normally-closed operation
- High visibility 7-digit LCD display with backlighting capability standard
- Long life 3 Volt lithium battery eliminates the need for external power
- Accepts input signals from a variety of sources: Dry Contact, PNP or NPN Sensors, Encoders
- High speed and low speed count inputs
- Resettable remotely or from the front panel
- Programmable security of front panel reset button and preset entry
- Option modules provide additional functionality and added convenience – fast, easy installation
- NEMA 4X/IP65 rated front panel for use in washdown environments

The A103 Preset Counters are further enhanced by a series of quick attach option modules. These can provide a power supply for sensors and display backlighting, provision for high or low voltage AC or DC count signals, and mechanical relay output.

SPECIFICATIONS

High Speed Count Input: PNP or square wave pulse; 10 kHz max (50% duty cycle), 45 μsec min pulse width; Low State: < 1.0 VDC, High State: > 2.0 VDC (28VDC max)

Low Speed Count Input: NPN, Contact Closure; 30 Hz max (50% duty cycle), 12 ms min pulse width; Low State: < 1.0 VDC, High State: > 2.0 VDC (28VDC max)

Security Input: Allows access to panel reset and programming features

Remote Reset Input: NPN or Contact Closure to common; edge sensitive

Control Output: Isolated Photomos relay; 0.1 amp @ 30 VAC/DC, >50Ω on resistance. Programmable normally-open or normally-closed operation

Power Source: Single or dual 3V Lithium battery; typical 5 years life w/single battery, 10 years w/dual batteries

Display: 12mm high, Supertwist LCD; 7 digits; "Low Bat" indicator.

Backlighting: Green Illumination over whole viewable area. Requires 10 to 28 VDC power source

Dimensions & Mounting: See dimensions figure. Panel Mount with supplied mounting bracket and gasket

Connections: Screw terminals

Operating Temperature: +32° to +131 °F (0° to +55°C)

Weight: Approximately 64 grams (2.25 ounces)

OPTION MODULE SPECIFICATIONS

Option modules accessories provide a convenient integrated solution to applications that require count signal voltage conditioning, a mechanical relay output, and/or a voltage source for use with external sensors or the A103's display backlight feature. Specifications for each option module feature follow, while specific combinations of features are listed in the "Models" table, below.

AC Power Supply: Provides 10 - 20 VDC @ 50mA for display backlighting and/or sensor. Requires connection to 115 or 230 VAC, 50/60 Hz
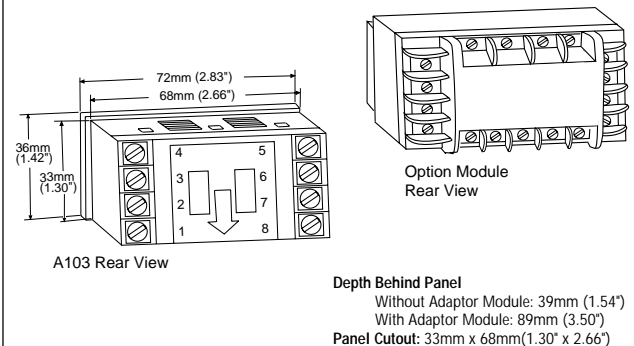
Low Voltage Input: Allows A103 to accept 5 to 30 VAC or VDC for count input

High Voltage Input: Allows A103 to accept 100 to 260 Volt AC/DC for count input

Mechanical Relay Output: SPDT (Form C); 120/240 VAC, 30 VDC contacts, 5 A

Model No.	Description
A103-007	A103 Preset Counter

Replacement Battery: 605472-0001
Panel Hole Punch: A103-A40

The following option modules attach to the rear of A103 Preset Counters:				
Model No.	**AC Power Supply**	**Low Voltage Input**	**High Voltage Input**	**Relay Output**
A103-A12	X			
A103-A17		X		
A103-A19	X	X		
A103-A10			X	
A103-A14	X		X	
A103-A11				X
A103-A13			X	X
A103-A15	X			X
A103-A16	X		X	X
A103-A18		X		X
A103-A20	X	X		X

Dimensions:

72mm (2.83")
68mm (2.66")
36mm (1.42")
33mm (1.30")

A103 Rear View

Option Module Rear View

Depth Behind Panel
Without Adaptor Module: 39mm (1.54")
With Adaptor Module: 89mm (3.50")
Panel Cutout: 33mm x 68mm(1.30" x 2.66")

AWESOME preset & batch counters with large, blazing bright, color changing displays

All in the family - Matching C628 series products in other sections of this catalog:

C628 Totalizers:	**Section 1**
C628 Rate Meters:	**Section 4**
C628 Elapsed Timers:	**Section 5**

CE

File No.: E185087

RECOGNIZED   RECOGNIZED

The Veeder-Root brand C628 Counters are members of a family of 1/8 DIN instruments which offer breakthrough display technology as well as easy-to-program user setup. The large LED display features the ability to change color based on process status such as exceeding the count preset. Therefore, when monitoring count, position, length, or other critical values, the C628 provides operators with an instant visual alert to changes in the application's status.
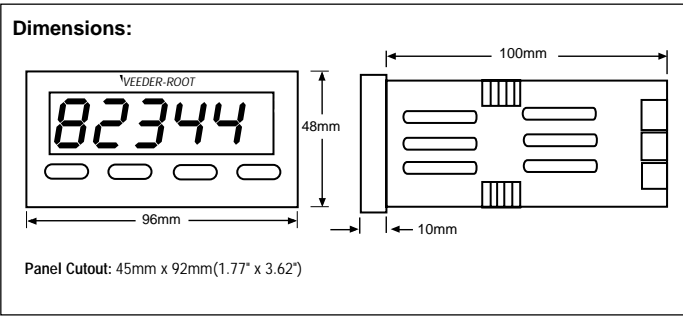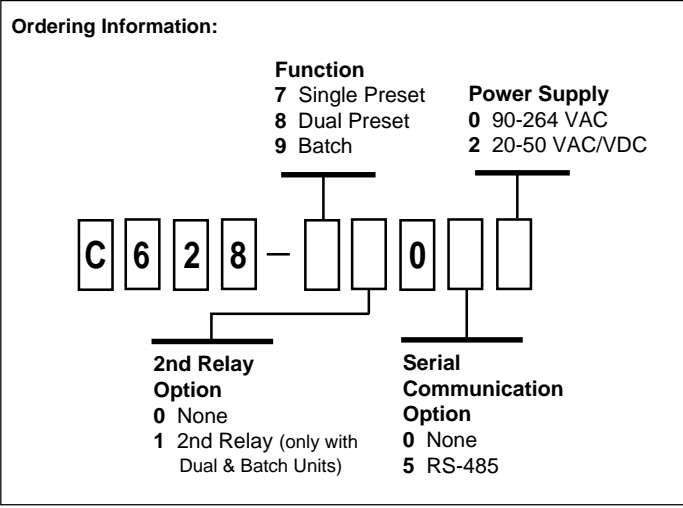
■ AWESOME 0.71" high digit LED display (27% larger than other 1/8 DIN units)
■ Programmable color change display based on an event
■ Batch units - Independent display of background total
■ Programmable help function and secondary legend display
■ Dual preset units - Preset 1 programmable as absolute value or prewarn which tracks Preset 2
■ Choice of NPN or PNP primary input
■ Filter speed settable for 20, 200, or 10,000 Hz
■ Standard Outputs: 1 NPN transistor (2 NPN transistors on Dual & Batch units) & 1 relay (optional 2nd relay on Dual & Batch units)
■ Front panel reset enable and preset lockout
■ Optional RS-485 plug in card
■ CE approved, UL, CUL recognized

Single (C628-7XXX) and dual (C628-8XXX) preset models are available with programmable latched or timed output operation. A batch model (C628-9XXX) also has a preset tied to output 1 as well as a batch preset tied to output 2. This model displays count, batch value, and background total.

SPECIFICATIONS

Count Inputs: Sinking/Sourcing or Contact Closure
Frequency: 10 kHz max. (5 kHz Quadrature)
Logic Low ≤ 2.0 VDC, Logic High ≥ 3.0, 30V max.
Impedance: 10 KΩ to common - Sourcing; 4.7 KΩ to +Voltage - Sinking

Calibrator: Multiplier 0.0001 to 9.9999

Control Inputs: Sinking, Edge Sensitive
Logic Low ≤ 2.0 VDC, Logic High ≥ 3.0
Impedance: 4.7 KΩ to +Voltage
Response Time: 25 ms
Functions: Input 1 - Remote Reset; Input 2 - Security Lockout

Outputs: Solid State: NPN open collector, 30 VDC max., 100 mA max.
Relay: SPDT, 2 amp resistive @ 110 VAC
Latency: 75 μ seconds, plus 8 ms for relay pull-in

Communication: RS-485; Serial asynchronous, UART to UART;
Open ASCII: One start bit, even parity seven data bits, one stop bit;
Baud Rate selectable from 9600, 4800, 2400, or 1200
Maximum Zones: 99

Supply Voltage: 90-264 VAC, 50/60 Hz, or 20-50 VAC/VDC; 4 Watts

Accessory Power Supply: 9-15 (unregulated VDC), 125 mA max.
Display: Red/Green, 7 segment LED
Primary display: 5 digits, 0.71" (18mm) height
Secondary display: single digit, 0.3" (7mm) height
Annunciators: Output 1 & Output 2 (for Dual & Batch units) status
Dimensions: 48mm x 96mm, 110mm deep
Mounting: Panel mount (mounting bracket supplied), 45mm x 92mm cutout
Connections: Screw type terminals - combination head
Front Panel Rating: NEMA 4X/IEC IP65
Case Material: GE Lexan 940
Weight: 0.56 lbs.
Operating Temp.: 0° to 55° Celsius, 32° to 131° Fahrenheit
Storage Temp.: -20° to 80° Celsius, -4° to 176° Fahrenheit
Relative Humidity: 20% to 95% non-condensing
Approvals: CE; UL, CUL recognized

Ordering Information:

Function
7 Single Preset
8 Dual Preset
9 Batch

Power Supply
0 90-264 VAC
2 20-50 VAC/VDC

C 6 2 8 – ☐ ☐ 0 ☐

2nd Relay Option
0 None
1 2nd Relay (only with Dual & Batch Units)

Serial Communication Option
0 None
5 RS-485

Dimensions:

Panel Cutout: 45mm x 92mm(1.77" x 3.62")

C628 Position Indicator

$C\!E$

Full-featured position indicator with large, blazing bright, color-changing display... 2 alarm outputs

All in the family - Matching C628 series products in other sections of this catalog:	
C628 Totalizers:	**Section 1**
C628 Rate Meters:	**Section 4**
C628 Elapsed Timers:	**Section 5**

File No.: E185087

The Veeder-Root brand C628 Position Indicator is a member of a family of 1/8 DIN instruments which offer breakthrough display technology as well as easy-to-program user setup. The large LED display features the ability to change color based on process status such as exceeding the high alarm value. Therefore, when monitoring actual position status or another critical vlaue, the C628 provides operators with an instant visual alert to changes in the application's status.

- AWESOME 0.71" high digit LED display (27% larger than other 1/8 DIN units)
- Programmable color change display based on an event
- Programmable help function and secondary legend display
- High and low alarm outputs
- Optional linear output relative to position
- Accepts encoder inputs
- Reset to a value other than zero enables establishment of a home position
- Filter speed settable for 20, 200, or 10,000 Hz
- Standard Outputs: 2 NPN transistors & 1 relay (optional 2nd relay)
- Front panel reset enable and alarm lockout
- Optional RS-485 plug in card
- CE approved, UL, CUL recognized

The high and low alarms each activate an NPN output and a relay output. In addition, position information can be transferred to a PLC or computer via optional RS-485 serial or linear output boards.

SPECIFICATIONS
Count Inputs: Quadrature
    Frequency: 5 kHz max.
    Logic Low $\leq$ 2.0 VDC, Logic High $\geq$ 3.0, 30V max.
    Impedance: 4.7 KΩ to +Voltage - Sinking
Calibrator: Multiplier 0.0001 to 9.9999
Control Inputs: Sinking, Edge Sensitive
    Logic Low $\leq$ 2.0 VDC, Logic High $\geq$ 3.0
    Impedance: 4.7 KΩ to +Voltage
    Response Time: 25 ms
    Functions: Input 1 - Remote Reset; Input 2 - Security Lockout
Outputs: Solid State: NPN open collector, 30 VDC max., 100 mA max.
    Relay: SPDT, 2 amp resistive @ 110 VAC
    Latency: 75 μ seconds, plus 8 ms for relay pull-in
Linear Outputs: Ranges: 0-20mA, 4-20mA, 0-10V, 2-10V, 0-5V, 1-5V
    Accuracy: $\pm$0.25% (mA at 250Ω, V at 2kΩ) degrades linearly to $\pm$0.5%
    Resolution: 8 bits in 250ms (10 bits in 1s. typ.)
    Load Impedence: mA ranges 500Ω max.; V ranges 500Ω min.
    Update: Approx. 4/s
Communication: RS-485; Serial asynchronous, UART to UART;
    Open ASCII: One start bit, even parity seven data bits, one stop bit;
    Baud Rate selectable from 9600, 4800, 2400, or 1200
    Maximum Zones: 99

Supply Voltage: 90-264 VAC, 50/60 Hz, or 20-50 VAC/VDC; 4 Watts
Accessory Power Supply: 9-15 (unregulated VDC), 125 mA max.
Display: Red/Green, 7 segment LED
    Primary display: 5 digits, 0.71" (18mm) height
    Secondary display: single digit, 0.3" (7mm) height
    Annunciators: Output 1 & Output 2 status
Dimensions: 48mm x 96mm, 110mm deep
Mounting: Panel mount (mounting bracket supplied), 45mm x 92mm cutout
Connections: Screw type terminals - combination head
Front Panel Rating: NEMA 4X/IEC IP65
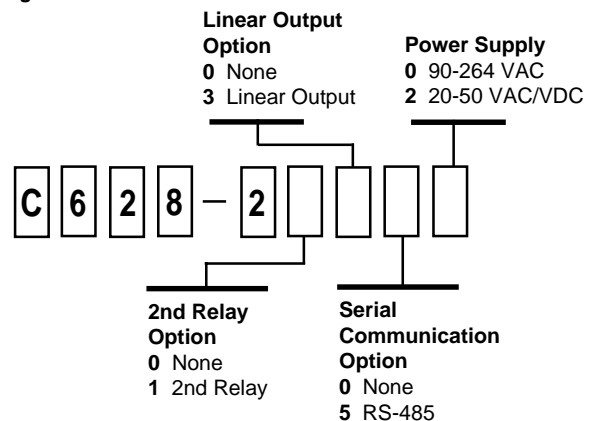**Case Material:** GE Lexan 940
Weight: 0.56 lbs.
Operating Temp.: 0$°$ to 55$°$ Celsius, 32$°$ to 131$°$ Fahrenheit
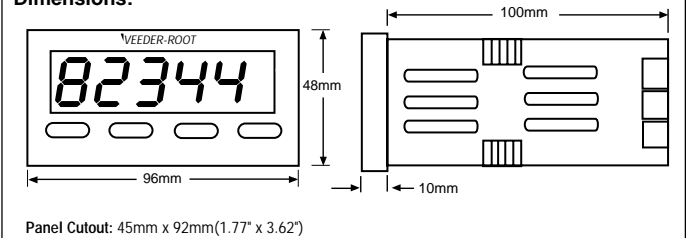**Storage Temp.:** -20$°$ to 80$°$ Celsius, -4$°$ to 176$°$ Fahrenheit
Relative Humidity: 20% to 95% non-condensing
Approvals: CE; UL, CUL recognized

Ordering Information:

Dimensions:

Panel Cutout: 45mm x 92mm(1.77" x 3.62")

2

MAX® jr Count 2

High-speed, 5-digit, two preset, programmable predetermining counters – for quick and easy configuration.

MAXjr Count 2 handles cut-to-length, filling, batching, locating, and many other applications. Its high speed bidirectional operation, and programmable features assure a no compromise solution to almost any count/control problem. A totalizing-only mode of operation is included which allows the unit to perform as an eight decade programmable totalizer.

- Calibrator scales input signal for display in engineering units
- Add/Subtract and quadrature counting modes – solid-state or contact input
- Selectable decimal point positioning
- Bright, high contrast, 5 digit Red LED display – plus status annunciators
- Non-volatile memory retains count and program during power loss
- Panel mounts in 1/8 DIN cut-out – NEMA-4 water and oil integrity
- Friendly menu-driven programming with display prompting – sealed tactile response keys
- Two presets – solid-state outputs with programmable hold times
- Security locks for program, preset and reset
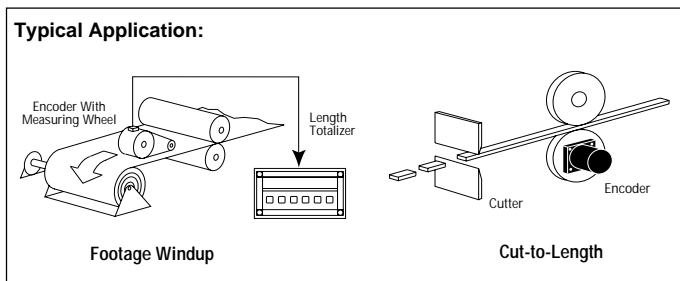- Accessory 12 VDC power supply supports external sensors

The **MAXjr** Count 2 includes many designed-in convenience features, such as: switch-selectable 115/230 VAC operating power, self-diagnostics, and display-prompted program editing – making it a "best value" industrial predetermining counter.

For matching totalizer, see MAXjr Count 1

For data communications capability, see MAX Count 2, Series 7910

SPECIFICATIONS

Input Power: Switch selectable 115 (95 to 130) VAC, or, 230 (190 to 260) VAC, 50/60 Hz, 6 VA; Optional: 10 to 26 VDC, 0.4 A maximum

Accessory Power: DC output provided for transducer, 12 VDC ±25%, 125 mA maximum

Display: 5 digit, 0.56" (14.2 mm) red LED. 8 annunciators for ease of programming and operation.

Decimal Point: Selectable decimal point (X.X.X.X.X.)

Keyboard: Sealed, 6 tactile response keys

Calibration: Input scaling common to inputs A and B. Range 0.0001 to 9.9999

Preset Limits: 2 individual, each allows preset to any 5 digit value

Preset Modes: Up Mode: Resets to zero, process presets 1 and 2 when count matches limit value; Down Mode: Resets to preset limit 2 value, outputs are actuated at preset limit 1 value, and at zero; Totalizer Mode: Presets not active, 8 decade capacity, displays either 4 most, or least, significant digits

Counting Modes: Add/Subtract: Input A adds, B subtracts; Quadrature: Inputs A and B count bidirectionally from quadrature signal source

Signal and Count Rate: X2 input logic, maximum 10 kHz count rate, 5 kHz signal rate

Signal Inputs: Open collectors (sinking or sourcing), magnetic, or contact closure (input speed limited to 20 Hz)

Control Inputs: Reset and stop count (commands initiated when switched to common)

Control Outputs: 2 open collector NPN (sinking), 30 VDC maximum applied voltage, 100 mA maximum load

Reset: Front panel pushbutton, remote, programmable automatic

Security: Selectable locks for reset, preset, and program mode

Diagnostics: Tests for signal and control inputs, outputs, panel keys, and display

Operating Temperature: +32° to +122°F (0 to +50°C)

Weight: 1.4 lbs. (453.6 g)

Model No.	Description
MCJR2S00	**MAXjr Count 2** (115/230 VAC, 50/60 Hz)
MCJR2D00	**MAXjr Count 2** (10-26 VDC operation)

Typical Application:

Encoder With Measuring Wheel

Length Totalizer

Footage Windup

Cutter

Encoder

Cut-to-Length

Dimensions:

3.78" 96 mm

.39" 10 mm

5.20" 132 mm

.50" 13 mm

3.54" 90 mm

FRONT

1.98" 50 mm

SIDE

1.67" 42 mm

Panel Dims: Cutout: 3.58" x 1.78". Thickness: 1/16" to 1/4". Depth: 5.68" min.

2

ELECTRONIC | PREDETERMINING
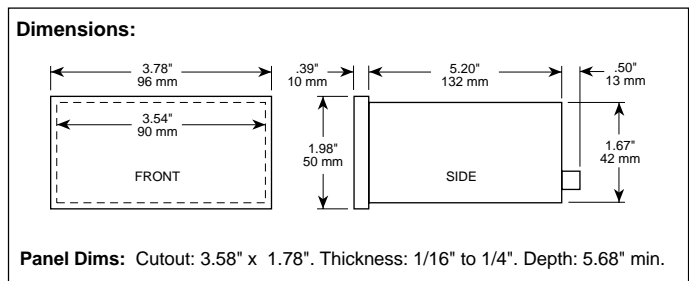
Three Counters in one . . . a powerful three preset counter with batch control and production totalizer

MAX Count 2 can handle your most demanding positioning, winding, sequencing and other count/control tasks with its programmable 3-limit predetermining counter. Preset batch counter and units totalizer features allow it to automatically direct a batching operation and totalize production quantity.

- 6-decade display for all three counters
- Calibration constant for display scaling
- Bidirectional and unidirectional count modes
- Three transistor outputs—optional relays
- Flexible programming for custom application
- RS-422/485 data port with selectable baud rate
- Bright, 0.6" high LED display
- Sealed NEMA 4 front panel
- DIN-size panel mounting
- Non-volatile memory during power loss

MAX Count 2 can accept bidirectional or unidirectional count input from a variety of encoders, sensing devices, pulse, and contact closure sources, at speeds to 40 kHz. An RS-422/485 communications port will support your present needs or future plans for system use.

An easy-to-use display prompted setup mode enables **MAX** Count 2 to be cusomized as required for a specific application. Programmable features include: input correction constant, output hold times and logic, and decimal point position. The program is retained in non-volatile memory and can be secured from unauthorized change.

A full numeric keypad with display prompting allows equipment operators to make quick and accurate changes to preset limit values. Access to preset limits can be restricted if desired.

SPECIFICATIONS

Input Power: Selectable, 100 to 130 VAC or 200 to 260 VAC, 50/60 Hz, 20 VA (12 VDC @ 0.3 A optional).

Accessory Power: 12 VDC @ 175 mA, short circuit protected.

Main Counter and Totalizer: Programmable x1, x2, or x4 logic; Maximum Input Frequency: 40 kHz x1, 20 kHz x2, 10 kHz x4.

Calibration Constant: 0.0001 to 9.9999 programmable range.

Program Security: System Lock and User Lock.

Signal Input: Contact closure or 3.5 to 15 VDC square wave @ 3.25 mA source.

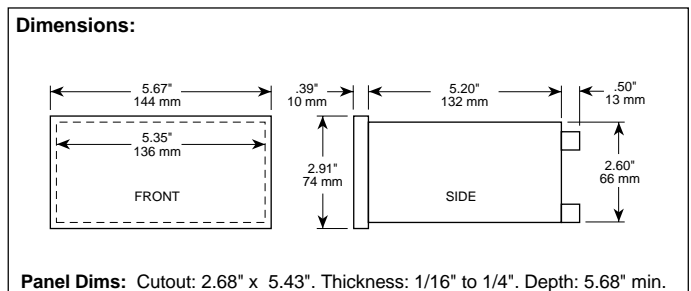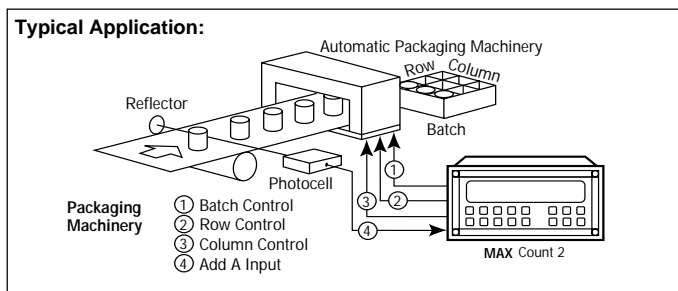**Outputs:** 3 solid state, 100 mA sink, 28 VDC max.; 3 SPDT, 5 amp, relays optional.

Serial Communications: RS-485/422 Differential, ASCII.

Operating Temperature: 32° to 122°F (0° to 50°C)

Model No.	Description
MC200S00	**MAX** Count 2 w/Solid State Outputs, A-B, A+B
MC201S00	**MAX** Count 2 w/Solid State and Relay Outputs, A-B, A+B
MC210S00	**MAX** Count 2 w/Solid State Outputs, A-B, A+B, Quad
MC211S00	**MAX** Count 2 w/Solid State and Relay Outputs, A-B, A+B, Quad

For 12 VDC operation, change the sixth digit in the model no. from S to D.

Typical Application:

Automatic Packaging Machinery

Row Column

Batch

Reflector

Photocell

Packaging Machinery

① Batch Control
② Row Control
③ Column Control
④ Add A Input

MAX Count 2

Dimensions:

5.67" / 144 mm
.39" / 10 mm
5.20" / 132 mm
.50" / 13 mm

5.35" / 136 mm
FRONT

2.91" / 74 mm
SIDE

2.60" / 66 mm

Panel Dims: Cutout: 2.68" x 5.43". Thickness: 1/16" to 1/4". Depth: 5.68" min.

*The simple solution
to complex multi-step
control problems
. . .16 presets, plus
separate batch control
and totalizing counters*

Applications needing several uniquely spaced punching, drilling, welding, printing, or other operations, are no problem for **MAX** Count 6. Its complement of 16 preset limits can operate several machine control functions by timed actuation, or by turning them on or off at specific count values. A large LED display panel keeps the equipment operator informed, while an RS-485/422 communications port can support two-way data transfer with a computer, or other remote system.

- Bidirectional counting in quadrature, add/subtract, or add/add modes
- Programmable features include calibration factor, and decimal point
- Multi-step 16 preset/6 decade control counter
- Big red LED display – plus illuminated annunciators
- Non-volatile memory of program and preset values
- Selectable count memory – reset or retained after power interruption
- RS-422/485 data allows local printer or remote system interface
- NEMA-4 rated, sealed front panel – tactile response keyboard
- Self diagnostics for inputs, outputs, keyboard, display, and memory

Two versions are available: **MAX** Count 6, for applications requiring up to 16 preset limits to be processed in the order of their absolute value as compared to the counted value, therefore preset limits may be processed out of sequence. **MAX** Count 6S is for applications requiring preset limits to be processed in ascending sequential order, with preset limit 1 controlling the process until the counted value equals its value, then preset limit 2 controls the process, and so on.

For more presets, see Series 7920, Series 79201
For specialized web control, see MAX S.L.R.C.

SPECIFICATIONS

Input Power: Selectable, 100 to 130 VAC or 200 to 260 VAC, 50/60 Hz, 20 VA (12 VDC @ 0.3 A optional).

Accessory Power: DC output provided for transducer, 12 VDC ±5%, 175 mA maximum

Display: 0.6" (15.2 mm) red LED, 8 annunciators

Decimal Point: Selectable decimal point (XX.X.X.X.X.)

Keyboard: Sealed, 16 tactile response keys

Input Modes: Add/subtract, add/add, quadrature

Input Logic: X1, X2, X4 (X4, quadrature only)

Count Rate: X1 Logic = 20 kHz; X2 Logic = 10 kHz; X4 Logic = 5 kHz

Input A & B Signal: Contact Closure (25 Hz, maximum) or sourcing 3.5 to 15 VDC

Calibration: Scaling common to inputs A and B; Range: 0.0001 to 9.9999

Preset Limits: 16 individual; each allows preset to any 6 digit value

Main Counter Capacity: 6 decades

Main Counter Modes: Up Mode: Resets to zero; Down Mode: Resets to start count preset value

Secondary Counters: 6 decade single preset batch counter, 6 decade background totalizer

Control Inputs: Reset and stop count/hold (commands initiated when switched to common)

Control Outputs: 8 open collector NPN, 28 VDC/100 ma

Reset: Front panel pushbutton, remote, automatic

Security: Selectable locks for reset, preset, and program mode

**Diagnostics:** Tests signal and control inputs, outputs, keyboard, display

Communications: RS-422/485; ASCII; 300, 600, 1200, 2400 baud

Operating Temperature: +32° to +122°F (0 to +50°C)
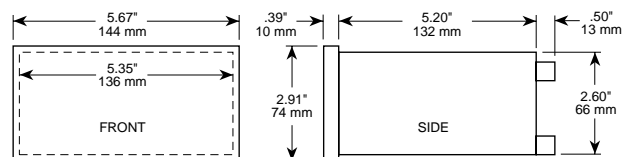
Weight: 2.2 lbs. (997.9 g)

Model No.	Description
MC600S00	**MAX** Count 6, Standard Model, AC Powered
MC600D00	**MAX** Count 6, Standard Model, DC Powered
MC60SS00	**MAX** Count 6, Sequential Model, AC Powered
MC60SD00	**MAX** Count 6, Sequential Model, DC Powered

Typical Applications:

Packaging Line
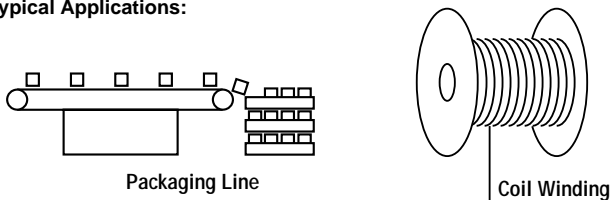
Coil Winding

Ideal for coil winding, heat treating, packaging machinery, position controls.

Dimensions:

5.67" / 144 mm .39" / 10 mm 5.20" / 132 mm .50" / 13 mm

5.35" / 136 mm

FRONT

2.91" / 74 mm

SIDE

2.60" / 66 mm

Panel Dims: Cutout: 2.68" x 5.43". Thickness: 1/16" to 1/4". Depth: 5.68" min.

MAX® Position 1

Bidirectional programmable counter . . . with powerful specialized features for position indication and control
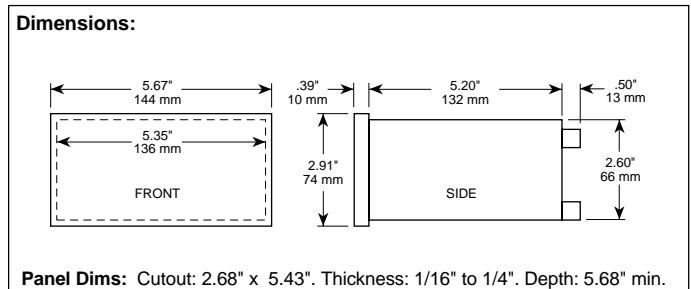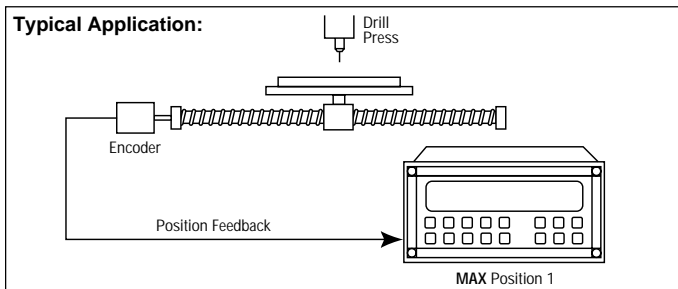
At last – a predetermining counter that makes design and operation of automated positioning controls easy. The **MAX Position 1** is perfect for state-of-the-art control systems, or the modernization of existing manually operated equipment. Besides providing a highly readable LED position display, its eight outputs send logic information to motor control systems, as to actual position status being greater than or equal to, or less than, each of its four position-presets.

■ Industrial grade enclosure with NEMA-4 rated front panel – tactile response keys

■ Large 8 decade LED display with programmable decimal point

■ 40 kHz count speed for error-free tracking at high slew rates

■ Bidirectional counting input accepts encoders and other transducers

■ 4 position presets, each with 2 outputs that signal position status relative to limits

■ Display and preset of position above and below zero (minus sign)

■ Short circuit proof, 12 VDC power output for external transducer

■ Non-volatile memory during power loss of count, presets, and program

■ Input and setpoint for automatic reference synchronization

■ RS-422/485 port supports remote data transfer with PLC or computer

Many convenience features are provided, such as: 115/230 VAC operation, power supply output for encoders and other transducers, and easy-to-wire screw-terminal-blocks.

SPECIFICATIONS

Display: Red, 0.6" high (15.4 mm) LED; programmable decimal point position

Front Panel: Membrane laminate, NEMA-4 rated when mounted with panel gasket, tactile response keys

Input Power: Selectable, 100 to 130 VAC or 200 to 260 VAC, 50/60 Hz, 20 VA (12 VDC @ 0.3 A optional).

Accessory Power: Output of 12 VDC, 120 mA maximum

Memory: Nonvolatile; retains all program and data during absence of power

Security: Program lock; user lock

Signal Inputs: 2 inputs, contact-closure or 3.5 to 15 VDC square wave

Count Capacity: 6 decades with polarity

Calibration: 6 decade multiplier. Range 0.00001 to 9.99999

Presets: 4 individual position comparison limits, each with 2 dedicated outputs

Control Inputs: Reference Enable; Output Disable; Reset; Reference Input; Contact closure or 12 volt square wave; 25 msec. minimum pulse width (320 µsec minimum for reference input)

Outputs: 8 NPN transistors, rated 28 VDC/100 mA sink, maximum

Output Logic: Outputs function in pairs, one output detects count value greater than or equal to preset, other detects count value less than preset

Serial Interface: RS-422, ASCII, programmable baud rate

Operating Temperature: 32° to 122°F (0° to 50°C)

Weight: 2.5 lbs. (1.13 kg.)

Model No.	Description
MP100S00	**MAX** Position 1, position indicator, AC Powered
MP100D00	**MAX** Position 1, position indicator, DC Powered

Typical Application:

Dimensions:

Panel Dims: Cutout: 2.68" x 5.43". Thickness: 1/16" to 1/4". Depth: 5.68" min.

*Solid state counter...
housed in 1/8 DIN
molded NORYL® case*

The DZ100 is a solid state counter which uses CMOS integrated circuits for the counting function. Counter output action occurs when the count total, indicated by front mounted thumbwheel switches, is reached. Its features include:

■ Housed in 1/8 DIN molded NORYL® case

■ Standard isolated double pole - double throw relay output

■ Factory assembly options provide "interval" or "delay" output sequences

■ All connections made through standard square base relay socket

■ Accessories available to convert into panel mounted configuration, including version with plug-in capability

OPERATION

The DZ100 sets to the selected thumbwheel setting when power is applied to terminals A and B. Counts are applied to a count input terminal, and each count is registered on contact opening. When the registered counts equal the setpoint, the output changes state. The output remains in this state as long as line voltage is applied to terminals A and B. The unit resets when line voltage is removed from either terminal A or B.

A count inhibit input is available with the DZ100 series counter. When line voltage is applied to the count inhibit input, from either terminal A or B, incoming count pulses are not counted. The counter remembers count total at the time the inhibit is applied and resumes counting from that point after the inhibit voltage is removed. The count inputs may be applied from either side of the power line.

SPECIFICATIONS

Count Accuracy: 100% accurate for any count setting between 1 and 99

Count Speed: 600 pulses per min.
Pulse must have minimum 40 ms ON and 60 ms OFF

Reset Time: 50 ms

Cycle Progress: Pilot light ON during "COUNT" cycle

Voltage/Frequency:
120 VAC (+10 -15%), 50/60 Hz or 120 VDC (+10 -15%)
240 VAC (+10 -15%), 50/60 HZ or 240 VDC (+10 -15%)

Burden: 120 VAC or DC, 1.9 VA max. relay output
240 VAC or DC, 2.5 VA max. relay output

Output Rating: Relay - 10 amp steady state
Mechanical Lifetime - over 20 million operations
Electrical Lifetime - contingent on load characteristics

Power Interruption: Line voltage interruptions of 16 ms or less will not reset unit

Power On Response: 30 ms max. after application of line voltage to pins A and B

Temperature Range: 32˚ to 140˚F (0˚ to 60˚C)

Transient Voltage Immunity: Performance unaffected by 50 microseconds, 600 V peak transients superimposed on line input

Vibration: Unaffected by 2.5G sinusoidal vibration magnitudes in both directions of three perpendicular mounting axes imposed from 10 to 1000 Hz

Laboratory Testing: UL Recognition E96337
CSA Certification L26861

ORDERING INFORMATION   DZ1   0   1   A3

TYPE

Sym.	Description
0	Standard

OUTPUT SEQUENCE

Sym.	Description
0	OOX
1	OXO

VOLTAGE & FREQUENCY

Sym.	Description
A3	120 VAC, 50/60 Hz or 120 VDC
B3	240 VAC, 50/60 Hz or 240 VDC

ACCESSORIES

Model No.	Description
DZ100-51	Bezel Kit for panel mounting
DZ100-52	Strain Relief Kit
DZ100-54	Plug-In Housing for panel mounting units
DZ100-56	Latch and Latch Release Kit for surface mounting
60SR3BO5	Square Base Relay Socket

DANAHER INDUSTRIAL CONTROLS has representatives and distributors located in major cities within the United States and throughout the world. For information about the distributor or sales office nearest you, contact our customer service department:

Customer Service
call Toll Free 800.873.8731
or 847.662.2666

Internet Presence
E-Mail: dancon@dancon.com
Worldwide Web: http://www.dancon.com

Veeder-Root
Dynapar
Eagle Signal

2
ELECTRONIC PREDETERMINING

DANAHER INDUSTRIAL CONTROLS has representatives and distributors located in major cities within the United States and throughout the world. For information about the distributor or sales office nearest you, contact our customer service department:

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or 847.662.2666

Internet Presence
E-Mail: dancon@dancon.com
Worldwide Web: http://www.dancon.com

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Eagle Signal

Veeder-Root

Dynapar

Eagle Signal

TOTALIZING COUNTERS

A totalizer is a counter that sums the "total" number of cycles applied to its input.

Common totalizer applications are: item or piece counting, machine cycle counting, material length measurement, and position display.

Mechanical and electric totalizers are visual display devices that register counts based on a rotary or ratcheting input. Readout is usually via decade-wheels that have 0-9 numerals printed on a contrasting background color. Most types are available with a count capacity of 5 to 8 digits.

LENGTH MEASUREMENT

ITEM COUNTING Photoelectric / Counter

MACHINE CYCLE COUNTING Counter / Linkage

POSITION DISPLAY Lead Screw

TOTALIZING COUNTER APPLICATIONS
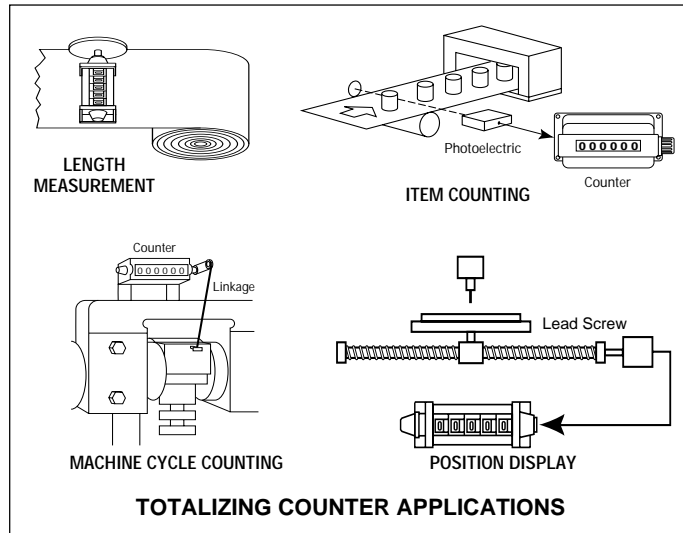
WE OFFER CHOICE OF TECHNOLOGY

Our VEEDER-ROOT brand mechanical and electric totalizers are recognized worldwide for their innovative designs, quality, durability, and accuracy – and are backed by over 120 years experience in development and application of counting and controlling instruments. This expertise has led to a product range that spans all counting technologies – mechanical and electrical, as well as the electronic models that are in the next section.

Mechanical totalizers are very easy to install and operate, and require no operating power or input sensors. Counting is accomplished through direct coupling to a rotating or reciprocating machine element, such as a shaft, measuring wheel, lever, or cam. Flexible enough to fit almost any application – many mounting styles, count capacities, drive ratios, shaft rotations and reset features are available.

SERIES 7428 (Rotary Drive)

SERIES 7272 (Ratchet Drive)

SERIES 7623 HAND TALLY

SERIES 7490 VARY TALLY

MECHANICAL TOTALIZERS
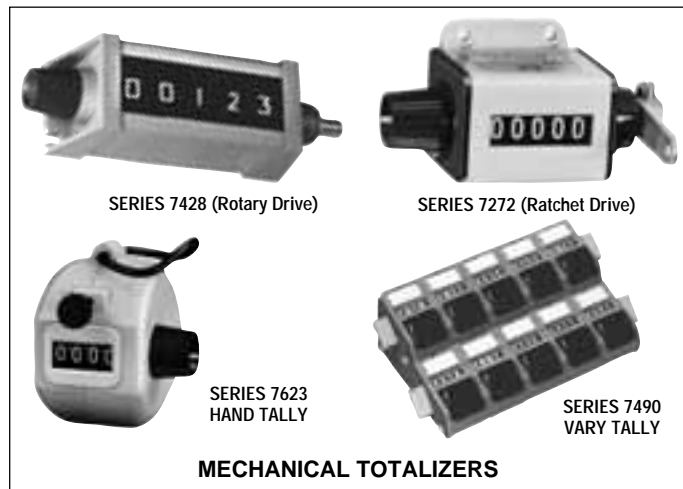
The mounting location for a mechanical counter is greatly influenced by its linkage or coupling requirements, therefore access for viewing its display and operating its reset feature should be contemplated when planning an application.

For hand-operated requirements, you'll like our HAND TALLY and VARY TALLY products.

Electric totalizers can be installed at locations that are remote from the origin of the count signal. The input signal is a voltage source, impulsed through switch or relay contacts, or a proximity switch or photoelectric sensor. We offer a variety of packaging and mounting styles, reset features, and have standard models covering all popular AC and DC voltage ratings. Our continued dedication to the development and improvement of electrical totalizers has yielded modern designs that are among the lowest priced in the industry – without compromise of quality and reliability.
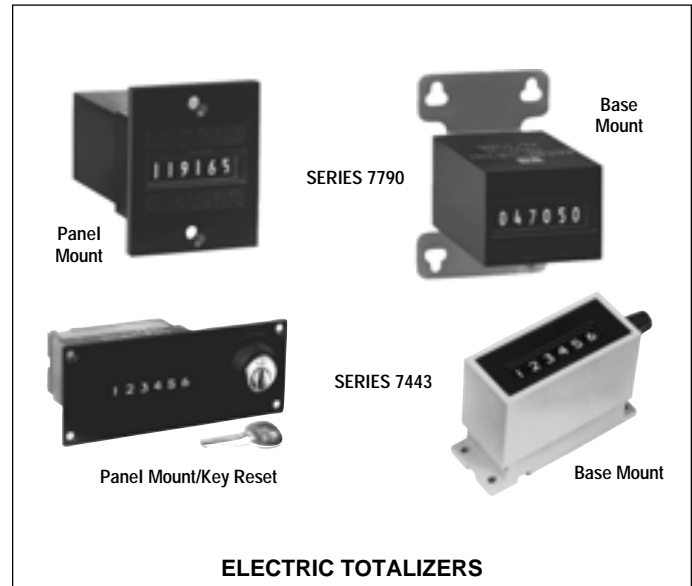
Panel Mount 119165

SERIES 7790

Base Mount 047050

Panel Mount/Key Reset 123456

SERIES 7443

Base Mount 123456

ELECTRIC TOTALIZERS

SPECIFYING A TOTALIZER

Considerations when selecting a totalizing counter for your application are:

- **Technology –** Mechanical, Electrical (also see our electronic totalizers in Section 1).
- **Input –** What is to be counted and from where will the counter's input be obtained?
- **Count Speed –** Speed ratings vary. Check Specifications.
- **Number of Digits and Figure Size –** Based on Maximum Count Value and Viewing Conditions
- **Packaging –** Mounting requirements and Enclosure Size
- **Environmental –** Temperature Specification

Most of our totalizers provide a convenient knob, push-button or lever for resetting to zero, although non-reset models are available for applications where security of totals is a consideration.

PREDETERMINING COUNTERS

Predetermining counters (or preset counters) are essentially totalizers that can switch an external circuit when its counted total matches a user-entered preset limit. They can be used in manufacturing and process applications to control batch lot size, cutting material to length, punching or drilling, and many other count, position, or length related operations.

CUT-TO-LENGTH

WINDING/SPOOLING

PREDETERMINING COUNTER APPLICATIONS

MECHANICAL – SERIES 7283   ELECTRIC – SERIES 7441

TYPES OF PREDETERMINING COUNTERS
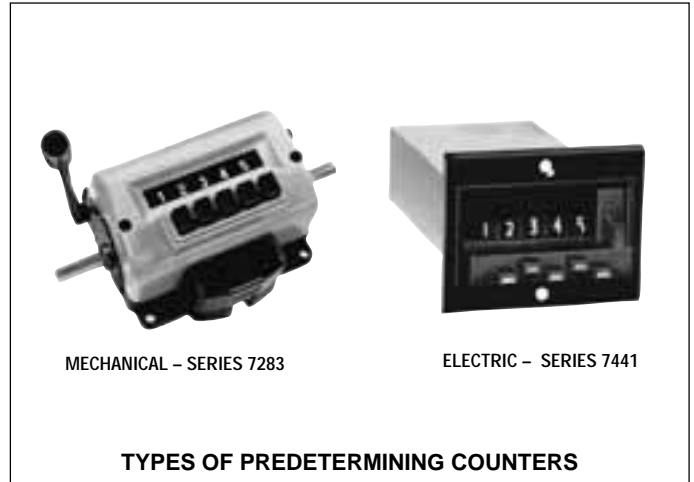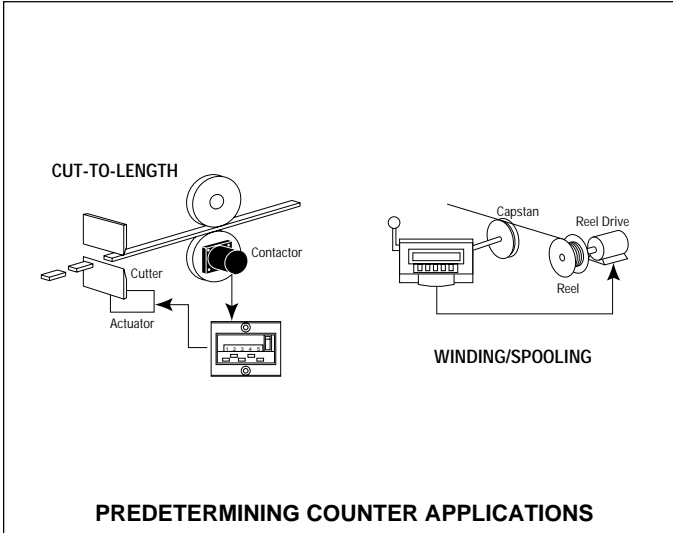
When selecting a predetermining counter, it is important to consider which technology is most appropriate for the application.

Mechanical predetermining counters are very easy to install and operate, and require no operating power or input sensors. They are ideal for relatively slow batching and measuring operations, such as stopping a machine when a preset quantity of parts, cycles, or length has been produced. Flexible enough to fit almost any application – many mounting styles, count capacities, drive ratios, shaft rotations and reset features are available.

Counting is accomplished through direct coupling to a rotating or reciprocating machine element, such as a shaft, measuring wheel, lever, or cam. When its preset count value is reached, a switch contact output is provided for controlling an external circuit. A manual reset is usually required before the process can be repeated.

The mounting location for a mechanical counter is greatly influenced by its linkage or coupling requirements, therefore display visibility and convenient access to preset and reset features should be contemplated when planning an application.

Electric predetermining counters are ideal for relatively slow batching operations. Since counting is not dependent on mechanical attachment to machine elements, they can be installed at locations that are remote from the origin of the count signal. The input signal is a voltage source, impulsed through switch or relay contacts, or a proximity switch or photoelectric sensor. We offer a variety of packaging and mounting styles, reset features, and have standard models covering all popular AC and DC voltage ratings.

SPECIFYING A PREDETERMINING COUNTER

Basic considerations when selecting a predetermining counter for your application are:

■ **Technology –** Mechanical, Electrical, Electronic (See our electronic predetermining counters in Section 2).
■ **Input –** What is to be counted and from where will the counter's input be obtained?
■ **Count Speed –** Speed ratings vary. Check Specifications.
■ **Number of Digits –** Based on Maximum Count Value
■ **Type and Size of Display –** Should accommodate operating environment's viewing and lighting conditions
■ **Packaging –** Mounting requirements and Enclosure Size
■ **Environmental –** Temperature Specification

Additional selection criteria for predetermining counters include:

■ **Output Device:** Most predetermining counters include internal contacts that can switch a wide voltage range of AC or DC circuits that draw moderate power. The relay is capable of directly controlling solenoids, valves, shears, lights, buzzers, etc.

■ **Output Action:** Electric and mechanical preset counters usually provide output contacts that are maintained on (latched), until the counter is manually reset.

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Electric Totalizing Counters

Advantages:
- ■ rugged
- ■ compact
- ■ economical

VEEDER-ROOT brand
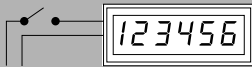
Mechanical Totalizing Counters

Advantages:
- ■ no wiring
- ■ rugged
- ■ versatile

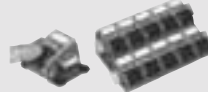*VEEDER-ROOT brand*
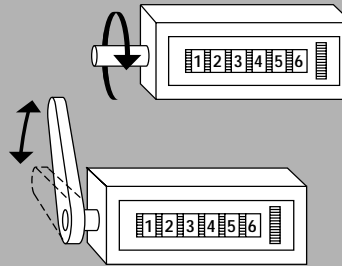
GENERAL PURPOSE	GENERAL PURPOSE		SPECIALIZED
Series 1205 *See page 3.19* ■ Base or panel mount	**Series 1490** *See page 3.04* ■ Multiple registers ■ Hand operated	**Series 7268** *See page 3.07* ■ Nonreset ■ Direct drive	**Series 7434** *See page 3.17* ■ Fits 2 measuring wheels ■ Counts yards/feet
Series 7443 *See page 3.20* ■ Base or panel mount	**Series 7623** *See page 3.05* ■ Hand held ■ Low cost	**Series 1133, 1134** *See page 3.12* ■ Fits measuring wheel ■ Heavy duty	**Series 7030** *See page 3.10* ■ Pneumatic drive ■ Rugged
Series 7790, 7791 *See page 1.19* ■ Compact, low cost	**Series 7458-7461** *See page 3.06* ■ Small, nonreset ■ Ratchet and rotary	**Series 7428, 7430** *See page 3.11* ■ High visibility ■ Accepts measuring wheel	**Series 1667, 1669** *See page 3.13* ■ Extremely rugged ■ Ratchet and rotary
Series 7437, 7438 *See page 3.22* ■ Low cost, reset, nonreset	**Series 7272, 7287** *See page 3.08* ■ Resettable ■ Ratchet and rotary	**Series 1129** *See page 3.15* ■ Extra large figures ■ Ratchet drive	**Series 7298** *See page 3.14* ■ Fits 2 measuring wheels ■ Quick lever reset
	Series 1259, 1261, 1262 *See page 3.09* ■ Rugged ■ Ratchet and rotary	**Measuring Wheels** *See page 3.18* ■ Accurate linear measuring ■ Two widths, four surfaces	**Series 1953** *See page 3.16* ■ Fits 2 measuring wheels ■ Counts feet/yards

Electric Predetermining Counters

Advantages
- durable
- compact
- easy to use

VEEDER-ROOT brand

123456

Mechanical Predetermining Counters

Ratchet

1 2 3 4 5 6

Rotating

1 2 3 4 5 6
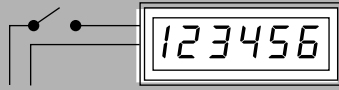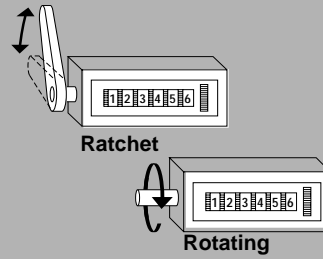
Series 7441
See page 3.25

- AC or DC models
- Easy, pushbutton presets

Series 1239
See page 3.23

- Up counting predetermining
- Accepts measuring wheels

Series 7283
See page 3.24

- Quick lever reset
- Accepts 2 measuring wheels
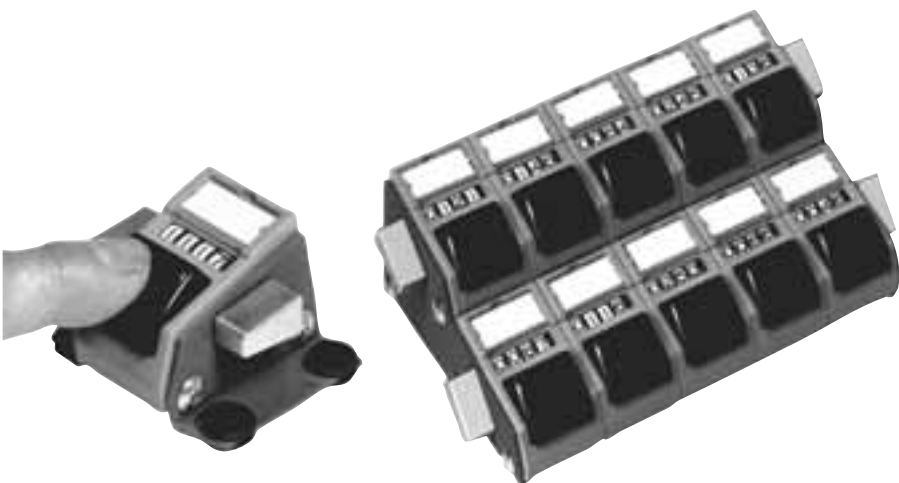
Manually operated, 4 figure counter . . . available as a single unit, or as multi-unit combinations

Pushbutton actuated, base mount totalizer. Standard models are offered that integrate up to 6 units, providing a common reset. Combinations of up to 114 units are possible for special orders. Among its many industrial and commercial uses are inspection tallies, medical and scientific studies, inventory control, traffic surveys, and point-of-sale records.

- Individual identification panels
- Large, positive action pushbutton adds one count per actuation
- Rugged, heavy duty construction – die cast frame and wheels
- Four black-on-white figures – counts to 9999
- Optional assemblies combine up to 114 counters
- Compact size – 40 counters fit in less than a square foot
- Common reset for entire row of counters
- Lubrication not required

The Series 1490 Vary Tally® is ruggedly constructed using die cast zinc and steel components, and will take extremely heavy use over a long service life.

For hand held totalizer, see Series 7263 Hand Tally

SPECIFICATIONS

Number of Figures: 4 per unit

Size of Figures: 0.170" high by 0.140" wide (4.3 mm by 3.6 mm)

Color of Figures: Black on white

Configuration: 0 to 9

Reset: Manual

Mounting: Base with feet in or out

Construction: Frame: Zinc die cast; Working Parts: Hardened steel; Wheels: Zinc die cast; Button: Acetal resin

Lubrication: Not required

Net Weight: Single unit 3 oz. (85 g)

Options: Combined assemblies to 114 counters; mounting feet in or out

Model No.	Units Wide	Tiers High	Feet Point
0149000-101	1	1	Out
0149000-102	2	1	Out
0149000-103	3	1	Out
0149000-104	4	1	Out
0149000-105	5	1	In
0149000-106	6	1	Out

Dimensions:

.625"
15.9mm

MOUNTING FEET OUT

.250"
6.4mm
Hole

6 Tier–6.737" (171.1mm)
5 " 5.706" (144.9mm)
4 " 4.675" (118.7mm)
3 " 3.644" (92.6mm)
2 " 2.613" (66.4mm)
1 " 1.582" (40.2mm)

14° Constant

RIGHT SIDE VIEW

1.453"
36.9mm
Constant

.312" (7.9mm)
Reset Knob
Clearance Constant

Base Line

6 Tier–13.625" (346.1mm)
5 " 11.375" (288.9mm)
4 " 9.125" (231.8mm)
3 " 6.875" (174.6mm)
2 " 4.625" (117.5mm)
1 " 2.375" (60.3mm)

11.2mm
.440" Constant

COUNTERS LONG
(add 1.291" for each counter over 6)
6 = 8.749" (222.2mm)
5 = 7.458" (189.4mm)
4 = 6.167" (156.6mm)
3 = 4.877" (123.9mm)
2 = 3.586" (91.1mm)
1 = 2.296" (58.3mm)

Label card, to be not more than .390" wide by 1.032" long by .015" thick (9.9 x 26.2 x 0.4mm)

Typical Applications:

1 2 3 4
$

VEEDER-ROOT brand
Mechanical & Electric Counters

7623 Hand Tally

Low cost, lightweight, thumb- or finger-actuated counter . . . made to fit comfortably in the palm of the hand, or in accessory mounting base

The universally popular Hand Tally from Veeder-Root. Solid, accurate, reliable – its high impact, corrosion resistant construction is designed to outlast low quality imitations many times over.

It can be used for unlimited counting chores. Traffic analysis, attendance, sporting events, farming and ranching operations, inventory control, surveys, laboratory studies, production counting.

- 4 figures – counts to 9999
- Compact and lightweight
- Impact, dust and corrosion resistant
- Weather resistant – use it indoors or out
- Smooth action quick-reset knob
- Meets U.S. government standards
- High contrast, white on black display figures
- Accessory mounting base allows fixed or portable use
- Low cost

An accessory mounting base is predrilled for mounting to a desk, bench, or other surface. It securely cradles the Series 7623 for use at a fixed location, but allows it to be easily removed for use in the field.

**For multiple register configurations, see Series 1490 Vary Tally
For remote sensing applications, see MITE series.**

SPECIFICATIONS

Number of Figures: 4

Count Capacity: 9999

Size of Figures: 0.188" high by 0.099" wide (4.8 mm by 2.5 mm)

Color of Figures: White on black

Operation: Depress thumb lever once for each count

Reset: Manual knob, rotary

Mounting: Hand-held; or detachable mounting base

Construction: Case: Polycarbonate; Knob & Wheels: Acetal resin; Internal Working Parts: Hardened steel and acetal resin; Finger Ring and Pushbutton: Hardened steel; black finish

Net Weight: Hand Tally: 1.2 oz. (34.02 g); Mounting Base: 1.2 oz. (34.02 g)

Model No.	Description
0762304-001	Hand Tally
0300301-547	Mounting Base

Dimensions:
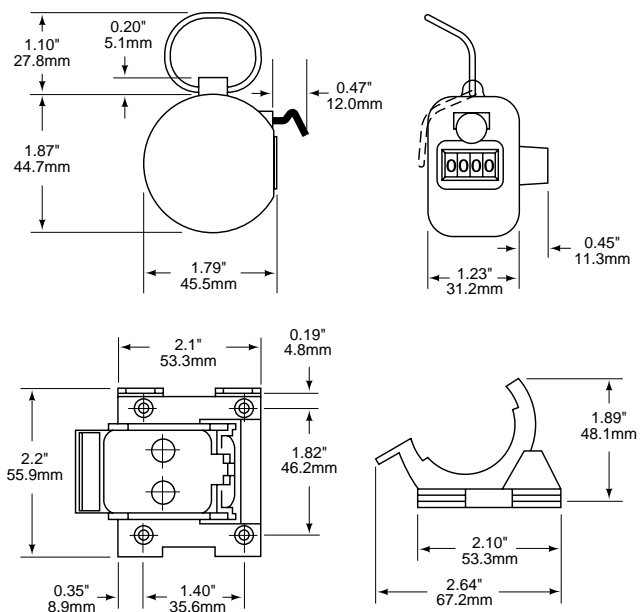
Typical Applications:

Attendance Counting — **12** — **Laboratory Counting**

Ideal for any hand-actuated counting application.

DANAHER INDUSTRIAL CONTROLS 3.05

3

M E C H & E L E C T R I C   C O U N T E R S

Small Square Case Counters . . . compact, lightweight, highly-reliable mechanical totalizers, available in rotary and ratchet drives

A very popular family of flange mount case, 5-figure nonreset totalizers. All models feature a scratch resistant front crystal, smooth low torque operation, and dust resistant construction.

- Precision design provides smooth operation and long service life
- Easy to see display – High contrast white-on-black figures
- Scratch resistant front crystal
- Stainless steel drive shaft; Tough molded case and internal parts
- Lubrication never required
- Compact and lightweight
- Wide temperature range, -40° to +160°F (-40° to +57°C)

Models are available with input shaft drives which count from a ratcheting motion, or rotary drives with count per revolution ratios of 1:1, 10:1, or 1:10.

Where order quantities permit, many special variations are possible, such as: 6 or 7 figures, mounting options, double-ended shaft, and reverse display colors.

For reset features, see Series 7272
For heavy industrial application, see Series 1259, 1260, 1261, 1262

SPECIFICATIONS
Drive Ratios:
Series 7458: Direct Drive, adds ten counts for each drive shaft revolution; Subtracts for opposite rotation
Series 7459: Revolution Drive, adds one count for each drive shaft revolution; Subtracts for opposite rotation
Series 7460: Ratchet Drive with stops, adds one count for each drive actuation through arc of 40° minimum; Maximum travel limited to arc of 45°; Integral return spring
Series 7461: Rotary Ratchet Drive, adds one count for each drive shaft actuation through arc of 40° minimum, 60° maximum; May be used as direct drive adding ten counts for each drive shaft revolution; Will not subtract in opposite direction
Count Speed: Direct Drive: 500 rpm; Revolution Drive: 1000 rpm; Ratchet Drive (harmonic motion): 1000 cpm; Rotary Ratchet Drive (harmonic motion): 1000 cpm; Geared Drive: 1000 cpm
Torque (oz.-in.): Direct Drive: 0.25; Revolution Drive: 0.5; Ratchet Drive: 6.0; Rotary Ratchet Drive: 1.0; Geared Drive: 0.5
Number of Figures: 5

Typical Applications:

Coin-operated Laundry

Vending Machine

Ideal for vending machines, office equipment, and other applications where non-electrical actuation is desired.

Size of Figures: 0.170" (4.3 mm) high by 0.087" (2.2 mm) wide
Color of Figures: White on black
Lubrication: Not required
Ambient Temperature: -40° to +160°F (-40° to +57°C)
Construction: Case, pinions, and wheels: acetal resin; Drive shaft and washer: stainless steel
Net Weight: 0.49 oz. for 5 figure model

Model No.	Description	Rotation
0745815-001	Direct drive, 5 figures, flange case	
0746015-001	Ratchet drive, 5 figures, flange case	
0746115-001	Rotary ratchet drive, 5 figures, flange case	1
0745915-001	Revolution drive, 5 figures, flange case	
0745825-001	Direct drive, 5 figures, flange case	
0746025-001	Ratchet drive, 5 figures, flange case	2
0745925-001	Revolution drive, 5 figures, flange case	
0745835-001	Direct drive, 5 figures, flange case	
0746035-001	Ratchet drive, 5 figures, flange case	3
0745935-001	Revolution drive, 5 figures, flange case	
0745845-001	Direct drive, 5 figures, flange case	
0746045-001	Ratchet drive, 5 figures, flange case	4
0745945-001	Revolution drive, 5 figures, flange case	

Dimensions:

3 & 4 Rotation — Side View — 1 & 2 Rotation

3 & 4 Rotation — Side View — 1 & 2 Rotation

*Heavy duty, nonreset
totalizer . . . ideal for
linear measurement or
position indication*

Series 7268 is frequently used for position indication on machine tools, back gauges, and laboratory equipment. It's tough enough to be unaffected by punishing industrial environments, yet remains accurate and maintenance-free over a long service life.

- Speeds to 25,000 counts per minute
- High contrast, easy-to-read, 5 figure display
- Direct drive – adds 10 counts per shaft revolution, reverse rotation subtracts
- Precision designed mechanism requires only 0.3 oz-in (0.21 N.cm) torque
- Rugged construction with brass case and stainless steel shaft
- Permanently lubricated oil impregnated porous bronze bushings
- Available in left and right shaft extension, with clockwise addition or subtraction
- Nonreset design provides security of counted totals

SPECIFICATIONS

Count Speed: 1500 rpm continuous, 2500 rpm intermittent

Torque: Maximum static: 0.3 oz-in (0.21 N.cm)

Number of Figures: 5 standard; 3 to 7 available, non-stock

Size of Figures: 0.187" (4.7 mm) high by 0.140" (3.6 mm) wide

Color of Figures: White on black

Lubrication: Not required

Mounting: Base

Construction: Case: Brass; Shaft: Stainless steel; Pinions: Acetal resin; Right Wheel: Nylon, all others acetal resin

Net Weight: 7 oz. (198.45 g)

Model No.	Description	Rotation
0726815-001	5 figure, nonreset	1
0726825-001	5 figure, nonreset	2
0726835-001	5 figure, nonreset	3
0726845-001	5 figure, nonreset	4

Dimensions:

Front View

Side View

Typical Applications:
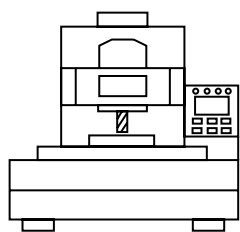
Machine Tool   Photo Enlarger

7272/7287 Small Reset

3

MECH &ELECTRIC COUNTERS
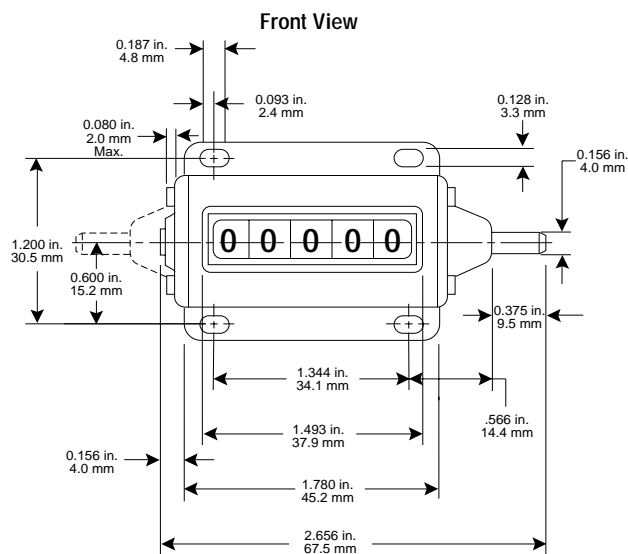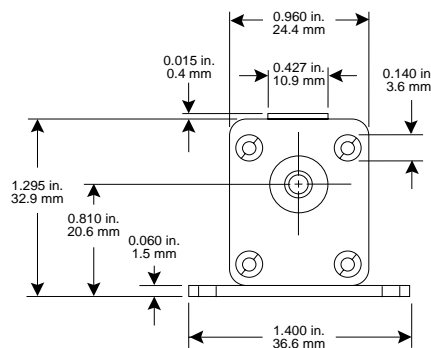
The ideal combination of small overall size, and large figure size . . . available in reset and nonreset versions

The long-time standard in small, flange mount, mechanical totalizers. All external and internal parts are corrosion resistant. Its ruggedness and reliability contribute to trouble free and accurate performance – indoors and out.

- Accurate, smooth operation and long service life
- Easy to see 5 figure display – high contrast white-on-black numerals
- Small overall size with solid base-mount flange
- Stainless steel drive shaft
- Tough molded case and internal parts
- Maintenance free – lubrication never required
- Dust and corrosion resistant

Series 7272 is available with left or right hand ratchet drives, while series 7287 is equipped with revolution drive (adds one count per shaft revolution in either direction).

Where order quantities permit, special variations are possible, such as: mounting options, special levers and couplings, and custom display colors.

For heavy industrial application, see Series 1259-1262
For higher speed operation, see Series 7268

SPECIFICATIONS

Drive Ratios:

Series 7272: Ratchet Drive, adds one count for shaft actuation through minimum arc of 40°; travel limited to 45°; internal lever return spring

Series 7287: Revolution Drive, adds one count for shaft revolution in either direction; will not subtract

Speed: Ratchet: Harmonic – 1000 cpm; impact – at least 30 ms to advance lever 45°; Revolution: 1000 rpm

Torque: Maximum Static: 3 oz-in. (2.12 N.m), ratchet 8 oz-in (5.65 N.m)

Size of Figures: 0.187 in. (4.7 mm) high by 0.099 in. (2.5 mm) wide

Color of Figures: White on black standard

Reset: Manual knob or lock-and-key reset; see model

Lubrication: Not required

Mounting: Base

Construction: Case: Glass filled nylon; Drive Shaft: Stainless steel; Wheels, reset knob, pawls, yoke, end caps, and working parts: Acetal resin

Net Weight: 2.4 oz. (68.0 g)

Model No.	Description	Rotation
0727215-001	Ratchet drive, 5 figure, knob reset	
0727215-012	Ratchet drive, 5 figure, lock-and-key reset	
0727215-002	Ratchet thumb lever drive, 5 figure, knob reset	1
0727215-004	Ratchet drive, 5 figure, nonreset	
0728715-001	Revolution drive, 5 figure, knob reset	
0727225-001	Ratchet drive, 5 figure, knob reset	
0727225-022	Ratchet drive, 5 figure, lock-and-key reset	2
0727225-007	Ratchet drive, 5 figure, nonreset	
0727235-001	Ratchet drive, 5 figure, knob reset	
0727235-019	Ratchet drive, 5 figure, lock-and-key reset	
0727235-002	Ratchet thumb lever drive, 5 figure, knob reset	3
0727235-007	Ratchet drive, 5 figure, nonreset	
0728735-001	Revolution drive, 5 figure, knob reset	
0727245-001	Ratchet drive, 5 figure, knob reset	
0727245-019	Ratchet drive, 5 figure, lock-and-key reset	4
0727245-005	Ratchet drive, 5 figure, nonreset	

Dimensions:

0.570"
14.5mm

Four Holes
0.128"
3.3mm
Dia.

1.200"
30.5mm

LEFT HAND WITH KNOB RESET TOP VIEW

1.200"
30.5mm

10.070"
.8mm

0.805"
20.4mm

1.180"
30.0mm

1.000"
25.4mm

.102"
Dia.

1.282"
32.6mm

0.964"
24.5mm

1.440"
36.6mm

0.100"
2.5mm

END VIEW RATCHET DRIVE

.156"
4.0mm
Shaft Dia.

0.386"
9.8mm

1.282"
32.6mm

0.964"
24.5mm

1.440"
36.6mm

0.100"
2.5mm

END VIEW REVOLUTION DRIVE

NOTE: Right hand drive models are mirror image.

Typical Applications:

Farm Machinery

Punch Press
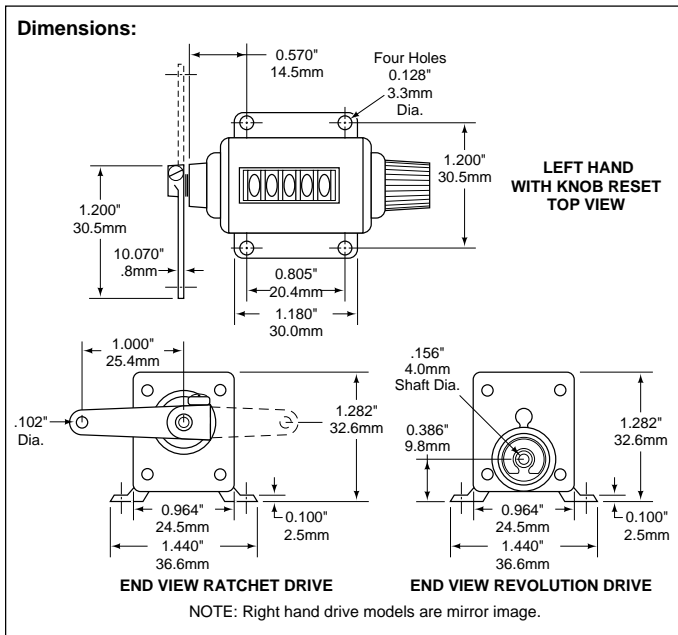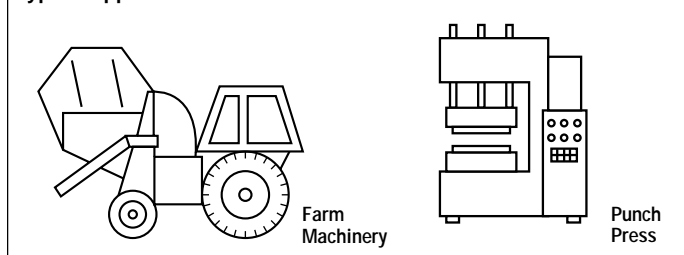
A rugged family of 6-digit resettable totalizers . . . available in all popular drive configurations

Engineered for broad application, high reliability, and long life. Critical parts are made of durable, corrosion resistant materials, including a die-cast enclosure and chrome plated steel shaft.

- Base mount with left- or right-hand shaft position
- 6 black-on-white figures – counts to 999999
- Ratchet drive – one count per stroke
- Revolution drive – one count per revolution
- Direct drive – 10 counts per revolution
- Convenient rotary knob reset to zero
- Tough, industrial duty construction
- Count speeds to 5000 C.P.M. (direct drive)
- Lubrication not required

Strength, versatility, and wide model range have made these a very popular choice for general use in many industries.

Other features and configurations are available on special order, such as: shaft variations, special wheel colors and markings, and reset options.

SPECIFICATIONS

Drive:

Series 1259: Ratchet drive, adds one count for each drive shaft actuation through 36° to 60° arc; max travel limited; internal return spring; max torque 2 oz-in.

Series 1261: Direct drive, adds 10 counts for each drive shaft revolution; will not subtract past zero on right-hand wheel when run in opposite rotation; max torque 1 oz-in.

Series 1262: Revolution drive, adds one count for each drive shaft revolution; will not subtract past zero on right-hand wheel when run in opposite rotation; max torque 0.5 oz-in.

Speed: Ratchet: 1000 cpm; Direct: 5000 cpm; Revolution: 2000 cpm

Figures: 6; 0.188" high by 0.156" wide (4.78 mm x 3.96 mm); black on white

Reset: Manual knob

Lubrication: Not required

Mounting: Base

Construction: Case: Zamak; Wheels and Pinions: Acetal resin; Shafts: Chrome plated steel; Gears: Brass

Net Weight: 9 oz. (255 g.)

Model No.	Description	Rotation
0125916-005	Ratchet drive	1
0125926-010 **0126226-010**	Ratchet drive Revolution Drive	2
0125936-015 **0126136-015**	Ratchet drive Direct drive	3
0125946-020 **0126246-020**	Ratchet drive Revolution drive	4

Dimensions:

.07" / 1.8 mm · 3.23" / 82.0 mm · .14" / 3.4 mm · .156" / 3.9 mm · 1.99" / 50.4 mm · .53" / 13.5 mm · 1.25" / 31.8 mm · .98" / 24.9 mm · .50" / 12.7 mm · .312" / 7.9 mm · .62" / 15.8 mm · .59" / 15.1 mm · 4.53" / 115.1 mm

1.16" / 29.5 mm · .60" / 15.2 mm · 1.0" / 25.4 mm · 1.56" / 39.7 mm · .10" / 2.6 mm · 1.25" / 31.8 mm

Ratchet Drive Shown

Typical Applications:

Counter · Linkage · Spooling · 123456 · Machine Cycle Counting
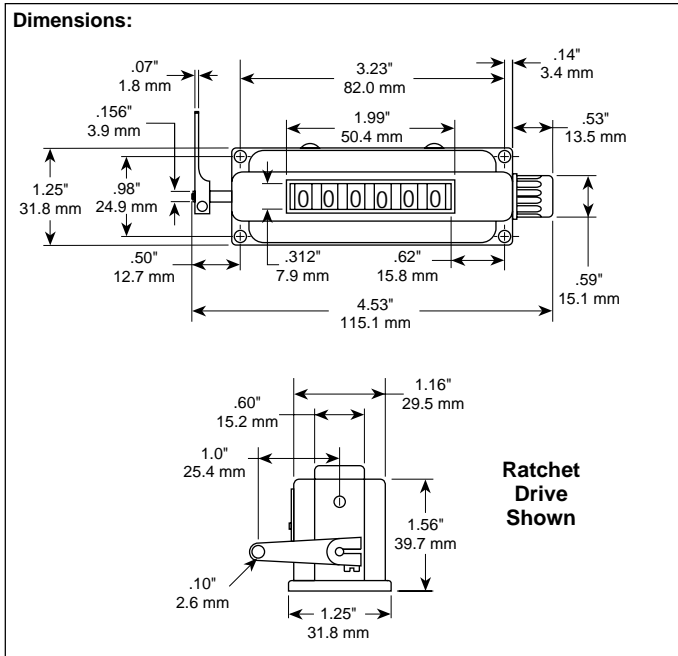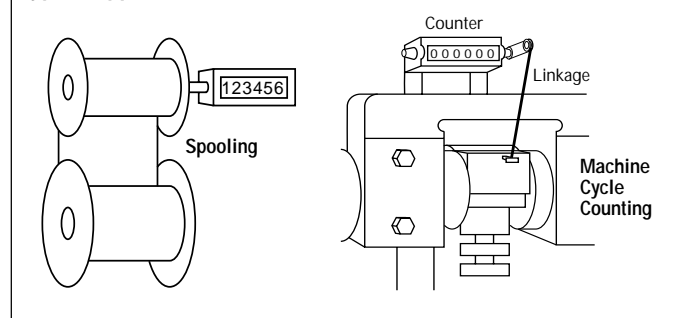
For specialized applications . . . operates by counting pulses of AIR – no mechanical or electrical connections

Although its rugged diecast enclosure design appears similar to our general purpose electrical- and mechanical-drive totalizers, the Series 7030 is unique because it counts pneumatic impulses. It is ideal where safety or environmental constraints make it difficult to use other counters – or where it's just more convenient to obtain an air pressure signal, than to supply a voltage source or mechanical linkage.

■ Sturdy, industrial duty construction

■ 6 figures – counts to 999999 with rollover to zero

■ High contrast white-on-black numerals

■ Requires no electricity or mechanical coupling

■ Operates reliably from air sources of 40 to 150 psi

■ Smooth acting rotary reset mechanism

■ Pneumatic drive protected by internal exhaust filter

■ Count speed to 1000 counts per minute

■ Long service life

■ Popular, general purpose base mount configuration

Series 7030 is rated for speeds to 1000 counts per minute (dependent on air pressure), and engineered to deliver a long service life. It is easy to install, by base mount attachment to machine frames, or many other surfaces.

For Mechanical General Purpose Totalizer, see Series 1259, 1251
For Electric General Purpose Totalizer, see Series 1205, 7443

SPECIFICATIONS

Speed: 250 to 1000 cpm depending on applied operating air pressure; see Speed/Operating Pressure

Number of Figures: 6

Figure Size: 0.180" (4.6 mm) high

Figure Color: White on black

Reset: Manual knob

Mounting: Base

Operating Temperature: 0° to +131°F (-18° to +55°C)

Construction: Case: Zamak; Wheels and Pinions: Acetal resin; Connection Fitting: Brass

Net Weight: 1 lb. (0.454 kg)

Model No.	Description
0703006-003	6-figure, base mount, knob reset

Dimensions:

Speed vs. Pressure

cpm/psi Graph

cpm

Applied Operating psi
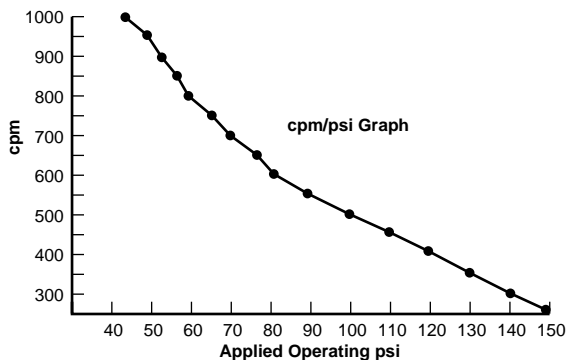
NOTE: Pressure valve must be within 6" of the counter input to prevent the rated speed/pressure from being affected. Speed or cpm rating at a given psi is based on a 50% duty cycle. When counting at a frequency or speed less than the rated cpm at a given psi, the on-off ratio must not be less than 50%.
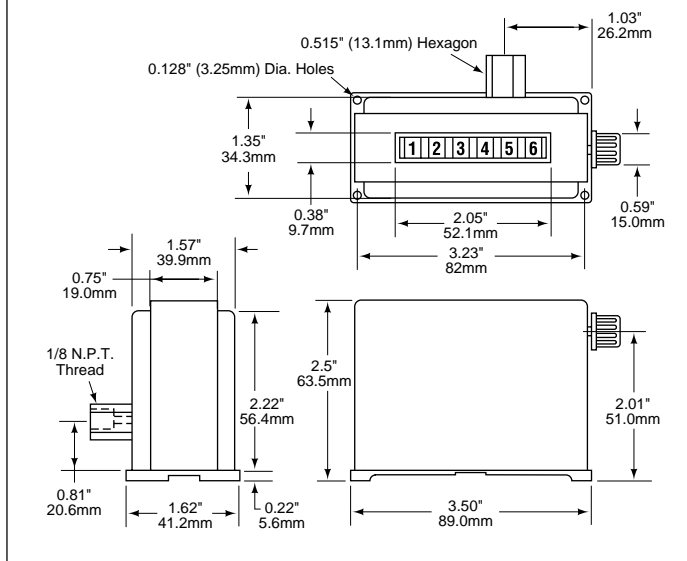
Modern styling, industrial duty . . . with large white on black figures for enhanced visibility

Bold 5-figure display and smooth rotary reset highlight this series of industrial grade totalizers. Other features include long-life bearings and 0.25 inch (6.35 mm) shaft, permitting use of our measuring wheels for linear footage totalizing applications. Counting is bidirectional on rotary input models.

- Base mount with right-hand shaft position
- 5 highly visible white-on-black figures – counts to 99,999
- Revolution drive – one count per revolution
- Direct drive – 10 counts per revolution
- Bidirectional counting with direct and revolution drives
- Convenient, low torque, rotary knob reset to zero
- Tough, industrial duty construction
- Long life bearings – lubrication not required

Many optional configurations are possible, such as: 3, 4, 6, 7, or 8 figures; custom wheel colors; special shaft lengths.

For yards counting, see Series 1954, 7434

SPECIFICATIONS

Series 7428: Direct Drive: Adds ten counts for each drive shaft revolution in specified rotation, subtracts for opposite rotations if reset knob is not obstructed

Series 7430: Revolution Drive: Adds one count for each drive shaft revolution in specified rotation; subtracts for opposite rotations if reset knob is not obstructed

Speed: Direct: 200 rpm of drive shaft; Revolution: 750 rpm of drive shaft

Figures: 5, 0.270" high by 0.185" wide (6.86 mm x 4.70 mm), white on black

Reset: Manual knob

Typical Applications:

Drill
Table
Leadscrew

Footage
Positioning

Lubrication: Not required

Mounting: Base

Construction: End Caps: Zamak; Case: C.A.B. plastic; Internal Parts: Acetal resin and A.B.S. plastic and sintered metal; Drive Shafts: Plated steel

Net Weight: 6 oz. (170 g)

Model No.	Description	Rotation
0742835-001	Direct drive, knob reset, sleeve bearing, 5 figures	
0743035-001	Revolution drive, knob reset, sleeve bearings, 5 figures	3
0743035-201	Revolution drive, knob reset, needle bearings, 5 figures	
0742845-001	Direct drive, knob reset, sleeve bearing, 5 figures	
0743045-001	Revolution drive, knob reset, sleeve bearings, 5 figures	4
0743045-201	Revolution drive, knob reset, needle bearings, 5 figures	

Dimensions:

3.660" / 92.96mm
3.340" / 84.84mm
2.410" / 61.21mm
.131" / 3.33mm
.335" / 8.51mm
.900" / 22.86mm
.420" / 10.67mm
.240" / 6.10mm
4.20" / 10.67mm

NONRESET
.670" / 17.02mm
.250" Dia. / 6.35mm
.045" wide x .070" deep / 1.14 x 1.78mm
1.335" / 33.9mm
Mounting Hole
.470" / 11.94mm
1.040" / 26.42mm
.870" / 22.1mm
1.330" / 33.78mm
.120" / 3.05mm
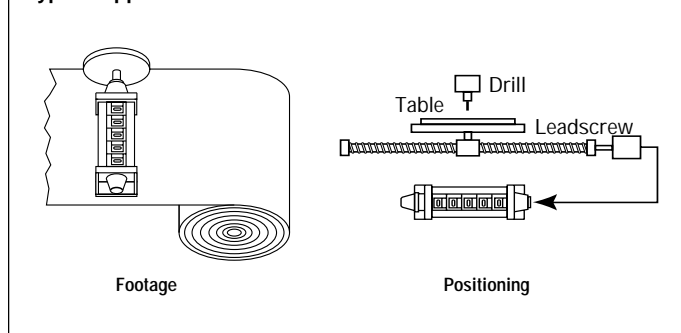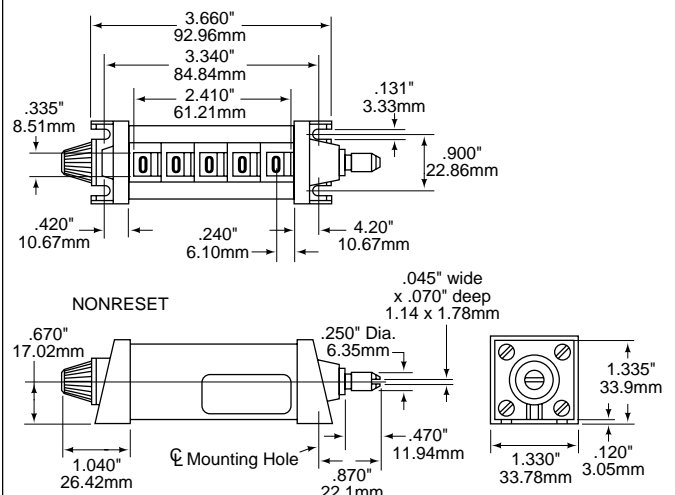
Heavy-duty bearings, large diameter shaft, and a speed rating to 10,000 counts/minute . . . this one's for the toughest applications

A time-proven, classic design. Choose the Series 1133, 1134 for your most punishing applications – even the count wheels consist of aluminum shells with steel engaging parts. Direct drive models use pre-lubricated bronze bearings which are capable of 1000 rpm continuous operation. Ball bearings used in the Revolution Drive model easily handle 2000 rpm, continuous.

- Heavy duty base mounting
- High speed continuous operation
- 5 white-on-black figures – counts to 99999
- Revolution drive – one count per revolution
- Direct drive – 10 counts per revolution
- 1/4 inch (6.35 mm) shaft fits standard measuring wheels
- Bidirectional counting
- Convenient rotary reset to zero
- All metal, tough industrial duty construction
- Count speeds to 10,000 C.P.M. (direct drive)
- Lubrication not required

A brass housing and chrome-on-steel shaft ensure maximum strength and corrosion resistance.

SPECIFICATIONS

Drive Ratios:
Series 1133: Direct Drive, adds ten counts for each drive shaft revolution in specified rotation, number 3 or 4 rotation only; subtracts for opposite rotation; pre-lubricated porous bronze sleeve bearings
Series 1134 Revolution Drive, adds one count for each drive shaft revolution; subtracts for opposite rotation; ball bearings

Speed: Direct Drive: 1000 rpm continuous, 1500 rpm intermittent; Revolution Drive: 2000 rpm continuous, 3000 rpm intermittent

Torque: Maximum static: 1.0 oz-in. (.71 N.cm)

Figures: 5; 0.188 in. high by 0.099 in. wide; white on black

Reset: Manual wing nut; push-in engagement with 360° turn

Lubrication: Not required

Mounting: Base

Construction: Case: Bras; Shaft: Chrome plated steel; Wheels: Aluminum shell, steel parts; Gears, Pinions: Chrome plated steel; End Caps: Zamak

Net Weight: 7 oz. (198.6 g.)

Model No.	Description	Rotation
0113335-005	Direct drive	3
0113345-005	Direct drive	4
0113445-005	Revolution drive	

Dimensions:

4.110"
104.4 mm

2.460"
62.5 mm

1.493"
37.9 mm

.386"
9.8 mm

.500"
12.7 mm

1.200"
30.5 mm

.250" Dia.
6.35 mm

1.440"
36.6 mm

Sleeve
Bearing

.427"

(4) .128" Dia.
3.3 mm

1.405"
35.7 mm

1.491"
37.9 mm

1.780"
45.2 mm

.962"
24.4 mm

.656"
16.7 mm

1.062"
27.0 mm

1.295"
32.9 mm

0.810"
20.57 mm

.468"
11.9 mm

1.734"
44.0 mm

Typical Applications:

Drill

Table

Leadscrew

123456

123456

Coil Winding

Positioning

VEEDER-ROOT brand
Mechanical & Electric Counters

1667, 1669 Visicounter

For the most demanding applications, indoors or outside . . . withstands dust, moisture, oil, grease, shock, and vibration

Combines excellent performance with practically indestructible construction. The counter of choice where only the most durable can survive. Commonly used on construction equipment, cement mixers, paving equipment, stokers, agricultural machinery, and other applications in extremely hostile environments. Available in both ratchet and geared drives, the Series 1667/1669 features highly visible white-on-black figures, quick rotary-reset, rugged die cast case, and steel shaft.

■ Unaffected by harsh application environments
■ Die cast metal and steel external components
■ 6 figures – large, easy-to-read numerals
■ Oversized 0.3125 (7.9 mm) plated steel shaft
■ Ratchet drive and geared drive models
■ Geared drive available in 1:1 and 3:1 ratio
■ Ratchet drive has positive stop and internal return spring
■ Quick, rotary reset
■ Long life – no lubrication required
■ Shaft accepts standard measuring wheels

For double shaft extension, see Series 7298, 1953, 7434
For large figure ratchet drive, see Series 1129

SPECIFICATIONS

Speed: Ratchet: 500 cpm; Geared: 1500 rpm or 5000 cpm whichever is limiting
Number of Figures: 6
Drive: Ratchet Drive: Series 1667 adds one count for each drive shaft actuation, arc of 26° to 45° for rotations 1 and 3, arc of 42° to 67° for rotations 2 and 4, maximum travel limited internal lever return spring; Geared Drive: Series 1669 adds one count for specified number of drive shaft revolutions in specific rotation, will not subtract past zero on right hand wheel, standard gear ratio is 1:1 or 3:1

Typical Applications:

Cement Truck   Punch Press

Size of Figures: 0.345" high by 0.25" wide (8.8 mm by 6.4 mm)
Color of Figures: White on black
Reset: Manual knob
Drive Torque: 1667: 4 lb-in. (45 N.cm); 1668: 3.5 lb-in. (40 N.cm); 1669: 1 oz-in (0.7 N.cm)
Mounting: Base
Construction: Case: Zamak; Base: Steel; Wheels, Pinions: Acetal resin; Shaft: Plated steel
Net Weight: 1 lb. 4 oz. (0.9 kg)

Model No.	Description	Rotation
0166716-006	Ratchet drive, knob reset	
0166916-004	Geared drive, knob reset, 1:1 ratio	1
0166916-006	Geared drive, knob reset, 3:1 ratio	
0166726-006	Ratchet drive, knob reset	2
0166736-006	Ratchet drive, knob reset	
0166936-005	Geared drive, knob reset, 1:1 ratio	3
0166746-006	Ratchet drive, knob reset	
0166946-005	Geared drive, knob reset, 1:1 ratio	4

Dimensions:

6.7" / 170 mm
1.22" / 31.0 mm
3.0" / 76 mm
(4) 0.21" / 5.3 mm
0.3125" / 7.9 mm
0.433" / 11.0 mm
(4) 1.126" / 28.6 mm
1.83" / 46.5 mm
0.94" / 24.0 mm
.2.3" / 59.0 mm
2.19" / 55.6 mm
0.63" / 16.0 mm
0.094" / 2.4 mm
0.25" / 6.5 mm
1.1" / 28.0 mm
.09" / 2.3 mm
1.405" / 35.7 mm
1.46" / 37.0 mm
2.87" / 73.0 mm
0.05" / 1.3 mm
1.19" / 30.0 mm
0.197" R / 5.0 mm
(2) 0.138" / 3.5 mm Dia
2.6" / 67.9 mm
1.5" / 38.0 mm

High-speed, quick reset and long life . . . double shaft extension accepts dual measuring wheels

Exacting design specifications and manufacturing standards make this high speed totalizer appropriate for continuous operation at rates to 6000 counts per minute (ball bearing model). Its unique short-stroke, antiscramble, lever-reset mechanism assures correct wheel registration at every operation. Its double shaft extension accepts dual measuring wheels for linear measuring applications – providing reliable, stable contact with the measured material.

■ Fast lever-action reset is positive and reliable

■ High speed, bidirectional counting to 6000 cpm

■ 5 figures – high contrast white-on-black numerals

■ Geared drive mechanism for long, accurate, service life

■ Strong 5/16" (7.9 mm) stainless steel shaft

■ Double shaft extension is ideal for measuring wheels

■ Permanently lubricated, high reliability sleeve bearings

■ Ball bearing model for extra high speed operation

■ Ideal for high speed coil winding or linear measurement tasks

Special models are available with options such as: special wheel colors, gear ratio variations, panel mounting.

For other ratios, see Series 1953, 7434
For measuring wheels, see page 3.18

SPECIFICATIONS

Speed: Sleeve Bearings: 4000 rpm or cpm continuous; Ball Bearings: 6000 rpm or cpm continuous

Drive: Geared Drive, adds one count for drive shaft revolution, subtracts in opposite rotation

Shaft Diameter: 0.312 in. (7.9 mm); (when used with measuring wheel, requires wheel with 0.313 in. bore.)

Torque: 4 oz-in. max.

Gearing: 1:1

Number of Figures: 5 figures

Size of Figures: 0.256 in. high by 0.160 in. wide

Color of Figures: White on black

Reset: Manual lever

Lubrication: Not required

Mounting: Base

Construction: Case, Cover: Cast aluminum; Wheels: Acetal resin with steel gear and heart cam; Drive Gears: Steel, brass or acetal resin; Shafts: Stainless steel, 5/16" diameter; Pinions: Nylon; Bearings: Porous bronze sleeve or precision ball

Net Weight: 2 lb.(907 g.)

Model No.	Description	Rotation
0729825-003	Geared drive, 1:1 ratio, 5 figures, sleeve bearing, base	
0729825-502	Geared drive, 1:1 ratio, 5 figures, ball bearing, base	2 or 4

Typical Application:

Coil Winding   Length Measuring

123456   45

Dimensions:

1.710"
43.43 mm

3.228"
81.99 mm

0.3125"
7.94 mm
Dia

3.860"
98.04 mm

0.315"
8.00 mm

2.000"
50.8 mm

45°

2.265"
57.53 mm

1.950"
49.53 mm

4.095"
104.01 mm

1.180"
29.97 mm
Both Ends

6.930"
176.02 mm

0.590"
14.99 mm

4.565"
115.95 mm
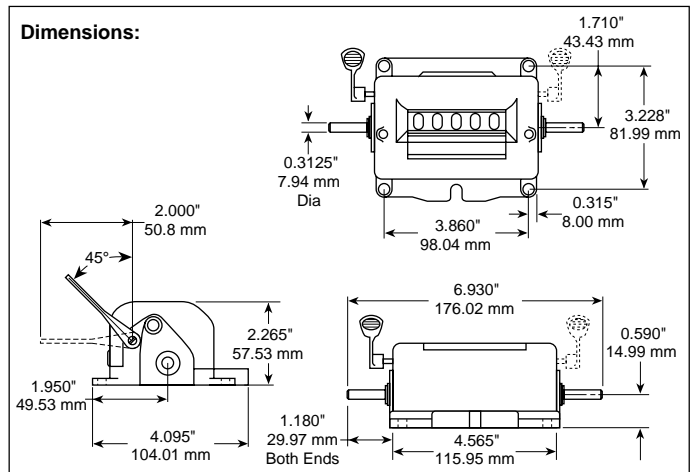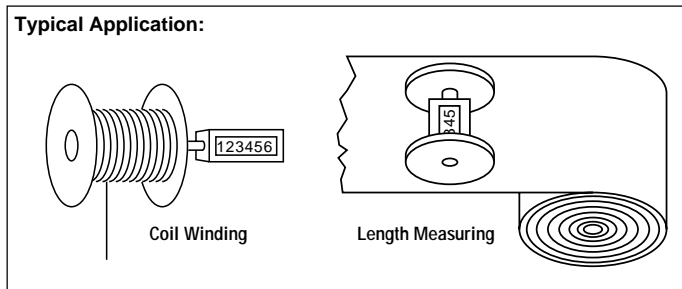
Very large figures make this totalizer easy to see at a distance . . . and it's rugged too

Heavy duty counters with large 3/4 inch figures for easy reading at a distance. Standard with ratchet drive and rotary knob reset. Built for rugged use on textile machinery, production equipment and machine tools.

■ Well defined 3/4 inch (19.0 mm) numbers

■ Five decades – counts to 99,999

■ Steel case and chrome on steel shaft

■ 250 counts per minute continuous speed

■ Lubrication never required

■ Ratchet drive standard

■ Direct and revolution drives available

■ Base mounting configuration

Resistant to shock and vibration, the Series 1129 is a popular choice for use in heavy industrial applications, such as punch presses and shearing machines. Rotary drive and nonreset versions are available at special order: Series 1127, 1128.

For 6 digits, see Series 1667
For high speed rotary drives, see Series 1133, 1134, 7298

SPECIFICATIONS

Drive: Ratchet drive, adds one count for each drive shaft revolution through 36 to 46° arc; max travel limited; internal lever return spring

Speed: 250 cpm continuous and intermittent

Number of Figures: 5

Size of Figures: 0.750" (19 mm) high by 0.605" (15.4 mm) wide

Color of Figures: White on black

Reset: Manual reset knob

Lubrication: Not required

Mounting: Base

Construction: End caps: Glass-filled nylon; Case: Steel; Shafts: Chrome-plated steel; Pinions: Nylon; Wheels: Aluminum and steel

Net Weight: 4 lbs. (1.8 kg)

Model No.	Description	Rotation
0112935-005	Ratchet drive, reset knob, 5 figures	3

Dimensions:

Typical Applications:

Shear

Punch Press

Ideal for use on heavy industrial equipment.

3

MECH & ELECTRIC COUNTERS
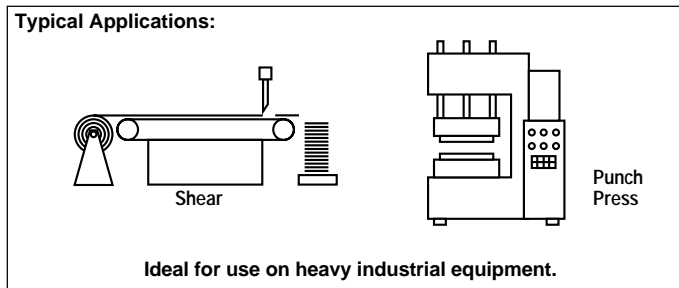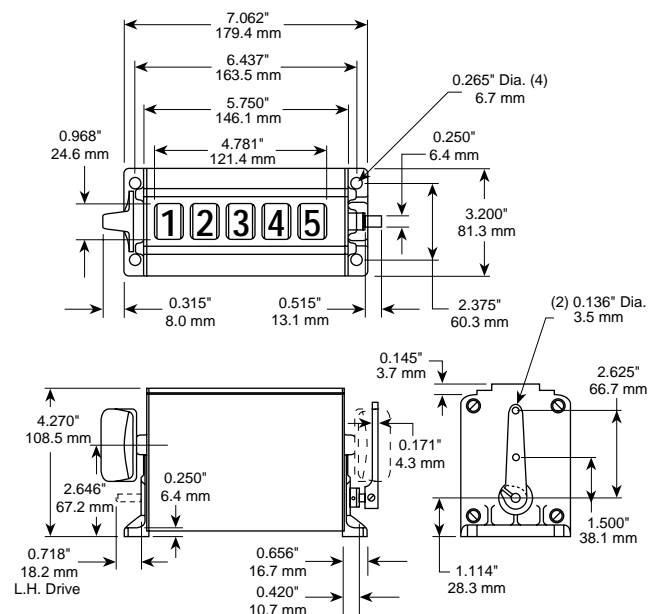
A six-digit, gear-driven linear measuring totalizer . . . ideal for use with measuring wheels

Available in several geared ratios, the Series 1953 is especially well suited for linear measurement of feet, yards, 1/8 yards, or meters. Its double-ended shaft allows use of two measuring wheels – providing extra grip and stability of contact with measured material. It is commonly used in the textile, wire and cable, paper, rope, and sheet products industries.

■ Precision linear measurement of all types of moving materials
■ Double stainless steel shafts accept dual measuring wheels
■ Black on white, 0.345" (8.8 mm) high figures for easy viewing
■ Heavy duty die-cast and steel components
■ Corrosion and dust resistant – long life in demanding environments
■ Models with 3:1, 1:1, or 0.375:1 revolution-to-count ratio
■ Counts in yards, 1/8 yards, or feet using standard footage wheel
■ Counts in meters, using 1/3 meter wheel
■ Smooth action rotary knob reset

The Series 1953 is designed and manufactured to provide years of trouble-free service in the most rigorous industrial applications. All models are right-hand drive, with types offered for addition in the clockwise, or counterclockwise direction. Opposite rotation subtracts.

For measuring wheels, see page 3.18

SPECIFICATIONS

Drive: Geared drive, adds one count for a specified number of drive shaft revolutions in specified rotation; will subtract for opposite rotation if reset knob is not obstructed
Speed: 1500 rpm or 5000 cpm, whichever is limiting, when adding
Gearing: Standard 3:1 (yards); 1:1 (feet); 0.375:1 (1/8 of yards); 3:1 gearing with 1/3 meter wheels for direct reading in meters
Torque: Maximum static 1.5 oz-in (1.06 N.cm) with 3:1 ratio
Number of Figures: 6
Size of Figures: 0.345" high by 0.250" wide (8.76 by 6.35 mm)

Typical Applications:
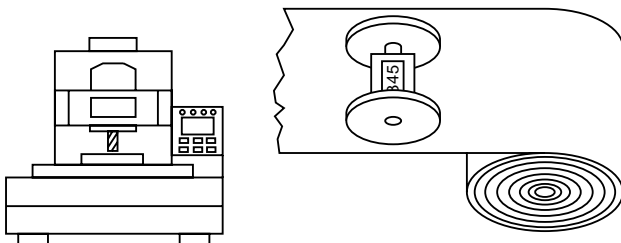
Ideal for measuring roll or sheet goods, position indicating on machine tools, etc.

Color of Figures: White on black
Reset: Manual knob: Rotary
Mounting: Base
Construction: Case and Worm Base: Zamak; Baseplate: Steel; Wheel, pinions: Acetal resin; Right Angle Drive Shafts: Stainless steel; Bearings: Porous bronze, oil impregnated; Worm Gear: Brass; Worm: Stainless steel
Net Weight: 3 lb. (1.36 kg)

Model No.	Description	Rotation
0195316-051	Knob reset, 6 figure, 1:1 ratio	
0195316-052	Knob reset, 6 figure, 3:1 ratio	1
0195316-053	Knob reset, 6 figure, 0.375:1 ratio	
0195326-045	Knob reset, 6 figure, 1:1 ratio	
0195326-046	Knob reset, 6 figure, 3:1 ratio	2
0195326-047	Knob reset, 6 figure, 0.375:1 ratio	

Dimensions:

Top View

Bottom View

Drive Detail

7434 Worm Drive
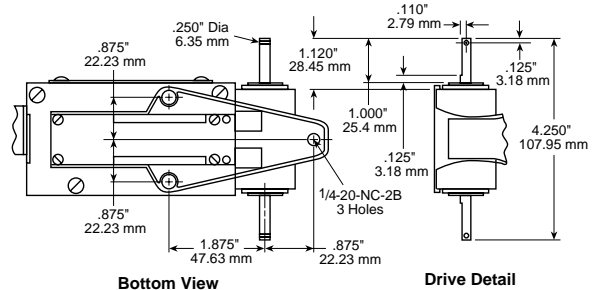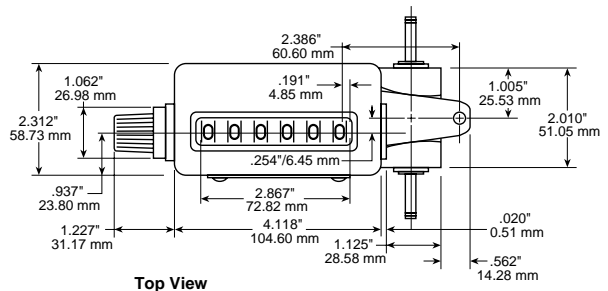
A five-digit, gear-driven totalizer . . . ideal for use with measuring wheels

Available in three popular geared ratios, the Series 7434 is typically used with measuring wheels to totalize feet, yards, 1/8 yards, or meters. Its double-ended shaft can carry two measuring wheels for extra grip and stability in contacting measured material. It is commonly used in the textile, wire and cable, paper, rope, and sheet products industries.

- Precision linear measurement of all types of moving materials
- Double stainless steel shafts accept dual measuring wheels
- Heavy-duty ball bearings allow shaft speeds to 3000 rpm
- White-on-black, high contrast figures for easy viewing
- Clean, modern styled enclosure – corrosion and dust resistant
- Models with 3:1, 1:1, or 0.375:1 revolution-to-count ratio
- Counts in yards,1/8 yards, or feet using standard footage wheel
- Counts in meters, using 1/3 meter wheel
- Smooth action rotary knob reset

Noncorrosive materials are used throughout for years of trouble-free service. Models are provided that add in the clockwise, or counterclockwise direction. Opposite rotation subtracts. All are right-hand drive.

Other features and configurations are available on special order, such as: shaft variations, special wheel colors and markings, and reset options.

SPECIFICATIONS

Drive: Geared Drive, adds one count for a specified number of drive shaft revolutions; models subtract for opposite rotation; with 0.375:1 ratio, right wheel is marked 0 to 7/8 by 1/8ths and reads yards and eighths when used with 1-foot circumference measuring wheels
Speed: Continuous 3000 rpm or 3000 cpm, whichever is limiting
Torque: Max static 2 oz-in.
Gearing: Standard 3:1, 1:1, and 0.375:1
Figures: 5; 0.270 in. high by 0.185 in. wide (6.9 mm x 4.7 mm); white on black

Typical Applications:

Used with measuring wheels for length measuring of sheet or roll goods.

Reset: Manual knob
Lubrication: Not required
Mounting: Base
Construction: End caps and worm base: Zamak; Case: C.A.B. plastic; Internal Parts: Acetal resin, A.B.S. plastic or sintered metal; Worm Drive Shaft: Stainless steel
Net Weight: 1 lb. (0.454 kg)

Model No.	Description	Rotation
0743415-003	Geared drive, base mount, 5 figures, knob reset, 1:1 ratio	
0743415-005	Geared drive, base mount, 5 figures, knob reset, 3:1 ratio	1
0743425-003	Geared drive, base mount, 5 figures, knob reset, 1:1 ratio	
0743425-005	Geared drive, base mount, 5 figures, knob reset, 3:1 ratio	2
0743425-014	Geared drive, base mount, 5 figures, knob reset, 0.375:1 ratio	

Dimensions:

Measuring Wheels

Rubber   Grooved   Knurled   Smooth

3

MECH&ELECTRIC COUNTERS

Accurate linear measuring starts with precision measuring wheels . . . available in two widths and four surfaces

Our measuring wheels are diecast and machined to the highest standards of quality. Circumferences of 1 foot, and 1/3 meter are standard, and are accurate to ±0.1% of stated size. Two bore sizes are provided, which fit most mechanical counters with 5/16" (6.4 mm) or 1/4" (8.0 mm) diameter shafts. Recessed set-screws secure the wheel firmly to the shaft. Choose from 1/2" (12.7 mm) or 1" (25.4 mm) width – rubber, smooth aluminum, or knurled aluminum contact surfaces, for the most reliable contact with the measured material. A special purpose tapered grooved wheel (1/2" width only) is ideal for accurate measurement of materials such as thread, wire, rope, braid, and cable, from smallest diameter to more than 1/4" (6.4 mm) diameter.

- Stable diecast/machined aluminum construction
- Fits shafts of many mechanical counters
- Choice of width and surface for optimum surface contact
- Measure cloth, paper, metal, foil, film, wood, and other materials
- Accurate to ±0.1% of measured length
- 1 foot wheel for measurement in feet or with geared counter, yards
- 1/3 meter wheel for measurement in meters with geared counter
- Special grooved model for wire, cable, thread, and similar materials

When used with counters with 1:1 or 1:10 drive ratios, these wheels will produce highly accurate resolutions of 1 foot or 1/10 foot. With geared drive counters, resolution of yards, or 1/8 yard is possible. 1/3 meter wheels are typically used with 3:1 drive ratio counters, for resolution of meters.

For linear totalizers, see Series 1953, 7434, 7298
For linear predetermining, see Series 1239, 7283

Model No.	Description
	1 Foot Circumference
0015537-070	Rubber, 1/2" wide, .251" center bore
0015537-530	Rubber, 1" wide, .251" center bore
0317680-001	Rubber, 1/2" wide, .313" center bore
0317678-001	Rubber, 1" wide, .313" center bore
0015537-095	Smooth, 1/2" wide, .251" center bore
0015537-525	Smooth, 1" wide, .251" center bore
0317681-001	Smooth, 1/2" wide, .313" center bore
0317677-001	Smooth, 1" wide, .313" center bore
0015537-510	Knurled, 1/2" wide, .251" center bore
0015537-535	Knurled, 1" wide, .251" center bore
0317828-001	Knurled, 1/2" wide, .313" center bore
0317679-001	Knurled, 1" wide, .313" center bore
0015537-187	Grooved, 1/2" wide, .251" center bore
0317682-001	Grooved, 1/2" wide, .313" center bore
	1/3 Meter Circumference
0407186-009	Rubber, 1/2" wide, .251" center bore
0407186-014	Rubber, 1/2" wide, .313" center bore
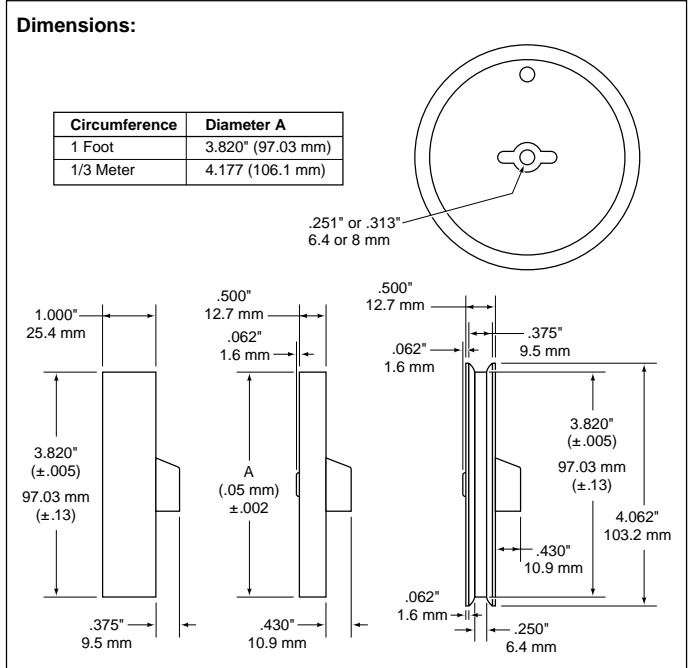
Dimensions:

Circumference	Diameter A
1 Foot	3.820" (97.03 mm)
1/3 Meter	4.177 (106.1 mm)

.251" or .313"
6.4 or 8 mm

1.000"
25.4 mm

.500"
12.7 mm

.062"
1.6 mm

.500"
12.7 mm

.375"
9.5 mm

.062"
1.6 mm

3.820"
(±.005)
97.03 mm
(±.13)

A
(.05 mm)
±.002

3.820"
(±.005)
97.03 mm
(±.13)

4.062"
103.2 mm

.430"
10.9 mm

.375"
9.5 mm

.430"
10.9 mm

.062"
1.6 mm

.250"
6.4 mm

Typical Applications:

123456   123456

Double Shaft Counter   Single Shaft Counter
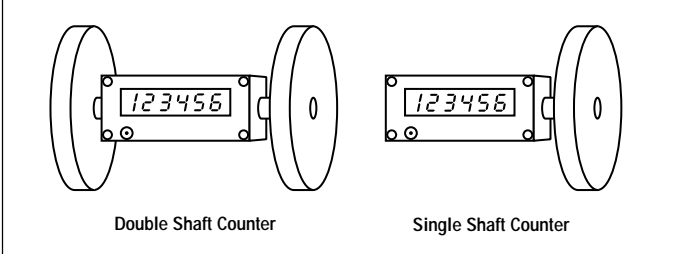
Panel Mount, Rotary Thumbwheel Reset

Panel Mount, Lock and Key Reset

Base Mount, Knob Reset

A rugged workhorse . . . with proven extra reliability for demanding industrial applications

3
MECH &ELECTRIC
COUNTERS

A popular 6-digit totalizer featuring heavy duty diecast construction that can really take the severe punishment found in so many industrial applications. Orginally designed over 50 years ago, and periodically upgraded to use the latest improved materials, the Series 1205 is perhaps the most popular counter in the world, and sets the standard for rugged totalizing counters.

Available in base mount/knob reset, panel mount/rotary reset, and panel mount/lock & key reset models.

- Designed for industrial duty
- Corrosion and shock resistant
- Extremely stable over temperature and voltage
- Easy-to-view black on white characters
- Count speed to 1000 per minute
- Non-rectified design – precision AC coil
- Long service life in harsh environments
- Lock & key reset model protects counted totals

The Series 1205 is tough: Wide temperature variations don't upset its thermo-stable wheels and pinions. Severe voltage transients will not damage its direct AC coil, so external surge protection is not required. Duty cycles that result in continuous coil energization won't degrade its life or performance.

**For LCD or LED display, see Series 7997 and 7995
For low voltage or DC operation, see Series 7443**

SPECIFICATIONS

Count Speed: 1000 cpm, 30 ms minimum on-time and off-time
Voltage: 115, 230 VAC models. Allowable variation is ± 10 volt
Power Consumption: 6 watts nominal
Number of Figures: 6
Size of Figures: 0.188 in. high by 0.156 in. wide
Reset: Manual rotary or lock and key. See models
Connections: 7'5" (190 mm), #22 AWG Leads from bottom
Construction: Wheels, pinions: plastic. Frame, covers: Zamak. Bobbin: nylon
Net Weight: Base Mount: 14 oz. (397 g); Panel Mount: 1 lb., 4 oz. (567 g); Lock and Key Reset: 1 lb., 8 oz. (680 g)

Model No.	Description
0120506-010	Base mount, knob reset, 115 VAC
0120506-011	Base mount, knob reset, 230 VAC
0120506-100	Panel mount, rotary thumbwheel reset, 115 VAC
0120506-397	Panel mount, lock and key reset, 115 VAC

Dimensions:
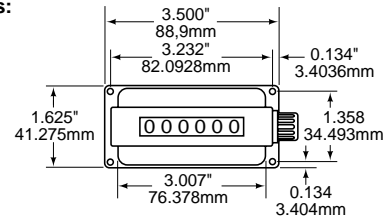
Panel Mount, Rotary Reset
Depth: 2.661"/67.6mm

PANEL CUTOUT

Panel Mount, Lock & Key Reset
Depth: 2.661"/67.6mm

PANEL CUTOUT
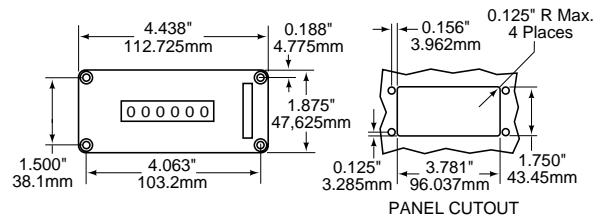
Typical Applications:
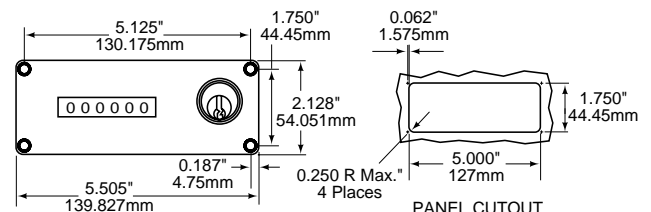
Printing Press
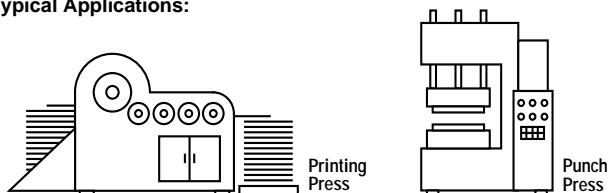
Punch Press

Ideal for punch presses, printing equipment, shears, and other heavy industrial machinery.

Panel Mount,
Rotary Thumbwheel
Reset

Panel Mount, Lock and Key Reset

Base Mount,
Knob Reset

Economical general purpose totalizers . . . with the strength required for severe industrial environments

Specific Models

RECOGNIZED   CERTIFIED

The perfect totalizer for a wide range of industrial applications. Precision internal working parts are supported and protected by its die-cast frame and heavy duty enclosure. Available with popular AC and DC voltage ranges, mounting styles, and reset features.

■ Designed for industrial duty
■ Crisp modern styling
■ Recognized by Underwriters Laboratories
■ Very readable white on black characters
■ Six digit capacity
■ Count speed to 600 per minute
■ AC models have non-rectified design
■ Long service life in harsh environments
■ Lock & key reset model protects counted totals

Series 7443 is a good choice for new applications requiring an industrial duty counter, or for updating existing installations. Applications with poorly conditioned AC power lines are no problem. Rectifiers, which frequently fail due to power surges and transients, are not used. Instead, a precision wound coil drives AC models of Series 7443.

For even greater durability, see Series 1205.
For LCD or LED display, see Series 7997 and 7995.

SPECIFICATIONS

Speed: 600 cpm, 50 ms minimum on-time and off-time
Maximum on Time: with 50% duty cycle, maximum permissible ON time is 5 minutes. Counter must not be energized continuously
Voltage: See models. Allowable variation ±10% (±10 volts on 115 V and 230 V models)
Power Consumption: 6 watts nominal
Number of Figures: 6
Size of Figures: 0.188" high x 0.16" wide (4.8 mm x 4.0 mm)
Reset: See models
Mounting: Base or panel
Connections: 12" (305 mm), #22 AWG Leads from bottom
Construction: Wheels, pinions: verge: acetal resin. Frame, case: die-cast Zamak
Net Weight: Base Mount: 15 oz. (0.4 kg); Panel Mount: 1 lb. 2 oz. (0.5 kg); Lock and Key Reset: 1 lb. 6 oz. (0.6 kg)

Typical Applications:

Packaging Line   Shear

Ideal for punch presses, riveters, shears, packaging equipment, and many other factory-floor jobs.

Model No.	Description
0744386-011	Base mount, knob reset, 115 VAC, UL/CSA
0744396-017	Base mount, knob reset, 12 VDC, UL
0744396-016	Base mount, knob reset, 24 VDC, UL
0744396-012	Base mount, knob reset, 230 VAC, UL
0744386-211	Panel mount, rotary thumbwheel reset, 115 VAC, UL/CSA
0744396-243	Panel mount, lock and key reset, 24 VAC, UL
0744386-241	Panel mount, lock and key reset, 115 VAC, UL/CSA

Dimensions:

Base Mount, Knob Reset
Depth: 2.570"/65.2mm

Panel Mount, Rotary Reset
Depth: 2.530"/64.3mm

PANEL CUTOUT

Panel Mount, Lock & Key Reset
Depth: 2.530"/64.3mm

PANEL CUTOUT

VEEDER-ROOT brand

Mechanical & Electric Counters

7790/7791 Series

Rear Mount

Back of Panel Mount

Base Mount

Panel Mount
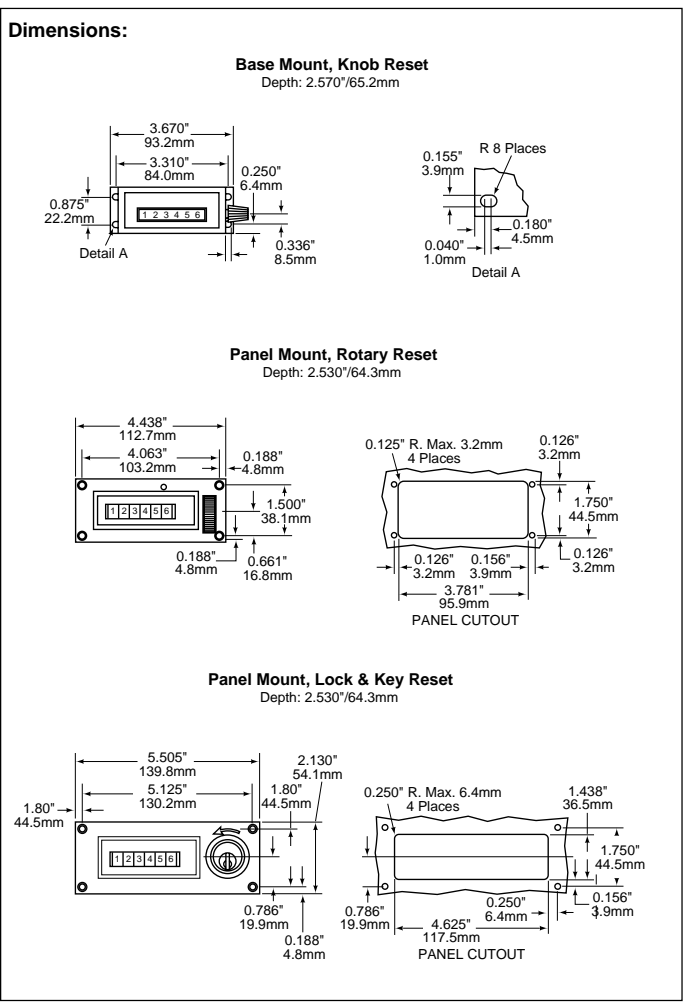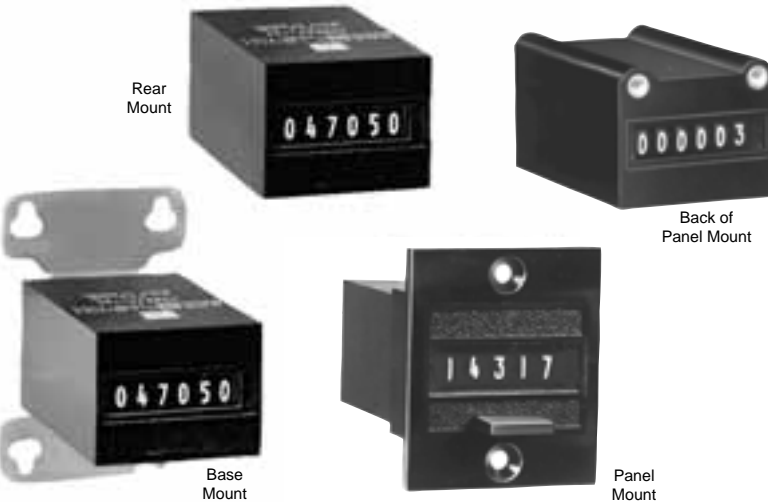
Economical miniature totalizers. . . available in all popular mounts and operating voltages

UL® RECOGNIZED   CSA® CERTIFIED

The series 7790 is a non-reset totalizer that delivers excellent performance and reliability characteristics for a minimal price. The series 7791 includes a push-bar reset feature.

- Compact size
- Four standard mounting styles
- Five and six figure indication standard–high contrast white on black
- Capable of speeds up to 600 counts/minute
- Count coil can be continously energized
- Long service life
- Standard models for a broad range of AC and DC voltages
- UL recognized; CSA certification available

For harsh environments see Series 1205 or 7443
For liquid crystal display (LCD), see Series 7999

SPECIFICATIONS

Number of Figures: 7790: 6; 7791: 5
Figure Size: 0.156" high, 0.070" wide (4.0 mm X 1.8 mm)
Count Speed: 600 cpm (800 cpm available as special option)
Minimum Count Pulse Timing: 50 ms min. on time and off time
Continous Coil Energization: Voltage can be applied continously without causing damage
Count Life: 10 million counts DC versions; 2 million counts AC versions, under normal operating conditions at +77° F (+25° C)
Voltage: 24, 48, 115 VAC; 6, 12, 24 VDC
Voltage Tolerance: ±10% or 10 volts, whichever is limiting
Power Consumption: 5 VA AC, 1.5 VA DC
Operating Temperature Range: +32° F to +122° F (0 to 50° C)
Mounting: Base, panel, rear, and back of panel
Mounting Screws: Rear Mount: #4 (.112) 40 UNC-2B; Max. Screw Length 0.090; Max. torque 5.0 inch lbs. (0.565 Nm)
Back of Panel Mount: #4 (.112) 40 UNC-2B; Max. Screw Length 0.218; Max. torque 7.5 inch lbs. (0.847 Nm)
Connections: #24 AWG leads, 10" (254 mm) long
Materials: Wheels, Verge and Pinions-acetal resin; Crystal-polycarbonate; Case and Panel Mounting Flange-polyphenylene oxide; Frame, Core, Armature and Base Mounting Flange-plated steel; Shafts-brass; Springs-music wire
Net Weight: 3.2 oz. (90 grams)

Typical Applications:

Photocopier

Vending Machine

Ideal for office and business equipment, vending and amusement machines, laboratory and test instruments.

Model No.	Description	Coil
0779086-008	Non-Reset, Base Mount, 6 VDC	24 Ω
0779086-007	Non-Reset, Base Mount, 12 VDC	96 Ω
0779086-006	Non-Reset, Base Mount, 24VDC	384 Ω
0779086-003	Non-Reset, Base Mount, 24 VAC, 50/60 Hz	32 Ω
0779086-015	Non-Reset, Base Mount, 48 VAC, 50/60 Hz	144 Ω
0779086-001	Non-Reset, Base Mount, 115 VAC, 50/60 Hz	800 Ω
0779086-208	Non-Reset, Panel Mount, 6 VDC	24 Ω
0779086-207	Non-Reset, Panel Mount, 12 VDC	96 Ω
0779086-206	Non-Reset, Panel Mount, 24 VDC	384 Ω
0779086-203	Non-Reset, Panel Mount, 24 VAC	32 Ω
0779086-201	Non-Reset, Panel Mount, 115 VAC	800 Ω
0779086-408	Non-Reset, Rear Mount, 6 VDC	24 Ω
0779086-407	Non-Reset, Rear Mount, 12 VDC	96 Ω
0779086-406	Non-Reset, Rear Mount, 24 VDC	384 Ω
0779086-403	Non-Reset, Rear Mount, 24 VAC, 50/60 Hz	32 Ω
0779086-401	Non-Reset, Rear Mount, 115 VAC, 50/60 Hz	800 Ω
0779086-107	Non-Reset, Back of Panel Mount, 12 VDC	96 Ω
0779086-106	Non-Reset, Back of Panel Mount, 24 VDC	384 Ω
0779185-207	Push-Bar Reset, Panel Mount, 12 VDC	96 Ω
0779185-206	Push Bar Reset, Panel Mount, 24 VDC	384 Ω
0779185-201	Push-Bar Reset, Panel Mount, 115 VAC, 50/60 Hz	800 Ω
0779185-407	Push-Bar Reset, Rear Mount, 12 VDC	96 Ω
0779185-401	Push-Bar Reset, Rear Mount, 115 VAC	800 Ω
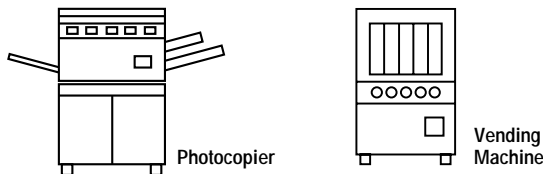
Dimensions:

Back of Panel Mount

0.150" R. 3.8 mm   0.153" 3.9 mm
1.00" 25.4 mm
0.439" 11.2 mm   1.00" 25.4 mm
0.500" 12.7 mm   1.306" 33.2 mm   0.250" 6.4 mm
MIN. DEPTH REQ'D: 2.225"/56.5 mm

Panel Mount

0.250" 6.4 mm
1.400" 35.6 mm
0.900" 22.9 mm   0.700" 17.8 mm   1.800" 45.7 mm
0.762"/19.4 mm to C.L. of HOLE FOR #6 F.H.M.S. (2 PLACES)
1.524" 38.7 mm
PANEL DIMS: CUTOUT: 1.437" X 1.156" DEPTH: 2.35"/59.7 mm MIN.

Rear Mount

1.00" 25.4 mm
0.500" 12.7 mm   1.306" 33.2 mm   0.250" 6.4 mm
0.312" 7.9 mm
0.500" 12.7 mm   0.625" 15.9 mm
0.653" 16.6 mm
MIN. DEPTH REQ'D: 2.225"/56.5 mm

Base Mount

1.562" 39.7 mm
1.250" 31.8 mm
1.00" 25.4 mm
0.144" 3.7 mm
2.312" 58.7 mm   1.570" 39.9 mm
1.00" 25.4 mm   2.000" 50.8 mm
1.306" 33.2 mm
1.125" 28.6 mm
MIN. DEPTH REQ'D: 2.35"/59.7 mm

3
MECH & ELECTRIC
COUNTERS

A complete family of versatile totalizers . . . low cost with choice of mounting style and operating voltage

Specific Models

®UL RECOGNIZED   CSA® CERTIFIED

High reliability at low cost. Frequently used in business equipment, vending machines, and metering instrumentation. Low power DC models are excellent for battery operated applications. Series 7437 is nonreset, keeping counted totals secure. A quick-reset bar is featured in Series 7438.

- Broad range of standard AC and DC models
- Base mount and panel mount styles
- High contrast white-on-black figures
- UL recognized; CSA certified
- Tamper resistant construction
- Capable of speeds to 600 counts/minute
- Nonreset and convenient bar-reset models
- Thermo-stable materials used for long term reliability

For heavy duty industrial use, see Series 1205 or 7443. For LCD display, see Series 7990 or 7999.

SPECIFICATIONS

Speed: 600 cpm

Minimum Count Pulse Timing: 50 ms on-time and off-time

Voltage: See models; Allowable variation is ±10% or 10 volts, whichever is limiting; nonreset counter with 115 VAC coil has allowable variation of 95 to 125 VAC

Power Consumption: 5 watts on AC, 1.5 watts on DC

Maximum ON Time (DC Models): No limit. Coil can be continuously energized without damage.

Maximum ON Time (AC Models): With 50% duty-cycle, 10 minutes maximum

Number of Figures: Reset: 5; Nonreset: 5, 6, or 7

Size of Figures: 0.160" high by 0.110" wide (4.1 mm x 2.8 mm) with 0.023" (0.6 mm) line width on 5 and 6 figure models

Operating Temperature Range: +32° to +120°F (0° to +49°C).

Mounting: Base, rear and panel mounting standard, see models

Connections: Wire leads, 12", #22 AWG

Materials: Wheels, pinions, and reset mechanism: acetal resin; Frame: glass filled acetal resin; Shafts, spring: stainless steel; Clapper: nickel plated SAE 1010 steel; Case: modified polyphenylene oxide

Net Weight: 4 oz. (113.4 g)

Typical Applications:

Coin-operated Laundry

X-ray Machine

Ideal for vending machines, photocopiers, x-ray machines, coin-operated laundry machines, etc.

Model No.	Description
0743785-001	Base mount, 5 figures, 115 VAC, nonreset, UL/CSA
0743785-002	Base mount, 5 figures, 230 VAC, nonreset, UL/CSA
0743785-003	Base mount, 5 figures, 24 VAC, nonreset, UL/CSA
0743785-004	Base mount, 5 figures, 115 VDC, nonreset, UL/CSA
0743785-006	Base mount, 5 figures, 24 VDC, nonreset, UL/CSA
0743785-007	Base mount, 5 figures, 12 VDC, nonreset, UL/CSA
0743795-101	Back-of-panel mount, 5 figures, 115 VAC, nonreset, UL
0743785-201	Panel mount, 5 figures, 115 VAC, nonreset, UL/CSA
0743795-206	Panel mount, 5 figures, 24 VDC, nonreset, UL
0743796-001	Base mount, 6 figures, 115 VAC, nonreset, UL
0743796-006	Base mount, 6 figures, 24 VDC, nonreset, UL
0743797-001	Base mount, 7 figures, 115 VAC, nonreset, UL
0743895-011	Base mount, 5 figures, 115 VAC, reset, UL
0743895-017	Base mount, 5 figures, 12 VDC, reset, UL
0743885-211	Panel mount, 5 figures, 115 VAC, reset, UL/CSA
0743885-216	Panel mount, 5 figures, 24 VDC, reset, UL/CSA
0743895-416	Rear mount, 5 figures, 24 VDC, reset, UL

Dimensions:

Panel Mount
Depth: 2.377"/60.4mm

Base Mount
Depth: 2.372"/60.3mm
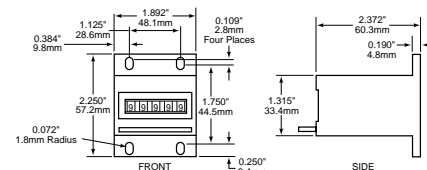
Back of Panel Mount
Depth: 2.377"/60.5mm

Rear Mount
Depth: 2.377"/60.4mm

VEEDER-ROOT brand
Mechanical & Electric Counters

1239 High Speed
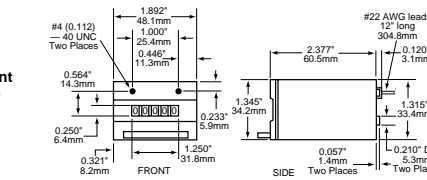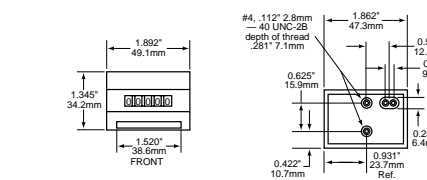
Rock-solid in construction and operation . . . easy to install and operate – mechanical drive input, electrical contact control output

Additive operation – unique for mechanical predetermining counters. Resets to zero, counts up with output at a preset number. One set of wheels shows the current count, while a second set is used for quick and easy preset. Repeat operation for the same preset number, after manual reset.

- Heavy duty base-mount enclosure
- Highly visible white-on-black count wheels
- Unobtrusive gray preset wheels
- 5 figures – count and preset to 99,999
- Form-c output contacts with high current rating
- High speed operation to 5000 counts per minute
- Preset is retained for next operation after reset
- Protective hinged cover gives easy access to presets
- Dust- and lint-resistant construction
- 1/4 inch (6.35 mm) shaft accepts standard measuring wheel

Series 1239 provides economical control for many industrial operations – and it's easy to install and use. When used with our accessory one-foot measuring wheels, it's perfect for unattended material length control applications.

SPECIFICATIONS

Drives: Geared drive, adds one count for each drive shaft revolution; will not subtract past zero

Speed: 2500 rpm or 5000 cpm whichever is limiting

Torque: Max static 4 oz-in. (2.83 N.cm)for 1:1 gearing

Contact Capacity: Manufacturer's switch rating: 1/2 hp at 230 VAC, 20 amp at 115 VAC, 15 amp at 230 VAC, 3 amp at 460 VAC, 0.4 amp at 115 VAC, 0.2 amp at 230 VDC; SPDT switch

Number of Figures: 5

Size of Figures: Counting: 0.206 in. (5.23 mm) high by 0.150 in. (3.81 mm) wide; Predetermining: 0.165 in. (4.19 mm) high by 0.120 in. (3.05 mm) wide

Color of Figures: Counting: White on black; Predetermining: Gray with molded recessed figures

Reset: Manual, resets to preset number

Lubrication: Periodic

Mounting: Base mount with switch at back

Construction: Case: Zamak; Drive Shaft: Chrome plated steel; Cover: Steel; Gears: Brass and chrome plated steel; Wheels, Pinions: Acetal resin

Net Weight: 2 lb., 9 oz. (1.16 kg)

Model No.	Description	Rotation
0123915-681	Geared drive, 1:1 ratio, 5 figures, SPDT switch, wing nut reset	1
0123925-686	Geared drive, 1:1 ratio, 5 figures, SPDT switch, wing nut reset	2
0123935-689	Geared drive, 1:1 ratio, 5 figures, SPDT switch, wing nut reset	3
0123945-696	Geared drive, 1:1 ratio, 5 figures, SPDT switch, wing nut reset(stock)	4

Dimensions:

1.500" / 38.1 mm
1.315" / 33.4 mm
.612" / 15.5 mm
1.266" / 32.2 mm
3.690" / 93.7 mm
.846" / 21.5 mm
.219" / 5.6 mm
1.687" / 42.8 mm
1.688" / 42.9 mm
2.573" / 65.4 mm

3.000" / 76.2 mm
.219" / 5.6 mm
.089" / 2.3 mm
2.300" / 58.4 mm
.750" / 19.1 mm
.250" / 6.4 mm
3.500" / 88.9 mm
3.938" / 100.0 mm
.438" / 11.1 mm
5.673" / 144.1 mm

Typical Applications:

123456

Coil Winding

Textile Machinery

3
M E C H & E L E C T R I C   C O U N T E R S
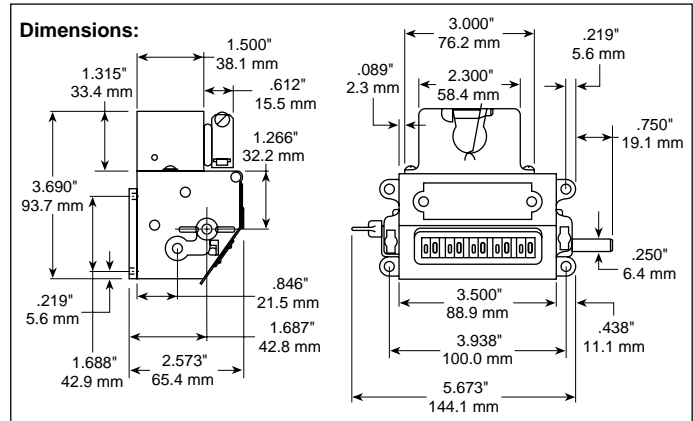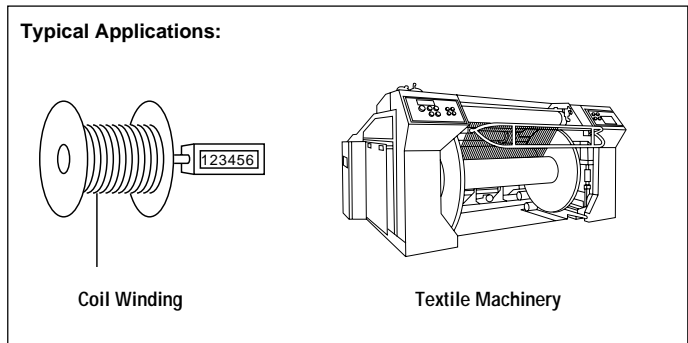
High speed control of turns or linear measure . . . with positive short-throw lever-reset and easy preset operation

Five direct acting pushbuttons, one for each counter digit, let the Series 7283 be preset to any value to 99,999. At each reset, the preset value is returned to the display, and output contacts are switched to provide electrical control of an external circuit. Primary count direction is downward. When the count reaches zero, the contact is switched to its original condition. Exacting design specifications and manufacturing standards allow continuous operation at rates to 6000 counts per minute (ball bearing model).

- Fast lever-action reset is positive and reliable
- High speed, bidirectional counting to 6000 CPM
- 5 figures – high contrast white-on-black numerals
- Form-c (SPDT) output contacts rated 115/230 VAC, 10 amps
- Geared drive mechanism for long, accurate, service life
- Strong 5/16" (7.9mm) stainless steel shaft
- Double shaft extension is ideal for measuring wheels
- Permanently lubricated, high reliability sleeve bearings
- Ball bearing model for extra high speed operation
- Reset lever may be positioned on left or right side

A unique short-stroke, antiscramble, lever-reset mechanism assures correct wheel registration at every operation. Its double shaft extension accepts dual measuring wheels for linear measuring applications – providing reliable, stable contact with the measured material.

Special models are available with options such as: special wheel colors; gear ratio variations; panel mounting.

SPECIFICATIONS

Drive: Subtracts one count for specified number of drive shaft revolutions; adds in opposite rotation

Speed: Sleeve bearings: 4000 rpm or cpm continuous; Ball Bearings: 6000 rpm or cpm continuous

Rated Life: 500 million counts or 1 million resets under normal operating conditions

Torque: 4 oz-in. (2.83 N.cm) maximum

Gearing: 1:1; 3:1 non standard

Contact Capacity: 10 amp at 120 to 240 VAC, 60 Hz; SPDT switch; switch actuation at reset

Number of Figures: 5 figures

Size of Figures: 0.256" high by 0.160" wide (6.5 by 4.1 mm)

Preset: 5 bushbuttons

Mounting: Base

Construction: Case, Cover: Cast aluminum; Wheels: Acetal resin with steel gear and heart cam; Drive Gears: Steel; Shafts: Stainless steel: Pinions: Nylon; Bearings: Porous bronze sleeve or precision ball

Model No.	Description	Rotation
0728315-001 **0728315-501**	Geared drive, 5 figures, sleeve bearing Geared drive, 5 figures, ball bearing	⌐ 1
0728325-001 **0728325-501**	Geared drive, 5 figures, sleeve bearing Geared drive, 5 figures, ball bearing	⌐ 2
0728315-001 **0728315-501**	Geared drive, 5 figures, sleeve bearing Geared drive, 5 figures, ball bearing	3 ⌐
0728325-001 **0728325-501**	Geared drive, 5 figures, sleeve bearing Geared drive, 5 figures, ball bearing	4 ⌐

Dimensions:

Typical Applications:

Spooling

Coil Winding

7441 Electric Preset
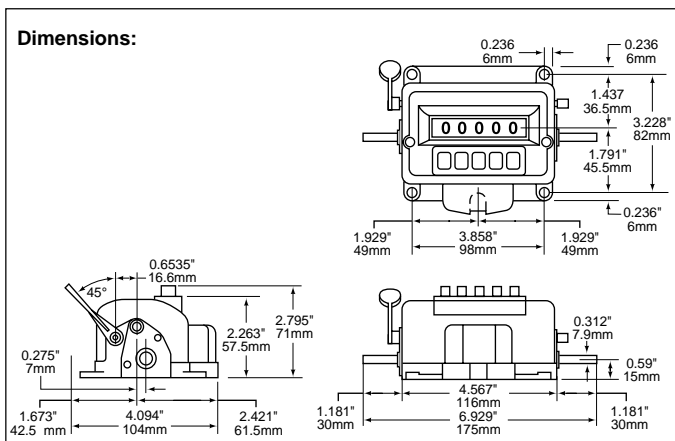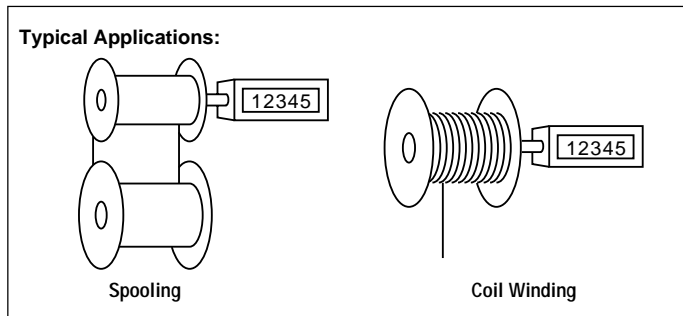
Convenient pushbutton preset entry . . . in a space-saving package

Specific Models

U RECOGNIZED   **CSA** CERTIFIED

When panel area is limited, and functional simplicity is a key concern, the Series 7441 may be the best predetermining counter for the job. It counts down from a user entered preset value. Upon reaching zero, an output switch is actuated. Manual or remote reset restores the switch and preset value to their original condition.

- Reliable operation at counting speeds to 1500/minute
- Underwriters Laboratories Recognized
- 5 figure count display and preset capability
- Models for AC and DC operation
- Compact size – 2" wide (50.8mm), 1" high (25.4mm)
- Rugged, high impact plastic and stainless steel case
- Unique preset interlock prevents accidental change
- Form C (SPDT) output contacts rated at 1 amp.
- Models available with electric remote-reset
- Convenient plug-in connector

Setting a preset value into the Series 7441 is direct and easy, yet secured from unintentional change. Just press the reset button to its special latched position, then use the five digit-buttons to set the desired number on the display. If left latched, the reset button will automatically return to its normal position when the first count signal is received.

For two presets, see Series C346
For low cost electronic, see Series A103

SPECIFICATIONS

Count Speed: 1500 cpm on DC, 1200 cpm on AC

Operating Temperature Range: +32° F to +120° F (0 to +49° C)

Maximum on Time: With a 50% duty cycle, maximum permissible ON time is 5 minutes

Count Pulse Timing: 20 milliseconds minimum on- or off-time for DC operation, 25 milliseconds minimum on-time for AC operation

Electric Reset Timing: 250 milliseconds minimum; 30 seconds maximum; allow 500 milliseconds after removal of reset pulse before applying count pulse

Supply Voltage: Standard voltages are 115 VAC, 50/60 Hz; 24 VDC; allowable voltage variation is ±10% or 10 volts, whichever is less

Typical Applications:

Printing Press   Molding Machine
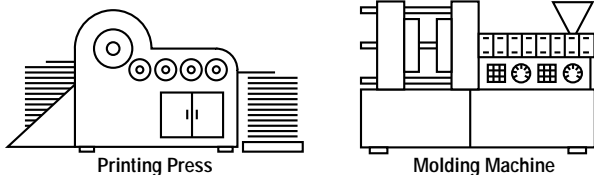
Ideal for printing presses, molding machines, and other industrial equipment.

Power Consumption: 6 watts count coil, 12 watts reset coil

Output Actuation: The internal SPDT switch actuates on the power-off half of the predetermining count cycle; the switch will remain in its position, and the count will stay at zero until the counter is reset

Number of Figures: 5 [0.160 in. high x 0.075 in. wide (4.1 x 1.9mm)]

Reset: Manual pushbutton or electric reset, see models

Preset: Manual pushbutton for each digit; reset button must be fully depressed and latched to permit setting

Connections: Plug-in connectors

Net Weight: 5 oz. (142g)

Model No.	Supply Voltage	Count Coil Resistance	Electric Reset Coil Resistance	Electric Reset
0744195-211	115 VAC	1500Ω	—	NO
0744195-221	115 VAC	1500Ω	716Ω	YES
0744195-226	24 VDC	100Ω	77Ω	YES

Dimensions:

2.395"
60.8mm

1.885"
47.8mm

1 2 3 4 5

PANEL MOUNT

0.125"
3.2mm

4.211"
107mm

2 holes for #4 screws

SUGGESTED PANEL CUTOUT

1.187"
30.1mm

27.8mm

2.187"
55.6mm

0.156"
4.0mm

1.50"
38.1mm
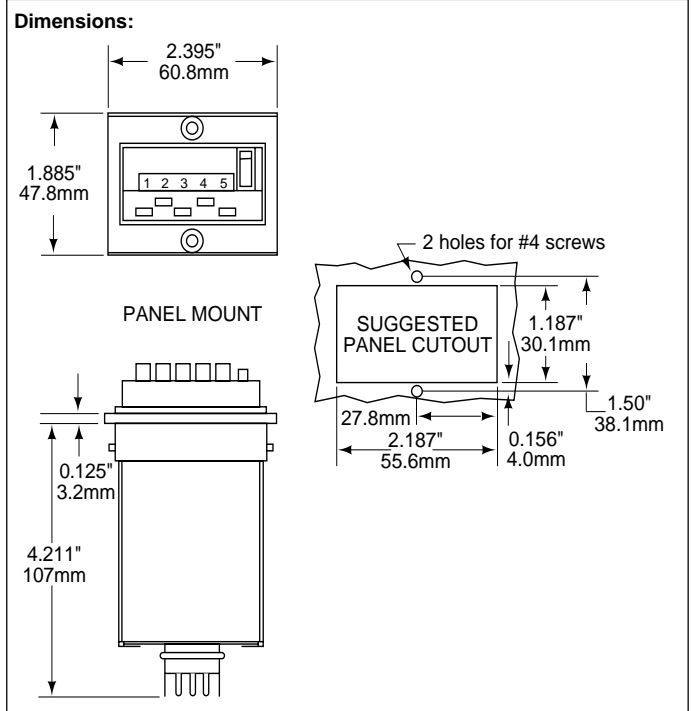
Electromechanical counter housed in standard CYCL-FLEX® case

The HZ170 series is an electromechanical counter housed in the standard CYCL-FLEX® case. The unit is available in three count ranges, 12, 40, and 100. The count setpoint is adjustable by a knob on the front of the unit.

Its features include:

- All count ranges use solenoid operated pawl feed count motor and electromechanical clutch

- Progress pointer, indicating count progression, advances clockwise from setpoint to zero

- Two sets of SPDT instantaneous contacts and two delayed SPDT switches which transfer at count out control output sequences

- Instantaneous and delayed contacts may be interconnected to supply output sequences

- Optional reverse action clutch will not reset on power failure

OPERATION

The HZ170 series counter is an impulse motor driven unit with standard or reverse clutch operation.

When power is applied to the clutch terminals on standard units, the clutch engages and instantaneous contacts transfer enabling the counter to receive and register counts. A 40 ms pulse to the count motor will register a count by moving the count progress pointer toward the zero point on the dial. When the progress pointer reaches zero, the unit is counted out and a set of delayed switches transfer. Additional counts will not be registered until the unit is reset. Removal of power from the clutch terminals resets the counter.

Units with 40 count and 100 count ranges have two delayed action switches. By adjustment of set screws on the switch trip lever, a transfer differential between the two switches can be obtained. The 40 count range switch differential can be adjusted for one count early transfer before count out. The 100 count range differential is two counts.

On reverse action clutch operation, removal of power from the clutch terminals enables the counter to receive counts.

SPECIFICATIONS

Count Ranges:

Sym.	Count Range	Minimum Setting
0	2-100	2
1	1-12	1
2	1-40	1

Count Speed: 500 counts per min. max.

Accuracy: 100%

Reset Time: 500 ms at max. setting

Input Requirements: Stepping Motor: 40 ms "ON" time, 80 ms "OFF" time
Clutch Coil: 50 ms pull in

Voltage/Frequency: 120 VAC (+10, -15%), 50/60 Hz
240 VAC (+10, -15%), 50/60 Hz

Burden: Stepping Motor: 26 VA, Inrush
Clutch Coil: 16 VA, Inrush; 10.5 VA, Maintained

Output Rating: 10 amps, 120 V, 50/60 Hz
5 amps, 240 V, 50/60 Hz

Temperature Range: 0˚ to 140˚F (-18˚ to +60˚C)

Laboratory Testing: UL Recognition E96337
CSA Certification LR26861

ENCLOSURES

Model No.	NEMA Class	Description
HN308	1	Surface Mtg. with terminal block
HN364	1	Surface Mtg. without terminal block
HN370	1A	Dual unit cabinet less unit cases and toggle switch, with 9 terminal block

ACCESSORIES

Model No.	Description
H-5331	Mounting Brackets 2 req'd per timer
HP50-31	One Hole Mounting Ring
HP103	120 V, 50/60 Hz Repeat Cycle Kit
	Not available with Feature 02
HP105	240 V, 50/60 Hz Repeat Cycle Kit
	Not available with Feature 02
HP50-133	Surface Mounting Adapter to use in place of brackets
HZ170-121	Dial Lock

MOUNTING

ORDERING INFORMATION

HZ17   0   A6   01

COUNT RANGE

Sym.	Description
0	2-100
1	1-12
2	1-40

VOLTAGE & FREQUENCY

Sym.	Description
A6	120 VAC, 50/60 Hz
B5	240 VAC, 50 Hz
B6	240 VAC, 60 Hz

FEATURES

Sym.	Description
01	Reverse Clutch
02	Revised for Mounting in NEMA VII Explosion Proof Enclosure HN384
05	Chrome Plated Bezel
07	Dial Lock
92	Enclosed in HN384 Explosion Proof Cabinet

4

RATE INDICATORS and CONTROLLERS

Ratemeters and Timers are used for measurement, display and control in applications that have speed or rate variables that can be sensed. Our Dynapar and Veeder-Root brands are respected throughout the industry for accurate, versatile, industrial duty rate indicators and controllers. This leadership is a result of pioneering accomplishments in the application of new technology and human interface design. Our broad applications experience and innovative products set the standard for performance and ease of use.

RATEMETER FUNCTIONS

Rate indicators provide a digital display of a process. The simplest ratemeters connect to a sensor and give a direct readout of frequency or voltage which is representative of rate or speed. Proper choice of a sensor allows the indicator to show process variables in engineering units such as motor revolutions/minute or material feet/minute. Some rate meters
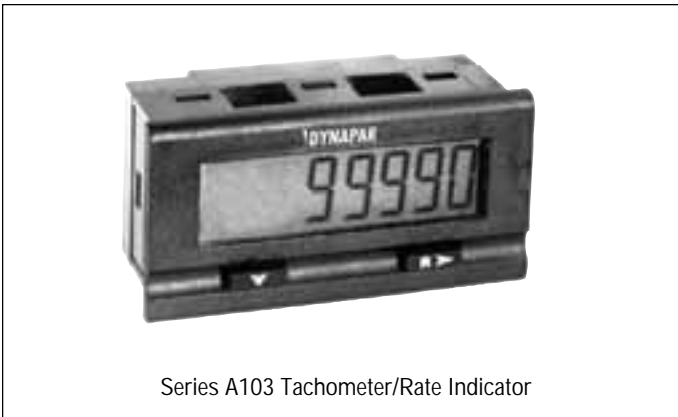
Series A103 Tachometer/Rate Indicator

have calibration which scales, or converts, the input signal to engineering units with almost any sensor choice. Applications where the sensor cannot be easily specified for direct readout, or ones that need unusual measurements, may need calibration.
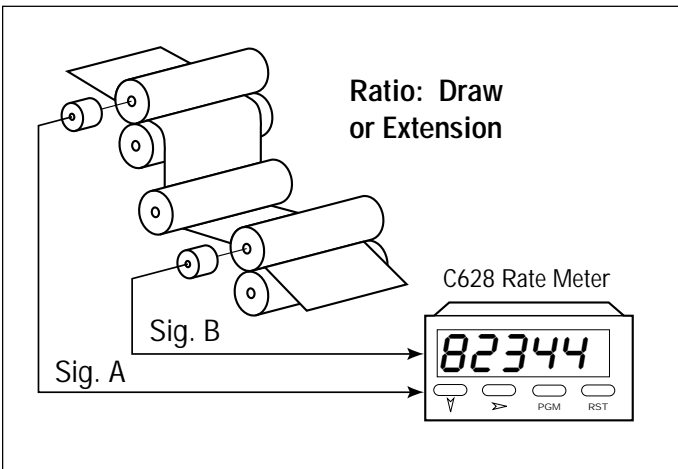
Rate controllers add the ability to monitor and compare the input to one or more values. These values are typically called "alarms" in rate control applications. In addition to the operator display, the "alarms" can trigger control outputs or relays to prevent out-of-tolerance operation or take corrective action to bring the process within its normal limits. In many applications, out-of-tolerance conditions are indicated by visual "alarms" such as light bulbs.

Draw indicators and controllers report on the relationship between two rates. Two sensors, A and B, are used to measure the rates Ra and Rb. Difference, Ra – Rb, is a draw function that is used when one section of a process is slower or faster than another; a single draw indicator is more desirable than two independent rate indicators. Ratio, Ra ÷ Rb, is another type of draw measurement used when electronic gearing, batch blending and other applications that require motor shafts or mixing pumps to perform as a pair. Percent difference draw, (Ra – Rb) ÷ Rb, tells how much faster or slower one rate is compared to the other; it is typically used in paper or plastics processing to indicate or control the stretch, or thickness of the material through each stage of the operation.

Some rate metering products can measure process time. This differs from a rate or ratio in that a measurment is made of how long a process takes, rather than how fast it is going. For example they may be used on conveyor lines to indicate the time a product spends in a galvanizing tank or baking oven.

DISPLAY TYPES

Light emitting diode (LED) and liquid crystal displays (LCD) are two popular choices for digital display of numeric information. Our products are offered in a wide range of price and size selections, in addition to the display type.

LED's can be viewed in very dimly lit areas since they produce their own light. Their high contrast presentation makes them the preferred type when the display must be observed from a distance. Our Series C628 "AWESOME" products feature display color change at alarm presets.

Ratio: Draw or Extension

Sig. B

Sig. A

C628 Rate Meter

82344

PGM   RST

Production Time

Nozzles

Baking Oven

Cookies

Encoder

Sig. A

Max jr Tach 2
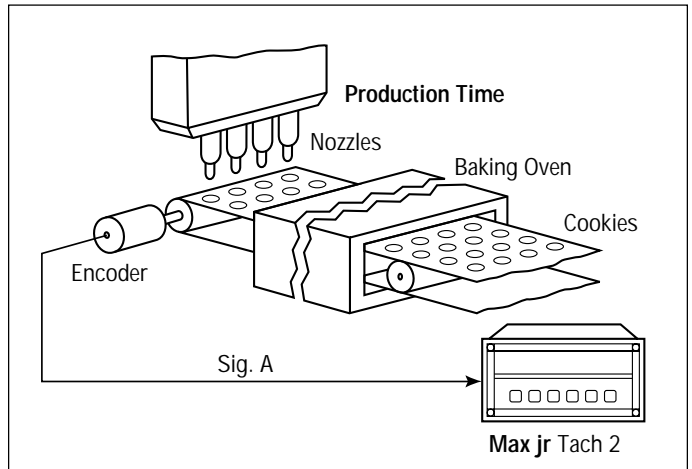
LCD's are best suited for installation in areas where there is reasonably good lighting. They are superior to most other display types when viewed in very bright ambient light, such as direct sunlight.

SPECIFYING A RATE INDICATOR/CONTROLLER

The selection of an LED or LCD display is dictated by the amount of ambient light in the area. LCD's are better suited to sunlit environments while LED's work well in dimly lit areas. LCD displays usually come in smaller package sizes and are often chosen when space constraints are present. Also, LCD products can be battery powered. With either display type, be sure the device has enough digits to be able to display the maximum value that may occur.

For process requirements that go beyond a visual display, rate or draw controllers should be specified. The need for warning lights or machine shutdown during out-of-tolerance conditions can be met with alarm setpoints and alarm outputs. Factors to consider when specifying alarms are their number and whether they reset automatically or manually.

Finally, other convenience features should be considered. Setup and calibration methods can vary from switch setting to keyboard programming. An accessory power supply may be needed to power sensing devices or alarm relays. A communications link to logic controllers or computers may be required in a system design or included for future needs.

Application	Examples	Sensing Technique
Speed Readout	Motor RPM	Variable Reluctance Hall Effect.
Production Rate	Bottles per Hour	Photoelectric Capacitive Proximity
Draw (Rate Difference, Ratio, or % Difference)	Gear Ratio Material Stretch	Rotary Encoders
Process Time	Oven Bake Time	Rotary Encoders
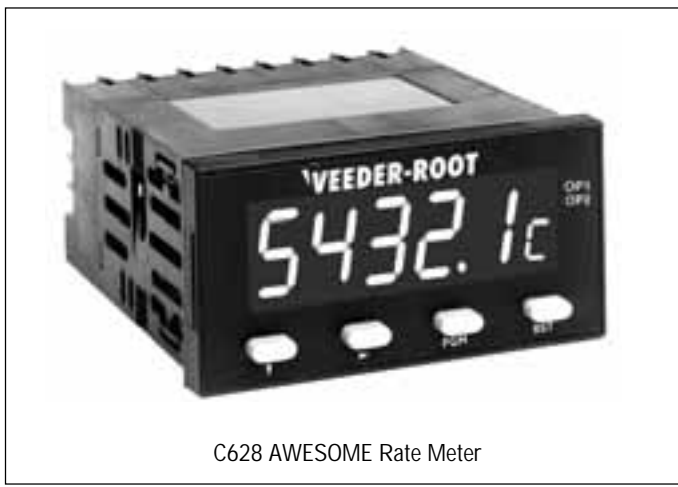
C628 AWESOME Rate Meter

DATA COMMUNICATIONS

There is an increasing need for rate and timer controllers that can communicate with printers, computers or other electronic systems. Such devices provide a serial communications port which allow remote access to rate or timer data or alarm values. With this feature, the data can be included on printed forms or receipts, or made available to management information or process control systems.

There are two forms of serial data communications interfaces offered:

■ **RS-232 –** Is intended for connection to a simple paper-tape, or multi-copy form printer. May also be used to communicate with nearby programmable logic controllers (PLC), or other system component. The distance between the external device and the indicator/controller should be limited to 50 feet.

■ **RS-422/485 –** Allows communication between multiple controllers and another system over a single bus. Operating distances of up to a mile can be maintained – even in severe industrial environments. Data collection and control tasks can be distributed between a computer, or PLC, and the motion controls.
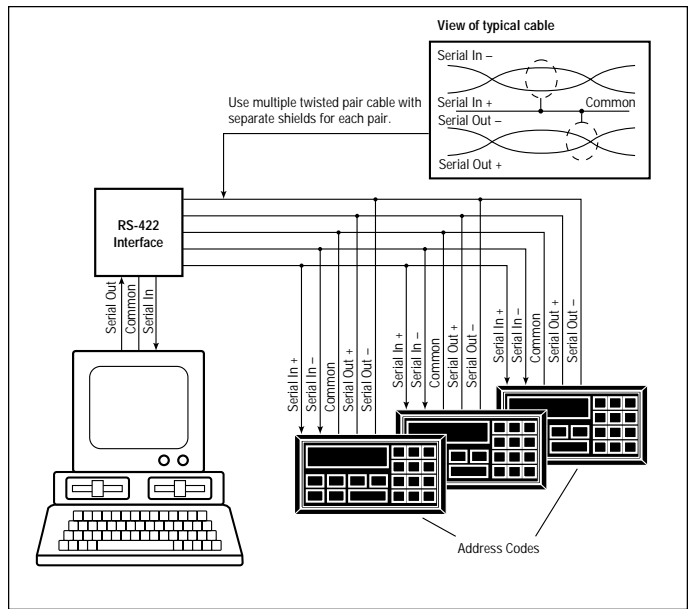
ELECTRONIC INPUT SIGNALS

Rate indicators need a signal which represents the process being measured. Draw indicators operate with one signal from each part of the application. Timers can work with a single input or, in some cases, a pair of signals. In cases where there is no signal available on the machine a suitable sensor will have to be added. We offer several types of sensors for different application requirements:

This Selector Guide can assist you in determining the type of rate indicator/controller that best fits your application requirements. Condensed description and specification information is provided. Complete information is available by turning to the referenced page number that appears above each product's picture. The ✫ symbol denotes our "Star Products" which we recommend be given first consideration. They offer maximum functionality, performance, and value.

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Dynapar brand	Series C628	Series A103	Series C342	MTjr1/2
Page Number: The ✫ symbol denotes our "Star Products" which we recommend be given first consideration. They offer maximum functionality, performance, and value. **Description and Features:** Condensed description and specification information is provided. Complete information is available by turning to the referenced page number that appears above each product's picture.	Page: 4.04 ✫ ■ AWESOME 0.71" high LED display changes color on alarm activation ■ Single instrument provides rate and count ■ Configurable sampling for optimal, flicker-free display presentation ■ Optional RS-485 plug-in card	Page: 4.05 - 4.07 ✫ ■ Internally powered, economically priced unit with 4 large digits and a backlit LCD display ■ Simple plug-and-play model for RPM display ■ Programmable versions that include background totalization and a scaled pulsed output	Page: 4.08 ✫ ■ Very compact size. Available with LCD or LED display ■ Models with internal lithium power source or external DC power supply ■ Matching Series C342 counters and timers available	Page: 4.09 ■ Industry standard 1/8 DIN, full 5 digit LED indicator ■ Transistor outputs for high and low rate alarms ■ MTJR2 features 2 inputs and can display ratios and time intervals
Dimensions	48mm x 96mm	36mm x 72mm	24mm x 48mm	50mm x 98mm
Display Type	LED, Programmable Red or Green color	Backlit LCD (Backlight requires 12 VDC power	7.0mm high LCD or 7.2mm LED	LED
Number of Digits	5 (0.71" high)	4 (plus dummy zero on prog. rate versions)	6, LSD fixed at zero	5 (0.56" high)
Power Supply	90-240 VAC, 20-50 VAC/DC 50/60 Hz, 4 Watts	3 Volt replaceable lithium battery	Internal lithium battery or 12-24 VDC external	115, 230 VAC (switch selectable) or 10-26 VDC
Alarm Outputs	2 NPN transistor, 1 SPDT 2A relay (2nd relay optional)	No	No	2 - NPN transistor
Calibator	Multiplier 0.0001 to 9.9999	Multiplier 0.001 to 9.999	NO	Multiplier 0.0001 to 9.9999
Max Frequency	10 kHz	10 kHz	7.5 kHz	10 kHz
Input Type	Sinking, Sourcing, Magnetic	Sinking, Sourcing, Magnetic	Sinking, Sourcing,	Sinking, Sourcing, Magnetic
Rate Calculation method	Time Interval (1/Tau)	Time Interval (1/Tau)	6 Second gate	Time Interval (1/Tau)
Sensor Power Supply	9 - 15 VDC	9 - 15 VDC (Option module required)	No	12 VDC
Front Panel Rating	NEMA 4X	NEMA 4X	IP65	NEMA 4
Serial Communication	Optional RS-485	No	No	No

For locating products which do not appear in this selector guide, refer to the table of contents or the product to page number index in Section 15. Additional specialized products that perform rate operations can be found in Section 7, Multifunction Products.

MT1	SimTach D	Series 7990	
Page: 4.10	**Page: 4.11**	**Page: 4.12**	
■ **Large, 5 digit LED display** ■ **Dual channel inputs allow the unit to keep track of 2 separate rate values or their draw ratio** ■ **6 transistor alarm outputs** ■ **RS-485 communication enhances plant wide automation**	■ **No programming required** ■ **Chose the 1 PPR input model for production rate monitoring** ■ **Chose the 60 PPR input unit for displaying RPM**	■ **Can be programmed for use in counting and timing applications as well as rate** ■ **Rugged metal case**	 **Series HT50** – Shirt pocket sized. Complete kit provides everything needed for optical non-contact or mechanical in-contact measurements. **Page 4.13** ■ Compact and lightweight ■ Simple push button operation ■ Automatic display hold for three minutes or until another reading ■ 9 to 99,999 RPM measurement range with 0.1 resolution ■ Automatic shutoff for power savings
74mm x 144mm	50mm x 96mm	36 mm x 72 mm	
LED	LED	LCD	
5 (0.8" high)	5 digit (0.56" high)	8 (0.35" high)	
115, 230 VAC (switch selectable) or 10-26 VDC	115, 230 VAC (switch selectable) or 10-26 VDC	Internal lithium battery	**Series HT100** – Bright LED Display. Mode selector for measurement of RPM, linear feet or meters per minute, counts, or time. **Page 4.14**
6 - NPN transisitor	None	Front Panel (Selectable Enable), Remote	■ Complete kit – includes Hand Tachometer, in-contact adaptor, carrying case, and reflective tape
Indiv. mult. 0.0001 to 99999, channels A and B	1 or 60 PPR input (selectable by model #)	Multiplier 0.001 to 9999	■ Microprocessor circuit allows switch selection of rate, time, or counting modes
30 kHz	10 kHz	10 kHz	■ Measures speeds from 3 rpm to 99,999 rpm
Sourcing	Sinking, Magnetic	Sinking, Contact closure	■ Fixed or floating decimal point operation
Time Interval (1/Tau)	Time Inteval (1/Tau)		■ Automatic shut-off with display memory recall
12 VDC	12 VDC	No	
NEMA 4	NEMA 4	NEMA 4	
RS-422/485	No	No	

Powerful, full-featured rate meter with large, bright display which changes color on alarm activation

All in the family - Matching C628 series products in other sections of this catalog:

C628 Totalizers:	Section 1
C628 Counters & Position Indicators:	Section 2
C628 Elapsed Timers:	Section 5

File No.: E185087

® RECOGNIZED   c® RECOGNIZED

CE

The Veeder-Root brand C628 Rate Meters are members of a family of 1/8 DIN instruments which offer breakthrough display technology as well as easy-to-program user setup. Its large LED display features the ability to change color based on process status such as exceeding a preset alarm value. Therefore, when monitoring rates of line-speed, flow, machinery RPM and other critical rates, the C628 can provide operators with an instant visual alert to changes in the application's status.

High/Low alarms also activate relay and transistor output channels for direct control of electrical circuits. Start up suppression prevents "false" outputs during initial process acceleration.

- AWESOME 0.71" high digit LED display (27% larger than other 1/8 DIN units)
- Programmable color change display based on an event
- Universal power supply operates at all popular AC and DC voltages
- Display configurable for rate mode (A or A/B), update time, minimum number of pulses, and forced zero time
- Optional linear output relative to rate
- Choice of NPN, PNP or magnetic primary input
- Independent calibration of rate & total
- Filter speed settable for 20, 200, or 10,000 Hz
- Standard Outputs: 2 NPN transistors & 1 relay (optional 2nd relay)
- Front panel reset enable and alarm lockout
- Optional RS-485 plug in card
- CE approved, UL, CUL recognized

The C628 is available with a count totalizing feature letting you instantly switch display between production rate and total – at the touch of a button. A process time mode lets the unit show travel time in minutes and seconds for applications such as food and beverage processing (inverse speed calculation).

SPECIFICATIONS

Count Inputs: Sinking/Sourcing or Contact Closure
  Frequency: 10 kHz max.
  Logic Low ≤ 2.0 VDC, Logic High ≥ 3.0, 30V max.
  Impedance: 10 KΩ to common - Sourcing; 4.7 KΩ to +Voltage - Sinking; Magnetic Input: 0.5 to 30V peak

Calibrators: Rate Multiplier: 0.0001 to 99999
  Total Multiplier: 0.0001 to 9.9999

Control Inputs: Sinking, Edge Sensitive
  Logic Low ≤ 2.0 VDC, Logic High ≥ 3.0
  Impedance: 4.7 KΩ to +Voltage
  Response Time: 25 ms
  Functions: Input 1 - Display Hold (Rate Meter) and Remote Reset (Rate Meter with Total); Input 2 - Security Lockout

Outputs: Solid State: NPN open collector, 30 VDC max., 100 mA max.
  Relay: SPDT, 2 resistive @ 110 VAC
  Latency: 75 μ seconds, plus 8 ms for relay pull-in

Linear Outputs: Ranges: 0-20mA, 4-20mA, 0-10V, 2-10V, 0-5V, 1-5V
  Accuracy: ±0.25% (mA at 250Ω, V at 2kΩ) degrades linearly to ±0.5%

  Resolution: 8 bits in 250ms (10 bits in 1s. typ.)
  Load Impedence: mA ranges 500Ω max.; V ranges 500Ω min.
  Update: Approx. 4/s

Communication: RS-485; Serial asynchronous, UART to UART;
  Open ASCII: One start bit, even parity seven data bits, one stop bit;
  Baud Rate selectable from 9600, 4800, 2400, or 1200
  Maximum Zones: 99

Supply Voltage: 90-264 VAC, 50/60 Hz, or 20-50 VAC/VDC; 4 Watts

Accessory Power Supply: 9-15 (unregulated VDC), 125 mA max.

Display: Red/Green, 7 segment LED
  Primary display: 5 digits, 0.71" (18mm) height
  Secondary display: single digit, 0.3" (7mm) height
  Annunciators: Output 1 & Output 2 status

Dimensions: 48mm x 96mm, 110mm deep

Mounting: Panel mount (mounting bracket supplied), 45mm x 92mm cutout

Connections: Screw type terminals - combination head

Front Panel Rating: NEMA 4X/IEC IP65

Case Material: GE Lexan 940

Weight: 0.56 lbs.

Operating Temp.: 0° to 55° Celsius, 32° to 131° Fahrenheit

Storage Temp.: -20° to 80° Celsius, -4° to 176° Fahrenheit

Relative Humidity: 20% to 95% non-condensing

Approvals: CE, UL Recognized, File No.: E185087

Ordering Information:

Function	Power Supply
4 Rate Meter	**0** 90-264 VAC
5 Rate Meter with Total	**2** 20-50 VAC/VDC

C 6 2 8 – ☐ ☐ ☐

2nd Relay Option	Linear Output Option	Serial Communication Option
0 None	**0** None	**0** None
1 2nd Relay	**3** Linear Output	**5** RS-485

Dimensions:

VEEDER-ROOT
82344

48mm
96mm
100mm
10mm

Panel Cutout: 45mm x 92mm(1.77" x 3.62")

9/24/98
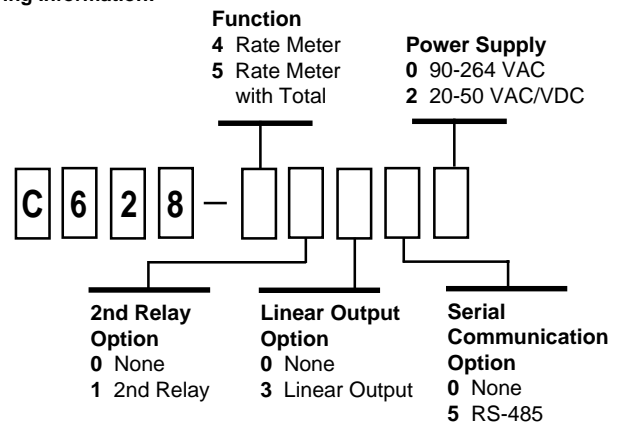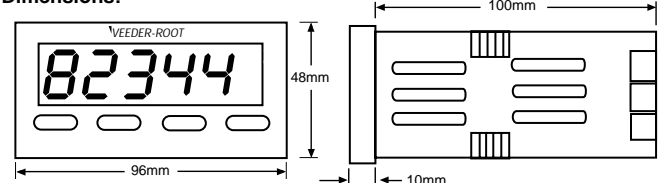
"Plug-and-play", compact tachometer… large display with backlighting

The A103 Tachometers provide high-visibility readout of motor, machine shaft or other RPM, yet are extremely compact in overall size. Its dedicated function design makes installation and operation direct and easy. The A103 series also includes matching indicators for count totalization, elapsed time indication, and rate metering, as well as models with a preset output for control by count or time. All are in a uniform 36 x 72 millimeters bezel size package, enhancing your control panel with a family of devices that look and program alike.

A supertwist LCD display with thick 12mm (.47") high digits allows for easy viewing at a glance and feature display-backlight capability by simply connecting an external DC power supply.

Powered by a long-life internal 3 volt battery, the A103 requires no external voltage source to operate. Signal input from a Dynapar brand magnetic pickup, also requiring no power connection, creates a complete "powerless" speed measurement system.

■ Matching totalizing and preset counters, elapsed time indicators, preset timers, and advanced feature rate indicators look great together on a panel

■ High visibility 4-digit LCD display with backlighting capability standard

■ Long life 3 Volt lithium battery eliminates the need for external power

■ "Magnetic" input accepts signals from inexpensive, non-powered sensors

■ Option modules provide additional functionality and added conve- nience – fast, easy installation

■ NEMA 4X/IP65 rated front panel for use in washdown environments

The A103 is further enhanced by a series of quick-attach option modules. These can provide a power supply for sensors and display backlighting, and accept high or low voltage AC or DC input signals.

SPECIFICATIONS

Magnetic Input: Capacitive coupled; 10 kHz (50% duty cycle); 0.2V peak (28 VDC max)

High Speed Input: PNP or square wave pulse; 10 kHz max (50% duty cycle), 45 µsec min pulse width; Low State: < 1.0 VDC, High State: > 2.0 VDC (28VDC max)

Low Speed Input: NPN, Contact Closure; 30 Hz max (50% duty cycle), 12 ms min pulse width; Low State: < 1.0 VDC, High State: > 2.0 VDC (28VDC max)

Calibrator: Not required. Display of RPM is based on 60 pulse-per-revolution input signal

Power Source: Single or dual 3V Lithium battery; typical 5 years life w/single battery, 10 years w/dual batteries

Display: 12mm high, Supertwist LCD; 4 digits; "Low Bat" indicator

Backlighting: Green Illumination over whole viewable area. Requires 10 to 28 VDC power source

Dimensions & Mounting: See dimensions figure. Panel Mount with supplied mounting bracket and gasket

Connections: Screw terminals

Operating Temperature: +32° to +131 °F (0° to +55°C)

Weight: Approximately 64 grams (2.25 ounces)
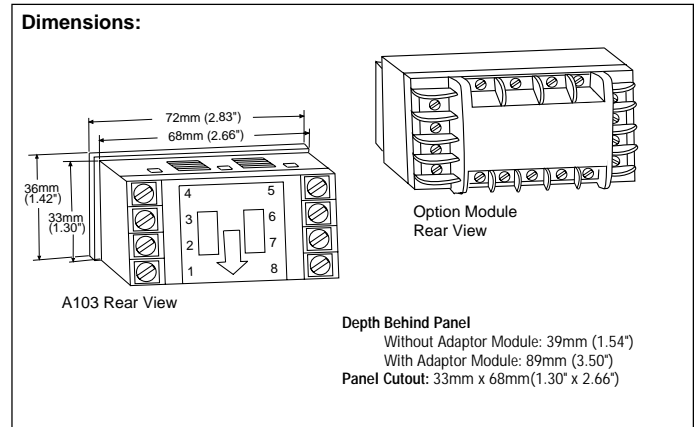
OPTION MODULE SPECIFICATIONS

Option modules accessories provide a convenient integrated solution to applications that require AC or high voltage DC signals, and/or a voltage source for use with the A103's display backlight feature or external. Specifications for each option module feature follow, while specific combinations of features are listed in the "Models" table, below.

High Voltage Input: Allows A103 to accept 100 to 260 Volt AC/DC as signal input

Low Voltage Input: Allows A103 to accept 15 to 30 VAC or VDC as signal input

AC Power Supply: Provides 10 - 20 VDC @ 50mA for display backlighting and/or sensor. Requires connection to 115 or 230 VAC, 50/60 Hz

Model No.	Description		
A103-003	A103 Tachometer		
The following option modules attach to the rear of the A103 Tachometers:			
Model No.	AC Power Supply	Low Voltage Input	High Voltage Input
A103-A12	X		
A103-A17		X	
A103-A19	X	X	
A103-A10			X
A103-A14	X		X

Replacement Battery: 605472-0001
Panel Hole Punch: A103-A40

Dimensions:

72mm (2.83")
68mm (2.66")
36mm (1.42")
33mm (1.30")

A103 Rear View

Option Module Rear View

Depth Behind Panel
Without Adaptor Module: 39mm (1.54")
With Adaptor Module: 89mm (3.50")
Panel Cutout: 33mm x 68mm(1.30" x 2.66")

Input scaling to measure any rate or speed… large display with backlighting

> ### *All in the family - Other matching A103 series products in this catalog:*
>
> | | |
> |---|---|
> | **A103 Totalizing Counters:** | **Section1** |
> | **A103 Preset Counters:** | **Section 2** |
> | **A103 Time Indicators:** | **Section 5** |
> | **A103 Preset Timers:** | **Section 5** |

4
RATE INDICATORS and CONTROLLERS

The A103 Programmable Rate Meters are extremely compact indicators providing high-visibility readout of virtually any rate: *gallons/minute, feet/minute, parts/hour, etc.* Easy to program input-scaling, decimal point, and "dummy-zero" features assure maximum flexibility for any application. The A103 series also includes matching indicators for count totalization, elapsed time indication, simple speed display (RPM) as well as models with a preset output for control by count or time. All are in a uniform 36 x 72 millimeters bezel size package, enhancing your control panel with a family of devices that look and program alike.

A supertwist LCD display with thick 12mm (.47") high digits allows for easy viewing at a glance and feature display-backlight capability by simply connecting an external 12VDC supply.

Powered by a long-life internal 3 volt battery, the A103 requires no external voltage source to operate. A complete non-powered rate measurement system can be achieved by using signal input from a Dynapar brand magnetic pickup.

■ Matching totalizing and preset counters, elapsed time indicators, preset timers, and advanced feature rate indicators look great together on a panel

■ High visibility 4-digit LCD display with programmable decimal point and "dummy zero". Backlighting capability standard

■ Input scale multiplier (0.001 to 9999) calibrates input signal to correct engineering unit

■ Long life 3 Volt lithium battery eliminates the need for external power

■ "Magnetic" input accepts signals from inexpensive, non-powered sensors

■ Option modules provide additional functionality and added convenience – fast, easy installation

■ NEMA 4X/IP65 rated front panel for use in washdown environments

The A103 indicators are further enhanced by a series of quick-attach option modules. These can provide a power supply for sensors and display backlighting, and accept high or low voltage AC or DC input signals.

SPECIFICATIONS
Magnetic Input: Capacitive coupled; 10 kHz (50% duty cycle); 0.2V peak (28 VDC max)
High Speed Input: PNP or square wave pulse; 10 kHz max (50% duty cycle), 45 μsec min pulse width; Low State: < 1.0 VDC, High State: > 2.0 VDC (28VDC max)
Low Speed Input: NPN, Contact Closure; 30 Hz max (50% duty cycle), 12 ms min pulse width; Low State: < 1.0 VDC, High State: > 2.0 VDC (28VDC max)
Calibrator: Input scale multiplier, programmable from 0.001 to 9999
Power Source: Single or dual 3V Lithium battery; typical 5 years life w/single battery, 10 years w/dual batteries
Display: 12mm high, Supertwist LCD; 4 digits w/selectable decimal point and "dummy zero" 5th digit; "Low Bat" indicator
Backlighting: Green Illumination over whole viewable area. Requires 10 to 28 VDC power source

Dimensions & Mounting: See dimensions figure. Panel Mount with supplied mounting bracket and gasket
Connections: Screw terminals
Operating Temperature: +32° to +131 °F (0° to +55°C)
Weight: Approximately 64 grams (2.25 ounces)

OPTION MODULE SPECIFICATIONS
Option modules accessories provide a convenient integrated solution to applications that require AC or high voltage DC signals, and/or a voltage source for use with the A103's display backlight feature or external. Specifications for each option module feature follow, while specific combinations of features are listed in the "Models" table, below.

High Voltage Input: Allows A103 to accept 100 to 260 Volt AC/DC as signal input
Low Voltage Input: Allows A103 to accept 15 to 30 VAC or VDC as signal input
AC Power Supply: Provides 10 - 20 VDC @ 50mA for display backlighting and/or sensor. Requires connection to 115 or 230 VAC, 50/60 Hz

Model No.	Description
A103-004	A103 Programmable Rate Meter
The following option modules attach to the rear of the A103:	

Model No.	AC Power Supply	Low Voltage Input	High Voltage Input
A103-A12	X		
A103-A17		X	
A103-A19	X	X	
A103-A10			X
A103-A14	X		X

Replacement Battery: 605472-0001
Panel Hole Punch: A103-A40

Dimensions:

72mm (2.83")
68mm (2.66")
36mm (1.42")
33mm (1.30")

A103 Rear View

Option Module Rear View

Depth Behind Panel
Without Adaptor Module: 39mm (1.54")
With Adaptor Module: 89mm (3.50")
Panel Cutout: 33mm x 68mm (1.30" x 2.66")

Scaled measurement of rate or speed – plus totals… large display with backlighting

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All in the family - Other matching A103 series products in this catalog:

A103 Totalizing Counters:	**Section 1**
A103 Preset Counters:	**Section 2**
A103 Time Indicators:	**Section 5**
A103 Preset Timers:	**Section 5**

The A103 Rate Meters with Totalizer are extremely compact indicators providing high-visibility readout of virtually any rate: *gallons/minute, feet/minute, parts/hour, etc.* – plus a <u>total count</u>. Easy to program input-scaling, decimal point, and "dummy-zero" features assure maximum flexibility for any application. The A103 series also includes matching indicators for count totalization, elapsed time indication, simple speed display (RPM) as well as models with a preset output for control by count or time. All are in a uniform 36 x 72 millimeters bezel size package, enhancing your control panel with a family of devices that look and program alike.

A supertwist LCD display with thick 12mm (.47") high digits allows for easy viewing at a glance and feature display-backlight capability by simply connecting an external 12VDC supply.

Powered by a long-life internal 3 volt battery, the A103 requires no external voltage source to operate.

■ Matching totalizing and preset counters, elapsed time indicators, preset timers, and advanced feature rate indicators look great together on a panel

■ High visibility LCD, 4-digit rate and 8-digit totals display with programmable decimal point and "dummy zero". Backlighting capability standard

■ Dual input scale multipliers for independent engineering unit calibration of rate and total

■ Available with calibrated pulse output (A103-009)

■ Long life 3 Volt lithium battery eliminates the need for external power

■ Option modules provide additional functionality and added convenience – fast, easy installation

■ NEMA 4X/IP65 rated front panel for use in washdown environments

The A103 indicators are further enhanced by a series of quick-attach option modules. These can provide a power supply for sensors and display backlighting, and accept high or low voltage AC or DC input signals.

SPECIFICATIONS
High Speed Input: PNP or square wave pulse; 10 kHz max (50% duty cycle), 45 μsec min pulse width; Low State: < 1.0 VDC, High State: > 2.0 VDC (28VDC max)
Low Speed Input: NPN, Contact Closure; 30 Hz max (50% duty cycle), 12 ms min pulse width; Low State: < 1.0 VDC, High State: > 2.0 VDC (28VDC max)
Calibrator: Independent programmable input scale multipliers for rate (range: 0.001 to 9999) and totals (range: 0.0001 to 99.9999). Additional calibrator for pulsed output (model A103-009), see below.
Pulsed Output: Model A103-009 only. Isolated Photomos relay; 0.1 amp @ 30 VAC/DC, >50Ω on resistance. Independent programmable calibrator scales input pulse rate by multiplier of 0.0000 to 0.9999
Power Source: Single or dual 3V Lithium battery; typical 5 years life w/single battery, 10 years w/dual batteries
Display: 12mm high, Supertwist LCD; 4 digits w/selectable decimal point and "dummy zero" 5th digit; "Low Bat" indicator
Backlighting: Green Illumination over whole viewable area. Requires 10 to 28 VDC power source

Dimensions & Mounting: See dimensions figure. Panel Mount with supplied mounting bracket and gasket
Connections: Screw terminals
Operating Temperature: +32° to +131 °F (0° to +55°C)
Weight: Approximately 64 grams (2.25 ounces)

OPTION MODULE SPECIFICATIONS
Option modules accessories provide a convenient integrated solution to applications that require AC or high voltage DC signals, and/or a voltage source for use with the A103's display backlight feature or external. Specifications for each option module feature follow, while specific combinations of features are listed in the "Models" table, below.

High Voltage Input: Allows A103 to accept 100 to 260 Volt AC/DC as signal input
Low Voltage Input: Allows A103 to accept 15 to 30 VAC or VDC as signal input
AC Power Supply: Provides 10 - 20 VDC @ 50mA for display backlighting and/or sensor. Requires connection to 115 or 230 VAC, 50/60 Hz

Model No.	Description
A103-005	A103 Rate Meter & Totalizer
A103-009	A103 Rate Meter & Totalizer w/Pulse Output
The following option modules attach to the rear of the A103 :	

Model No.	AC Power Supply	Low Voltage Input	High Voltage Input
A103-A12	X		
A103-A17		X	
A103-A19	X	X	
A103-A10			X
A103-A14	X		X

Replacement Battery: 605472-0001
Panel Hole Punch: A103-A40

Dimensions:

72mm (2.83")
68mm (2.66")
36mm (1.42")
33mm (1.30")

A103 Rear View

Option Module Rear View

Depth Behind Panel
Without Adaptor Module: 39mm (1.54")
With Adaptor Module: 89mm (3.50")
Panel Cutout: 33mm x 68mm (1.30" x 2.66")

Ultra-compact 1/32 DIN tachometers… available with LCD or LED display

All in the family - Matching C342 series products in other sections of this catalog:

C342 Counters:	Section 1
C342 Timers:	Section 5

CE

A very compact tachometer available standard with choice of LCD or LED display. Chose from self powered models containing a 7 year lithium battery, or from models accepting an external 12 - 24 VDC power supply. Externally powered units utilize a nonvolatile RAM to retain data during absence of power.

Easy field programing allows interface to PNP or NPN count signals.

- ■ Available with LCD or LED display
- ■ Requires only one input pulse per revolution
- ■ Choose from internal battery or DC powered units
- ■ Field programmable to accept PNP or NPN signals
- ■ Compact 1/32 DIN bezel size and short depth
- ■ IP65 rated front panel for use in washdown environments

All units are packaged in a compact 1/32 DIN size case with depths as short as 32mm. The front panel is rated IEC IP65 for use in washdown environments. The C342 series also includes matching indicators for count-totalizing, and time-totalizing, as well as an alphanumeric message display. All are in a uniform 24 x 48 millimeters bezel size package.

Model No.	Power Supply	Display Type/Digits
C342-3464	Lithium	LCD/8
C342-3462	12 - 24VDC	LCD/8
C342-3562	12 - 24VDC	LED/6

Dimensions:

48 mm

VEEDER-ROOT

123450

24 mm

Panel Cutout: 22, ±0.3mm x 45, ±0.6mm

8 mm

See Note

Mounting Grooves

Bracket Arm

Note: C342-3464, -3462= 32mm
C342-3562= 60mm

SPECIFICATIONS

Input, NPN/PNP models: Signal field selectable;
Logic Low < 0.7 VDC, Logic High > 5 VDC; 30 VDC max.

Input Frequency: 7.5kHz max.; 30Hz for contact-closure signal

Display: LCD: 7.0mm high; LED: 7.6mm high

Display Range: 10 RPM to 450,000 RPM (±10 RPM)

Power Source:
External Power Supply Models: 12 -24 VDC +20%/-10%
Internally Powered Models: Lithium Battery, 7 years typical life

Operating Temperature: -10°C to 50°C

Front Panel Rating: IEC IP65

Approvals: CE

Excellent performance is coupled with flexibility and small package size

The Dynapar MAXjr Tach family set the standard for low cost industrial rate controllers. Programmable calibration factor and decimal point allow speed to be displayed in units, such as: feet/minute, gallons/minute, etc. Combining high accuracy measurement with alarm capability, built-in diagnostics, large, bright LED display, simple programming and compact size makes the MAXjr Tachs a best value.

■ Calibration factor allows display in engineering units

■ 0.01% accurate time interval measurement

■ Large, bright 0.56" high red LED display

■ Full 5 digit display capability

■ High and low alarm setpoints with outputs

■ Sealed NEMA 4 front panel

■ Programmable decimal point position

■ Built-in diagnostics

The **MAXjr Tach 1** Rate Indicator/Controller performs the basic rate or speed measurement functions. The **MAXjr Tach 2** provides a choice of operating modes: rate of input A, as in the **MAXjr Tach 1**; ratio of two independent inputs A and B; and time interval, which can be the period of A or the elapsed time between inputs A (start) and B (stop).

SPECIFICATIONS

Panel Mounting: 1.78" x 3.56" cutout; 5.68" depth

Accuracy: ± 0.01% crystal controlled

Inputs: Magnetic (sine wave), pulsed (square wave) open collector, TTL, CMOS or line driver; 10 kHz max.

Display: 5 digit, 0.56" LED; update rate 0.7 seconds or 1 signal period

Alarms: 1 each high and low; open collector outputs

Calibration: Programmable 0.0001 to 99999.

Power Requirements: 95 to 130, or 190 to 260 VAC, 50/60 Hz, 6 VA; 10 to 26 VDC @ 0.4 A max.

Accessory Power: + 12 VDC ± 25% @ 0 to 125 mA

Operating Temperature: 32° to +122°F (0° to +50°C)

Model No.	Description
MTJR1S00	MAXjr Tach 1 Rate Controller, 115 or 230 VAC
MTJR1D00	MAXjr Tach 1 Rate Controller, 10 to 26 VDC
MTJR2S00	MAXjr Tach 2 Rate/Ratio/Time Interval Controller, 115 or 230 VAC
MTJR2D00	MAXjr Tach 2 Rate/Ratio/Time Interval Controller, 10 to 26 VDC

Typical Applications:

Encoder With Measuring Wheel

Web Speed

MAXjr Tach

Dimensions:

3.78" 96 mm
.39" 10 mm
5.20" 132 mm
.50" 13 mm

3.54" 90 mm

FRONT

1.98" 50 mm

SIDE

1.67" 42 mm
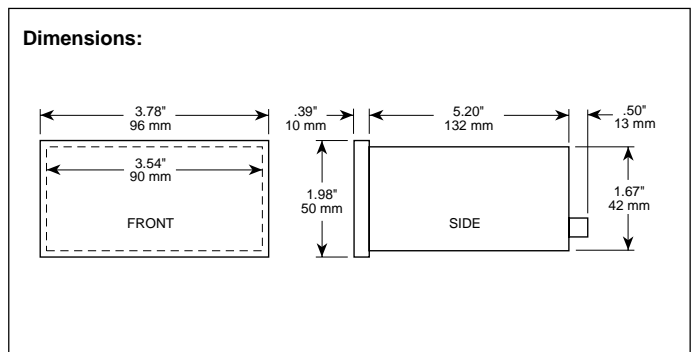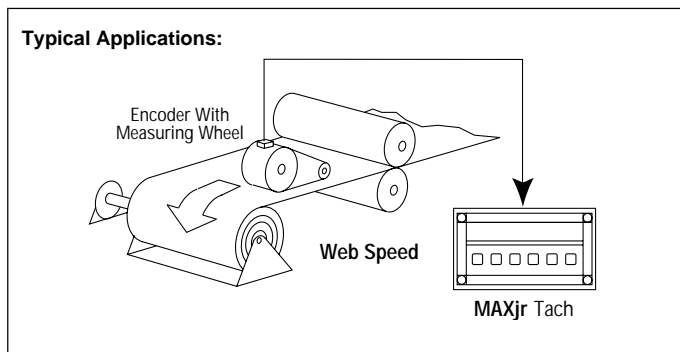
Two channel rate plus draw indicator and controller with serial communication port

The **MAX Tach 1** is the leader in microprocessor based rate and draw instruments. The large LED display and informative annunciators combine with menu-driven programming to simplify setup and operation. Two rate channels that accommodate both low resolution and high speed inputs making input sensor selection noncritical. A programmable draw function allows complex monitoring of processes previously requiring more complicated instrumentation.
Communications is provided by the standard serial port or with an optional interface to a parallel BCD data buffer.

- 0.01% accurate time interval measurement
- Large, bright 0.8" high red LED display
- Full ±5 digit display capability
- Draw modes available: difference (A-B); ratio (A÷B); percent draw (A-B) ÷ A or (A-B) ÷ B
- High and low alarm setpoints with indicators and outputs for rate A, rate B and draw (six total)
- Sealed NEMA 4 front panel
- Separately programmable calibrators and decimal point position for each channel
- Full duplex RS-485/422A serial communications
- Built-in diagnostics

Rate monitor and control applications for the MAX Tach 1 include production rate, material speed and motor RPM. Use of the draw functions would include gear ratio, web or material stretch, conveyor matching and blending machinery.

For single channel rate, see MAXjr Tach 1 & 2
For BCD Output Buffer, see PM62S

SPECIFICATIONS

Panel Mounting: 2.68" x 5.43" cutout; 5.68" depth

Accuracy: ± 0.01% crystal controlled

Inputs: Pulsed (square wave) current source; 30 kHz max.

Display: 5 digit, 0.8" LED; update rate 0.6 seconds or 1 signal period

Alarms: (6);1 high and low each for rate A, rate B and draw; open collector outputs

Calibration: Independent for A and B; programmable 0.0001 to 99999.

Power Requirements: 95 to 130, or 190 to 260 VAC, 50/60 Hz, 6 VA; 9 to 15 VDC @ 0.3 A max.

Accessory Power: + 12 VDC ± 5% @ 0 to 175 mA

Operating Temperature: 32° to +122°F (0° to +50°C)

Model No.	Description
MT100S00	MAX Tach 1 Dual Rate and Draw Controller, 115 or 230 VAC
MT100D00	MAX Tach 1 Dual Rate and Draw Controller, 12 VDC
MT101S00	MAX Tach 1 with provision for BCD output, 115 or 230 VAC

Typical Applications:

Ratio: Draw or Extension

Sig. A

Sig. B

Dimensions:

5.67" / 144 mm

.39" / 10 mm

5.20" / 132 mm

.50" / 13 mm

5.35" / 136 mm

FRONT

2.91" / 74 mm

SIDE

2.60" / 66 mm
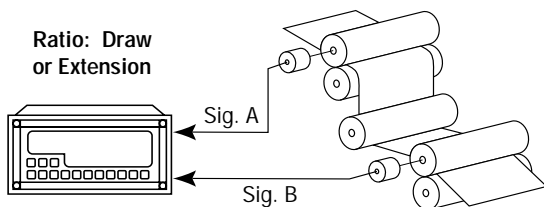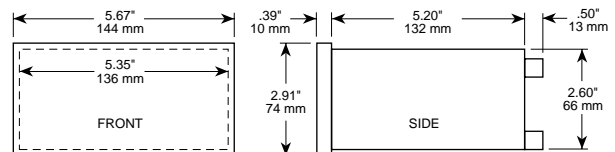
Panel Dims: Cutout: 2.68" x 5.43". Thickness: 1/16" to 1/4". Depth: 5.68" min.

Superior accuracy for RPM readout without complicated setup or programming

SimTach D brings high performance and "plug and play" simplicity to speed indication. Time Interval measurement coupled with factory calibration provide the highest accuracy available for speed or rate indicators. Separate models for use with 1 and 60 pulse per revolution (or item) sensors, and individual high and low level inputs make installation and operation straightforward.

- Large, bright 0.56" high red LED display
- 0.01% crystal controlled accuracy
- Models for 1 or 60 pulse/revolution inputs
- Magnetic (sine wave) or pulsed (square wave) input
- Sealed NEMA 4 front panel
- +12 VDC transducer supply

In addition to RPM, feet/minute, etc. applications, the SimTach D can also indicate items and parts per minute from photocell or proximity sensors, making it an ideal production rate indicator.

SPECIFICATIONS

Panel Mounting: 1.78" x 3.58" cutout; 5.68" depth

Accuracy: ± .01%; crystal controlled

Inputs: Magnetic (sine wave) or pulsed (square wave)

Display: 5 digit, 0.56" LED

Power Requirements: 95 to 130, or 190 to 260 VAC, 50/60 Hz, 6 VA; or 10 to 26 VDC @ 0.4 A max.

Accessory Power: +12 VDC ± 25% @ 0 to 125 mA

Operating Temperature: 32° to +122°F (0° to +50°C)

Model No.	Description
STD0001	115 VAC, 1 PPR Input Speed Indicator
STD0002	115 VAC, 60 PPR Input Speed Indicator
STDE001	230 VAC, 1 PPR Input Speed Indicator
STDE002	230 VAC, 60 PPR Input Speed Indicator
STDS001	115/230 VAC, 1 PPR Input Speed Indicator
STDS002	115/230 VAC, 60 PPR Input Speed Indicator
STDD001	10–26 VDC, 1 PPR Input Speed Indicator
STDD002	10–26 VDC, 60 PPR Input Speed Indicator

For voltage inputs, see SimTach A
For other PPR inputs, see MAXjr Tach 1

Typical Applications:
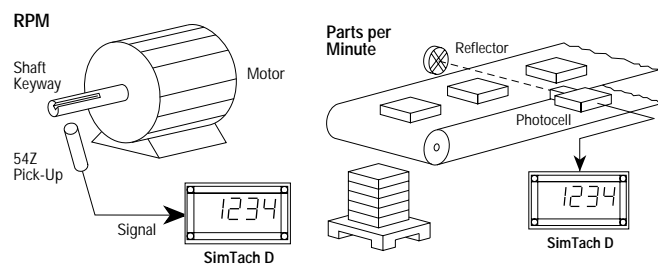
Dimensions:
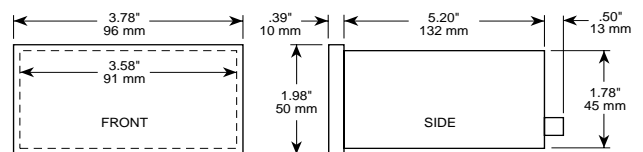
Panel Dims: Cutout: 1.78" x 3.58". Thickness: 1/16" to 1/14". Depth: 5.68" min.

*Selectable functions
and calibration make
this low cost indicator
family unique*

The FLEX Series 7990 is the best value in a low cost, versatile indicator for industrial applications. With its unique functionality, it can be used to totalize parts production, keep track of machine hours, indicate process times, or show production rate. Input scaling accommodates a variety of input sources and the ability to readout in meaningful engineering units.

■ Eight digit hourmeter and elapsed timer with resolution in seconds, minutes or hours

■ Four digit rate indicator uses a time interval measurement for improved accuracy

■ Large 8 digit display; same size as competitive 6 digit models

■ Compact, solid state design; battery operated

■ Rugged, die cast metal housing

■ NEMA-4 front panel seal with gasket and mounting clips (provided)

■ Independent Program Enable and Front Panel Reset Enable

Accessories are available for termination of field wiring by use of the screw terminal adapter. Isolation and high voltage sources can be accommodated with the AC/DC input module. Connection to high voltage AC for timing applications is accomplished with the Triac adapter module.

Panel adapters, available with or without a locking key reset, allow easy mounting and retrofit to older and larger mechanical, electrical or electronic products.

**For Electrical Hour Meters, see Series 7795
For 25x50 mm LCD Indicators, see MITE Series 7999**

SPECIFICATIONS

Panel Mounting: 2.625" x 1.313" cutout; 0.71" depth

Accuracy: ±1 Count or 0.01%

Inputs: Contact closure or open collector; selectable X1 or X2 logic; programmable multiplication by 0.001 to 9999 prescaler

Display:
Hourmeter: 8 digit, 0.35" LCD
Timer: 8 digit, 0.35" LCD
Tachometer: 4 digit, 0.35" LCD

Power: Internal lithium battery with 8 year typical life.

Operating Temperature: +32° to +167 °F (0° to +75°C)

FLEX REPLACES MANY COMPETITIVE MODELS

FLEX Series 7990 can physically and electrically replace the following competitive models:
FLEX 1 replaces: Red Lion Cub 2, Cub 2L and Cub 2L8
FLEX 2 also replaces: Red Lion DITAK 5 and DITAK 6

Model No.	Description
0799008-101	FLEX 1 LCD Totalizer/Hourmeter/Timer
0799008-201	FLEX 2 LCD Totalizer/Hourmeter Timer/Tachometer
0328992-010	Screw Terminal Adapter
0328992-020	AC/DC Input Module
0328992-030	Triac Input Module
0328992-120	Panel Mount Adapter
0328992-110	Panel Mount w/Reset Key Adapter
BIK100	Basic Installation Kit (one included with each unit)

Typical Applications:
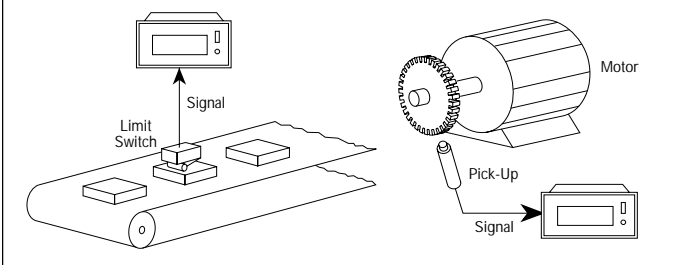
Dimensions:
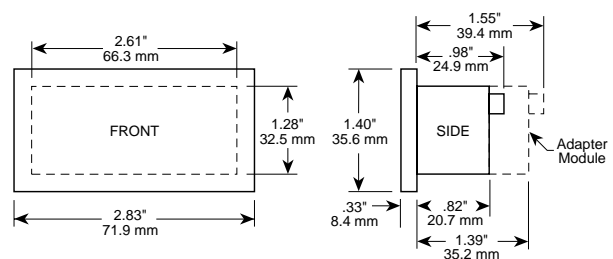
Remote Probe Accessory

Part Number 605830-0001. Maintains comfortable viewing by providing optical pickup of RPM sources in tight or hard to access areas. Easy plug-in connection.

Shirt-pocket size. Contacting or non-contacting . . . an essential part of your tool kit.

4
RATE INDICATORS and CONTROLLERS

The Dynapar brand Series HT50 hand tachometer provides a convenient, accurate means of measuring rotary or surface speeds on all types of machinery. For non-contacting measurement, the tachometer optically detects a reflective target on the rotating object to read revolutions per minute. Where in-contact measurement is desired, an accessory adaptor is used with the appropriate device – a wheel for surface speed or rubber tip for shaft rotation.

- Optical non-contact or in-contact measurement
- Compact and lightweight
- Simple push button operation
- Automatic display hold for three minutes or until another reading
- 6.0 to 99999 RPM measurement range with 0.1 resolution
- Automatic shutoff for power savings

The Series HT50 hand tachometer can be used for everyday checks of motors, conveyors, HVAC equipment and line speeds. It also provides an excellent reference source for checking speed indicators on machinery control panels.
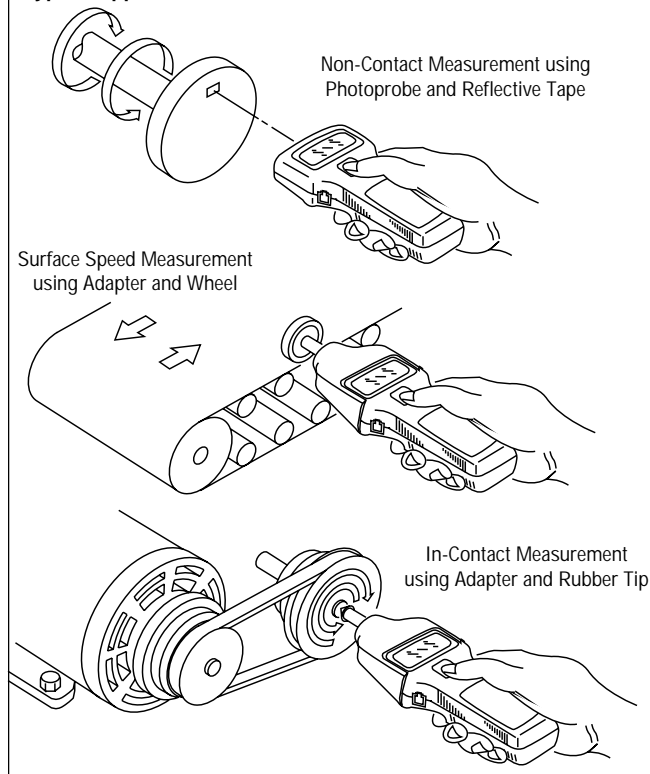
SPECIFICATIONS

Measurement Range: 6.0 to 99999.9 RPM; 3.00 to 3000.00 meters or yards per minute using in-contact adapter and appropriate wheel

Resolution: 0.1 RPM

Accuracy: RPM: ± 0.01%, Surface Speed: ± 0.05 %; and ± 1 digit

Optical Range: 50 to 300 mm (2 to 12 inches) using reflective tape

Update Time: 1 to 10 seconds sample time

Display: 6 digit LCD; low battery and reflective light input indicators

Display Hold: 3 minutes from last measurement then auto power-off

Power Requirements: (4) 1.5V batteries, AAA size, included. 20 hours continuous measurement

Operating Temperature: 40° to +104°F (5° to +40°C)

Typical Applications:

Non-Contact Measurement using Photoprobe and Reflective Tape

Surface Speed Measurement using Adapter and Wheel

In-Contact Measurement using Adapter and Rubber Tip

Model No.	Description
HT50 02	Hand Tachometer System (Includes: Hand Tachometer; In-Contact Adaptor; Rubber Tips (3 pcs.); Reflective Tape (10 sheets); Surface Speed Wheels (1/10 m/min and 1/10 yd/min); Carrying Case; Dry Batteries (4–AAA size, 1.5 V); Instruction Manual
605830-0001	Accessory Remote Probe
0576008-394	Replacement Rubber Tip for In-contact Adaptor
0576008-395	Replacement 1/10 Yard Wheel
0576008-396	Replacement 1/10 Meter Wheel
605831-0002	Replacement In-contact Adaptor
0616483-001	Reflective Tape (Replacement)

Dimensions:

4.72" 120mm
2.20" 56mm
Thickness: 0.98" (25mm)

6.97" 177mm
2.20" 56mm
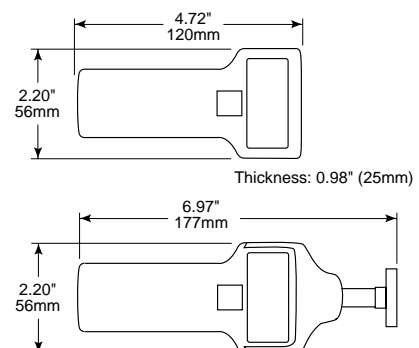
Large, red LED display is easy to see from any angle . . . instantly switches between speed, time interval, or count measurements.
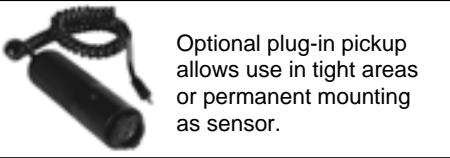
Optional plug-in pickup allows use in tight areas or permanent mounting as sensor.

The HT100 Hand-Held Rate & Time Indicator's display provides a highly visible reading, even in dim light or at indirect viewing angles.

When used as a non-contact indicator, a marker (reflective tape, supplied) is placed on the shaft, or other target that is to be measured. The HT100 is then simply pointed at the marker to read rate-per-minute, seconds-per-event, or counts. An in-contact adaptor is provided that allows display of linear feet or meters per minute, RPM, or counts.

- Complete kit – includes Hand Tachometer, in-contact adaptor, carrying case, and reflective tape
- Microprocessor circuit allows switch selection of rate, time, or counting modes
- High contrast LED display can be easily seen in dim or shadowed lighting conditions
- Measures speeds from 3 rpm to 99,999 rpm
- Fixed or floating decimal point operation
- Automatic shut-off with display memory recall
- Up to eight hours operating time from set of standard AA cells
- Target-detect, and battery-low indicators
- Lightweight yet rugged design, fits comfortably in hand
- Optional plug-in pickup allows remote or fixed mount sensing

The **HT100** system is packaged in a rugged carrying case. A generous supply of reflective tape is included.

For LCD Hand Tachometer, see HT50
For Panel-Mount Tachometer, see A103

SPECIFICATIONS

Measurement Range: RPM: 3 to 99,999; M/min: 0.3 to 19,999; Ft/min: 0.3 to 19,999; Time-interval: 0.01 to 99,999 sec.; Counts: 1 to 99,999

Display: 5 digit red LED, 0.4" (10.5 mm), floating decimal in autorange mode

Display Update Time: 0.8 second above 75 rpm, time between pulses below 75 rpm

Accuracy: RPM: ±0.05% of reading, ±1 digit; M/min & Ft/min: ±2% of reading

Time Base: Crystal controlled

Auto/Fixed Ranges: User selectable via yellow switch

Resolution: Rate, Fixed Decimal Mode: ±1 digit; Rate, Autorange: Maximum 0.001 units (revs/meters/feet); Time Modes: Max. 0.01 sec., autoranging only; Count Mode: 1 count (1 pulse/shaft rev. in contact mode)

Auto Power-Off: After release of button, reading displayed for 10 seconds then switches off

Memory Recall: Last reading available for up to 1 minute after automatic power-off

Over Range: Display flashes

Under Range: Display reverts to zero (rate modes)

On Target Indicator: Green LED glows when optical alignment is correct

Battery Low Indication: Red LED glows when batteries are nearing replacement level

Optical Range: 1" - 3 feet (25 mm - 1000 mm)

Light Source: Visible light, long life lamp

Operating Temperature: 32° to 113° F (0 to 45° C)

Net Weight: 1 lb., 12 oz. (794 g)

Model No.	Description
HT100	Hand-Held Rate & Time Indicator Kit, includes in-contact adaptor, reflective-tape, batteries, case
PROB00	Plug-in Pickup; allows remote sensing
PMB	Bracket for Plug-in Pickup
0616483-001	Replacement supply of reflective tape (3.5" x 3/8")
605153	Replacement in-contact adaptor (includes wheel & tip)
605156	Replacement in-contact wheel
605154	Replacement in-contact tip

Typical Applications:

Shaft Speed

In-Contact

Reflective

Production Counting

Surface Speed

Dimensions:

2.00"
50.8mm

7.88"
127.0mm

2.75"
69.9mm

DANAHER INDUSTRIAL CONTROLS has representatives and distributors located in major cities within the United States and throughout the world. For information about the distributor or sales office nearest you, contact our customer service department:

Customer Service	**Internet Presence**
call Toll Free 800.873.8731	E-Mail: dancon@dancon.com
or 847.782.5291	Worldwide Web: http://www.dancon.com

Veeder-Root

Dynapar

Eagle Signal

Customer Service
call Toll Free 800.873.8731
or 847.782.5291

Internet Presence
E-Mail: dancon@dancon.com
Worldwide Web: http://www.dancon.com

Veeder-Root
Dynapar
Eagle Signal

Electronic timers exist because many processes are based upon timed events. They are available in many forms each with a major characteristic best suited for a particular application. Electronic timers can be found in a broad spectrum of industrial and commercial applications where the highest accuracy and resolution is required.

Eagle Signal brand industrial timers have a 70 year history of providing accuracy and reliability in harsh industrial environments.

Plastic Working Equipment

Food Processing Machinery

Material Handling Controls

Packaging Machines

Pump Controls

TYPICAL RESET AND RECYCLE TIMER APPLICATIONS

TYPES OF ELECTRONIC TIMERS

A **time indicator** is simply a device which records and displays an elapsed time but performs no output function. Various models are available with LED or LCD displays. A time indicator will time in increments of fractions of a second up to a total time of several minutes, or in increments of one hour up to a total time of several years.

A **reset timer** is a control device. It is inactive until it is started by an external command, then measures a specific time interval, after which it becomes inactive once again. It times through a preset time period, produces a control output, then is automatically or manually reset, awaiting another cycle to begin.

The reset timer can be considered a single cycle timer. Most reset timers are used to turn a load ON *for a timed interval* or to turn a load ON *after a timed interval*. A reset timer can either be in one of three states: Reset, Timing, and Timed-Out. When reset, the timer does not perform any timing function. The timing period starts when an external signal is received. The timed-out state is the period between the end of timing and when the timer returns to the reset state.

A **repeat cycle timer** just as the name applies, repeats the cycle of turning a load on and off in a repeating pattern as long as power is applied to the unit. Repeat cycle timers are produced in many varieties and types. All Eagle Signal brand electronic repeat cycle timers allow separate adjustment of the ON and OFF times. Some repeat cycle timer models have batch counters and allow dwell times between ON and OFF periods.

ADVANTAGES OF ELECTRONIC TIMERS

Electronic timers and time indicators bring the advantage of modern digital displays, precise digital settability, high accuracy and fast reset times. Although electromechanical controls provided accurate and reliable time control, the electronic timer is specified for its modern appearance, high precision and advanced features. Digital electronic timers use LCD or LED displays and offer high accuracy and long time ranges.

They typically have fast reset times and are available in compact DIN standard enclosures.

Liquid Crystal Displays (LCD) are best suited for installation in areas where there is reasonably good lighting.

Light Emitting Diode (LED) displays, since they produce their own light can be viewed in very dimly lit areas -even in the dark.

B506

SX210

CX200

B90D

TYPICAL ELECTRONIC RESET AND RECYCLE TIMERS

LCD Display   LED Display

TYPES OF ELECTRONIC DISPLAYS

SPECIFYING AN ELECTRONIC TIMER

The following criteria should be considered when selecting an electronic timer for your application:

Control Function - Reset function, repeat cycle function.

Time Range - What time range will the timer use?

Mounting - Jack-in case, Panel mount, Surface mount, DIN rail mount, Timer lock

Size - What are the size limitations if any for the timer?

Service Voltage and Frequency - 12 VDC, 24 VDC, 24 VAC, 120 VAC, 240 VAC; 50 Hz, 60 Hz., Other

Setting Accuracy - What is the minimum setting accuracy required for the time setting?

Repeat Accuracy - What is the minimum repeat accuracy required for the timing cycle?

Front Panel - What type of interaction does the operator need to have with the front panel controls of the unit?

Load - What device will be controlled by the timer and what are the electrical specifications for this load?

A103

7999 MITE

TYPICAL ELECTRONIC TIME INDICATORS

Cycle Rate: How often will the timer switch the load.

Action on Power Failure - After a failure, what should the timer do upon restoration of power?

Operator Restraints - Lighting, gloves, low skill level

Special Requirements - NEMA-4 Washdown, High temperature and humidity, High vibration, Corrosive atmosphere, Electrical interference and brownouts

Agency Approval - U.L., CSA, FM

ELEMENTS OF ELECTRONIC TIMERS

All electronic timers will have three basic elements: (1) Control Input, (2) Timing components (3) Output Elements
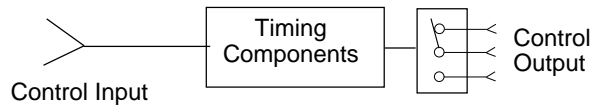
Timer Control Inputs	Electronic Timing Components	Timer Control Outputs
AC voltage	Microprocessor	Instantaneous Relay
DC voltage	Integrated Circuit	Delay Relay
Contact		Triac

5

ELECTRONIC TIMERS

This Selector Guide can assist you in determining the type of timer that best fits your application requirements. Condensed description and specification information is provided. Complete information is available by turning to the referenced page number that appears above each product's picture. The ☆ symbol denotes our "Star Products" which we recommend be given first consideration. They offer maximum functionality, performance, and value.

5
E L E C T R O N I C
T I M E R S

▼ Eagle Signal brand	Series B866	Series BRE	Series B856	Series B506
Page Number: The ☆ symbol denotes our "Star Products" which we recommend be given first consideration. They offer maximum functionality, performance, and value.	Page: 5.04 ☆	Page: 5.42 ☆	Page: 5.06 ☆	Page: 5.08 ☆
Description and Features: Condensed description and specification information is provided. Complete information is available by turning to the referenced page number that appears above each product's picture.	■ Simple dial set timer with multiple tme ranges and versatile functions ■ Universal power supply accepts 24 - 240 VAC or 24 VDC ■ Field selectable On-Delay, Off-Delay, Interval, or Repeat Cycle modes ■ Direct replacement for obsolete Series B846	■ Simple dial set timer with 11 time ranges and surface mounting ■ Models for 120VAC or 240VAC operation ■ Field selectable Standard and Reverse Start operating modes ■ Solid-State replacement for Series BR1	■ Button-per-digit preset entry simplifies setup and operation ■ High Contrast dual line LCD indicates both Process Time and Preset Value ■ Field selectable On-Delay, Off-Delay, Interval, or Repeat Cycle modes	■ Front panel programming with an intuitive button-per-digit interface ■ Four digit dual line LED display indicates set value and time value ■ Three different base models: standard, high performance, and repeat cycle
Dimensions	48mm x 48mm	2.5" x 4.25"	48mm x 48mm	48mm x 48mm
Display Type	Dial for time set	Dial for time set	Dual line LCD	Dual line LED
Number of Digits	NA	NA	4	4
Power Supply	24 - 240 VAC or 24 VDC	120 or 240 VAC	24 - 240 VAC or 24 VDC	90 - 240 VAC or 24 V AC/DC
Time Ranges	1, 10 Seconds; 1, 10 Minutes; 1, 10 Hours	11 ranges cover .05 seconds to 10 hours	Hrs; Min; Sec; Hrs:Min; Min:Sec	Selectable for Hrs, Min, Sec; Selecable Decimal PT.
Operation Modes	On-Delay, Off-Delay, Interval, Repeat Cycle	Standard, reverse and momentaty Start	On-Delay, Off-Delay, Interval, Repeat Cycle	On Delay, Off Delay, Interval, Repeat, Delay/Interval
Control Inputs	Start/Stop - Reset	Start/Stop - Reset	Start/Stop - Reset	Start/Stop - Reset
Repeat Accuracy	Setting: ±5% Repeat: ±0.5%	Setting: 3% of full scale Repeat: ±1/4% of full scale	Repeat: ±0.03%	Repeat: ±0.01%
Control Outputs	DPDT - 5 Amps	To 10 Amps	DPDT - 5 Amps	5 Amp Relay & NPN Transistor
Front Panel Rating	NEMA 4/IP65	N/A	NEMA 4/IP65	NEMA 4/IP65

For locating products which do not appear in this selector guide, refer to Section 6, the Table of Contents, or the product to page number index in Section 15. Additional specialized products that perform timing operations can be found in Section 7, Multifunction Products.

Series B90D	*Series C628*	*Series A103*	*Series EHM*	*Series C342*
Page: 5.10 ⑤	Page: 5.11 ⑤	Page: 5.12, 5.44 ⑤	Page: 5.46 ⑤	Page: 5.13 ⑤
■ Space saving 22.5 mm wide DIN rail mount design ■ Field selectable choice of 8 timing modes for settings from 0.2 seconds to 999 hrs ■ Lithium power provides long life and eliminates the need for external power	■ AWESOME 0.71" high digit LED display ■ Programmable color change display based on an event ■ Cumulative or single timing operation	■ Self powered time totalizer or preset timer with programmable ranges ■ Preset timer is programmable for Interval or On Delay operation and has a 0.1 amp SSR output	■ Electronic Hour Meter. Attractive 5mm 6-digit LCD display ■ High reliability non-volatile memory ■ Wide voltage range	■ Available with LCD or LED display. Models with internal lithium power source or external DC ■ Hours:Minutes:Seconds and Hours in 1/100's models
22.5mm x 93mm	48mm x 96mm	36mm x 72mm	Rect. 1.2" X 2", Round: 2.4" dia.	24mm x 48mm
LCD & Annunciators	LED, Programmable Red or Green color	Backlit LCD (Backlight requires external 12 VDC)	LCD	7.0mm high LCD or 7.6mm LED
3	5 (0.71" high)	7 (0.47" high)	6 (5mm high)	LCD: 8, LED: 6
Two Internal Lithium Cells	90-240 VAC, 20-50 VAC/DC 50/60 Hz, 4 Watts	3 Volt replaceable lithium battery	9-85VDC @ 4mA max.	Internal lithium battery or 12-24 VDC external
8 Time Ranges from 0.2 Sec. to 999 Hrs	Sec., Min., Hrs., Min.& Sec., or Hrs. & Min.	Seconds, Minutes to 0.1, hours to 0.1, Hrs:Mins:Secs	To 99999.9 hours with 0.1 hour resolution	Hrs:Mins:Secs or Hours to .01
On Delay, Off Delay, Interval, Rep. Cycle, On-Delay Interval	Single alarm at timed interval	On Delay, Interval	Hour Meter	Hour Meter
Start/Stop	Start/Stop - Reset	Start, Reset - Sinking, Contact closure	Start	Start/Reset - Reset
Repeat: ±0.3% of Setting	Repeat: ±0.1%	0.2%	±2 sec over temperature	–
SPDT - 8 Amps	2 Amp Relay & NPN Transistor	0.1 Amp SSR (A103-008)	–	Optional on LED display models
IP20	NEMA 4X/IP65	NEMA 4X	IP65	IP65

5

ELECTRONIC TIMERS

*Simple dial set timer
…Multiple time ranges
and versatile functions*

File No.: E96337

5

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A unique combination of versatility and simplicity make the Eagle Signal brand B866 the premiere low cost timing solution. Housed in a compact 1/16 DIN package, changing the set time is as simple as turning a dial.

Selectable time ranges provide preset times ranging from 0.06 seconds to 10 hours. The B866 is also field configurable to operate in On-Delay, Off-Delay, Interval, or Repeat Cycle timing modes.

A unique On-Delay/Interval model lets the B866 perform two timing functions in one compact unit. In addition to working as an On-Delay timer, an independent output interval time is provided. The output interval can be set to one of eight time values through DIP switches located on the side of the unit.

An industry standard 11 pin socket connection simplifies wiring and makes replacing existing units quick and easy. The unit can be DIN rail mounted, or with optional hardware, panel mounted. Multiple time ranges allow settings from 0.06 seconds to 10 hours

■ Field selectable for operation in On-Delay, Off-Delay*, Interval, or Repeat Cycle modes

■ Universal power supply accepts 24 - 240 VAC or 24 VDC

■ Meets IEC 801 level 4 noise immunity standards

■ Unique On-Delay/Interval model lets one unit do the work of two in many applications

■ Industry standard socket connection

■ Front panel or DIN rail mounting

■ Flexible start and reset input signals

■ UL, CUL recognized, CE compliant

■ NEMA 4X/IP65 rated front panel

Harsh industrial environments are no problem for the B866… its NEMA 4 front panel and IEC 801 level 4 noise immunity rating give this unit the strength to survive in the toughest conditions. A universal power supply meets global requirements for 24 - 240 VAC or 24 VDC operation.

*Off-Delay function not provided on B866-511

SPECIFICATIONS

Inputs:
Start (B866-500/100): NPN or Dry Contact

Reset (B866-500/100): NPN or Dry Contact

Outputs:
Timed (B866-500/100): DPDT - 5 amp

Timed (B866-511): SPDT - 5 amp

Instantaneous (B866-511): SPDT - 5 amp

Physical:
Dimensions: 48mm x 48mm, 85mm deep

Mount: Panel Mounting in 45 x 45 cutout (requires optional mounting bracket), or DIN rail

Wiring Connection: Via 11 pin (B866-500/100) or 8 pin (B866-511) plug-in socket

Operation:
Supply Voltage: 100 - 240 VAC 50/60Hz, and 24 VDC

Power Consumption: < 10 VA

Time Ranges: Field Selectable 1, 10 Seconds; 1, 10 Minutes; 1, 10 Hours

Operating Modes: On-Delay, Off-Delay, Interval, Repeat Cycle, On-Delay Interval

Setting Accuracy: $\pm$ 5%

Repeat Accuracy: $\pm$ 0.5%

Electrical Service Life: 100,000 cycles at full load

Mechanical Service Life: 10 million cycles at min. load

Environmental:
Front Panel Rating: NEMA 4X/IP65

Operating Temperature: 0° to 55° C (32° to 131° F)

Storage Temperature: -40° to 90° C (-40° to 194° F)

Humidity: 5% to 95% RH non-condensing

Weight: 100 grams (3.5 ounces)

Approvals:
B866-100, -500: UL, CUL recognized, CE compliant
B866-511: UL, CUL recognized

OPERATING MODES

Timing Modes | Modes Available for Model

Mode A — Power ON Delay Mode
Power 2–7
Time limit contact NC 1–4 (8–5)
Time limit contact NO 1–3 (8–6)
Operation/power LED

Mode A1 — Power ON Delay 1 Mode
Power 2–7
Time limit contact NC 8–5
Time limit contact NO 8–6
Instantaneous contact NC 1–4
Instantaneous contact NO 1–3
Operation/power LED
※Output width for One–Shot has been fixed.

Mode B — Power ON Delay 2 mode
Power 2–7
Time limit contact NC 8–5
Time limit contact NO 8–6
Instantaneous contact NC 1–4
Instantaneous contact NO 1–3
Operation/power LED

Mode C — Signal OFF Delay Mode
$t=t1+t2$
$t > t-a$
Power 2–10
START 2–6
INHIBIT 2–5
RESET 2–7
Time limit contact NC
Time limit contact NO
Operation/power LED

Mode D — Signal ON/OFF Delay Mode
$t=t1+t2$
$t > t-a$
Power 2–10
START 2–6
INHIBIT 2–5
RESET 2–7
Time limit contact NC
Time limit contact NO
Operation/power LED

Mode F — Repeat Cycle Flicker Mode (OFF Start)
Power 2–7
Time limit contact NC 1–4 (8–5)
Time limit contact NO 1–3 (8–6)
Operation/power LED

Mode F1 — Repeat Cycle Flicker 1 Mode (ON Start)
Power 2–7
Time limit contact NC 8–5
Time limit contact NO 8–6
Instantaneous contact NC 1–4
Instantaneous contact NO 1–3
Operation/power LED

Mode I — Interval Mode
Power 2–7
Time limit contact NC 8–5
Time limit contact NO 8–6
Instantaneous contact NC 1–4
Instantaneous contact NO 1–3
Operation/power LED

t: Setting time   t > t–a   Rt: Return time(Keep 0.1sec or more for the return time)

※ Time setting should be 100ms minimum if using Output Modes F or F1.
Shorter time settings may be inaccurate due to relay contact reaction time.

Model	-500	-100	-511
Timing Mode			
A	X	X	X
A1	N/A	N/A	X
B	N/A	N/A	X
C	X	X	N/A
D	X	X	N/A
F	X	X	X
F1	X	X	X
I	X	X	X

X= Available on Model

N/A= Not Available on Model

Wiring Connections

B866-500 and B866-100

B866-511

Dimensions:
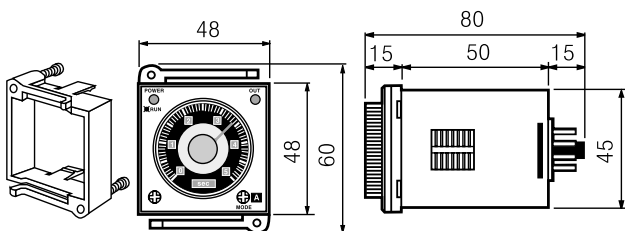
ORDERING INFORMATION

Description	Model
Multi-Function Dial Set Timer (11-pin)	B866-500
As Above w/Instant Contacts	B866-100
Multi-Function Dial Set Timer (8-pin)	B866-511

Optional Accessories

Mounting Bracket & Locking Ring	B846-A30
8 Pin Socket	60SR2P06
11 Pin Socket	60SR3P06

High accuracy digital timer features dual line LCD and multiple ranges… Every popular operating mode in a compact 1/16 DIN package

File No.: E96337

5

ELECTRONIC TIMERS

An excellent value in its class, the B856 features a compact 1/16 DIN package, precise digital setting, versatile functionality, and a straightforward button-per-digit interface.

It can be easily programmed to perform any standard timing operation: On-Delay, Off-Delay, Interval, or Repeat Cycle. A unique On-Delay/ Interval Mode can, in many cases, perform the function of two separate timers. Output is via DPDT relay contacts.

Five selectable time ranges and a programmable decimal point provide preset times ranging from 0.01 seconds to 9999 hours.

A standard model features a timed DPDT contact output while another model includes separate timed and instantaneous SPDT contacts. All are rated for 5 Amp loads.

Simplicity of operation is maintained while still providing a high level of functionality. All programming is done through the front panel, with an intuitive button-per-digit keypad that makes entry of preset times quick and easy. A crisp dual line LCD display lets the operator readily view elapsed or remaining cycle time as well as the preset value. Prominent annunciators indicate information such as the time range and the status of the input and outputs.

■ Button-per-digit preset entry simplifies setup and operation

■ High Contrast dual line LCD display indicates both Process Time and Preset Value

■ Field selectable for operation in On-Delay, Off-Delay, Interval 1, Interval 2, or Repeat Cycle modes

■ Universal Power Supply accepts 24 - 240 VAC or 24 VDC

■ Designed to meet IEC 801 level 4 noise immunity standards for increased reliability

■ Unique On-Delay/Interval mode lets one unit do the work of two in many applications

■ Industry standard socket connection

■ Programmable security levels prevent unauthorized setpoint or program changes

■ UL, CUL recognized, CE compliant

■ IEC IP65 rated front panel for use in washdown environments

Reliability is a key feature of the B856. IEC level 4 noise immunity ensures flawless operation in harsh electrical environments. Its IEC IP65 enclosure rating allows use in washdown conditions.

Wiring via an industry standard 11 or 8 pin socket and a power supply that can accept 24 - 240 VAC or 24 VDC vastly simplifies setup.

SPECIFICATIONS

Inputs:
Start : NPN or Dry Contact

Reset : NPN or Dry Contact

Outputs:
Timed (B856-500): DPDT - 5 amp

Timed (B856-501 & -511): SPDT - 5 amp

Instantaneous (B856-511): SPDT - 5 amp

Activation Time: 15 msec. max.

Physical:
Dimensions: 48mm x 48mm, 81mm deep
Mounting: Panel Mounting in 45 x 45 cutout or DIN rail
Wiring Connection: Via 8 pin (B856-501) or 11 pin (B856-500 & -511) plug-in socket

Operation:
Supply Voltage: 24 - 240 VAC 50/60Hz or 24 VDC

Power Consumption: 50 VA @ 240 VAC

Time Ranges: Field Selectable for Hours, Minutes, Seconds, Hours:Minutes, Minutes:Seconds

Resolution: Field selectable from XXXX to XX.XX for Hours, Minutes and Seconds

Operating Modes: On-Delay, Off-Delay, Interval 1, Interval 2, Repeat, On-Delay/Interval

Repeat Accuracy: $\pm$ 0.03%

Electrical Service Life: 100,000 cycles at full load

Mechanical Service Life: 10 million cycles at min. load

Environmental:
Front Panel Rating: IEC IP65

Operating Temperature: 0° to 60° C (B856-500); 0° to 55° C (B856-501); 0° to 50° C (B856-511)

Storage Temperature: -40° to 90° C

Humidity: 5% to 95% RH non-condensing

Weight: 100 grams (3.5 ounces)

Approvals:
B856-500 & -501: UL and CUL recognized, CE marked
B856-511: UL and CUL recognized

OPERATING MODES

On-Delay

Timing begins on the leading edge of the start input. The output will activate at the completion of the preset time (T) and will remain active until the reset signal is applied or power is interrupted.* For B856-511, the instantaneous output will activate upon the start signal and will remain active until the reset signal is applied or power is interrupted.*
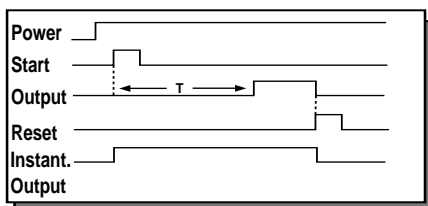
Off-Delay

The output is activated at the leading edge of the start signal. Timing begins on the trailing edge. The output will remain active until the preset time (T) has elapsed or power is interrupted.* Reapplying the start signal before T has elapsed will reset the time value. The reset input is not used.
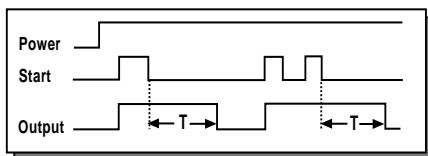
Interval 1

On the leading of the start input, the output is activated and timing begins. The output will remain active until the preset time (T) has elapsed or power is interrupted.* Removal of the start signal will also cause the ouput to be deactivated and the time value reset. The reset input is not used.
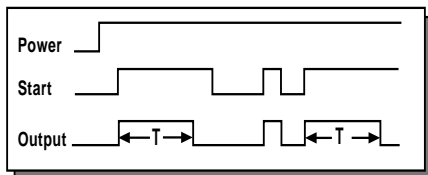
Interval 2

On the leading of the start input, the output is activated and timing begins. The output will remain active until the preset time (T) has elapsed or power is interrupted.* The reset input is not used. Reapplying the start signal has no effect unless the cycle has completed.
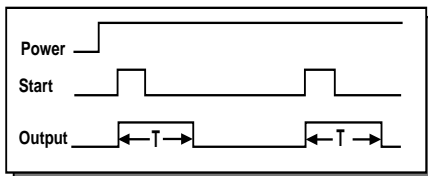
Repeat Cycle

Timing begins on the leading edge of the start input. A cycle is initiated where the output will be OFF for the preset time (T), then ON for the preset time. This cycle will continue until a reset signal is applied or power is interrupted.* The unit can also be programmed for the timing sequence to begin with an ON cycle.
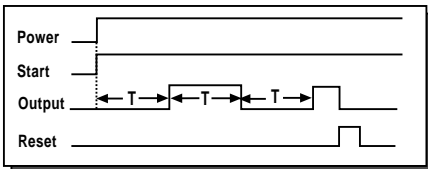
Delay/Interval

The delay cycle begins upon application of the start signal. The output will activate at the completion of the preset time (T1). Upon activation of the output, the Interval cycle will begin. The output will be deactivated at the end of the Interval time (T2). T1 is the primary preset value. T2 is settable from 0.1 to 999.9 seconds. The timing sequence and output can also be reset through the reset input or interruption of power.*
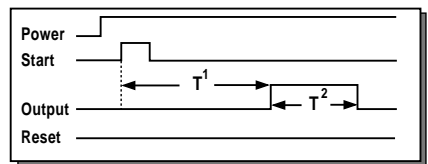
* The Power Reset parameter can be set so that a timing sequence will not be reset upon power interruption but instead continue on when power is restored.

Connections

B856-500 & -511
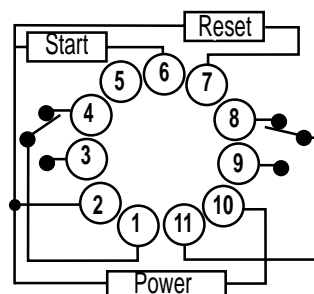
B856-501
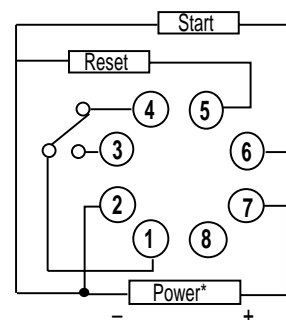
For the -511 version, Pins 1, 3, 4 are the instantaneous contacts

* 24–240 VAC or 24 VDC

Dimensions:
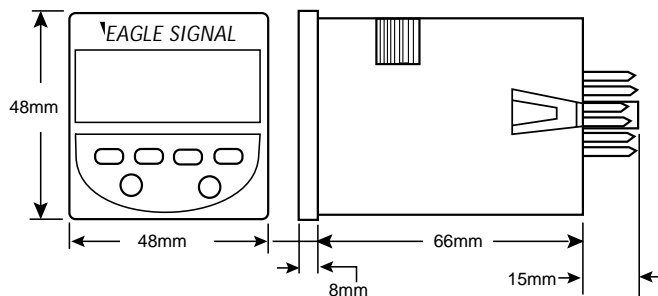
ORDERING INFORMATION

Description	Model
Multi-Function (11 Pin) Timer	B856-500
As Above w/Instant Contacts	B856-511
Multi-Function (8 Pin) Timer	B856-501*
*For Drop-In Replacement of LX260 DC Version, Order B856-502	

Accessories	
B856-500 & -511:	
11 Pin Socket	60SR3P06
11 Pin Socket - Outward	PBT-03172
Facing Terminals	
B856-501:	
8 Pin Socket	60SR2P06
8 Pin Socket - Outward	PBT-03155
Facing Terminals	

A compact 1/16 DIN size timer… combines the visibility of LED display with advanced functionality

File No.: E96337

® RECOGNIZED   ® RECOGNIZED

Designed as the "best" fit timer for most applications, the B506 family is divided into 3 separate base models. The standard unit offers a wide range of field selectable operating modes and time ranges as well as a host of other convenient features. The high performance model is a good choice when advanced functions such as dual setpoints and 1 ms resolution are required. The repeat cycle model provides a variety of benefits specifically tailored for cyclical operations.

■ Three different base models: standard, high performance, and repeat cycle
■ Four digit dual line LED display indicates set value and time value
■ All models offer multiple field programmable modes of operation and time ranges
■ Multiple levels of security prevent unauthorized set value or parameter changes
■ IP65 rated for use in washdown conditions
■ Universal AC supply voltage (90-240 VAC) or 24 VAC/VDC models
■ Front panel programming with an intuitive button-per-digit interface
■ 5 amp relay output or NPN transistor
■ Industry standard 11 pin socket connection
■ Wide range of unique features for each model

Simple to set up and operate, the B506 utilizes an intuitive button-per-digit method for setpoint input and easy to follow scroll through menus for programming. The dual line display optimizes the interface by indicating both the present time value and the setpoint, while up to 8 annunciator lights provide information on process status. Multi-level security enables shop floor access to be tailored to your needs.

Intended for tough industrial conditions, the B506 offers an IP65 rated front panel and a high degree of noise immunity. Choose from models with a 5 amp relay, which can directly drive a load, or solid state outputs for high speed applications.

COMMON SPECIFICATIONS

Inputs:
Start & Reset: NPN or Dry Contact
Activation Time: 4ms (B506-XXX2), 21 ms (B506-XXX1)
Impedence: 10 KΩ

Operation:
Supply Voltage: 90-240 VAC 50/60 Hz or 24 VAC/VDC
Time Ranges: Hrs., Mins., Secs., Hrs.: Mins., Mins.: Secs.
Repeat Accuracy: ± 0.01%

Physical:
Dimensions: 48mm x 48mm, 85mm deep
Display: Dual line, 4 digit, 7 segment LED- 8mm high
Mounting: Panel mounting 45mm x 45mm cutout or DIN rail
Wiring Connection: Via 11 pin plug in socket
Weight: 100 grams (3.5 ounces)

General:
Front Panel Rating: IEC IP65
Operating Temperature: 0 °C to 55 °C (32 °F to 131 °F)
Storage Temperature: -40 °C to 90 °C (-40 °F to 194 °F)
Humidity: 5% to 95% RH non-condensing
Memory: Nonvolatile
Approvals: UL, CUL recognized; CE compliant

UNIQUE SPECIFICATIONS

STANDARD MODEL
Output: Timed DPDT (5 amps)
Power Consumption: < 10 VA
Resolution: Settable for XXXX or XX.XX for hrs., mins., and secs. ranges
Operating Modes: On Delay, Off Delay, Interval, Repeat, Delay/ Interval

REPEAT CYCLE MODEL
Inhibit: NPN or Dry Contact
Outputs: Relay (B506-700X) - 2 SPDT (5 amp) - 15 ms latency; Transistor (B506-705X) - NPN Open Collector - 30 VDC, 30 mA max.
Power Consumption: <10 VA max @ 240 VAC, 200 mA @ 24 VDC
Resolution: Settable for XXXX or X.XXX for hrs., mins., and secs. ranges
Operating Mode: Repeat Cycle

HIGH PERFORMANCE MODEL
Inhibit: NPN or Dry Contact
Outputs: Relay (B506-200X) - 2 SPDT (5 amp) - 15 ms max latency; Transistor (B506-205X) - NPN Open Collector - 30 VDC, 30 mA max. opto isolated
Power Consumption: <10 VA max @ 240 VAC, 200 mA @ 24 VDC
Resolution: Settable for XXXX or X.XXX for hrs., mins., and secs. ranges

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E L E C T R O N I C   T I M E R S

WIRING REFERENCE

B506-2001/2, B506-7001/2

Reset
Start
Inhibit
5 6 7
4 8
3 9
2 10
1 11
Output #1 (Timed)
Output #2 (Timed or Batch)
Power
Neutral (−)   L1 (+)

B506-2051/2, B506-7051/2

Reset
Start
Inhibit
5 6 7
4 8
3 9
2 10
1 11
Power
Neutral (-)   L1 (+)

B506-5001/2

Reset
Start
5 6 7
4 8
3 9
2 10
1 11
Power
Neutral (-)   L1 (+)
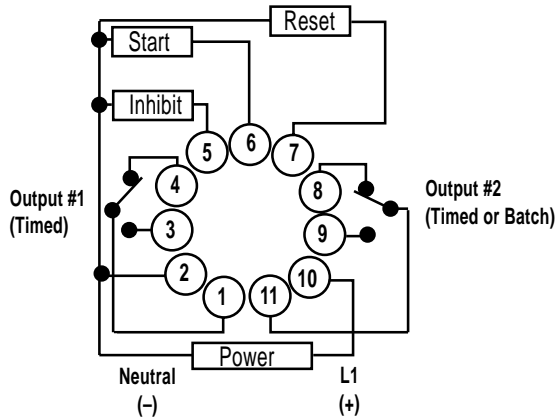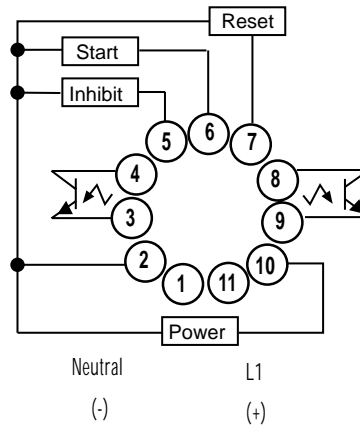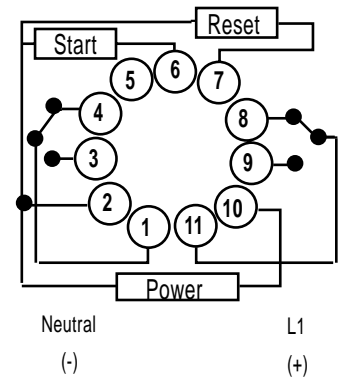
Available in three basic configurations to accomodate every industrial timing application

Standard Model
- Multiple Operating Modes: on delay, off-delay, interval, and repeat
- Front Panel Programming
- Large Buttons
- Power Reset Programming
- Multiple Levels of Security

Repeat Cycle Model
- Completely Independent Setting of On and Off Times
- Programmable to Start with an On or Off Cycle
- Ability to Input Cycle as a Time Base and a %
- Batch Count Function

High Performance Model
- 17 Different Programmable Modes of Operation
- Dual Preset Capability
- Batch Function with Timed or Latched Output
- 1 ms Resolution

ORDERING INFORMATION

Description	Standard	Repeat Cycle	High Performance
90-240 VAC	B506-5001		
24 VAC/VDC	B506-5002		
Relay Out, 90-240 VAC		B506-7001	B506-2001
Relay Out, 24 VAC/VDC		B506-7002	B506-2002
NPN Trans Out, 90-240 VAC		B506-7051	B506-2051
NPN Trans Out, 24 VAC/VDC		B506-7052	B506-2052
11 Pin Sockets - Din Rail Mount	60SR3P06	60SR3P06	60SR3P06
11 Pin Sockets - Outward Facing Terminals	PBT-03172	PBT-03172	PBT-03172

Dimensions:

8mm
48mm
66mm
81mm
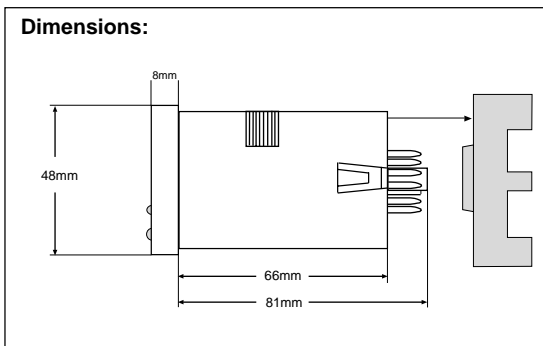
Space Saving 22.5 mm wide multifunction timer with digital setting

E195335

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Save interior panel space, simplify wiring and improve performance with the Eagle Signal brand B90D DIN rail timer. The unit mounts on a standard 35mm DIN rail, and with multiple functions and time ranges enables you to standardize on one device to fulfill all your behind the panel timing needs.

■ Space saving 22.5 mm wide DIN rail mount design

■ Field selectable choice of 8 timing modes

■ Multiple time ranges allow settings from 0.2 seconds to 999 hrs.

■ Digital Setting accuracy of ±0.5 %

■ LCD display provides field prgrammability, progress indication and operation status

■ Lithium battery provides long life and eliminates the need for external power

■ SPDT contacts rated for up to 8 amps

■ Single model accepts a wide range (12 V to 260 V) of AC and DC start signals

■ UL recognized, CE compliant

The B90D offers improved performance via digital setting accuracy (0.5% compared to 10% on some analog set DIN rail timers) and eliminates fiddling with pots for "fine adjustment". The LCD display provides for simple timer setup, and provides progress indication and output status that can be helpful in troubleshooting/maintenance.

Standard On-Delay, Off Delay, Interval, and One Shot Operation are field selectable, as are a variety of repeat cycle modes that allow for asymmetrical cycling and the ability to start with either the On or Off function.

Internal 3 volt lithium batteries, with 10 year life, eliminate the need to provide and wire an external power source for this device.

A wide range of DC start signals makes the B90D compatible for use with most sourcing prox and photo sensors, while AC input capability enables the unit to replace many plug-in TDRs and older electro-mechanical timers. All inputs are optically isolated and programmable for level or edge trigger operation. An 8 amp SPDT relay output can be used for direct switching of loads.

SPECIFICATIONS

Inputs:

Type: 5 to 260 DC, PNP; 12 to 260 VAC

Input Impedance: 10KΩ for 5 to 48 Volts, 180 KΩ for 48 to 260 Volts

Min. Pulse: 20 ms

Triggering: Edge or Level field programmable

Outputs:

Type: SPDT Relay

Rating: 8 amp @ 260 VAC, 5 amp @ 30 VDC

Expected Life: 100,000 operations @ 8 amp resistive load, 1,000,000 operations @ 2 amps resistive load

Physical:

Dimensions: 22.5 mm wide x 93mm high x 100 mm deep

Mounting: Spring clip connection to 35 mm DIN rail

Wiring: Front accessible screw terminals

Display: Black on silver LCD, 3 numeric digits, time base, operation mode and output status indicators

Operation:

Power Source: Two non-replaceable 3V lithium batteries, 10 years expected life

Time Ranges: 0.2 to 99.9, 1 to 999 secs. 0.01 to 9.99, 0.1 to 99.9, 1 to 999 min. 0.01 to 9.99, 0.1 to 99.9, 1 to 999 hrs.

Operating Modes: On-Delay, Off-Delay, Interval, Symmetrical Repeat Cycle (On or Off start), Asymmetrical Repeat Cycle (On or Off start), On-Delay Interval

Setting Accuracy: ± 0.5% of set time, or +50ms -20ms, whichever is greater

Repeat Accuracy: ± 0.3% of set time

Environmental:

Operating Temperature: -10˚C to + 60˚ C

Storage Temperature: -20˚C to +70˚ C

Approvals: UL recognized, CE compliant

Ordering Information

Description	Model
Din-Rail Mount Timer	**B90D-500**

Dimensions:
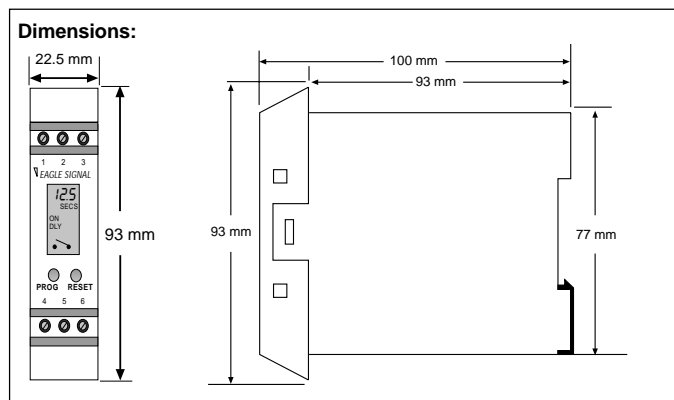
Large, blazing bright, color-changing display… cumulative or single timing operation

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All in the family - Matching C628 series products in other sections of this catalog:

C628 Totalizers:	**Section 1**
C628 Counters & Position Indicators:	**Section 2**
C628 Rate Meters:	**Section 4**

File No.: E185087

CE

UL RECOGNIZED   cUL RECOGNIZED

The Veeder-Root brand C628 Elapsed Timer is a member of a family of 1/8 DIN instruments which offer breakthrough display technology as well as easy-to-program user setup. Its large LED display features the ability to change color based on process status such as exceding the preset value. Therefore, when monitoring an application's elapsed time, the C628 can provide operators with an instant visual alert to changes in the application's status.

■ AWESOME 0.71" high digit LED display (27% larger than other 1/8 DIN units)

■ Programmable color change display based on an event

■ Programmable help function and secondary legend display

■ Programmable for single input or cumulative operation

■ Choice of NPN or PNP primary input

■ Filter speed settable for 20, 200, or 10,000 Hz

■ Standard outputs: 1 NPN transistor & 1 relay

■ Front panel reset enable and preset/alarm lockout

■ Optional RS-485 plug in card

■ CE approved, UL, CUL recognized

The C628 Elapsed Timer has a definable set value at which an output will activate. The unit can be programmed to operate in a cumulative (elapsed time continues to accumulate during all instances when the input is active) or single (time value will display the elapsed time of an individual input and will reset to zero for each successive new pulse) input function mode. In addition, the time format (seconds, minutes, hours, minutes & seconds, or hours & minutes) and timing direction (up or down) can be selected.

SPECIFICATIONS

Count Inputs: Sinking/Sourcing or Contact Closure
    Frequency: 10 kHz max.
    Logic Low $\leq$ 2.0 VDC, Logic High $\geq$ 3.0, 30V max.
    Impedance: 10 KΩ to common - Sourcing; 4.7 KΩ to +Voltage - Sinking

Control Inputs: Sinking, Edge Sensitive
    Logic Low $\leq$ 2.0 VDC, Logic High $\geq$ 3.0
    Impedance: 4.7 KΩ to +Voltage
    Response Time: 25 ms
    Functions: Input 1 - Remote Reset; Input 2 - Security Lockout

Outputs: Solid State: NPN open collector, 30 VDC max., 100 mA max.
    Relay: SPDT, 2 A resistive@ 110 VAC
    Latency: 75 μ seconds, plus 8 ms for relay pull-in

Communication: RS-485; Serial asynchronous, UART to UART;
    Open ASCII: One start bit, even parity seven data bits, one stop bit;
    Baud Rate selectable from 9600, 4800, 2400, or 1200
    Maximum Zones: 99

Supply Voltage: 90-264 VAC, 50/60 Hz, or 20-50 VAC/VDC; 4 Watts

Accessory Power Supply: 9-15 (unregulated VDC), 125 mA max.

Display: Red/Green, 7 segment LED
    Primary display: 5 digits, 0.71" (18mm) height
    Secondary display: single digit, 0.3" (7mm) height

Time Formats: Seconds, Minutes, and Hours: XXX.X
    Minutes & Seconds and Hours & Minutes: XX.XX

Dimensions: 48mm x 96mm, 110mm deep

Mounting: Panel mount (mounting bracket supplied), 45mm x 92mm cutout

Connections: Screw type terminals - combination head

Front Panel Rating: NEMA 4X/IEC IP65

Case Material: GE Lexan 940

Weight: 0.56 lbs.

Operating Temp.: 0° to 55° Celsius, 32° to 131° Fahrenheit

Storage Temp.: -20° to 80° Celsius, -4° to 176° Fahrenheit

Relative Humidity: 20% to 95% non-condensing

Approvals: CE, UL, CUL

Ordering Information:

Power Supply
0 90-264 VAC
2 20-50 VAC/VDC

C 6 2 8 – 6 0 0 ☐ ☐

Serial Communication Option
0 None
5 RS-485

Dimensions:

VEEDER-ROOT

82344

48mm

96mm

100mm

10mm
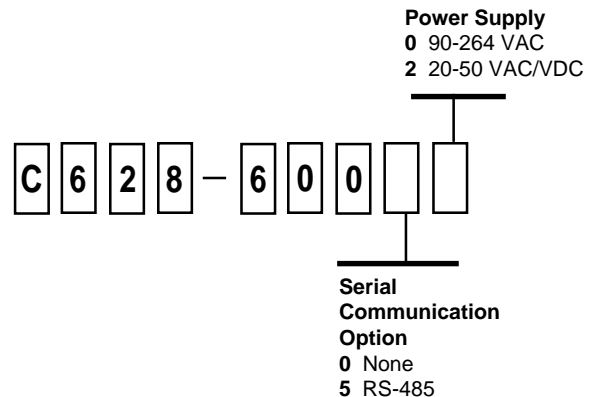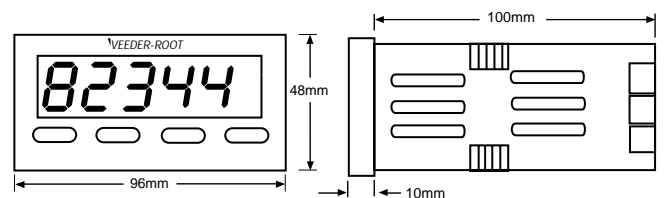
Panel Cutout: 45mm x 92mm (1.77" x 3.62")

Compact, cost effective control by elapsed time… large display with backlighting

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All in the family - Other matching A103 series products in this catalog

A103 Totalizing Counters:	**Section 1**
A103 Preset Counters:	**Section 2**
A103 Tachometers/Rate Indicators:	**Section 4**

CE

5

E L E C T R O N I C   T I M E R S

The A103 Preset Timers are amazingly compact in size and low in cost, with a full complement of popular features such as field programmable Up or Down timing and Interval or ON-delay operation. The A103 series also includes matching indicators for count-totalizing, timing, and rate metering, as well as preset-counter models. All are in a uniform 36 x 72 millimeters bezel size package, enhancing your control panel with a family of devices that look and program alike.

A supertwist LCD display with thick 12mm (.47") high digits allows for easy viewing at a glance and feature display-backlight capability by simply connecting an external 12VDC supply.

Powered by an internal 3 volt battery, the A103's unique design has two battery slots; this allows battery changeover without loss of memory.

Numerous types of inputs can be accepted giving you a totally self-contained system not requiring external power.

■ Matching totalizing counter, time and rate indicators, and preset-counters available – look great together on a panel

■ SSR relay output – selectable Interval or ON-delay operation

■ High visibility 7-digit LCD display with backlighting capability standard

■ Long life 3 Volt lithium battery eliminates the need for external power

■ Accepts input signals from a variety of sources: Dry Contact, PNP or NPN Sensors, Encoders

■ Programmable Up or Down timing

■ Resettable remotely or from the front panel

■ Programmable security of front panel reset button and preset entry

■ Option modules provide additional functionality and added convenience – fast, easy installation

■ NEMA 4/IP65 rated front panel for use in washdown environments

The A103 Preset Timers are further enhanced by a series of quick-attach option modules. These can provide a power supply for sensors and display backlighting, provision for high or low voltage AC or DC timing signals, and mechanical relay output.

SPECIFICATIONS

Start/Stop Input: NPN, Contact Closure; Accumulates time when connected to common; Low State: < 1.0 VDC, High State: > 2.0 VDC (28VDC max)
Security Input: Allows access to panel reset and programming features
Remote Reset Input: NPN or Contact Closure to common; edge sensitive
Control Output: Isolated Photomos relay; 0.1 amp @ 30 VAC/DC, >50Ω on resistance. Programmable Interval or ON-delay operation
Power Source: Single or dual 3V Lithium battery; typical 5 years life w/single battery, 10 years w/dual batteries
Ranges & Resolution: Seconds, minutes to 1/10, hours to 1/10, hours: minutes: seconds
Display: 12mm high, Supertwist LCD; 7 digits; "Low Bat" indicator.
Backlighting: Green Illumination over whole viewable area. Requires 10 to 28 VDC power source
Dimensions & Mounting: See dimensions figure. Panel Mount with supplied mounting bracket and gasket
Connections: Screw terminals
Weight: Approximately 64 grams (2.25 ounces)

OPTION MODULE SPECIFICATIONS

Option modules accessories provide a convenient integrated solution to applications that require AC or high-voltage DC signals, a mechanical relay output, and/or a voltage source for use with external sensors or the A103's display backlight feature. Specifications for each option module feature follow, while specific combinations of features are listed in the "Models" table, below.

AC Power Supply: Provides 10 - 20 VDC @ 50 mA for display backlighting and/or sensor. Requires connection to 115 or 230 VAC, 50/60 Hz
Low Voltage Input: Allows A103 to accept 5 to 30 VAC or VDC as timing input
High Voltage Input: Allows A103 to accept 100 to 260 Volt AC/DC as timing input
Mechanical Relay Output: SPDT (Form C); 120/240 VAC, 30 VDC contacts

Model No.	Description		
A103-008	A103 Preset Timer		
The following option modules attach to the rear of the A103:		
Model No.	**AC Power Supply**	**Low Voltage Input**	**High Voltage Input**	**Relay Output**
A103-A12	X			
A103-A17		X		
A103-A19	X	X		
A103-A10			X	
A103-A14	X		X	
A103-A11				X
A103-A13			X	X
A103-A15	X			X
A103-A16	X		X	X
A103-A18		X		X
A103-A20	X	X		X

Replacement Battery: 605472-0001
Panel Hole Punch: A103-A40

Dimensions:

72mm (2.83")
68mm (2.66")
36mm (1.42")
33mm (1.30")

A103 Rear View

Option Module Rear View

Depth Behind Panel
Without Adaptor Module: 39mm (1.54")
With Adaptor Module: 89mm (3.50")
Panel Cutout: 33mm x 68mm(1.30" x 2.66")
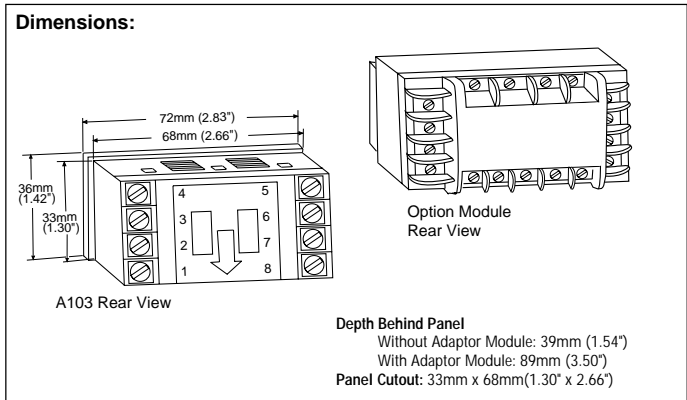
Ultra-compact 1/32 DIN hourmeters… available with LCD or LED display and AC/DC inputs

All in the family - Matching C342 series products in other sections of this catalog:

C342 Totalizing Counters: **Section 1**
C342 Tachometers/Rate Indicators: **Section 4**

A very compact elapsed time meter available in two operating modes: Hours:Minutes:Seconds, or Hours and 1/100 Hour. Standard versions are offered with an 8 digit LCD display or 6 digit LED display. Chose from self powered models containing a permanent 7 year lithium battery, or from models accepting an external 12 - 24 VDC power supply. Externally powered units utilize a nonvolatile RAM to keep timed data during absence of power.

Easy field programing allows interface to PNP or NPN start/stop signals, or you may choose a model that directly accepts high voltage AC or DC (12-250 VAC/DC) as its input.

LED models are available with an optional factory programmed preset limit (preset-time specified when ordered) and feature a transistor output that can perform control functions or interact with a PLC. A 6 character alphanumeric message (characters derived from seven segment pattern) can be programmed to appear when the preset time value is reached.

■ Available with a 8 digit LCD display or a 6 digit LED

■ LED units offer factory entered preset values, and transistor output

■ Choose from internal battery or DC powered units

■ Field programmable to accept PNP or NPN signals, with models available for high voltage inputs

■ Compact 1/32 DIN bezel size and short depth

■ Display can be reset from the front panel or remotely; front reset button can be disabled

■ IP65 rated front panel for use in washdown environments

All units are packaged in a compact 1/32 DIN size case with depths as short as 32mm. The front panel is rated IEC IP65 for use in washdown environments. The C342 series also includes matching indicators for count-totalizing, position indication, and rate metering, as well as an alphanumeric message display. All are in a uniform 24 x 48 millimeters bezel size package.

SPECIFICATIONS

Input, NPN/PNP models: Signal field selectable;
  Logic Low < 0.7 VDC, Logic High > 5 VDC; 30 VDC max.

Input, AC/DC input models: 12 - 250 VAC/VDC

Optional Output: PNP, 10mA

Power Source:
  External Power Supply Models: 12 -24 VDC +20%/-10%
  Internally Powered Models: Lithium Battery, 7 years typical life

Display: LCD: 7.0mm high; LED: 7.6mm high

Time Mode: Hours:Minutes:Seconds, or Hours (1/100 resolution)

Operating Temperature: -10°C to 50°C

Front Panel Rating: IEC IP65

Approvals: CE

Model No.	Time Range	Power Supply	Signal Input	Display Type/Digits	Control Output
C342-1464	H:M:S	Lithium	NPN/PNP	LCD/8	
C342-2464	H:1/100	Lithium	NPN/PNP	LCD/8	
C342-1474	H:M:S	Lithium	12 - 250AC/DC	LCD/8	
C342-2474	H:1/100	Lithium	12 - 250AC/DC	LCD/8	
C342-1462	H:M:S	12 - 24VDC	NPN/PNP	LCD/8	
C342-2462	H:1/100	12 - 24VDC	NPN/PNP	LCD/8	
C342-1562	H:M:S	12 - 24VDC	NPN/PNP	LED/6	*C342-1562A
C342-2562	H:1/100	12 - 24VDC	NPN/PNP	LED/6	*C342-2562A

* Optional factory programmed preset limit with transistor output. Preset limit value must be specified at time of order. A 6 character alphanumeric message (characters derived from seven segment pattern) may also be specified to appear when the preset time value is reached.

Dimensions:

Panel Cutout: 22, ±0.3mm x 45, ±0.6mm

Note: C342-1464, -2464, -1462, -2462= 32mm
C342-1562, -2562, -1474, -2474= 60mm
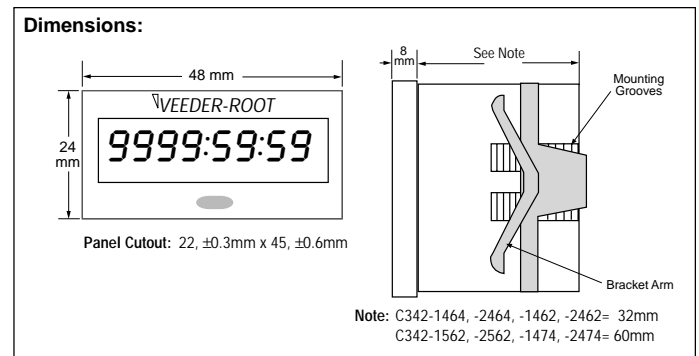
Economical, electronic, single setpoint reset timer... with 8 time ranges and 8 operating modes

The SX210 timer is a microprocessor based digital timer housed in a standard DIN style case (68mm square cutout). The small case and front bezel require minimal panel space yet provide large, easy to use programming keys and a .3 inch high LED display.

- Eight programmable time ranges and eight output operating modes

- Operating modes and all other setup functions programmed with miniature rocker switches located on the back of the housing

- Nonvolatile RAM memory retains setpoint, actual time values, and program parameters (10 year expected life of data in memory)

- NEMA 4 Hosedown Test rated

- Special surface just below the display on which the function can be marked with pen or pencil

- SET and ENT keys provide access to setpoint and front panel programmed functions

- Programming changes entered via increment and decrement keys

- Keypad "lock" function allows setpoint to be viewed, but does not allow unauthorized changes

- Four .3 inch red LED displays for easy readability

- Flashing LED (right side of display) indicates unit is in timing cycle and LED (left side of display) lights when programmed contacts are energized

- Two removable terminal blocks with screw gate style wire clamps permit prewiring of panel without the timer in place and eliminate rewiring if unit needs to be removed or replaced

- Two DPDT relay outputs with five amp contact ratings - one is a set of instantaneous contacts that energize when timing cycle starts and remain energized until timer is reset, and the other is a set of programmable contacts that can be programmed to turn on and off in several operating modes

SPECIFICATIONS

Time Ranges:

Sym.	Maximum Range	Minimum Setting
1	99.99 Sec.	.01 Sec.
2	999.9 Sec.	.1 Sec.
3	99.99 Min.	.01 Min.
4	999.9 Min.	.1 Min.
5	99.99 Hr.	.01 Hr.
6	999.9 Hr.	.1 Hr.
7	99 Min.: 59 Sec.	1 Sec.
8	99 Hr.: 59 Min.	1 Min.

Operating Voltage/Frequency: A6 - 120 VAC, 50/60 Hz
B6 - 240 VAC, 50/60 Hz

Setting Accuracy: ±0.05% of setting or 50 ms, whichever is larger

Repeat Accuracy: ±0.001% of setting or 35 ms, whichever is larger

Reset Time: 15 ms

Power on Response: 200 ms max.

Operating Temperature: +32˚ to +122˚F (0˚ to +50˚C)

Output Rating: Relay: 5 amp (resistive), 10 to 264 VAC
Current capacity derates from 7 amps at 250C to 5 amps at 500C with all output contacts used

Vibration: Unit function is unaffected by 2.5G sinusoidal vibration magnitude in both directions of the perpendicular mounting axes imposed from 10 to 100 Hz

Static Discharge: Unit function is unaffected by a constant 3600 volt peak, 60 Hz discharge applied to the grounded front plate at a relative humidity of less than 25%

Transient Protection: Immune to 2500 volts peak transients up to 50 microseconds in duration

Approvals: UL Recognition E96337
CSA Certification LR26861

OUTPUT OPERATING MODES

ON-Delay Operation

INSTANTANEOUS CONTACT OPERATION
START INPUT
RESET
PROGRAMMED CONTACTS
TIMING
RESET
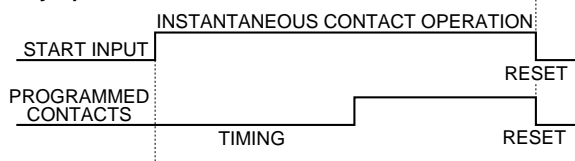
ON-Delay Operation with Time Totalization
The contacts operate as they do in the ON-Delay mode above. When the timing cycle is completed and the programmed contacts are energized, the SX210 timer begins time totalizing and continues until the unit is reset.

Interval Operation

INSTANTANEOUS CONTACT OPERATION
START INPUT
RESET
PROGRAMMED CONTACTS
TIMING
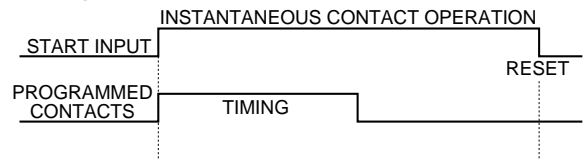
Interval Operation with Time Totalization
The contacts operate as they do in the Interval mode above. The contacts are energized during the timing cycle and deenergize at the end of the timing cycle. When the timing cycle is completed and the programmed contacts are deenergized, the SX210 timer begins time totalizing and continues until the unit is reset.

WIRING

INSTANTANEOUS CONTACTS
PROGRAMMED CONTACTS

Single-Pulse Operation

INSTANTANEOUS CONTACT OPERATION
START INPUT
RESET
PROGRAMMED CONTACTS
PULSE
TIMING

Pulse and Repeat Operation

INSTANTANEOUS CONTACT OPERATION
START INPUT
RESET
PROGRAMMED CONTACTS
PULSE   PULSE
TIMING   TIMING
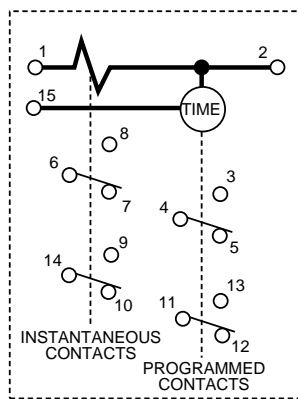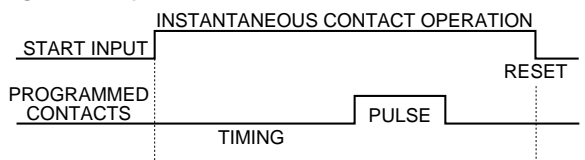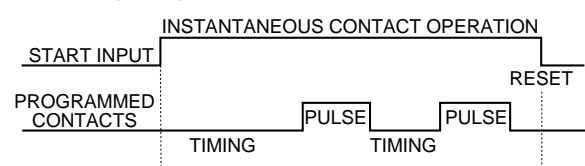
MOUNTING

The SX210 timer uses two removable mounting clips with adjustable screws to mount the enclosure in a panel as shown below. To mount the unit, slide the gasket onto the case until it is against the back of the bezel and place the unit in the panel cutout from the front of the panel.
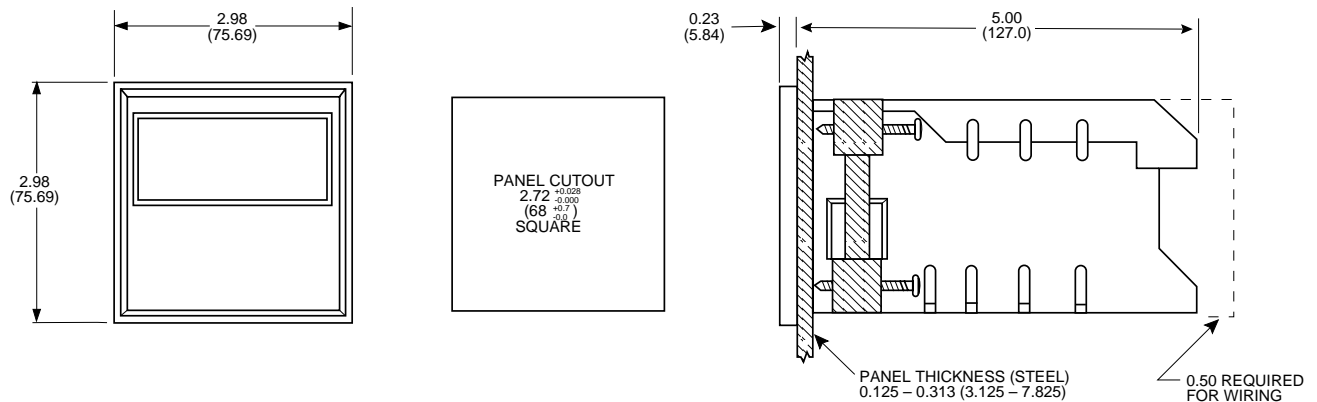
2.98 (75.69)

2.98 (75.69)

PANEL CUTOUT
2.72 +0.028 -0.000
(68 +0.7 -0.0)
SQUARE

0.23 (5.84)

5.00 (127.0)

PANEL THICKNESS (STEEL)
0.125 – 0.313 (3.125 – 7.825)

0.50 REQUIRED FOR WIRING

ORDERING INFORMATION

SX2   10   A6

OUTPUT TYPE

Sym.	Description
10	Relay Output

VOLTAGE & FREQUENCY

Sym.	Description
A6	120 VAC, 50/60 Hz
B6	240 VAC, 50/60 Hz

Repeat cycle timer and batch counter combined in a compact package... can control time cycle length plus number of cycles

The SX160 is a microprocessor based control that combines a repeat cycle timer with an internal batch counter. The batch counter counts the number of repeat cycle operations that the timer performs. The batch counter has its own programmable output and automatically stops the repeat cycle timer operation after the user programmed number of cycles.

The repeat cycle timer function has a SPDT relay output. The setpoints for the output ON and OFF times are individually programmable. There are eight time ranges available for the repeat timer function from 99.99 seconds to 999.9 hours.

The internal batch counter has its own SPDT relay output with two programmable operating modes. The batch counter output can operate in either an ON-Delay or Interval mode. The batch counter can be set to allow from 1 to 9999 cycles, or it can be set to provide continuous repeat cycle operation.

The SX160 is housed in a standard DIN case (68mm square cutout). The case and front bezel require minimal panel space yet provide easy to use programming keys and an easy to read .36 inch LED display.

The operating modes and time ranges for the unit are programmed using rocker switches on the back of the unit. This programming method provides both simplicity and security. The front panel display has a prompted programming routine that prompts the user when to program the ON and OFF times as well as the batch counter setpoint.

Some of the other features of the SX160 timer include:

■ NEMA 4 Hosedown Test rated

■ Two 5 amp SPDT relay outputs

■ Two output operating modes for the repeat cycle timer

■ Two output operating modes for the batch counter

■ Eight time ranges for the ON and OFF time

■ Time inhibit input

■ LED indicators for output status

■ Setpoint to zero or zero to setpoint cycle progress indication

■ Front panel and remote reset inputs

■ Keypad lock function

■ Nonvolatile memory (NOVRAM) for program and data retention

■ Removable terminal blocks for wiring connections

SPECIFICATIONS

Time Ranges:

Sym.	Maximum Range	Minimum Setting
1	99.99 Sec.	.01 Sec.
2	999.9 Sec.	.1 Sec.
3	99 Min.: 59 Sec.	1 Sec.
4	99.99 Min.	.01 Min.
5	999.9 Min.	.1 Min.
6	99 Hr.: 59 Min.	1 Min.
7	99.99 Hr.	.01 Hr.
8	999.9 Hr.	.1 Hr.

Operating Voltage/Frequency: A6 - 120 VAC, 50/60 Hz
   B6 - 240 VAC, 50/60 Hz

Batch Counter Range: 1-9999 or continuous

Setting Accuracy: Time: ±0.05% of setting or 50 ms, whichever is larger
   Count: 100%

Repeat Accuracy: Time: ±0.001% of setting or 35 ms, whichever is larger
   Count: 100%

Reset Time: 15 ms

Power on Response: 200 ms max.

Operating Temperature: +32˚ to +122˚F (0˚ to +50˚C)

Sensor Power Supply: +12 VDC, 75 milliamps

Output Rating: Relay: 5 amp (resistive), 10 to 264 VAC

Vibration: Unit function is unaffected by 2.5G sinusoidal vibration magnitude in both directions of the perpendicular mounting axes imposed from 10 to 100 Hz

Static Discharge: Unit function is unaffected by a constant 3600 volt peak, 60 Hz discharge applied to the grounded front plate at a relative humidity of less than 25%

Transient Protection: Immune to 2500 volts peak transients up to 50 microseconds in duration

OUTPUT OPERATING MODES

ON-Delay Counter Output Operation

Output 2 performs the repeat cycle timing operation. Output 1 energizes at the end of the programmed number of repeat operations.

OUTPUT 1 — COUNT SETPOINT = 2

OUTPUT 2 — SET 1 | SET 2 | SET 1 | SET 2
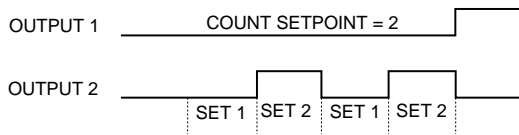
Interval Counter Output Operation

Output 2 performs the repeat cycle timing operation. Output 1 energizes at the beginning of the repeat cycle operation and remains energized until the programmed number of repeat operations is completed.

OUTPUT 1 — COUNT SETPOINT = 2

OUTPUT 2 — SET 1 | SET 2 | SET 1 | SET 2
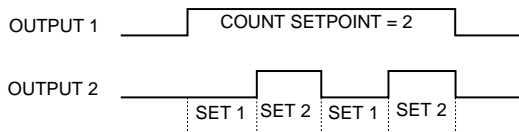
Repeating Sequence Intervals

Output 1 and Output 2 provide repeat cycle timing operation. Output 1 is on during the interval of Setpoint 1 (SEt1). Output 2 is on during the interval of Setpoint 2 (SEt2). The batch counter controls the number of repeat cycle operations, but does not have an output function.

OUTPUT 1 — SET 1 | SET 1

OUTPUT 2 — SET 2 | SET 2

TERMINAL ASSIGNMENTS

| 1 START L1 | 2 NEUT L2 | 3 | 4 | 5 | | 12 | 13 | 14 | 15 RESET L1 | 16 POWER L1 |

OUTPUT 1 — OUTPUT 2

| 6 | 7 | 8 DC COMMON | 9 DC+ | 10 INHIBIT | 11 |

SWITCH

ON 1 2 3 4 5 6 7 8
OFF
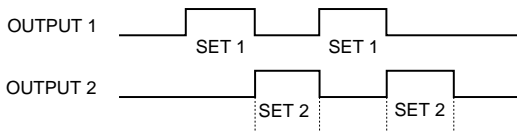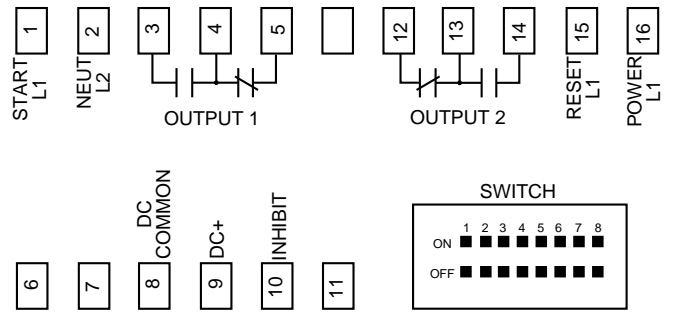
Terminals 6, 7, and 11 are not used on the SX160 timer.

5

ELECTRONIC TIMERS

MOUNTING

The SX160 timer uses two removable mounting clips with adjustable screws to mount the enclosure in a panel as shown below.

2.98 (75.69)

2.98 (75.69)

PANEL CUTOUT
2.72 +0.028 -0.000
(68 +0.7 -0.0)
SQUARE

0.23 (5.84)

5.00 (127.0)

PANEL THICKNESS (STEEL) 0.125 – 0.313 (3.125 – 7.825)

0.50 REQUIRED FOR WIRING

ORDERING INFORMATION

SX1   60   A6
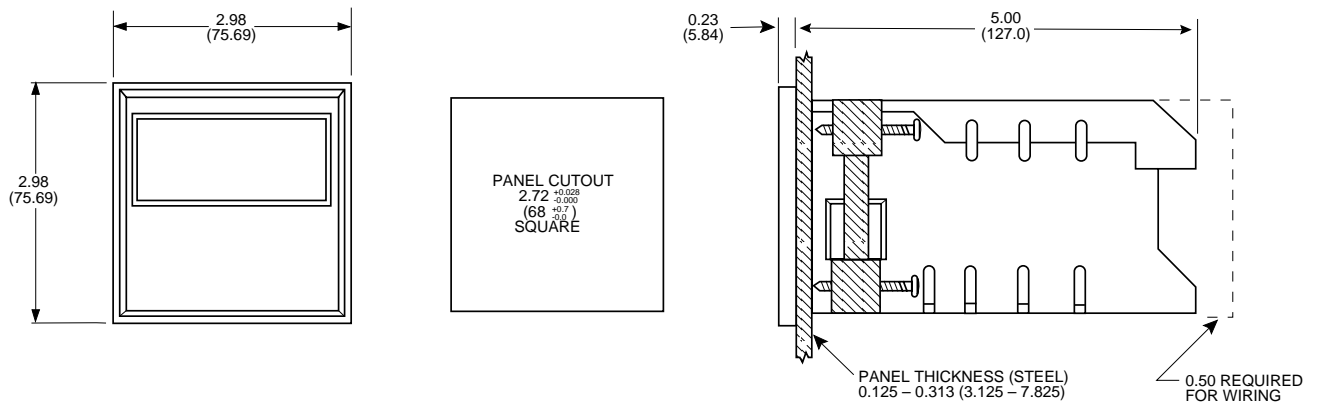
OUTPUT TYPE

Sym.	Description
60	Relay Output

VOLTAGE & FREQUENCY

Sym.	Description
A6	120 VAC, 50/60 Hz

Three setpoints allow control of complex operations... built-in batch counter can run a set number of cycles

The SX110 is a microprocessor based control that combines a three setpoint repeat cycle timer with an internal batch counter. The three setpoints on the repeat cycle timer function allow overlap or dwell between the two output timing intervals. The batch counter counts the number of repeat cycle operations that the timer performs and automatically stops the timer operation after the user programmed number of cycles.

The repeat cycle timer can operate as either a DPDT relay output with ON and OFF times or as two independent SPDT relay interval outputs. When operated as two interval outputs, a third setpoint is available that can provide overlap of the two intervals or a dwell period between the two intervals. The time ranges for the output sequences are individually programmable. There are four time ranges available for each output sequence from 99.99 seconds to 99 hours: 59 minutes.

The internal batch counter counts the number of cycles of the repeat timer output. The batch counter will also automatically stop the timing operation after the programmed number of cycles. The batch counter can be set to allow from 1 to 9999 cycles, or it can be set to provide continuous repeat cycle operation.

The SX110 is housed in a standard DIN case (68mm square cutout). The case and front bezel require minimal panel space yet provide easy to use programming keys and an easy to read .36 inch LED display.

The operating modes and time ranges for the unit are programmed using rocker switches on the back of the unit. This programming method provides both simplicity and security. The front panel display has a prompted programming routine that prompts the user when to program the ON and OFF times as well as the batch counter setpoint.

Some of the other features of the SX110 timer include:

■ NEMA 4 Hosedown Test rated

■ Two 5 amp SPDT relay outputs

■ Four output operating modes

■ Four independently programmable time ranges for the ON and OFF times

■ Time inhibit input

■ LED indicators for output status

■ Setpoint to zero or zero to setpoint cycle progress indication

SPECIFICATIONS

Time Ranges:

Sym.	Maximum Range	Minimum Setting
1	99.99 Sec.	.01 Sec.
2	999.9 Sec.	.1 Sec.
3	99 Min.: 59 Sec.	1 Sec.
4	99 Hr.: 59 Min.	1 Min.

Operating Voltage/Frequency: A6 - 120 VAC, 50/60 Hz

Batch Counter Range: 1-9999 or continuous

Setting Accuracy: Time: ±0.05% of setting or 50 ms, whichever is larger
Count: 100%

Repeat Accuracy: Time: ±0.001% of setting or 35 ms, whichever is larger
Count: 100%

Reset Time: 15 ms

Power on Response: 200 ms max.

Operating Temperature: +32˚ to +122˚F (0˚ to +50˚C)

Sensor Power Supply: +12 VDC, 75 milliamps

Output Rating: Relay: 5 amp (resistive), 10 to 264 VAC

Vibration: Unit function is unaffected by 2.5G sinusoidal vibration magnitude in both directions of the perpendicular mounting axes imposed from 10 to 100 Hz

Static Discharge: Unit function is unaffected by a constant 3600 volt peak, 60 Hz discharge applied to the grounded front plate at a relative humidity of less than 25%

Transient Protection: Immune to 2500 volts peak transients up to 50 microseconds in duration
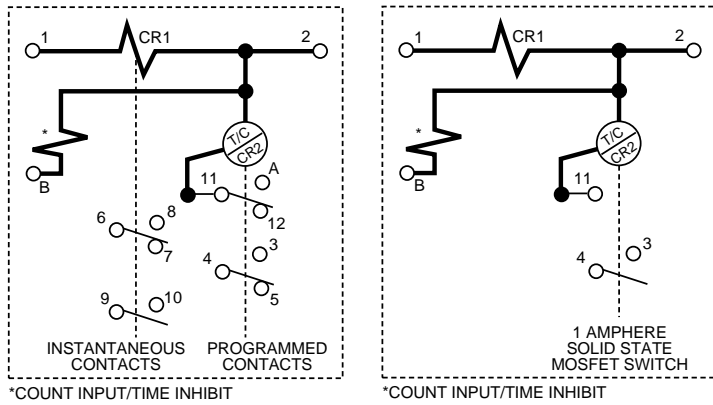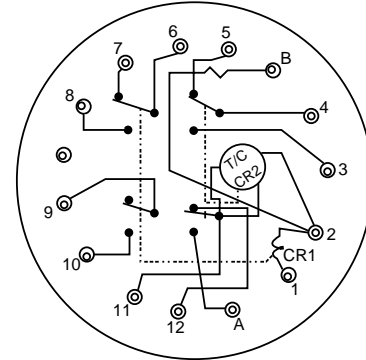
OUTPUT OPERATING MODES

DPDT - OFF Time First
Both outputs are energized together. The OFF time defined by Setpoint 1 (SEt1) occurs first.

OUTPUT 1 and OUTPUT 2

SET 1 SET 2 SET 1 SET 2
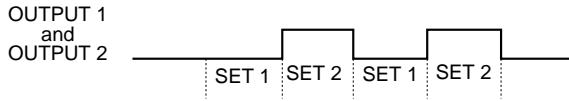
DPDT - ON Time First
Both outputs are energized together. The ON time defined by Setpoint 1 (SEt1) occurs first.

OUTPUT 1 and OUTPUT 2

SET 1 SET 2 SET 1 SET 2

Overlapping Intervals
Output 1 is ON first. Output 2 is normally energized at the end of the Output 1 timing interval. The Output 2 timing interval can be programmed to begin before the end of the Output 1 interval by using Setpoint 3 (SEt3). Setpoint 3 is the amount of time before the end of the Output 1 interval that the Output 2 interval is started. In repeat operation, Output 1 is energized again at the end of the Output 2 interval.

OUTPUT 1   SET 1

SET 3

OUTPUT 2   SET 2
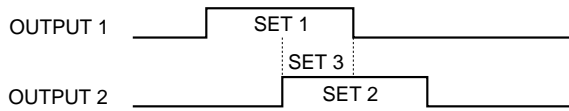
Non-Overlapping Intervals
Output 1 is ON first. Output 2 is normally energized at the end of the Output 1 timing interval. The Output 2 timing interval can be programmed to begin a delay or dwell period after the end of the Output 1 interval by using Setpoint 3 (SEt3). Setpoint 3 is the amount of time after the end of the Output 1 interval that the Output 2 interval is started. In repeat operation, the Setpoint 3 dwell period also occurs after the Output 2 interval and before the Output 1 interval repeats.

OUTPUT 1   SET 1

SET 3

OUTPUT 2   SET 2

SET 3

TERMINAL ASSIGNMENTS

START L1 — 1
NEUT L2 — 2
3
4
5
12
13
14
RESET L1 — 15
POWER L1 — 16

OUTPUT 1   OUTPUT 2

6
7
8 — DC COMMON
9 — DC+
10 — INHIBIT
11

SWITCH

ON 1 2 3 4 5 6 7 8
OFF
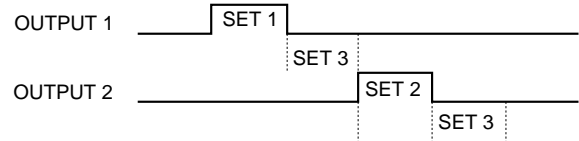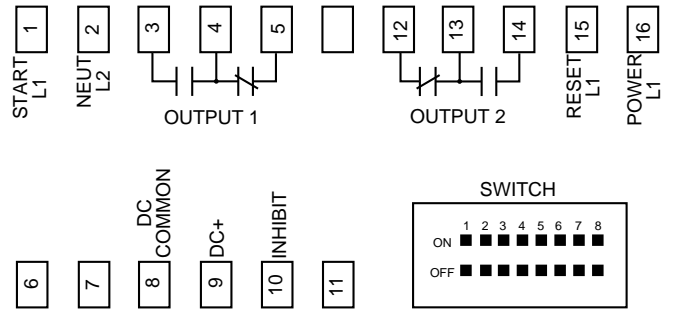
Terminals 6, 7, and 11 are not used on the SX110 timer.

MOUNTING

The SX110 timer uses two removable mounting clips with adjustable screws to mount the enclosure in a panel as shown below.

2.98 (75.69)

2.98 (75.69)

PANEL CUTOUT
2.72 +0.028 -0.000
(68 +0.7 -0.0)
SQUARE

0.23 (5.84)

5.00 (127.0)

PANEL THICKNESS (STEEL)
0.125 – 0.313 (3.125 – 7.825)

0.50 REQUIRED FOR WIRING
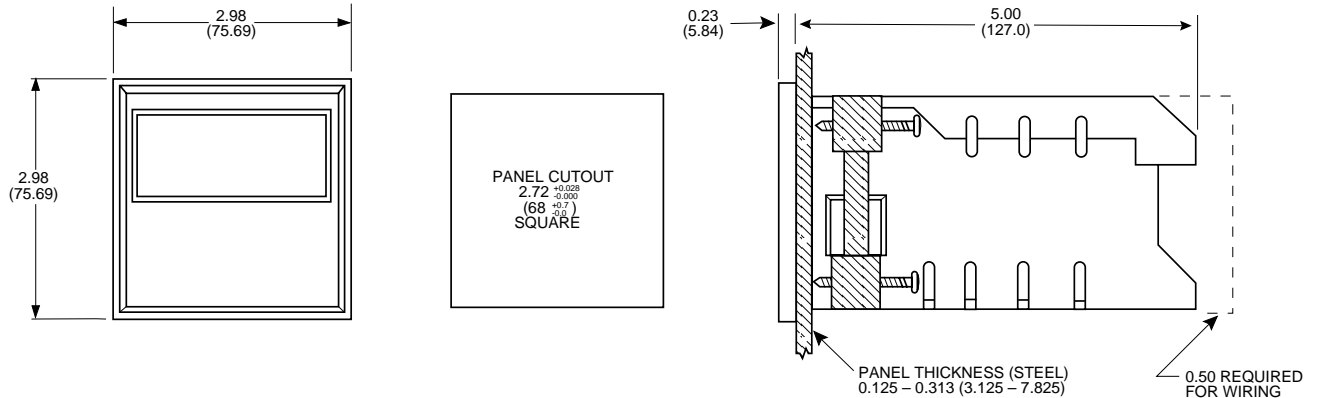
ORDERING INFORMATION

SX1   **10**   **A6**

OUTPUT TYPE

Sym.	Description
10	Relay Output

VOLTAGE & FREQUENCY

Sym.	Description
A6	120 VAC, 50/60 Hz

Dual setpoints with programmable model for delay interval, timed pulse, and repeat cycle operation

The SX410 and the SX430 are dual setpoint timers featuring an inhibit function that allows the timing operation of the units to be stopped without resetting the timed value or the outputs.

The many operating modes and the four time ranges are programmed using rocker switches on the back of the unit. This programming method provides both simplicity and security. The front panel display has a prompted programming routine that shows the user how to program variables such as setpoints and the display cycle progress direction.

Some of the other features of the SX410 and the SX430 timers include:

■ NEMA 4 Hosedown Test rated

■ Eight output operating modes programmable for one or both outputs

■ Programmable Early Trip prewarn operation

■ Time inhibit input

■ LED indicators for output status

■ Setpoint to zero or zero to setpoint cycle progress indication

■ Front panel and remote reset inputs

■ Keypad lock function

■ Nonvolatile memory (NOVRAM) for program and data retention

■ Removable terminal blocks for wiring connections

■ +12 VDC, 75 milliamp sensor power supply

SPECIFICATIONS

Time Ranges:

SX410

Sym.	Maximum Range	Minimum Setting
1	99.99 Sec.	.01 Sec.
2	999.9 Sec.	.1 Sec.
3	99 Min.: 59 Sec.	1 Sec.
4	99 Hr.: 59 Min.	1 Min.

SX430

Sym.	Maximum Range	Minimum Setting
1	99.99 Min.	.01 Min.
2	999.9 Min.	.1 Min.
3	99.99 Hr.	.01 Hr.
4	999.9 Hr.	.1 Hr.

Operating Voltage/Frequency: A6 - 120 VAC, 50/60 Hz
B6 - 240 VAC, 50/60 Hz

Setting Accuracy: ±0.05% of setting or 50 ms, whichever is larger

Repeat Accuracy: ±0.001% of setting or 35 ms, whichever is larger

Programmed Pulse: .01 to 99.99 seconds

Reset Time: 15 ms

Power on Response: 200 ms max.

Operating Temperature: +32° to +122°F (0° to +50°C)

Sensor Power Supply: +12 VDC, 75 milliamps

Output Rating: Relay: 5 amp (resistive), 10 to 264 VAC

Vibration: Unit function is unaffected by 2.5G sinusoidal vibration magnitude in both directions of the perpendicular mounting axes imposed from 10 to 100 Hz

Static Discharge: Unit function is unaffected by a constant 3600 volt peak, 60 Hz discharge applied to the grounded front plate at a relative humidity of less than 25%

Transient Protection: Immune to 2500 volts peak transients up to 50 microseconds in duration

OUTPUT 1 OPERATING MODES

ON-Delay
Output 1 is energized at the end of the timing cycle.

RESET TIMING | TIMING COMPLETE | RESET

Interval
Output 1 is energized during the timing cycle.

RESET TIMING | TIMING COMPLETE

The ON Delay and interval modes are also available with totalization. In these modes, the display will continue to indicate time registered after the timing cycle is complete.

OUTPUT 1 OPERATING MODES CONT.

ONTimed Pulse Output
Output 1 is energized for a programmable pulse time up to 99.99 seconds at the end of the timing cycle.

```
                    ┌──TIME──┐
────────────────────│ PULSE  │────────────────
RESET  TIMING       PULSE      TIMING COMPLETE
```

Timed Pulse and Repeat
Output 1 is energized for a programmable pulse time up to 99.99 seconds at the end of the timing cycle with the time cycle automatically repeating.

```
              PULSE    PULSE
           ┌──┐     ┌──┐
───────────┘  └─────┘  └───────────
RESET TIMING TIMING TIMING RESET
```
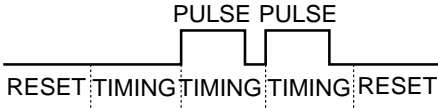
Repeat Cycle, ON or OFF Time Cycle First
Output 1 is energized and deenergized in repeating operation with either the ON or OFF time period first. The time periods are equal length. Unequal length time intervals can be obtained using the Early Trip prewarn output.

```
        ┌────┐      ┌────┐
────────┘    └──────┘    └────────
RESET  TIME   TIME   TIME   TIME  RESET
```
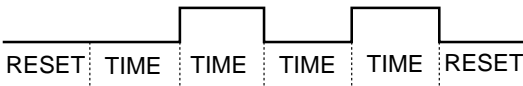
OUTPUT 2 OPERATING MODES

Output 2 can be programmed to operate in parallel with Output 1, providing DPDT relay operation form the two SPDT relays, or it can be programmed as an Early Trip prewarn output that is energized at a predetermined time before the end of the cycle. An example of Early Trip prewarn operation with the ON Delay mode for Output 1 is shown here for reference.

```
                         ┌───────────┐
OUTPUT 1  ───────────────┘           └──────────

                     ┌──────────────┐
OUTPUT 2  ───────────┘              └──────────
          RESET TIMING   TIMING       RESET
                         COMPLETE
```
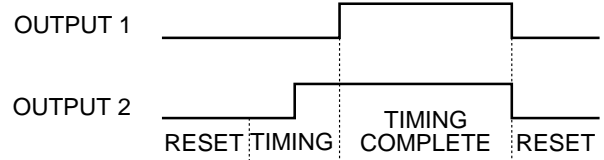
TERMINAL ASSIGNMENTS
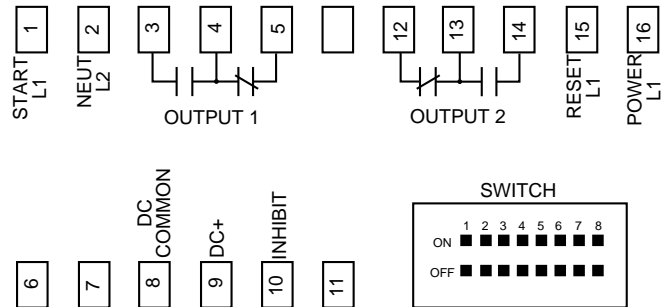
MOUNTING

The SX400 timer uses two removable mounting clips with adjustable screws to mount the enclosure in a panel as shown below.

2.98 (75.69)

2.98 (75.69)

PANEL CUTOUT
2.72 +0.028 -0.000
(68 +0.7 -0.8)
SQUARE

0.23 (5.84)

5.00 (127.0)

PANEL THICKNESS (STEEL)
0.125 – 0.313 (3.125 – 7.825)

0.50 REQUIRED FOR WIRING

ORDERING INFORMATION

SX4   10   A6
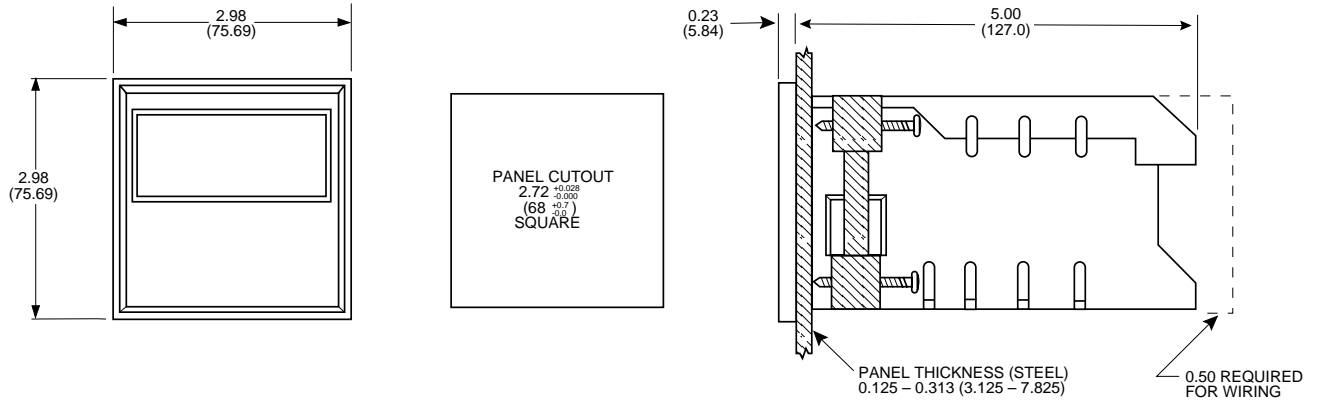
OUTPUT TYPE

Sym.	Description
10	Time Ranges: 99.99 Sec., 999.9 Sec., 99 Min.: 59 Sec., and 99 Hr.: 59 Min.
30	Time Ranges: 99.99 Min., 999.9 Min., 99.99 Hr., and 999.9 Hr.

VOLTAGE & FREQUENCY

Sym.	Description
A6	120 VAC, 50/60 Hz
B6	240 VAC, 50/60 Hz

Two independent interval timers in a compact package... can start simultaneously or in sequence

The SX460 is a dual output timer with two independently programmable, timing interval setpoints. The two outputs can be programmed to operate either simultaneously or in sequence, providing the equivalent operation of two interval timers. The sequential output operation can also be used to provide repeat cycle timer operation.

The SX460 has eight programmable time ranges. Time ranges from 99.99 seconds to 999.9 hours are available to allow the use of one unit in many applications. Easy to use minute: second and hour: minute ranges are also available.

The SX460 is housed in a standard DIN case (68mm square cutout). The case and front bezel require minimal panel space yet provide easy to use programming keys and an easy to read .36 inch LED display.

The four operating modes and the eight time ranges are programmed using rocker switches on the back of the unit. This programming method provides both simplicity and security. The front panel display has a prompted programming routine that shows the user how to program the setpoints.

Some of the other features of the SX460 timer include:

- NEMA 4 Hosedown Test rated
- Two 5 amp SPDT relay outputs
- Four output operating modes
- Eight time ranges
- Time inhibit input
- LED indicators for output status
- Setpoint to zero or zero to setpoint cycle progress indication
- Front panel and remote reset inputs
- Keypad lock function
- Nonvolatile memory (NOVRAM) for program and data retention
- Removable terminal blocks for wiring connections
- +12 VDC, 75 milliamp sensor power supply

SPECIFICATIONS

Time Ranges:

Sym.	Maximum Range	Minimum Setting
1	99.99 Sec.	.01 Sec.
2	999.9 Sec.	.1 Sec.
3	99.99 Min.	.01 Min.
4	999.9 Min.	.1 Min.
5	99.99 Hr.	.01 Hr.
6	999.9 Hr.	.1 Hr.
7	99 Min.: 59 Sec.	1 Sec.
8	99 Hr.: 59 Min.	1 Min.

Operating Voltage/Frequency: A6 - 120 VAC, 50/60 Hz
B6 - 240 VAC, 50/60 Hz

Setting Accuracy: ±0.05% of setting or 50 ms, whichever is larger

Repeat Accuracy: ±0.001% of setting or 35 ms, whichever is larger

Reset Time: 15 ms

Power on Response: 200 ms max.

Operating Temperature: +32˚ to +122˚F (0˚ to +50˚C)

Sensor Power Supply: +12 VDC, 75 milliamps

Output Rating: Relay: 5 amp (resistive), 10 to 264 VAC

Vibration: Unit function is unaffected by 2.5G sinusoidal vibration magnitude in both directions of the perpendicular mounting axes imposed from 10 to 100 Hz

Static Discharge: Unit function is unaffected by a constant 3600 volt peak, 60 Hz discharge applied to the grounded front plate at a relative humidity of less than 25%

Transient Protection: Immune to 2500 volts peak transients up to 50 microseconds in duration

OUTPUT OPERATING MODES

Simultaneous Intervals, Beginning Together
Both outputs are energized together. They have separately programmable timing intervals.

OUTPUT 1 ⎍ SET 1

OUTPUT 2 ⎍ SET 2
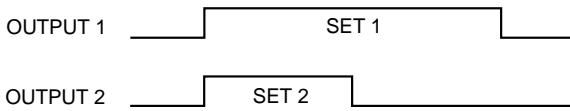
Simultaneous Intervals, Ending Together
Output 1 is energized first. The setpoint for Output 2 determines how long before the end of the Output 1 interval that Output 2 is energized.
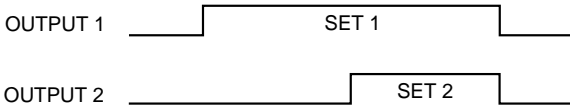
OUTPUT 1 ⎍ SET 1

OUTPUT 2 ⎍ SET 2

Sequential Intervals
The timing interval for Output 1 is followed by the timing interval for Output 2.

OUTPUT 1 ⎍ SET 1

OUTPUT 2 ⎍ SET 2
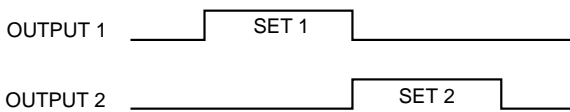
Repeating Sequential Intervals
The timing interval for Output 1 is followed by the timing interval for Output 2. After the timing interval for Output 2, the timing interval for Output 1 begins again and the cycle repeats.

OUTPUT 1 ⎍ SET 1 | SET 1

OUTPUT 2 ⎍ SET 2 | SET 2

TERMINAL ASSIGNMENTS

| 1 START L1 | 2 NEUT L2 | 3 | 4 | 5 | | 12 | 13 | 14 | 15 RESET L1 | 16 POWER L1 |

OUTPUT 1   OUTPUT 2

| 6 | 7 | 8 DC COMMON | 9 DC+ | 10 INHIBIT | 11 |

SWITCH
ON / OFF   1 2 3 4 5 6 7 8
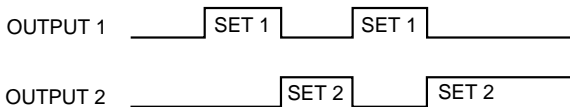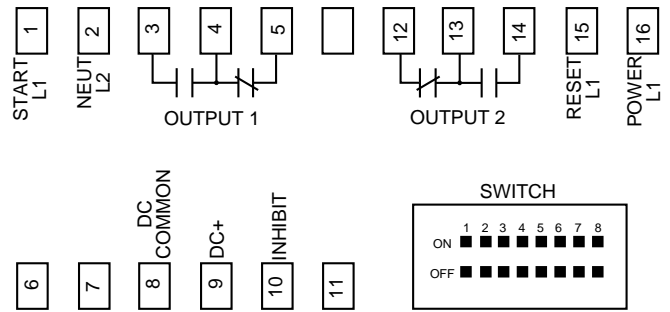
MOUNTING

The SX460 timer uses two removable mounting clips with adjustable screws to mount the enclosure in a panel as shown below.

2.98 (75.69)

2.98 (75.69)

PANEL CUTOUT
2.72 +0.028 -0.000
(68 +0.7 -0.0)
SQUARE

0.23 (5.84)

5.00 (127.0)

PANEL THICKNESS (STEEL)
0.125 – 0.313 (3.125 – 7.825)

0.50 REQUIRED FOR WIRING

ORDERING INFORMATION

SX4   **60**   **A6**
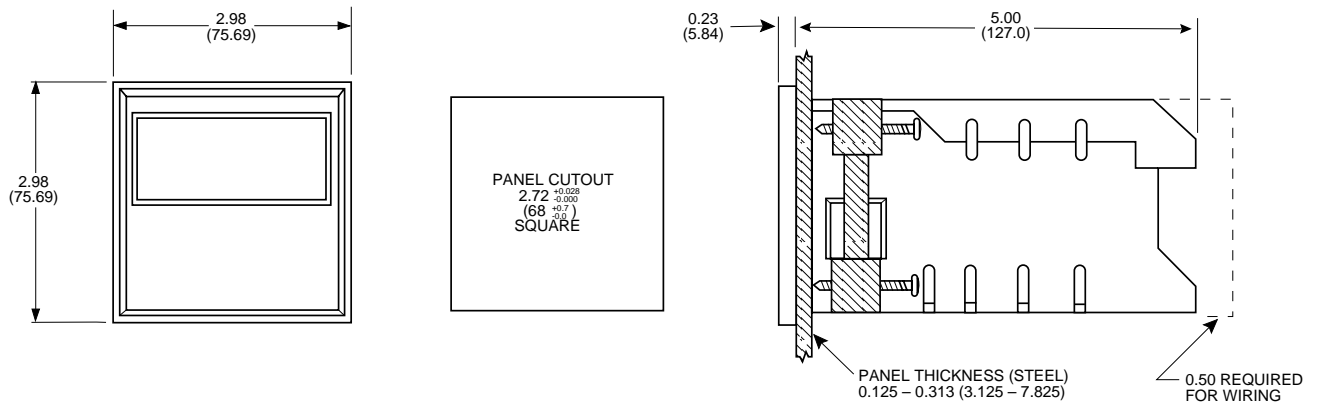
OUTPUT TYPE	
Sym.	Description
60	Relay Output

VOLTAGE & FREQUENCY	
Sym.	Description
A6	120 VAC, 50/60 Hz
B6	240 VAC, 50/60 Hz

Microprocessor based solid state timer/ counter... housed in CYCL-FLEX® case

5

ELECTRONIC TIMERS

The CX200 is a microprocessor based timer/counter housed in a standard 15 terminal CYCL-FLEX® plug-in case. Time or count operation, time range, and standard or reverse start operation is selected by 7 miniature rocker switches located inside the unit housing. Time or count setpoints are entered into the unit using a sealed membrane keypad on the front of the unit. Each digit in the setpoint is individually increased or decreased by pressing the appropriate keypad switch. Time or count setpoint and progress is displayed on the front of the unit by a 4 1/2 digit liquid crystal display with .5 inch digits. Time or count subtracts from the setpoint and the output changes state at zero. Operational mode annunciators also appear in the display area on the front of the unit. The mode annunciator flashes when the unit is timing or counting.

- Five time ranges from 19.999 sec. to 199 hrs.: 59 min.

- Two count rates - accept and display counts from 1 to 19999

- Two relay outputs - socket mounted for easy replacement

- Two form C instantaneous contacts and two form C programmed contacts

- N.O. solid state MOSFET, delayed action switch rated at 1 ampere continuous load current, 0-264 VAC 50/60 Hz or DC

- Ideal output for switching low level signals and high voltage loads due to MOSFET output's ON resistance of 0.5 ohm and very low OFF leakage

- Programmed outputs operate in one of four load sequences; OOX, OXO, OOX with pulse output, and OOX pulse output with repeat cycle operation

- Standard start is defined as ON delay reset timer or counter

- For standard start units, timer/counter resets on power failure

- Reverse start or OFF delay units will not reset on power failure and will continue cycle when power is restored

SPECIFICATIONS

Time/Count Ranges:

Sym.	Maximum Range	Minimum Setting	Count Rate
1	19999 Cts.	1 Ct.	500/Min. AC.
2	19999 Cts.	1 Ct.	5000/Min. AC
3	199.99 Sec.	.01 Sec.	
4	1999.9 Sec.	.1 Sec.	
5	19.999 Sec.	.001 Sec.	
6	199 Min.: 59 Sec.	1 Sec.	
7	199 Hr.: 59 Min.	1 Min.	

Operating Voltage/Frequency: A6 - 120 VAC, 50/60 Hz
  B6 - 240 VAC, 50/60 Hz
  K6 - 208 VAC, 50/60 Hz

Time Inhibit/Count Line Voltage/Frequency:
  A6 - 120 VAC 50/60 Hz
  B6 - 240 VAC 50/60 Hz
  K6 - 208 VAC 50/60 Hz

Setting Accuracy: Time: ±0.1% or 50 ms, whichever is larger (0˚ to 60˚C)
  Count: 100%

Repeat Accuracy:
  Time: ±0.001% of setting or 35 ms, whichever is larger (0˚ to 60˚C)
  Count: 100%

Reset Time: 30 ms following voltage removal from simulated clutch input (CR1)

Power on Response: 300 ms maximum after voltage applied to terminal 11

Operating Temperature: +32˚ to +140˚F (0˚ to +60˚C)

Output Rating: Relay: 10 amp (resistive), 120 VAC
  Mechanical Life: 20 million operations
  Electrical Life: contingent upon controlled load
  Solid State: 1 amp, 0-264 VAC, VDC

Vibration: Unit function is unaffected by 2.5G sinusoidal vibration magnitude in both directions of the perpendicular mounting axes imposed from 10 to 100 Hz
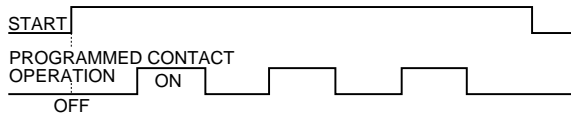
Static Discharge: Unit function is unaffected by a constant 3600 volt peak, 60 Hz discharge applied to the grounded front plate at a relative humidity of less than 25%

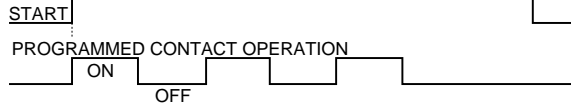**Battery Life:** The CX uses a lithium battery with an expected life of 10 years

Agency Approvals: UL Recognition E96337
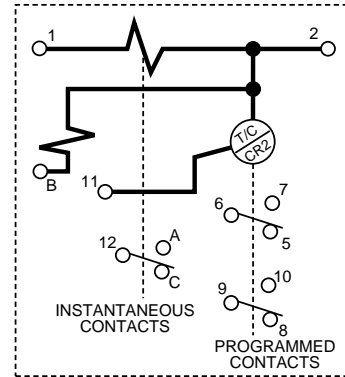 CSA Certification LR26861

CX200 TERMINAL ASSIGNMENTS

INSTANTANEOUS CONTACTS   PROGRAMMED CONTACTS

*COUNT INPUT/TIME INHIBIT

1 AMPHERE SOLID STATE MOSFET SWITCH

*COUNT INPUT/TIME INHIBIT

TERMINALS AND WIRING DIAGRAM ON REAR OF TIMER CASE

MOUNTING

DRILL AND TAP FOUR HOLES FOR 8-32 SCREWS (INCLUDED W/UNIT)

1.406 (35.71)

1.406 (35.71)

3.187 ±.062 (80.95 ±1.57) DIA. CUTOUT

1.406 (35.71)   1.406 (35.71)

MTG. HOLE USED FOR GROUNDING CASE

4.250 (107.95)

3.812 (96.82)

3.062 (77.77)

4.125 (104.78)

1.625 (41.27)

5.750 (146.05)

ENCLOSURES

Model No.	NEMA Class	Description
HN308	1	Surface Mtg. with terminal block
HN364	1	Surface Mtg. without terminal block
HN370	1A	Dual unit cabinet less unit cases and toggle switch, with 9 terminal block

ACCESSORIES

Model No.	Description
H-5331	Mounting Brackets 2 req'd per timer
HP50-31	One Hole Mounting Ring
HP50-131	CYCL-FLEX Water-Sealed Housing provides NEMA 4 Hosedown rating for CX series timers/counters
HP50-133	Surface Mounting Adapter to use in place of brackets
PDM-534	1/4 DIN Adapter Plate

ORDERING INFORMATION

CX2 **02** **A6**

OUTPUT TYPE

Sym.	Description
02	10 amp Relay Output
42	1 amp Solid State MOSFET

VOLTAGE & FREQUENCY

Sym.	Description
A6	120 VAC, 50/60 Hz
B6	240 VAC, 50/60 Hz
K6	208 VAC, 50/60 HZ

Microprocessor based timer/counter housed in the industrial standard CYCL-FLEX® case

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The CX300 is a microprocessor based timer/counter housed in a standard 15 terminal CYCL-FLEX® plug-in case which allows easy removal for programming changes and replacement. Time or count operation, time range, and the type of start input switch operation are programmed with 7 miniature rocker switches located inside the unit housing.

The front panel of the CX300 is a sealed membrane keypad which provides excellent protection for most industrial environments. The time or count setpoint is entered using the increment and decrement keys for each digit position. The SET and ENT keys provide access to the setpoint, as well as to the front panel programmable software functions. These programmable functions control the pulse output length, setpoint to zero or zero to setpoint cycle progress indication, and count input scale factor. The software programming functions are indicated by prompts to help the user program these functions without the need for written instructions.

- Keypad lock function allows viewing of setpoint, but does not allow unauthorized changes
- 4 1/2 digit (19999) liquid crystal display - .5 inch high digits
- Annunciators (right of the display) flash to indicate timing or counting
- Two form C instantaneous contacts and two form C programmed contacts
- Five time ranges from 19.999 sec. to 199 hr.: 59 min.
- Three count rate input rate speeds are programmable with a max. count display of 19999 - can be extended via count input scale factor
- 24, 120, or 240 VAC operations
- Count input available for 120 volt AC or low voltage AC/DC operations
- When programmed as timer, count input circuit serves as time inhibit (without resetting the unit)

SPECIFICATIONS

Time/Count Ranges:

Sym.	Maximum Range	Minimum Setting	Count Rate
1	19999 Cts.	1 Ct.	7500/Sec. 12-50 VDC Count Input
2	19999 Cts.	1 Ct.	500/Min. AC or DC
3	19999 Cts.	1 Ct.	5000/Min. AC or DC
4	199.99 Sec.	.01 Sec.	
5	1999.9 Sec.	.1 Sec.	
6	19.999 Sec.	.001 Sec.	
7	199 Min.: 59 Sec.	1 Sec.	
8	199 Hr.: 59 Min.	1 Min.	

Operating Voltage/Frequency: A6 - 120 VAC, 50/60 Hz
  B6 - 240 VAC, 50/60 Hz
  Z6 - 24 VAC, 50/60 Hz

Time Inhibit/Count Line Terminals B & C:
  CX311/CX341 - 12-50 VDC or 20-28 VAC, 50/60 Hz
  CX312/CX342 - 120 VAC, 50/60 Hz or 120 VDC

Setting Accuracy: Time: ±0.1% or 50 ms, whichever is larger (0˚ to 60˚C)
  Count: 100%

Repeat Accuracy:
  Time: ±0.1% or 35 ms, whichever is larger (0˚ to 60˚C)
  Count: 100%

Reset Time: 30 ms following voltage removal from simulated clutch input (CR1)

Power on Response: 300 ms max. after voltage applied to terminal 11

Operating Temperature: +32˚ to +140˚F (0˚ to +60˚C)

Output Rating: Relay: 10 amp (resistive), 120 VAC
  Mechanical Life: 20 million operations
  Electrical Life: contingent upon controlled load
  Solid State: 1 amp, 0-264 VAC, VDC

Vibration: Unit function is unaffected by 2.5G sinusoidal vibration magnitude in both directions of the perpendicular mounting axes imposed from 10 to 100 Hz

Static Discharge: Unit function is unaffected by a constant 3600 volt peak, 60 Hz discharge applied to the grounded front plate at a relative humidity of less than 25%

Battery Life: The CX uses a lithium battery with an expected life of 10 years

Approvals: UL Recognition E96337
  CSA Certification LR26861

OUTPUT OPERATING MODES

ON-Delay Operation
The contacts are energized at the end of the timing/counting cycle and remain energized until the unit is reset.

Interval Operation
The contacts are energized during the timing/counting cycle and then shut off at the end of the cycle.

Pulse Output Operation
The contacts are energized at the end of the timing/counting cycle for a pulse which is user programmable. See **Front Panel Feature Programming** instructions for details on how to program the pulse length..
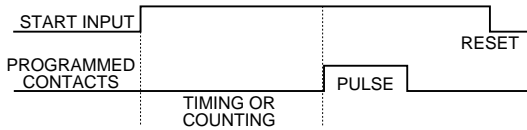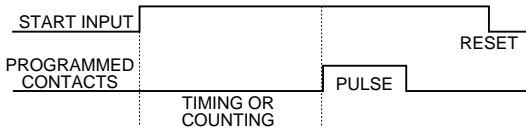
Pulse and Repeat Operation
The contacts are energized at the end of the timing/counting cycle for a pulse which is user programmable. At the same time that the cycle is completed and the pulse output begins, the timing/counting cycle resets and begins again. This repeat operation continues as long as the start circuit is energized.
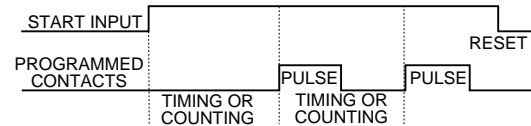
MOUNTING

ENCLOSURES

Model No.	NEMA Class	Description
HN308	1	Surface Mtg. with terminal block
HN364	1	Surface Mtg. without terminal block
HN370	1A	Dual unit cabinet less unit cases and toggle switch, with 9 terminal block

ACCESSORIES

Model No.	Description
H-5331	Mounting Brackets 2 req'd per timer
HP50-31	One Hole Mounting Ring
HP50-131	CYCL-FLEX Water-Sealed Housing provides NEMA 4 Hosedown rating for CX series timers/counters
HP50-133	Surface Mounting Adapter to use in place of brackets
PDM-534	1/4 DIN Adapter Plate

ORDERING INFORMATION

CX3   1   2   A6

OUTPUT TYPE

Sym.	Description
1	10A DPDT Instantaneous
	10 DPDT Delayed Relay Output
4	1A Solid State Output

COUNT / INHIBIT INPUT VOLTAGE

Sym.	Description
1	12-50 VDC, 20-28 VAC, 50/60 Hz
2	120 VDC, 120 VAC, 50/60 Hz

VOLTAGE & FREQUENCY

Sym.	Description
A6	120 VAC, 50/60 Hz
B6	240 VAC, 50/60 Hz
Z6	24 VAC, 50/60 Hz

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ELECTRONIC TIMERS

Dual setpoint, microprocessor based timer/counter... packaged in CYCL-FLEX® case

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The CX400 is a microprocessor based, dual setpoint timer/counter housed in a standard 15 terminal CYCL-FLEX® plug-in case which allows easy removal for programming changes and replacement. Time or count operation, time range, and the type of start input switch operation are programmed with 7 miniature rocker switches located inside the unit housing.

The front panel of the CX400 is a sealed membrane keypad which provides excellent protection for most industrial environments. The time or count setpoint is entered using the increment and decrement keys for each digit position. The SET and ENT keys provide access to the setpoint, as well as to the front panel programmable software functions. These programmable functions control the pulse output length, setpoint to zero/zero to setpoint cycle progress indication, and count input scale factor. The software programming functions are indicated with prompts to help the user program these functions without the need for written instructions.

- Keypad lock function allows viewing of setpoint, but does not allow unauthorized changes
- 4 1/2 digit (19999) liquid crystal display - .5 inch high digits
- Annunciators (right of the display) flash to indicate timing or counting
- Five time ranges from 19.999 sec. to 199 hr.: 59 min.
- Three count input rate speeds are programmable with a max. count display of 19999 - can be extended via count input scale factor
- Designed for 120 VAC operations
- Count input available for 120 volt AC or low voltage AC/DC operations
- When programmed as timer, count input circuit serves as time inhibit (without resetting the unit)

SPECIFICATIONS

Time/Count Ranges:

Sym.	Maximum Range	Minimum Setting	Count Rate
1	19999 Cts.	1 Ct.	7500/Sec. 12-50 VDC Count Input
2	19999 Cts.	1 Ct.	500/Min. AC or DC
3	19999 Cts.	1 Ct.	5000/Min. AC or DC
4	199.99 Sec.	.01 Sec.	
5	1999.9 Sec.	.1 Sec.	
6	19.999 Sec.	.001 Sec.	
7	199 Min.: 59 Sec.	1 Sec.	
8	199 Hr.: 59 Min.	1 Min.	

Operating Voltage/Frequency: A6 - 120 VAC, 50/60 Hz

Time Inhibit/Count Line Terminals B & C:
CX411/CX441 - 12-50 VDC or 20-28 VAC, 50/60 Hz
CX412/CX442 - 120 VAC, 50/60 Hz or 120 VDC

Setting Accuracy: Time: ±0.1% or 50 ms, whichever is larger (0˚ to 60˚C)
Count: 100%

Repeat Accuracy:
Time: ±0.1% or 35 ms, whichever is larger (0˚ to 60˚C)
Count: 100%

Reset Time: 30 ms following voltage removal from terminal 1

Power on Response: 300 ms max.after voltage applied to terminal 11

Operating Temperature: +32˚ to +140˚F (0˚ to +60˚C)

Output Rating:
Relay Contacts:
Instantaneous: 10 amp (resistive), 120 VAC
Delayed: 5 amp (resistive) @ 120 VAC, 60 Hz
Early Trip: 5 amp (resistive) @ 120 VAC, 60 Hz
Mechanical Life: in excess of 20 million operations
Electrical Life: contingent upon contact load
Solid State: 1 amp, 0-264 VAC, VDC

Battery Life: The CX uses a lithium battery with an expected life of 10 years

Approvals: UL Recognition E96337
CSA Certification LR26861

OUTPUT OPERATING MODES

ON-Delay Operation
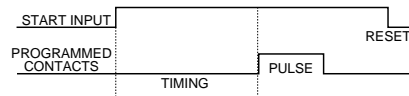The contacts are energized at the end of the timing/counting cycle and remain energized until the unit is reset.

START INPUT
RESET
PROGRAMMED CONTACTS
TIMING OR COUNTING
RESET

Interval Operation
The contacts are energized during the timing/counting cycle and then shut off at the end of the cycle.

START INPUT
RESET
PROGRAMMED CONTACTS
TIMING OR COUNTING

Pulse Output Operation
The contacts are energized at the end of the timing/counting cycle for a pulse which is user programmable. See **Front Panel Feature Programming** instructions for details on how to program the pulse length..

START INPUT
RESET
PROGRAMMED CONTACTS
TIMING OR COUNTING
PULSE

Pulse and Repeat Operation
The contacts are energized at the end of the timing/counting cycle for a pulse which is user programmable. At the same time that the cycle is completed and the pulse output begins, the timing/counting cycle resets and begins again. This repeat operation continues as long as the start circuit is energized.
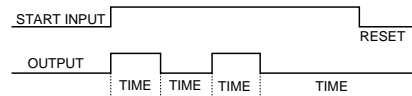
START INPUT
RESET
PROGRAMMED CONTACTS
TIMING OR COUNTING
PULSE
TIMING OR COUNTING
PULSE

MOUNTING

DRILL AND TAP FOUR HOLES FOR 8-32 SCREWS (INCLUDED W/UNIT)

1.406 (35.71)

3.187 ±.062 (80.95 ±1.57) DIA. CUTOUT

1.406 (35.71)

1.406 (35.71)   1.406 (35.71)

MTG. HOLE USED FOR GROUNDING CASE

4.250 (107.95)

3.812 (96.82)

3.062 (77.77)

4.125 (104.78)   1.625 (41.27)

5.750 (146.05)

ENCLOSURES

Model No.	NEMA Class	Description
HN308	1	Surface Mtg. with terminal block
HN364	1	Surface Mtg. without terminal block
HN370	1A	Dual unit cabinet less unit cases and toggle switch, with 9 terminal block

ACCESSORIES

Model No.	Description
H-5331	Mounting Brackets 2 req'd per timer
HP50-31	One Hole Mounting Ring
HP50-131	CYCL-FLEX Water-Sealed Housing provides NEMA 4 Hosedown rating for CX series timers/counters
HP50-133	Surface Mounting Adapter to use in place of brackets
PDM-534	1/4 DIN Adapter Plate

ORDERING INFORMATION

CX4   1   2   A6

OUTPUT TYPE

Sym.	Description
1	10A DPDT Instantaneous
	5A SPDT Programmed
	5A SPDT Early Trip
4	1A Solid State Programmed
	1A Solid State Early Trip

COUNT INPUT / TIME INHIBIT VOLTAGE

Sym.	Description
1	12-50 VDC, 20-28 VAC, 50/60 Hz
2	120 VDC, 120 VAC, 50/60 Hz

VOLTAGE & FREQUENCY

Sym.	Description
A6	120 VAC, 50/60 Hz

Continuously runs cycles with independently settable on/off ratio

5

E L E C T R O N I C

T I M E R S

The CX100 is a solid state repeat cycle timer that will alternately turn an output on and off as long as power is applied to the unit. The CX100 is a microprocessor based timer with digital setting for greater setting accuracy than can be achieved with analog style repeat cycle timers. In addition to its greater setting accuracy, the CX100 timer is fully programmable to provide a number of time ranges and operating modes in one unit.

The ON and OFF time ranges are individually programmable for four time ranges from 199.99 seconds to 199 hours and 59 minutes. The CX100 timer is also programmable to have the ON time first instead of the OFF time first and to reset or non-reset on power interruption. The time ranges and the operating characteristics of the unit are pro- grammed using 7 miniature rocker switches located inside the unit housing.

■ Housed in standard CYCL-FLEX® enclosure for easier removal, programming changes, and service

■ 4 1/2 digit (19999) liquid crystal display - .5 inch high

■ Annunciators (right of the display) flash to indicate ON time cycle and are constantly on to indicate OFF time cycle

■ Two socket mount 10 amp output relays - one performs ON/OFF cycle switching and the other is a set of instantaneous contacts that energize when power is applied to the start input and do not deenergize until power is disconnected from the start input

■ Time inhibit input allows timing function to be stopped without resetting the unit

SPECIFICATIONS

Time Ranges:

Maximum Range	Minimum Setting
199.99 Sec.	.01 Sec.
1999.9 Sec.	.1 Sec.
199 Min.: 59 Sec.	1 Sec.
199 Hr.: 59 Min.	1 Min.

Operating Voltage/Frequency:
A6 - 120 VAC, 50/60 Hz
B6 - 240 VAC ,50/60 Hz

Setting Accuracy: ±0.05% or 50 ms, whichever is larger (0˚ to 60˚C)

Repeat Accuracy:
±0.001% of setting or 35 ms, whichever is larger (0˚ to 60˚C)

Reset Time: 30 ms following voltage removal from simulated clutch input (CR1)

Power on Response: 300 ms maximum after voltage applied to terminal 11

Operating Temperature: +32˚ to +140˚F (0˚ to +60˚C)

Output Rating: Relay: 10 amp (resistive), 120 VAC
Mechanical Life: 20 million operations
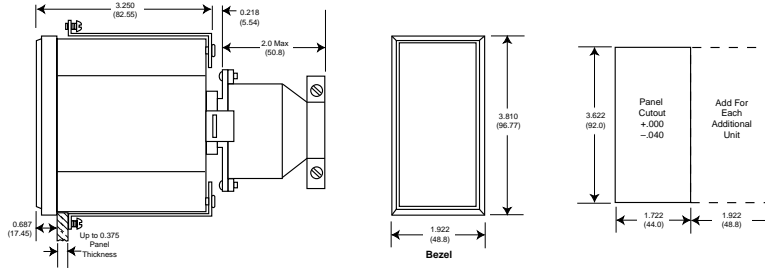Electrical Life: contingent upon controlled load

Vibration: Unit function is unaffected by 2.5G sinusoidal vibration magni- tude in both directions of the perpendicular mounting axes imposed from 10 to 100 Hz

Static Discharge: Unit function is unaffected by a constant 3600 volt peak, 60 Hz discharge applied to the grounded front plate at a relative humidity of less than 25%

Battery Life: The CX uses a lithium battery with an expected life of 10 years

Approvals: UL Recognition E96337
CSA Certification LR26861

OUTPUT OPERATING MODES

OFF Time First/Repeat Cycle Operation

ON Time First/Repeat Cycle Operation

CX100 TERMINAL ASSIGNMENTS

MOUNTING

DRILL AND TAP FOUR HOLES FOR 8-32 SCREWS (INCLUDED W/UNIT)

1.406 (35.71)

1.406 (35.71)

3.187 ±.062 (80.95 ±1.57) DIA. CUTOUT

1.406 (35.71)   1.406 (35.71)

MTG. HOLE USED FOR GROUNDING CASE

4.250 (107.95)

3.812 (96.82)

3.062 (77.77)

4.125 (104.78)   1.625 (41.27)

5.750 (146.05)

ENCLOSURES

Model No.	NEMA Class	Description
HN308	1	Surface Mtg. with terminal block
HN364	1	Surface Mtg. without terminal block
HN370	1A	Dual unit cabinet less unit cases and toggle switch, with 9 terminal block

ACCESSORIES

Model No.	Description
H-5331	Mounting Brackets 2 req'd per timer
HP50-31	One Hole Mounting Ring
HP50-131	CYCL-FLEX Water-Sealed Housing provides NEMA 4 Hosedown rating for CX series timers/counters
HP50-133	Surface Mounting Adapter to use in place of brackets

ORDERING INFORMATION

CX1   00   A6

OUTPUT TYPE

Sym.	Description
00	10 amp Relay Output

VOLTAGE & FREQUENCY

Sym.	Description
A6	120 VAC, 50/60 Hz
B6	240 VAC, 50/60 Hz

Family of compact timers... 1/8 DIN housing mounts in standard relay socket

The DG100 is a solid state timer housed in a 1/8 DIN, molded NORYL® case. The timer uses CMOS integrated circuits for the timing function. The DG100 series timer is available in 16 time ranges from 3.5 seconds to 30 hours. Time is set with a knob referenced to a graduated scale. A pilot light on the front of the unit indicates when the unit is timing.

- All connections make through standard square base relay socket
- Available accessories for conversion into panel mount including a version with plug-in capability
- Standard unit functions as ON-Delay timer in sustained start mode
- Single relay with isolated double pole - double throw relay contact controls outputs
- Timer operation can be configured as: interval output timer with momentary start.

OPERATION

The timing base for the DG100 series timer is generated by an internal oscillator set by a precision capacitor and a dial adjustable potentiometer. This allows accurate control over long time ranges.

The unit times as long as power is applied to the control input terminal. The output contacts change state at the completion of the timing period. The unit resets when power is removed from the control input.

SPECIFICATIONS

Time Ranges:

Sym.	Dial Range	Minimum Setting	Sym.	Dial Range	Minimum Setting
01	3.5 Sec.	.35 Sec.	09	15 Min.	1.5 Min.
02	7 Sec.	.7 Sec.	10	30 Min.	3 Min.
03	15 Sec.	1.5 Sec.	11	60 Min.	6 Min.
04	30 Sec.	3 Sec.	12	120 Min.	12 Min.
05	60 Sec.	6 Sec.	13	4 Hr.	.4 Hr.
06	120 Sec.	12 Sec.	14	8 Hr.	.8 Hr.
07	4 Min.	.4 Min.	15	15 Hr.	1.5 Hr.
08	8 Min.	.8 Min.	16	30 Hr.	3 Hr.

Operating Voltage/Frequency:
120 VAC (+10 -15%), 50/60 Hz or 120 VDC (+10 -15%)
240 VAC (+10 -15%), 50/60 Hz or 240 VDC (+10 -15%)
24 VAC (+10 -15%) 50/60 Hz or 24 VDC (+10 -15%)

Setting Accuracy: Within ±10% of maximum range

Repeatability (Constant Voltage & Temperature):
±0.1% of setting or 25 ms, whichever is larger

Repeatability (Voltage & Temperature Variation):
Variable Voltage: ±1% of setting
Variable Temperature: ±2% of setting
Variable Voltage and Temperature: ±3% of setting

Reset Time: 50 ms

Cycle Progress: Pilot light during timing

Burden:	OFF Time	On Time
120 VAC or DC	.8 VA max.	4.8 VA max.
240 VAC or DC	1.6 VA max.	4.8 VA max.
24 VAC or DC	1.5 VA max.	2.9 VA max.

Power on Response: 30 ms max. after line voltage applied to pins A and B

Operating Temperature: 0˚ to -60˚C (+32˚ to +140˚F)

Output Rating:
Relay: 10 amp steady state, 120 VAC
Mechanical Life: over 20 million operations
Electrical Life: contingent upon load characteristics

Power Interruption:
Line voltage interruptions of 20 ms or less will not reset unit

Transient Voltage Immunity: Unaffected by 50 microseconds, 600 V peak transients superimposed on the line input

Vibration: Unit function is unaffected by 2.5G sinusoidal vibration magnitude in both directions of three perpendicular mounting axes imposed from 10 to 100 Hz

Approvals: UL Recognition E96337
CSA Certification L26861
FM Approved J10C8A4.AF

OUTPUT OPERATING MODES

ON-Delay
    The unit starts timing when voltage is applied to terminals A and B. When the dial setting is reached, the output relay energizes and remains in the energized state as long as voltage is applied to terminals A and B. Removal of voltage from terminals A and B resets the unit.

Interval
    The unit starts timing with the output relay in the energized state when voltage is applied to terminals A and B. When the dial setting is reached, the output relay deenergizes and remains in that state until voltage is reapplied to terminals A and B. Removal of voltage from terminals A and B resets the unit.

DG100 TERMINAL ASSIGNMENTS
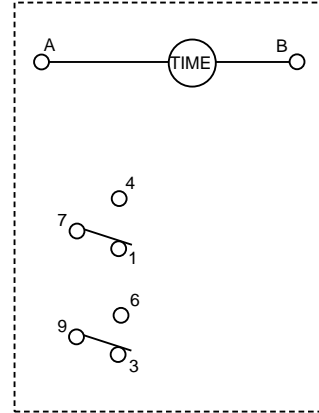
MOUNTING

Panel Mount:
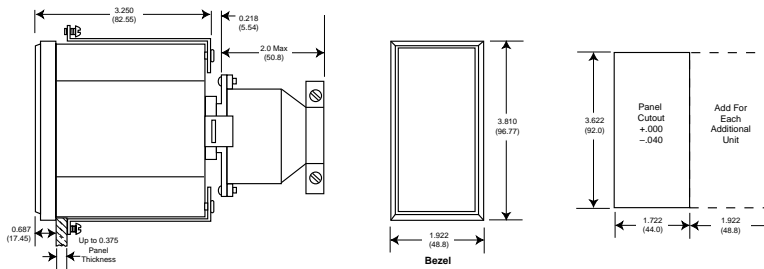
Surface Mount:
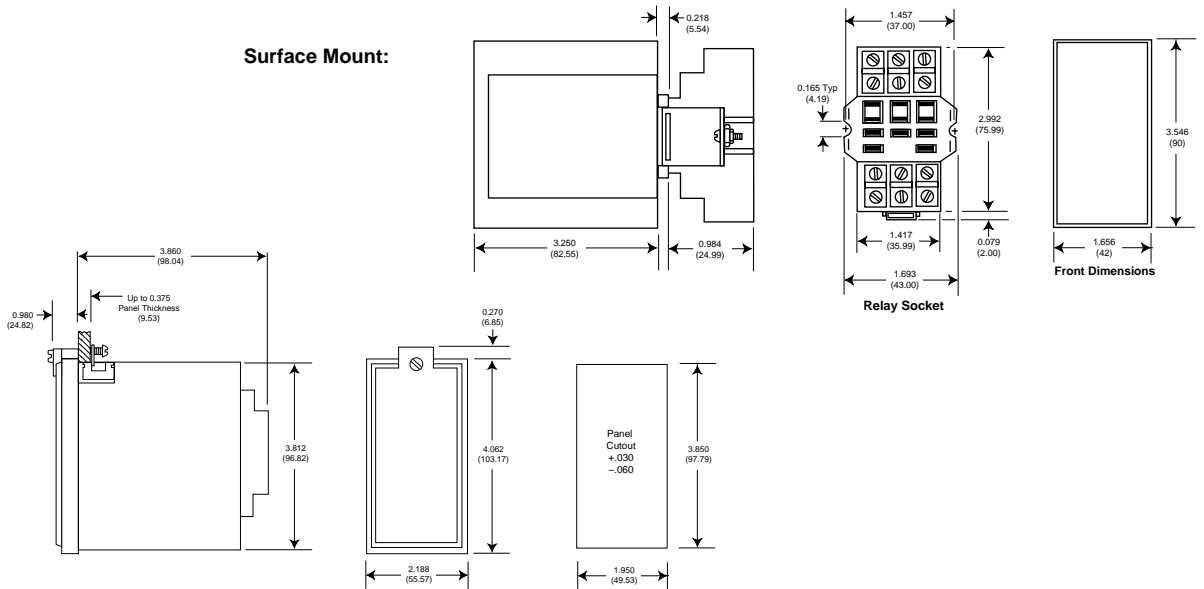
Plug-In Mount:

ORDERING INFORMATION

DG1   03   A3   02

TIME RANGE

See Specifications for
Time Range Catalog Symbol

VOLTAGE & FREQUENCY

Sym.	Description
A3	120 VAC, 50/60 Hz or 120 VDC
B3	240 VAC, 50/60 Hz or 240 VDC
Z3	24 VAC, 50/60 Hz or 24 VDC

FEATURES

Sym.	Description
(Blank)	Standard, On-Delay, DPDT Relay Output
02	Interval Timing

1/8 DIN sized plug-in timer with digital setpoint... 8 operating modes accommodate all popular timer configurations

The DG200 series timer is a microprocessor based, four digit reset timer housed in a 1/8 DIN style enclosure. Four push-button switches on the front of the unit provide exact setting of the time setpoint. There are four time ranges from 99.99 seconds to 99 hours and 99 minutes.

There are two versions of this timer series. The DG201 has six basic output operating modes. The DG203 has the six output modes of the DG201, but it also has a control input for Delay-On-Release and Single-Shot operation. In the other modes, the DG200 control input can be used for a time inhibit function which stops the timing cycle without resetting the unit. Rocker switches, located on the side of the unit, are used to program the time ranges and operating modes.

The DG200 timer can be mounted in three ways for use in most any application. The terminal connections for the unit are 3/16 inch terminals for use with a square base relay socket. This provides a means of mounting the unit within a panel. The DG200 timer can also be mounted through the front of the panel using either an economical fixed bezel kit or a unique plug-in housing which allows easy removal for programming changes and replacement.

Other features include:

■ 5 amp SPDT relay output

■ Separate LED indicators to show timing and relay output operation

■ Recessed programming rocker switches with a protective cover to help prevent accidental switch changes

■ 0.01 second setting resolution for fast time cycles and easy to use minute: second and hour: minute time ranges

■ Optically isolated control input on the DG203 version

■ Time inhibit function on the DG203 version

SPECIFICATIONS

Time Ranges:

Sym.	Maximum Range	Minimum Setting
1	99.99 Sec.	.01 Sec.
2	999.9 Sec.	.1 Sec.
3	99 Min.: 99 Sec.	1 Sec.
4	99 Hr.: 99 Min.	1 Min.

Operating Voltage/Frequency: A6 - 120 VAC, 50/60 Hz
The control input on the DG203 also operates at this voltage.

Setting Accuracy: ±0.01% of setting or 35 ms, whichever is larger

Repeat Accuracy: ±0.01% of setting or 35 ms, whichever is larger

Reset Time: 35 ms

Power on Response: 35 ms

Operating Temperature: +32˚ to +122˚F (0˚ to +50˚C)

Output Rating: 5 amp, 10 to 240 VAC resistive

Vibration: Unit function is unaffected by 2.5G sinusoidal vibration magnitude in both directions of the perpendicular mounting axes imposed from 20 to 100 Hz

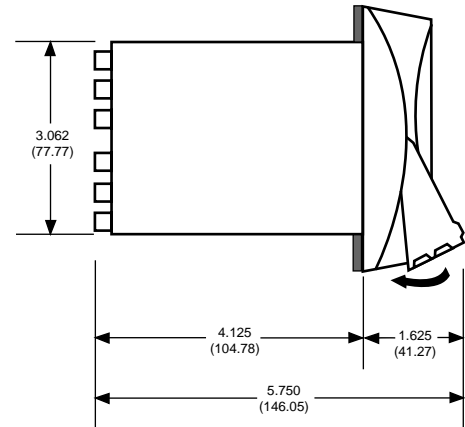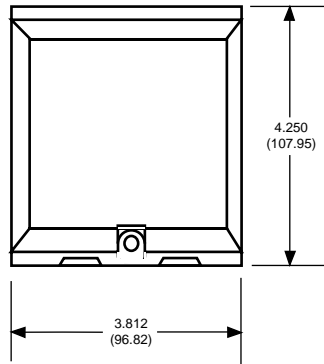**Static Discharge:** Unit function is unaffected by a constant 3600 volt peak, 60 Hz discharge applied to the front plate at a relative humidity of less than 25%

Transient Protection: Immune to 2500 volts peak transients up to 50 microseconds in duration

OUTPUT OPERATING MODES

ON-Delay Operation
    The output contacts are energized at the end of the timing cycle and remain energized until the unit is reset.
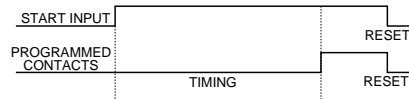
Interval Operation
    The output contacts are energized during the timing cycle and deenergized at the end of the cycle.
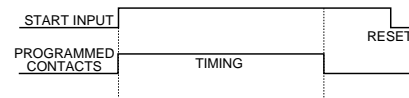
Timed Pulse Output Operation
    The output contacts are energized at the end of the timing cycle for a 100 millisecond pulse output.

OUTPUT OPERATING MODES CONT.

Timed Pulse and Repeat Operation
The output contacts are energized at the end of the timing cycle for a 100 millisecond pulse. At the same time that the cycle is completed and the pulse output begins, the timing cycle resets and begins again. This repeat operation continues as long as the start circuit is energized.

START INPUT | PROGRAMMED CONTACTS | RESET | TIMING | PULSE | TIMING | PULSE

Repeat Cycle - ON First
The output contacts are energized for repeating ON and OFF periods. The ON and OFF time periods are the same length.

START INPUT | RESET | OUTPUT | TIME | TIME | TIME | TIME

Single-Shot (DG203 Only)
When power is applied to start input, the output contacts energize and the time delay period starts. The output contacts deenergize at time out.

ENABLE INPUT | START INPUT | OUTPUT | TIMING

Repeat Cycle - OFF First
The output contacts are energized for repeating OFF and ON periods. The OFF and ON time periods are the same length.

START INPUT | RESET | OUTPUT | TIME | TIME | TIME | TIME

Delay ON Release (DG203 Only)
The output contacts are energized when power is applied to the start input. The time delay cycle begins when the start input is opened.

ENABLE INPUT | START INPUT | OUTPUT | TIMING

ACCESSORIES

Model No.	Description
DZ100-51	Bezel Kit - for panel mounting. Includes (1) Bezel, (1) gasket, (2) brackets, and hardware
DZ100-54	Plug-in Housing
DZ100-56	Latch and Release Kit - Used with 60SR3B05 Socket
60SR3B05	Surface/Track Mount Square Base Socket

MOUNTING

Panel Mount:
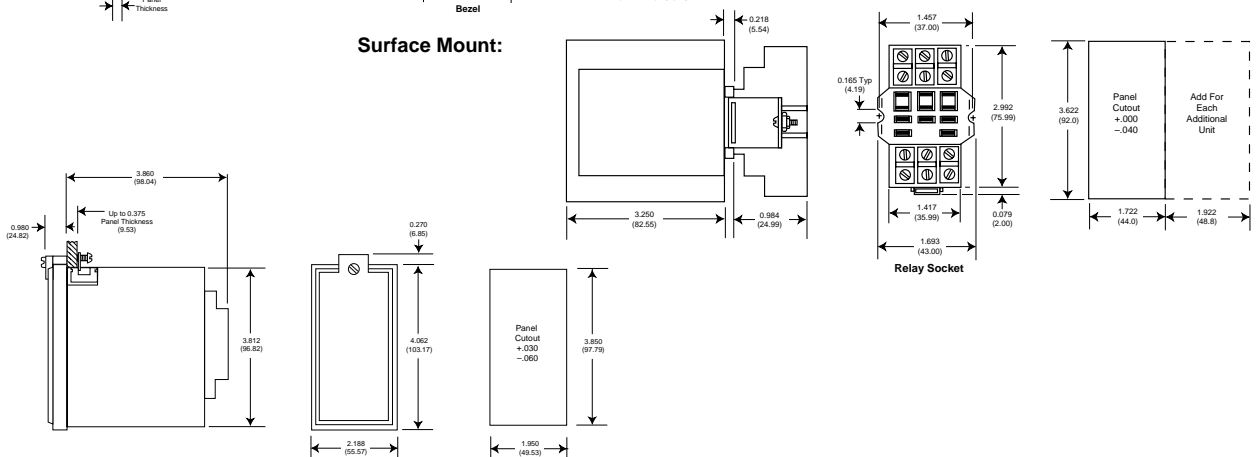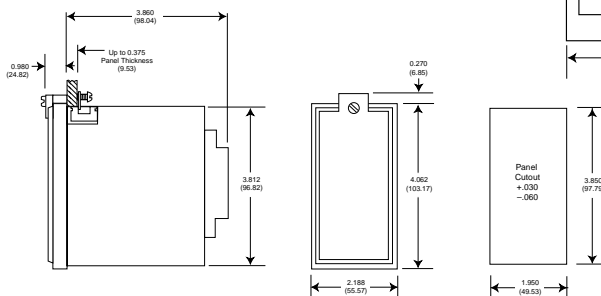
3.250 (82.55) | 0.218 (5.54) | 2.0 Max (50.8) | 0.687 (17.45) | Up to 0.375 Panel Thickness

3.810 (96.77) | 1.922 (48.8) | **Bezel**

3.546 (90) | 1.656 (42) | **Front Dimensions**

Surface Mount:

0.218 (5.54) | 3.250 (82.55) | 0.984 (24.99)

0.165 Typ (4.19) | 1.457 (37.00) | 2.992 (75.99) | 1.417 (35.99) | 0.079 (2.00) | 1.693 (43.00) | **Relay Socket**

3.622 (92.0) | Panel Cutout +.000 −.040 | Add For Each Additional Unit | 1.722 (44.0) | 1.922 (48.8)

Plug-In Mount:

3.860 (98.04) | 0.980 (24.82) | Up to 0.375 Panel Thickness (9.53) | 3.812 (96.82)

0.270 (6.85) | 4.062 (103.17) | 2.188 (55.57)

Panel Cutout +.030 −.060 | 3.850 (97.79) | 1.950 (49.53)

ORDERING INFORMATION

DG2   01   A6

BASIC UNIT	
Sym.	Description
DG2	5 amp SPDT Relay Output

INPUT / OUTPUT	
Sym.	Description
01	6 Operating Modes - No Control Input
03	8 Operating Modes - With Control Input

VOLTAGE & FREQUENCY	
Sym.	Description
A6	120 VAC, 50/60 Hz

Continuous repeat cycle timing in a compact 1/8 DIN case... fast, easy analog dial setpoint adjustment

5

E L E C T R O N I C

T I M E R S

The DA100 is a solid state ON/OFF repeat cycle timer housed in a 1/8 DIN, molded NORYL® case. The timer uses CMOS integrated circuits for the timing function. Sixteen time ranges are available in any combination of ON and OFF periods. Two knobs reference to a calibrated scale provide the individual time settings. Two front mounted pilot lights indicate timing status.

■ All connections made through standard square base relay socket

■ Available accessories for conversion into panel mount including a version with plug-in capability

■ Standard unit times its OFF period first and provides an isolated double pole - double throw relay contact output

■ Available options include ON-Time First timing and One-Cycle timing (previously required two time delay relays)

OPERATION

The timing base for each of the two timing states (ON time and OFF time) is generated by an internal oscillator set by a precision capacitor and a dial adjustable potentiometer. This allows accurate control over the long time ranges available with the DA100 series.

The DA100 alternately times its OFF and ON periods as long as power is applied to the control input terminal. The output contacts change state at the completion of each timing period. The DA100 resets when power is removed from the control input.

SPECIFICATIONS

Time Ranges:

Sym.	Dial Range	Minimum Setting	Sym.	Dial Range	Minimum Setting
10	3.5 Sec.	.37 Sec.	18	15 Min.	1.6 Min.
11	7 Sec.	.75 Sec.	19	30 Min.	3.2 Min.
12	15 Sec.	1.5 Sec.	20	60 Min.	6.4 Min.
13	30 Sec.	3 Sec.	21	120 Min.	12.8 Min.
14	60 Sec.	6 Sec.	22	4 Hr.	25.6 Min.
15	120 Sec.	12 Sec.	23	8 Hr.	51.2 Min.
16	4 Min.	24 Sec.	24	15 Hr.	1.7 Hr.
17	8 Min.	48 Sec.	25	30 Hr.	3.4 Hr.

Operating Voltage/Frequency:
120 VAC (+10 -15%), 50/60 Hz or 120 VDC (+10 -15%)
240 VAC (+10 -15%), 50/60 Hz or 240 VDC (+10 -15%)
24 VAC, 50/60 or 24 VDC

Setting Accuracy: Within ±10% of maximum range

Repeatability (Constant Voltage & Temperature):
±0.1% of setting or 25 ms, whichever is longer

Repeatability (Voltage & Temperature Variation):
Variable Voltage: ±1% of setting
Variable Temperature: ±2% of setting
Variable Voltage and Temperature: ±3% of setting

Reset Time: 65 ms

Cycle Progress: Pilot lights during ON time and OFF time

Power on Response: 30 ms max. after line voltage applied to pins A and B

Operating Temperature: 0˚ to 60˚C (+32˚ to +140˚F)

Output Rating:
Relay: 10 amp steady state
Mechanical Life: over 20 million operations
Electrical Life: contingent upon load characteristics

Power Interruption:
Line voltage interruptions of 20 ms or less will not reset unit

Transient Voltage Immunity: Unaffected by 50 microseconds, 600 V peak transients superimposed on the line input

Vibration: Unit function is unaffected by 2.5G sinusoidal vibration magnitude in both directions of three perpendicular mounting axes imposed from 10 to 100 Hz

Approvals: UL Recognition E96337
CSA Certification L26861
FM Approved J10C8A4.AF

MOUNTING

Panel Mount:

3.250 (82.55)
0.218 (5.54)
2.0 Max (50.8)
3.810 (96.77)
3.622 (92.0)

Panel Cutout +.000 −.040

Add For Each Additional Unit

0.687 (17.45)
Up to 0.375 Panel Thickness

1.922 (48.8)
Bezel
1.722 (44.0)
1.922 (48.8)

Surface Mount:

0.218 (5.54)
1.457 (37.00)
0.165 Typ (4.19)
2.992 (75.99)
3.546 (90)
3.250 (82.55)
0.984 (24.99)
1.417 (35.99)
0.079 (2.00)
1.656 (42)
Front Dimensions
1.693 (43.00)
Relay Socket

Plug-In Mount:

3.860 (98.04)
Up to 0.375 Panel Thickness (9.53)
0.980 (24.82)
0.270 (6.85)
3.812 (96.82)
4.062 (103.17)
Panel Cutout +.030 −.060
3.850 (97.79)
2.188 (55.57)
1.950 (49.53)

DA100 TERMINAL ASSIGNMENTS

A — (TIME) — B

4
7
1
6
9
3

ACCESSORIES

DZ100-51 Bezel Kit for panel mounting. Kit includes bezel, bezel gasket, brackets and mounting hardware.

DZ100-52 Strain Relief Kit provides cable connection to panrl mounted unit. Includes H11496 strain relief and 4270-0621 socket and hardware.

DZ100-54 Plug-in Housing for panel mounting units with plug-in conveinience. Kit includes housing and mounting brackets.

DZ100-56 Latch and Latch Release Kit for surface mounting. Kit includes latch, spacer, latch release and mounting hardware (use with 60SR3BO5 Relay Socket).

60SR3BO5 Square Base Relay Socket

DZ100-51
DZ100-52
DZ100-54
DZ100-56

ORDERING INFORMATION

DA **10** **10** **A3** **01**

OFF TIME

See Specifications for Time Range Catalog Symbol

ON TIME

See Specifications for Time Range Catalog Symbol

VOLTAGE & FREQUENCY

Sym.	Description
A3	120 VAC, 50/60 Hz or 120 VDC
B3	240 VAC, 50/60 Hz or 240 VDC
Z3	24 VAC, 50/60 Hz or 24 VDC

FEATURES

Sym.	Description
(Blank)	Standard, OFF Time First, DPDT Relay Output
01	ON Time First
03	One Cycle Only (OFF Time First)
	(Requires factory components)

Repeat cycle timer with digital setpoints and 4 time ranges... compact 1/8 DIN case

The DA200 series timer is a microprocessor based repeat cycle timer housed in a 1/8 DIN style enclosure. Two 4 digit push-button switches on the front of the unit provide exact setting of the ON and OFF time setpoints. Four time ranges from 99.99 seconds to 99 hours and 99 minutes can be independently programmed for the ON and OFF times. Repeat or Single Cycle operation and ON or OFF time first operation can also be programmed. All programming is done using rocker switches located on the side of the unit.

The DA200 timer can be mounted in three ways for use in most any application. The terminal connections for the unit are 3/16 inch terminals for use with a square base relay socket. This provides a means of mounting the unit within a panel. The DA200 timer can also be mounted through the front of the panel using either an economical fixed bezel kit or a unique plug-in housing which allows easy removal for programming changes and replacement.

DA200 timer features include:

■ DPDT 5 amp relay output

■ Two LED indicators to show ON and OFF time operation

■ Recessed programming rocker switches with a protective cover to help prevent accidental switch changes

■ 0.01 second setting resolution for fast time cycles and easy to use minute: second and hour: minute time ranges

Operating Voltage/Frequency: A6 - 120 VAC, 50/60 Hz

Setting Accuracy: 0.01% of setting or 35 ms, whichever is larger

Repeat Accuracy: 0.01% of setting or 35 ms, whichever is larger

Reset Time: 15 ms

Power on Response: 35 ms

Operating Temperature: +32˚ to +122˚F (0˚ to +50˚C)

Output Rating: 5 amp, 10 to 240 VAC resistive

Vibration: Unit function is unaffected by 2.5G sinusoidal vibration magnitude in both directions of the perpendicular mounting axes imposed from 20 to 100 Hz

Static Discharge: Unit function is unaffected by a constant 3600 volt peak, 60 Hz discharge applied to the front plate at a relative humidity of less than 25%

Transient Protection: Immune to 2500 volts peak transients up to 50 microseconds in duration

OUTPUT OPERATING MODES

Repeat Cycle Operation - OFF Time First

Repeat Cycle Operation - ON Time First

SPECIFICATIONS

Time Ranges:

Sym.	Maximum Range	Minimum Setting
1	99.99 Sec.	.01 Sec.
2	999.9 Sec.	.1 Sec.
3	99 Min.: 99 Sec.	1 Sec.
4	99 Hr.: 99 Min.	1 Min.
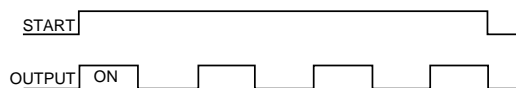
OUTPUT OPERATING MODES CONT.

Single-Cycle Operation - OFF Time First

START

OUTPUT   ON

Single-Cycle Operation - ON Time First

START

OUTPUT   ON

MOUNTING

Panel Mount:

3.250
(82.55)

0.218
(5.54)

2.0 Max
(50.8)

3.810
(96.77)

3.622
(92.0)

Panel
Cutout
+.000
–.040

Add For
Each
Additional
Unit

0.687
(17.45)

Up to 0.375
Panel
Thickness

1.922
(48.8)

Bezel

1.722
(44.0)

1.922
(48.8)

Plug-In Mount:

3.860
(98.04)

0.980
(24.82)

Up to 0.375
Panel Thickness
(9.53)

0.270
(6.85)

3.812
(96.82)

4.062
(103.17)

Panel
Cutout
+.030
–.060

3.850
(97.79)

2.188
(55.57)

1.950
(49.53)

Surface Mount:

0.218
(5.54)

1.457
(37.00)

0.165 Typ
(4.19)

2.992
(75.99)

3.546
(90)

3.250
(82.55)

0.984
(24.99)

1.417
(35.99)

0.079
(2.00)

1.656
(42)

Front Dimensions

1.693
(43.00)

Relay Socket

DA200 TERMINAL ASSIGNMENTS

A   (TIME)   B

4

7   1

6

9   3

ACCESSORIES

DZ100-51 Bezel Kit for panel mounting. Kit includes bezel,bezel gasket, brackets and mounting hardware.

DZ100-52 Strain Relief Kit provides cable connection to panrl mounted unit. Includes H11496 strain relief and 4270-0621 socket and hardware.

DZ100-54 Plug-in Housing for panel mounting units with plug-in conveinience. Kit includes housing and mounting brackets.

DZ100-56 Latch and Latch Release Kit for surface mounting. Kit includes latch, spacer, latch release and mounting hardware (use with 60SR3BO5 Relay Socket).

60SR3BO5 Square Base Relay Socket

DZ100-51

DZ100-52

DZ100-54

DZ100-56

ORDERING INFORMATION

DA2   11   A6

BASIC UNIT

Sym.	Description
11	5 amp DPDT Relay Output

VOLTAGE & FREQUENCY

Sym.	Description
A6	120 VAC, 50/60 Hz

Solid state reset timer... housed in standard CYCL-FLEX® case

The CD300 is a solid state reset timer housed in a standard CYCL-FLEX® case. The timer uses CMOS integrated circuits for the timing function. The timer is set by three digital thumbwheel switches on the front of the unit. Five neon annunciators on the front of the unit indicate when the unit is timing, and the timing cycle progress in increments of 25%, 50%, 75%, and 100% (timed out).

■ Configured into one of three time ranges via program wire located on printed circuit board inside the unit (easily accessible when unit is removed from the case)

■ Function is similar to Eagle Signal brand HP5 and CT530/531

■ Easily programmable reverse start feature

■ Two electromechanical relays control output sequences - one energizes when timer starts timing cycle and the other energizes when timer completes timing cycle

■ Usable timing output available when instantaneous and delayed relay contacts are interconnected

OPERATION

The timing is controlled by an internal oscillator. The oscillator output is directed to designated frequency dividers through a programming wire, providing the selection of one of three time ranges.

Relay (CR1) is energized when power is applied to the control input. For standard start units, timing starts when the clutch relay is energized. For reverse start units, the timer is reset when the clutch relay is energized and timing starts when the input to the relay is removed.

A delay relay (CR2) is energized when the timing cycle is complete. The operation of the delay relay is identical in both standard start and reverse start units.

SPECIFICATIONS

Time Ranges:

Sym.	Maximum Range	Minimum Setting
01	99.9 Sec.	.1 Sec.
02	999 Sec.	1 Sec.
03	99.9 Min.	.1 Min.

The 01 time range is standard. The CD is field programmable for the other time ranges.

Operating Voltage/Frequency: 120 VAC, 50/60 Hz
240 VAC, 50/60 Hz

Repeatability (Constant Voltage & Temperature):
±0.1% of setting or 35 ms, whichever is larger

Repeatability (Voltage & Temperature Variation):
Variable Voltage: ±1% of setting or 35 ms
Variable Temperature: ±2% of setting or 35 ms
Variable Voltage and Temperature: ±3% or 35 ms

Reset Time: 100 ms

Cycle Progress: Cycle ON annunciator with time progression annunciators indicating elapsed time percentages of 25%, 50%, 75%, and 100% (cycle complete)

Burden:	Reset	Timing	Timed-Out
120 VAC	.8 VA max.	4.0 VA max.	7.3 VA max.
240 VAC	1.6 VA max.	4.8 VA max.	8.0 VA max.

Power on Response: 40 ms max. after application of line voltage to pins 1 and 2

Operating Temperature: +0˚ to 60˚C (+32˚ to +140˚F)

Output Rating: Relay: 10 amp steady state at 120 VAC, 60 Hz
Mechanical Life: over 20 million operations
Electrical Life: contingent on load characteristics

Power Interruption:
Line voltage interruptions of 16 ms or less will not reset unit

Transient Voltage Immunity: Unaffected by 50 microseconds, 600 V peak transients superimposed on the line input

Vibration: Unit function is unaffected by 2.5G sinusoidal vibration magnitude in both directions of three perpendicular mounting axes imposed from 10 to 100 Hz

Approvals: UL Recognition E96337
CSA Certification LR26861

CD300 TERMINAL ASSIGNMENTS

INSTANTANEOUS CONTACTS   DELAYED CONTACTS
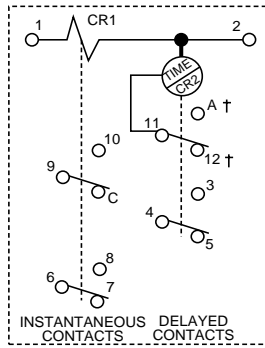
† Terminals A and 12 are useable ONLY on 120 Volt

MOUNTING

DRILL AND TAP FOUR HOLES FOR 8-32 SCREWS (INCLUDED W/UNIT)

1.406 (35.71)

1.406 (35.71)

3.187 ±.062 (80.95 ±1.57) DIA. CUTOUT

1.406 (35.71)   1.406 (35.71)

MTG. HOLE USED FOR GROUNDING CASE

4.250 (107.95)

3.812 (96.82)

3.062 (77.77)

4.125 (104.78)   1.625 (41.27)

5.750 (146.05)

ENCLOSURES

Model No.	NEMA Class	Description
HN308	1	Surface Mtg. with terminal block
HN364	1	Surface Mtg. without terminal block
HN368	1A	Dual unit cabinet with 9 position terminal block, timer housings, and DPST toggle switch
HN370	1A	Dual unit cabinet less unit cases and toggle switch, with 9 terminal block

ACCESSORIES

Model No.	Description
H-5331	Mounting Brackets 2 req'd per timer
HP50-31	One Hole Mounting Ring
HP50-133	Surface Mounting Adapter to use in place of brackets

ORDERING INFORMATION

CD3   **01**   **A6**   **01**

PROGRAMMABLE TIME RANGES

Sym.	Description
01*	99.9 Sec.
02	999 Sec.
03	99.9 Minutes

*The 01 Time Range is standard.
The CD is field programmable for the other time ranges.

VOLTAGE & FREQUENCY

Sym.	Description
A6	120 VAC, 50/60 Hz
B6	240 VAC, 50/60 Hz

CUSTOMER PROGRAMMABLE FEATURE

Sym.	Description
01	Reverse Start

Electronic low profile surface mount reset timer... features 11 time ranges

5

DESCRIPTION

BRE enclosed construction with front facing dial and knob. The BRE timer has a heavy duty terminal block, with 9 screw terminals that will readily accept 16 gauge wire commonly used in industrial circuit wiring.

The case of the BR series timer is injection molded Lexan®. This material is recognized by Underwriters Laboratories for use as the sole support of current carrying components. Lexan is self-extinguishing, has a high impact strength, and high dimensional stability.

OPERATION

The NEW BRE series reset timers are micro proces-sor driven. They provide an accurate adjustable time delay between the actuation of the control circuit and the operation of the load switches. New standard pilot light is on during timing period.

Standard Start

Instantaneous contact 8-9 and 8-3 operates directly with energization of 1 & 2, (CRI), offering different sequences of operation depending on the control circuit configuration. Delayed contacts 6-5 close and 6-7 and 1-4 open when timer reaches a timed out condition. Contacts 6-7 and 1-4 close and 6-5 open when timer is reset.
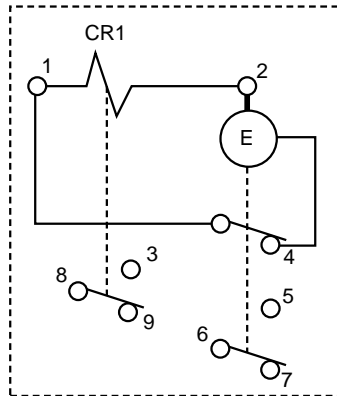
Reverse Start

Instantaneous contact 8-9 operates directly with the energization of 1 & 2 (CRI). Delayed contacts 6-5 close and 6-7 and 3-4 open when timer reaches a timed out position. Contacts 6-7 and 3-4 close and 6-5 open when timer is reset.
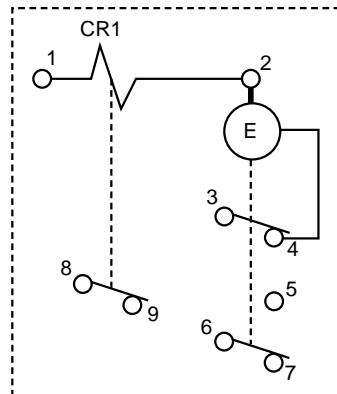
SPECIFICATIONS

Time Ranges:

Sym.	Maximum Setting	Minimum Setting	Dial Mark Divisions
1	5 Sec.	.05 Sec.	1/4 Sec.
3	15 Sec.	.15 Sec.	1 Sec.
4	30 Sec.	.3 Sec.	2 Sec.
5	60 Sec.	.6 Sec.	2 Sec.
6	150 Sec.	1.5 Sec.	5 Sec.
7	5 Min.	3 Sec.	15 Sec.
8	10 Min.	6 Sec.	30 Sec.
9	30 Min.	18 Sec.	2 Min.
10	60 Min.	.6 Min.	2 Min.
11	5 Hr.	3 Min.	15 Min.
12	10 Hr.	6 Min.	30 Min.

Repeatability: Typical ±1/4% of full scale

Reset Time: 1 ms

Voltage/Frequency: 120V (+10, -15%), 50/60 Hz
240V (+10, -15%), 50/60 Hz

Power Consumption: 1.5 W

Output Rating: 10 amp, 1/4 HP, 120/240 VAC
1/2 amp, 125 VDC
1/4 amp, 240 VDC

Activation Time: 150 ms

Dial Setting Accuracy: 3% of full scale

Minimum Setting: 2% of full scale

Operating Temperature: -10˚ to 140˚F (-23˚ to +60˚C)

Laboratory Testing: UL Recognition E61735; FM Approval 21038

DIMENSIONS

Inches (mm)
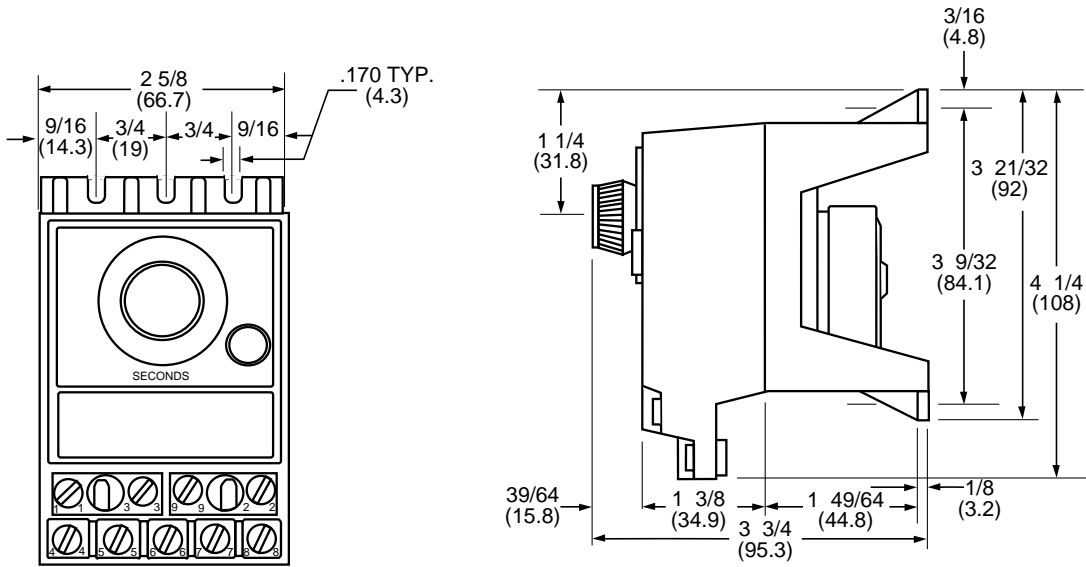
ORDERING INFORMATION

BR   E   5   A6   01

Sym.	Description
E	Surface mounted with dial knob and 9 point screw type terminal block

FEATURES

Sym.	Description
Blank	Standard Timer
01	Reverse Start

TIME RANGE

Sym.	Description	Sym.	Description
1	5 Sec.*	8	10 Min.
3	15 Sec.	9	30 Min.
4	30 Sec.	10	60 Min.
5	60 Sec.	11	5 Hr.
6	150 Sec.	12	10 Hr.
7	5 Min.		

*Not available in B6 version

VOLTAGE & FREQUENCY

Sym.	Description
A6	120V, 50/60 Hz
B6	240V, 50/60 Hz

Cost effective, compact elapsed time indicator… large display with backlighting

All in the family - Other matching A103 series products in this catalog:

A103 Totalizing Counters:	Page 1.02
A103 Preset Counters:	Page 2.07
A103 Tachometers/Rate Indicators:	Page 4.04 - 4.06
A103 Preset Timers:	Page 5.05

CE

The A103 Elapsed Time Indicators provide a range of capabilities unequaled in products of similar size and cost. A single model can be programmed to display in seconds, minutes, hours, or hours: minutes: seconds. The A103 series also includes matching indicators for count totalization and rate metering, as well as models with a preset output for control by count or time. All are in a uniform 36 x 72 millimeters bezel size package, enhancing your control panel with a family of devices that look and program alike.

A supertwist LCD display with thick 12mm (.47") high digits allows for easy viewing at a glance and feature display-backlight capability by simply connecting an external 12VDC supply.

Powered by an internal 3 volt battery, the A103's unique design has two battery slots; this allows battery changeover without loss of memory.

Timing start/stop can be initiated by solid-state signals or mechanical switches.

■ Matching totalizing and preset counters, preset timers, tachometer/ rate indicators are available – look great together on a panel

■ High visibility 7-digit LCD display with backlighting capability standard

■ Long life 3 Volt lithium battery eliminates the need for external power

■ Accepts input signals from a variety of sources: Dry Contact, PNP or NPN Sensors

■ Single multirange model covers popular time resolutions

■ Resettable remotely or from the front panel

■ Programmable security of front panel reset button

■ Option modules provide additional functionality and added conve- nience – fast, easy installation

■ NEMA 4X/IP65 rated front panel for use in washdown environments

The A103 timers are further enhanced by a series of quick-attach option modules. These can provide a power supply for sensors and display backlighting, and accept high or low voltage AC or DC input signals.

SPECIFICATIONS

Start/Stop Input: NPN, Contact Closure; Accumulates time when connected to common; Low State: < 1.0 VDC, High State: > 2.0 VDC (28VDC max)
Security Input: Allows access to panel reset and programming features
Remote Reset Input: NPN or Contact Closure to common; level sensitive
Power Source: Single or dual 3V Lithium battery; typical 5 years life w/single battery, 10 years w/dual batteries
Ranges & Resolution: Seconds, minutes to 1/10, hours to 1/10, hours: minutes: seconds
Display: 12mm high, Supertwist LCD; 7 digits; "Low Bat" indicator
Backlighting: Green Illumination over whole viewable area. Requires 10 to 28 VDC power source
Dimensions & Mounting: See dimensions figure. Panel Mount with supplied mounting bracket and gasket
Connections: Screw terminals
Weight: Approximately 64 grams (2.25 ounces)

OPTION MODULE SPECIFICATIONS

Option modules accessories provide a convenient integrated solution to applications that require AC or high voltage DC signals, and/or a voltage source for use with the A103's display backlight feature or external. Specifications for each option module feature follow, while specific combinations of features are listed in the "Models" table, below.

High Voltage Input: Allows A103 to accept 100 to 260 Volt AC/DC as timing input
Low Voltage Input: Allows A103 to accept 5 to 30 VAC or VDC as timing input
AC Power Supply: Provides 10 - 20 VDC @ 50 mA for display backlighting and/or sensor. Requires connection to 115 or 230 VAC, 50/60 Hz

Model No.	Description
A103-006	A103 Elapsed Time Indicator

The following option modules attach to the rear of A103 timers:		

Model No.	AC Power Supply	Low Voltage Input	High Voltage Input
A103-A12	X		
A103-A17		X	
A103-A19	X	X	
A103-A10			X
A103-A14	X		X

Replacement Battery: 605472-0001
Panel Hole Punch: A103-A40

Dimensions:

72mm (2.83")
68mm (2.66")
36mm (1.42")
33mm (1.30")

A103 Rear View

Option Module Rear View

Depth Behind Panel
Without Adaptor Module: 39mm (1.54")
With Adaptor Module: 89mm (3.50")
Panel Cutout: 33mm x 68mm(1.30" x 2.66")

A family of low cost, high performance LCD indicators and accessories

E135458
Specific Models

CE

The MITE Series 7999 time indicators offer unmatched ease-of-use, simplicity, performance and value. Two models provide four timing ranges to cover applications such as coating/rinsing, baking and engine usage.

- Timers include models for second or minutes and seconds; or hours and minutes or hours and hundreths
- Compact, solid state design
- Front panel and remote reset
- NEMA-4/IP65 environmental sealing
- Easy-to-read, high contrast Liquid Crystal Display (LCD)
- UL recognized, CSA Certified
- Supplied with prewired plug-in connector
- Fast, easy mounting - minimal 1.2" (30mm) depth behind panel
- Very low priced - without sacrifice of performance or reliability

SPECIFICATIONS

Accuracy: Timer: ±20 ppm @ 20°C

Inputs: Contact closure or open collector

Display: 7 digit, 7mm LCD

Reset: Front panel (selectable), remote by contact closure or NPN transistor.

Power Requirements: None; permanent internal lithium battery with 10-year typical life

Operating Temperature: +14° to +144 °F (−10° to +60°C)

Storage Temperature: +4° to +144 °F (−20° to +60°C)

Model No.	Description
079998D-510	LCD Time Indicator, Sec or Min-Sec, Din Size
079998D-610	LCD Time Indicator, Hr-Min or Hrs–$1/_{100}$ths, Din Size

ACCESSORIES

AC/DC Input Module: Allows use of high voltage input signal of 5 to 240 VAC/DC. Connections are via screw terminations. Part Number 108940-0001

Screw Terminal Adaptor: Provides the convenience of screw terminal connection of input signal and remote reset. Part Number 108937-0001

Typical Applications:

1–Total Machine Hours
2–Tools Usage Time

7999 Timers

Dimensions:

48mm
24mm

Behind panel depth: 30.5mm
With adaptor installed: 47mm
44.9mm
REAR
21.9mm
Adaptor
4mm
SIDE
Mounting Clip

Panel Cutout: 45mm x 22mm (+0.5, -0)

DIN Size Models

5
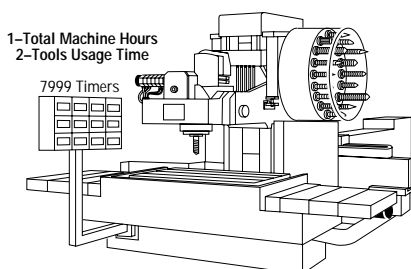
ELECTRONIC TIMERS
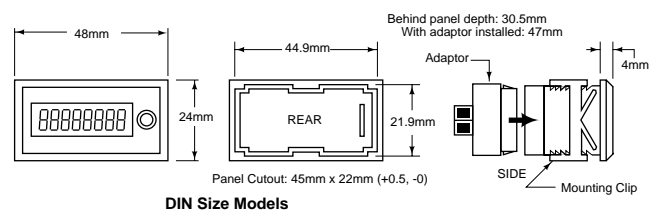
- **Attractive 5mm 6-digit LCD display**
- **High reliability non-volatile memory**
- **Wide voltage range.**
- **Wide industrial temperature range.**
- **Snap-fit panel mounting**
- **Hourglass operation indicator**
- **Low power consumption**
- **Reverse polarity protection (85VDC)**

The Veeder-Root brand Series EHM hourmeter provides an industrial environment time monitoring function.

There are three versions of the hourmeter with identical functionality:
- Round Meter – 2.4" panel bezel
- Rectangular Meter – 2.09" x 1.23" panel bezel
- PCB Mount Meter.

All are entirely fashioned from high strength plastic and feature a high-contrast LCD display.

SPECIFICATIONS

Accuracy: ±2 sec over temperature
Display: 6-digit LCD, 5 mm high
Power: 9-85VDC @ 4mA max.
Non-Volatile Memory: Exclusive Error Detection/Error Correction algorithm provides single fault error of less than 4 seconds over 100,000 hours.
Range & Resolution: 99999.9 hours @ 0.1 hour resolution
Timing Activation: 9-85VDC
Timing Indication: Hourglass Icon
Termination: Blade terminals; 1/4" on round case; 3/16" on rectangular case
EMC EMC Susceptibility:
   EN61000-4-2 for industrial environments
   EN50082-1 for commercial and light industrial environments.
EMC Emissions
   EN50081-1 for light industrial environments
   EN50081-2 for industrial environments
Operating temperature: -40C to +85C (LCD response degrades < -30C and > +75C)
Storage Temperature -40C to +85C (LCD glass freezes at -40C)
Humidity: 5% to 95% RH non-condensing
Safety: Low Voltage Directive Safety Requirements EN61010-1
Vibration: SAE J 1378 20g
Mechanical Shock: SAE J 1378 55g
Environmental Sealing: NEMA4X

MOUNTING DETAILS

2.1" Dia.
53.3mm

0.06"
R1.54mm

0.95"
24.1mm

0.15"
3.8mm

1.45"
36.8mm

1.75"
44.5mm
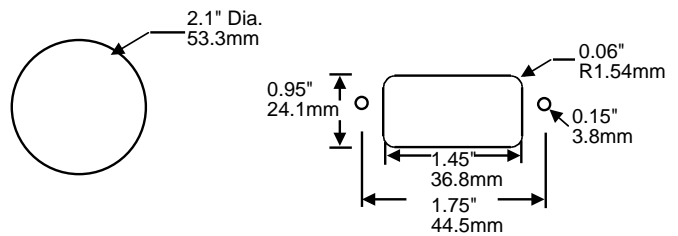
CONNECTIONS

Terminal	Description
+V	+ (9-85 VDC)
-V	- (GND)
S	Start Input + (9-85VDC)
	Note: For two wire operation, connect +9-85VDC to "S" and - (GND) to "-V"

DIMENSIONS

CODE A: 1 - ROUND

2.41" Dia.
61.2mm

0.92"
23.4mm

2.06" Dia.
52.3mm

[+] [−]

[S]

1/4" blade
0.42" long

0.39"
9.9mm

1.75" Max
44.5mm

CODE A: 2 - RECTANGULAR

2.09"
53.1mm

1.75"
44.4mm

1.40"
35.6mm

1.38" Max
35mm

0.17"
4.3mm

1.23"
31.2mm

0.90"
22.9mm

0.06"
1.5mm

3/16" blade
0.44" long

1.43"
36.3mm

[+] [−]

[S]

0.93"
23.6mm
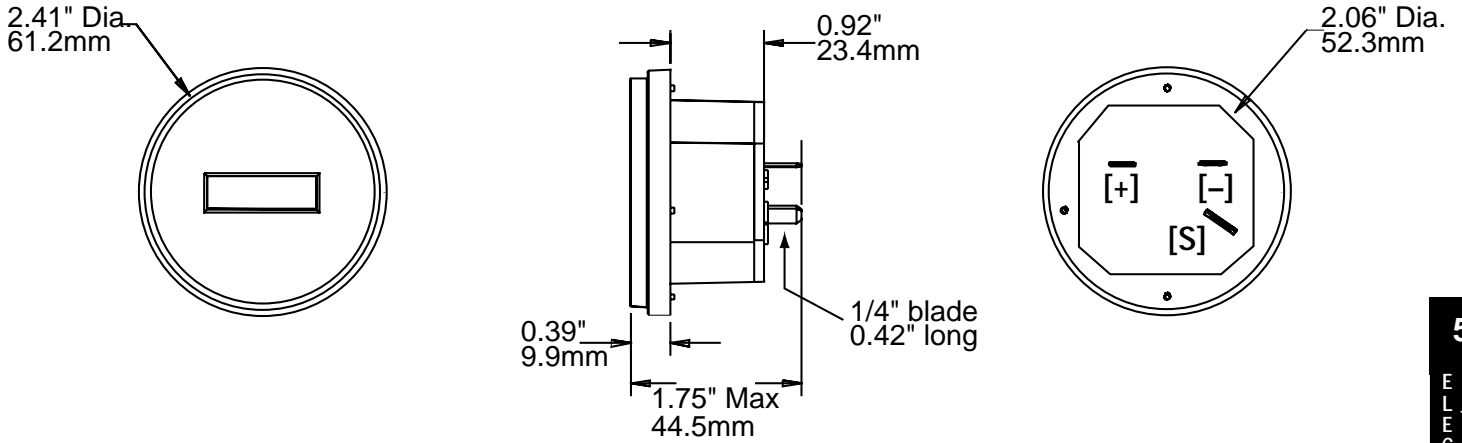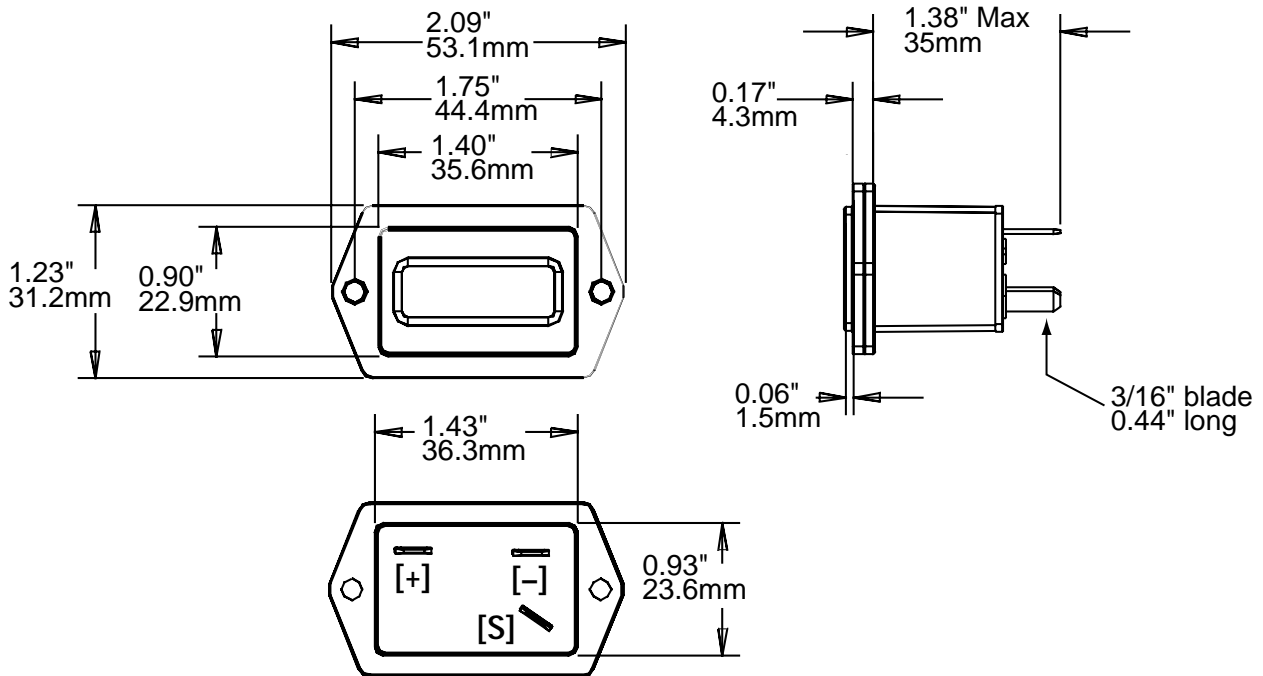
ORDERING INFORMATION

| EHM- [A] [B] [C] [D] [E] [F] | | | | | |
Code A: Style	Code B: 0	Code C: 0	Code D: Logo	Code E: Termination	Code F: Voltage
1 Round Hour Meter	**0**	**0**	**0** No Logo	**1** Blade Terminals	**2** 9-85VDC
2 Rectangular Hour Meter			**1** V-R Pad Print		

Example: EHM-100112 Round Veeder-Root hour meter with blade terminals 9-85VDC

Use totalizers, tachometers, hourmeters, or precision elapsed timers?
. . . just one FLEX model replaces any one of these functions at a very low price

Highly versatile, the **FLEX** can be programmed at installation to operate as a totalizer, tachometer (Model 0799008-201 only), or elapsed time meter. Use two or three of them and have matching control panel instrumentation for count, speed, and time. Standardize them throughout your plant, and reduce inventory by stocking just one indicator instead of several.

- Large, easy to read 8-digit LCD (4-digit, tachometer mode)
- Heavy, die-cast enclosure for industrial duty application
- Simple programming procedure selects operating mode and other functions
- Tamper proof programming mode lock
- Operates without external power – long life lithium battery
- Totalizer mode has input scaling and selectable decimal point
- Tachometer mode (Model 0799008-201) has input scaling, and decimal point
- Timer modes for hours, minutes, seconds with choice of time increment
- Front panel reset, remote reset, or nonreset operation
- NEMA-4 rated front panel – sealed against water and dust

Many convenience features are included, such as adhesive labels preprinted with popular engineering unit identifiers, security locks for reset and programming, and accessory snap-on adaptor modules for screw-terminal wire connection or converting high-voltage input signals.

For Electrical Hour Meters, see Series 7795
For 24x48 mm LCD Indicators, see Series 7999
For 33x68 mm LCD Indicators, see Series A103

SPECIFICATIONS

Display: Eight-digit LCD (four-digit in rate mode), 0.35" (8.9 mm) high characters
Power Source: Internal lithium battery; eight-year typical life
Temperature Range: +32° to +167°F (0° to +75°C)
Time Base Accuracy: ±0.01%, ±1 count (time and rate modes only)
Environmental Integrity: NEMA 4 when using panel gasket provided

Typical Applications:

Weight: 5.5 oz. (156 g)
Signal Inputs: High Speed: For use with logic level voltage, TTL, CMOS, open collector NPN transistor, or magnetic sensor; Frequency Response: 10 kHz (50% duty cycle); Low Speed: For use with isolated switch/relay contact; Frequency Response: 25 Hz (50% duty cycle)
Input Count Logic: Programmable choice of X1 or X2
Reset: Front panel push-button (may be disabled) and remote reset for counter and elapsed time modes
Connections: Integral plug; mating connector provided (accessory screw-termination adaptor available)
Function Selection: Access set-up mode through recessed stylus switch on front panel; jumper connection can restrict access to the set-up mode
Operating Functions: Totalizer: Eight-digit capacity, programmable prescaler (divide by 1 to 9,999); programmable decimal point
Elapsed Time Indicator: Eight-digit capacity; programmable ranging for resolution of hours, minutes, (decimal placement for whole units, tenths, or hundredths); or seconds
Hour Meter: Eight-digit capacity; registers hours in while units, tenths, or hundredths (no reset function)
Rate Indicator (Form Number 0799008-201 only): Four-digit capacity; registers in RPM or other engineering unit; prescaler allows multiplication of input signal by 0.001 to 9,999; programmable decimal point

Model No.	Description
0799008-101	Totalizer, Elapsed Time Indicator, Hourmeter
0799008-201	As above plus Tachometer/Rate Indicator Function
0328992-010	Screw terminal adaptor
0328992-020	AC/DC voltage adaptor; allows signal input from 24 to 270 volts AC/DC; 10 Hz, maximum
0328992-030	TRIAC voltage adaptor; allows signal input from solid-state 115 VAC switching devices; 10 Hz maximum
0328992-120	PANEL OPENING ADAPTOR; lets flex fit in 3.78"x1.75" cut-outs; retrofit Series 7443, 1205, 7997 or 7995 (except lock & Key reset types)
0328992-110	PANEL OPENING ADAPTOR; same as above except accommodates retrofit of lock & key reset models of Series 7443, 1205, 7995, or 7997

Dimensions:

Panel Dims: Cutout: 2.63" x 1.31". Thickness: 0.08" to 0.25". Depth: 0.70" min.

Compact LCD timer modules available with or without front panel reset pushbutton

U L RECOGNIZED **c U L** RECOGNIZED

5

ELECTRONIC TIMERS

A very compact totalizing counter module for printed circuit board mounting. 8 digit, 8mm high, LCD display. Powered by an external lithium battery (not supplied), memory and operation are maintained for a typical life of 8 to 10 years.

Its bidirectional counting inputs, accepts count pulses on one input while a second input commands the counting direction.

PCB solder-pins are provided for electrical connections and molded posts are provided to align mounting position with holes in the host printed circuit board.

- ■ 8 digit high contrast LCD characters
- ■ Leading zero blanking
- ■ 4 operating modes for Seconds, Minutes/Seconds, Hours/Minutes, and Hours/Hundredths
- ■ Available with or without front panel reset
- ■ Remote reset input
- ■ External battery life of 8 to 10 years when using 1/2 AA, 900mAH, 3 volt lithium cell

Standard models are available with, or without, a front panel reset button. All models feature remote electronic reset to zero

Dimensions:
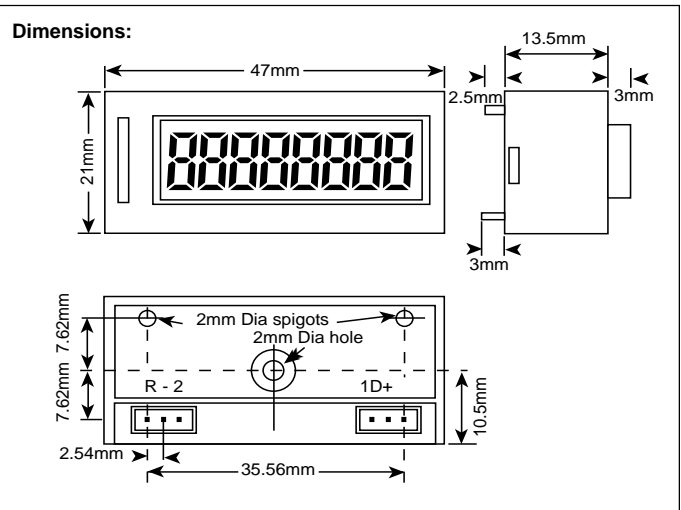
SPECIFICATIONS

Supply Voltage: 2.6-3.4VDC 3µA quiescent, 10µA maximum

Display: Eight digit 8mm high LCD high contrast with leading zero blanking

Operating Modes: Seconds, Minutes/Seconds, Hours/Minutes, and Hours/Hundredths

Mode Selection: Connection or no-connection between two timing select pins and the positive rail

Timing Start/Stop Input: NPN (sink)/contact closure compatible. Response time 15mS

Reset: Manual pushbutton on front or pin connection which is NPN (sink)/contact closure compatible Response time 15mS

Accuracy: ±20 parts per million at 25°C 3VDC

Operating Temperature: -10°C to +60°C

Storage Temperature: -10°C to +60°C

Model Number	Description
0799988-612	Timer, with reset button
0799988-602	Timer, without reset button

See Section 1 for matching MicroMITE count totalizers.   Models 0 799988-402/412

Solid state time/count totalizer... housed in a 1/8 DIN case

®**UL** RECOGNIZED

The DX100 is a solid state time/count totalizer. The unit is housed in a 1/8 DIN molded NORYL® case. Time/count totals are displayed by 0.5 inch high, 4 1/2 digit liquid crystal display.

- Annunciators on the front panel indicate time/count operating mode and time range
- Six time ranges from 1999.9 seconds to 19999 hours and a count range of 19999 counts
- Surface mounted using standard square base relay socket
- Fixed or plug-in panel mounting accessories available

OPERATION

Timing is referenced to the service line frequency. The line frequency is counted and internal divider networks determine one of six available time ranges.

Two count modes are available and determined by external wiring.
Mode 1: Line voltage is applied to the count input. The count is registered when the line voltage is removed from the count input (trailing edge).
Mode 2: Contact closure across the internal count circuit registers a count (leading edge).

All units have remote reset capability through external wiring.

NOTE: The cable from the totalizer to the remote reset switch must be a twisted pair with a maximum length of 5 feet.

The 02 option features a manual reset push-button on the front of the unit in addition to the remote reset capability.

The DX100 totalizer has an internal, replaceable battery. The charge on the battery is maintained at a constant level by a trickle charge circuit. A fully charged battery will maintain memory and readout for a minimum of 650 hours with power disconnected. It is recommended that the battery be replaced every two years. Initial slow response of the LCD readout indicates a low battery charge. To charge battery to full capability, apply line voltage to the unit for 48 hours.

SPECIFICATIONS

Time/Count Ranges:

Sym.	Range	Sym.	Range
00	19999 Cts.	04	19999 Min.
01	1999.9 Sec.	05	1999.9 Hr.
02	19999 Sec.	06	19999 Hr.
03	1999.9 Min.	07	Factory Programmed

Operating Voltage/Frequency:
120 VAC, 60 Hz (Can be field modified for 50 Hz operation)

Repeatability: Timing is based on service line frequency

Count Accuracy: 100%

Count Speed:
2500 per min. with voltage application: 8 MS "ON" 16 MS "OFF"
5000 per min. with switch closure: 4 MS "ON" 8 MS "OFF"

Reset Time: 10 ms

Cycle Progress: 4 1/2 digit liquid crystal display
.5 inch high (12.7 mm)

Burden: 120 VAC, 1.2 Watts
120 VDC, 1.2 Watts (counter only)

Current Required to Energize Count Line: 16.4 Microamperes

Power Interruption: Line voltage interruptions will not reset timer or counter. Battery life is a minimum of 2 years.

Operating Temperature: +32˚ to +140˚F (0˚ to +60˚C)

Transient Voltage Immunity: Unaffected by 50 microseconds, 600 V peak transients superimposed on the line input

Vibration: Unit function is unaffected by 2.5G sinusoidal vibration magnitude in both directions of three perpendicular mounting axes imposed from 20 to 900 Hz

Agency Approvals: UL Recognition E96337

Replacement Battery: PBB9

MOUNTING

Panel Mount:

Add For
Each
Additional
Unit

1.922
(48.8)

Panel
Cutout
+.000
−.040

1.722
(44.0)

3.622
(92.0)

Surface Mount:

TOTALIZER

Eagle Signal

1.656
(42)

3.546
(90.0)

ORDERING INFORMATION

DX1　　**01**　　**A6**　　**02**

TIME RANGE

Sym.	Description	Annunciator
00	19999 Ct.	CTS
01	1999.9 Sec.	SEC and Decimal
02	19999 Sec.	SEC
03	1999.9 Min.	MIN and Decimal
04	19999 Min.	MIN
05	1999.9 Hr.	HR and Decimal
06	19999 Hr.	HR
07	19999 Ct.	Annunciators are not
	1999.9 Sec.	programmed. All
	19999 Sec.	annuniciators are displayed.

VOLTAGE & FREQUENCY

Sym.	Description
A6	120 VAC, 60 Hz*

*Unit can be modified to 50 Hz operation.

FEATURES

Sym.	Description
	Standard Remote Reset ONLY
02	Reset Pushbutton on Front Panel
	(May be wired for Remote Reset)

ABV03141P001
FLEXIBLE DUST COVER KIT

Provides dust and liquid protection for LZ and LX series products. Allows changing thumbwheel and pushbutton settings.

CG900-6
REMOTE POTENTIOMETER KIT

Allows time seeting to be made from a remote location on the CG9 series time delay relay.

DZ100-51
BEZEL KIT

Panel mount hardware for 1/8 DIN DA, DG, DX, and DZ series products.
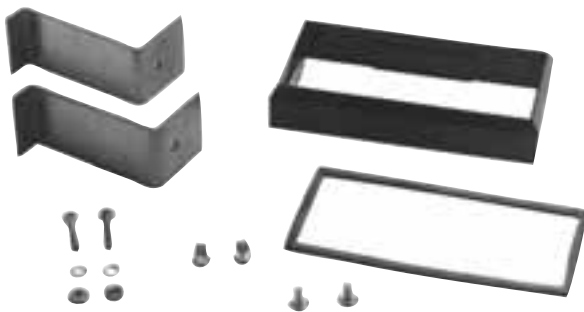
DZ100-52
STRAIN RELIEF KIT

Provides cable connection to panel mounted unit.
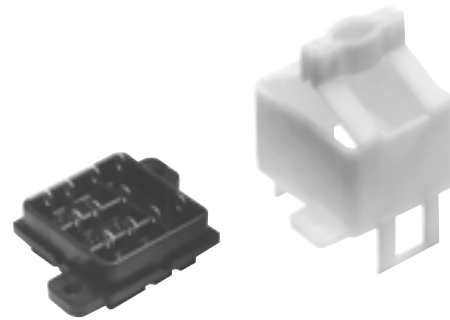
DZ100-54
PLUG-IN HOUSING
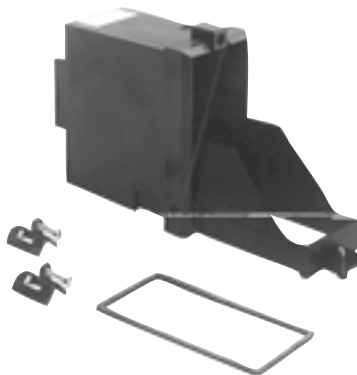
Plug-in housing for 1/8 DIN products DA, DG, DX, and DZ.

DZ100-56
LATCH AND RELEASE KIT

Contains clips to latch 1/8 DIN DA, DG, DX, and DZ series products to socket. Release device mounts directly to unit. Requires 1 kit/unit.
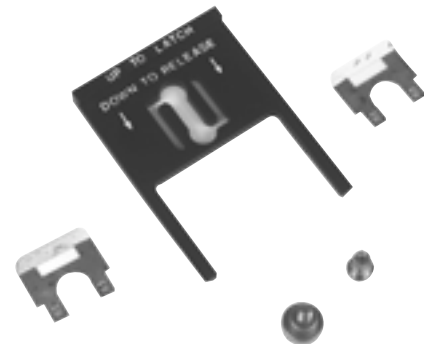
HP50-31
MOUNTING RING

Eliminates drilling and tapping the four mounting holes for panel mounting all CYCL-FLEX® products.

APPLIED TO TIMER PLUG-IN CASE

USER PANEL

H-5331
MOUNTING BRACKETS

Allows surface mounting of all CYCL-FLEX® and BR4 products.
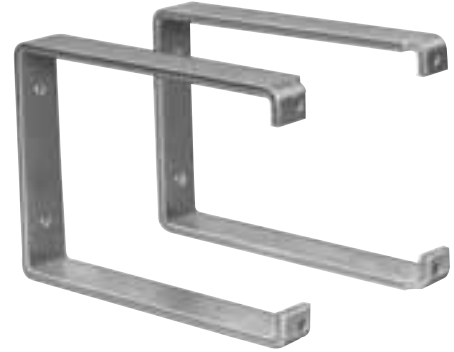
HP50-133
SURFACE MOUNT ADAPTER

Adapter to surface mount CYCL-FLEX® products. Attaches to CYCL-FLEX® case with terminal screws. Terminal connections of adapter are accessible from front.

HP50-131
CYCL-FLEX® WATER-SEALED HOUSING

Standard HP50130 housing with gasket added between chrome plate and plastic housing. Provides NEMA 4 Hosedown test rating for CX series timers/counters.

5

ELECTRONIC TIMERS

Customer Service
call Toll Free 800.873.8731
or 847.662.2666

Internet Presence
E-Mail: dancon@dancon.com
Worldwide Web: http://www.dancon.com

Veeder-Root
Dynapar
Eagle Signal
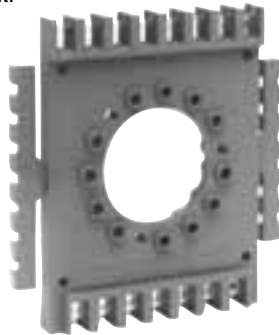
Electric timers use the accuracy of synchronous motors to display time or control devices by the measurement of time intervals.

Electric timers are found in applications such as fluid metering, batch process control, motor control, load shedding and injection molding.

The Eagle Signal brand name has been recognized for over 50 years as synonymous with quality, reliability, durability and accuracy in time control devices. The innovative Cycl-Flex® plug-in case style for timers set the industrial standard for ease of installation and service.

Why Choose Electric Timers?

Eagle Signal brand electric timers are very popular for applications not requiring extremely fast duty cycles or reset actions. Characteristics common to all models are:

Simplicity of Operation - Setpoint is adjusted with knob and simple clock like dial.

Operate in Harsh Power Environments - Electric timers are virtually immune to EMI, brownouts and blackouts, and withstand many power surges.

Heavy Duty Construction - Years of operation continue to prove the long maintenance free life in dirty, dusty, damp, hot and cold environments.

Simple Programming - No switch programming required. Timer works the way you expect it to work.

Long Service Life - Highly reliable. Exact or similar replacements available for an extensive installed base.

6

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HP5 CYCL-FLEX® Reset Timer

Ram cycle time

Heat cycle time

Molding Machine

HP5
Reset Timer

Fill
Valve

Filling System

Running hours
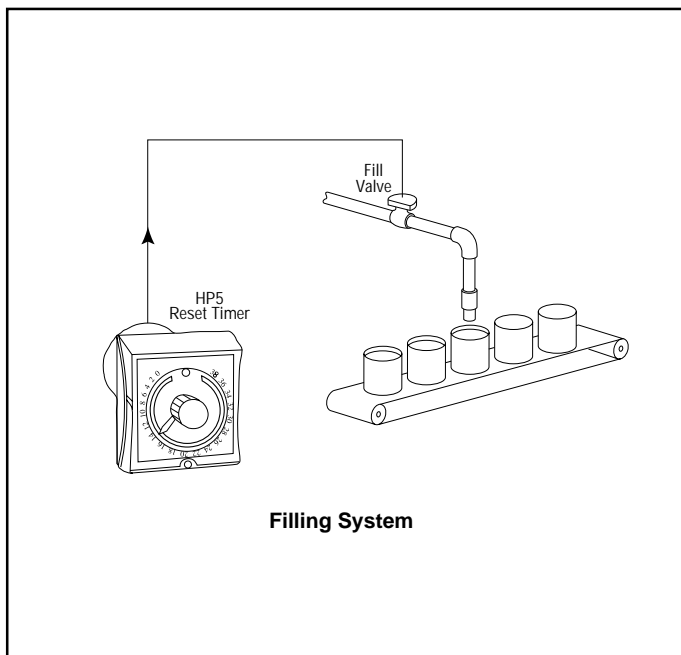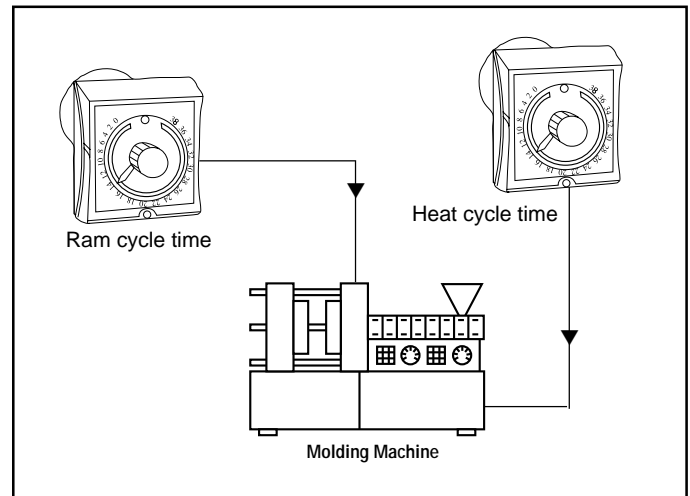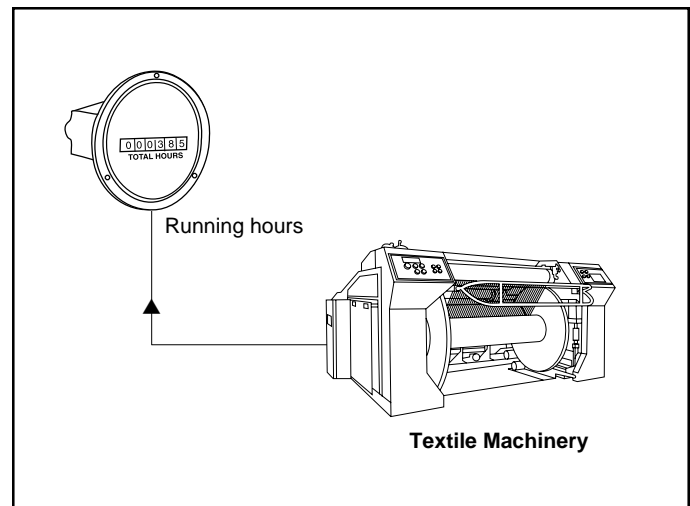
Textile Machinery

TYPES OF ELECTRIC TIMERS

Your design criteria will determine the type of timer you specify:

Elapsed Time Indicators (also called time totalizers) measure how long a process takes. They provide a display of elapsed time but do not control the process. A popular application is as a hour meter, used to track machine operating time for maintenance or warranty.

Reset Timers time through a preset cycle and is then automatically or manually reset until it is restarted by an outside source. Most commonly, an electrically started timer is used in industrial applications where automatic control of process time is required.

Handset timers are a form of reset timer where the time-set knob does double duty: it sets the timing period and starts the timing interval. They are ideal when single cycle operation and low cost are required.

For special applications, where electric powered reset timers can not be used, a push-button pneumatic timer can be a great problem solver. Typical applications include security systems and fire safety door controls.

Repeat Cycle Timers provides repetitive time-cycling by turning on and off one or more loads as long as power is applied. You may chose to select on and off times independently or as a percentage of a total time cycle.

In addition, if multiple loads need to be controlled, repeat cycle cam timers offer convenient and reliable service. Timing is fixed at percentage of a total time cycle with each cam circuit being independently adjustable.

Sequencers can control independent on/off cycling of several loads based on a stepping command input. The sequencer can switch the power distribution to the loads at each step.
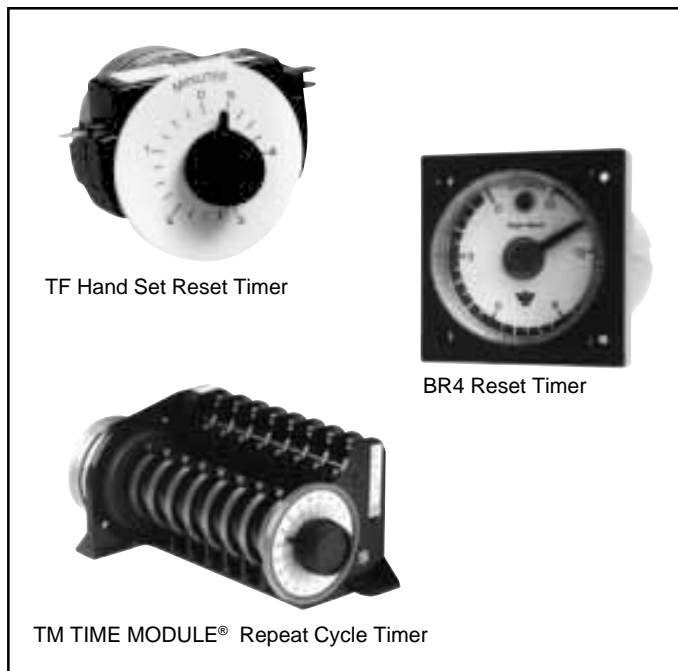
TF Hand Set Reset Timer

BR4 Reset Timer

TM TIME MODULE® Repeat Cycle Timer

SPECIFYING AN ELECTRIC TIMER

Basic criteria used in selecting an electric time indicator or controller are:

Product Type: What function is to be performed by the timer? Reset timing, repeat cycle timing, percentage timing? How many circuits require control?

Starting: Is the timer to be electrically started or manually started?

Type of Display: Does the application require progress monitoring? How precise does the time setting have to be made?

Mounting: Various mounts are available: panel, surface, socket.

Service Voltage: At what voltage will the unit be operated? What type of load will be controlled?

Environmental: Consider operating temperature, humidity, vibration, explosive atmosphere.

Agency Approvals: UL, CSA, FM required?

HQ4 Percentage Timer

BR1 Reset Timer

Electric Timers

ELAPSED TIME INDICATORS

Function:

Totalizes time for the duration that power is applied.

VEEDER-ROOT

0 0 0 3 8 5

TOTAL HOURS
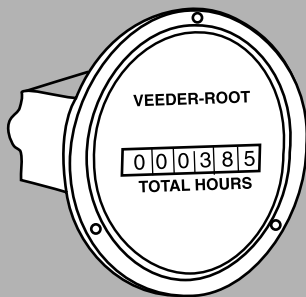
RESET TIMERS

Function:

Upon command, times preset cycle length and stops. Awaits command to start next cycle

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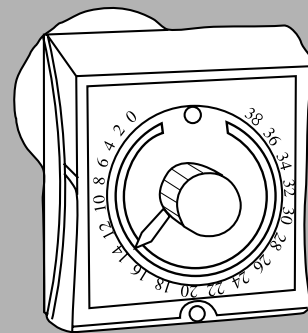
VEEDER-ROOT brand

7795
See page 6.04
■ AC and DC models
■ Round or rectangular mount

EAGLE SIGNAL brand

HK
See page 6.06
■ Highly visible digits
■ Reset and nonreset models

EAGLE SIGNAL brand

HP5 CYCL-FLEX®
See page 6.08
■ Plug-in housing
■ Rugged industrial standard

EAGLE SIGNAL brand

BR4
See page 6.10
■ Economical
■ Progress indicator

EAGLE SIGNAL brand

BR1
See page 6.12
■ Surface mount
■ Dual frequency operation

BR1

EAGLE SIGNAL brand

Model 191
See page 6.14
■ Hand set – pushbutton start
■ Panel mount

EAGLE SIGNAL brand

AB
See page 6.14
■ Hand set to start
■ Panel mount

EAGLE SIGNAL brand

TF
See page 6.15
■ Hand set
■ Economical

EAGLE SIGNAL brand

Model 90
See page 6.15
■ Compact
■ Pneumatic timing

6

ELECTRIC TIMERS

REPEAT CYCLE TIMERS

Function:

Continuously cycles power to a load in an ON/Off pattern. Ability to set cycle times vary by model type.
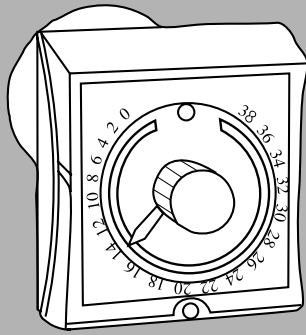
SEQUENCERS

Function:

Provides stepping action ON/OFF control for a number of output loads.
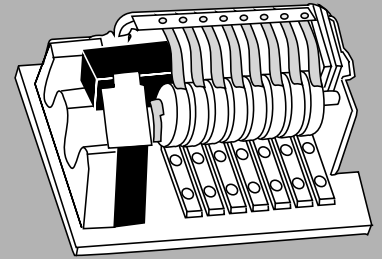
EAGLE SIGNAL brand

HG1 FLEXOPULSE®
See page 6.16
■ Plug-in housing
■ Independent ON/OFF time

EAGLE SIGNAL brand

HQ9
See page 6.18
■ Percentage timing
■ Cycle progress

EAGLE SIGNAL brand

MTSTEPSWITCH
See page 6.23
■ Heavy duty contacts
■ Flexible load sequencing
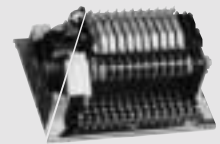
EAGLE SIGNAL brand

HQ4 Series 48
See page 6.20
■ Percentage timing
■ Panel mount

EAGLE SIGNAL brand

TM TIME MODULE®
See page 6.22
■ Modular construction
■ Controls up to 10 loads

EAGLE SIGNAL brand

MP MULTIPULSE®
See page 6.22
■ Adjustable timing
■ Controls up to 12 loads

EAGLE SIGNAL brand

Model 76
See page 6.23
■ Economical
■ Controls up to 3 loads

6

ELECTRIC TIMERS

*Rugged and reliable
hour meters in
rectangular or round
case, for AC or DC
operation*

Specific Models

®**UL** RECOGNIZED   **CSA**® CERTIFIED

Ruggedness and reliability are featured in the Series 7795 electric hour meters. One-tenth hour resolution, round or rectangular package and cutout styles and a choice of DC or AC inputs allow its use on construction machinery or leased equipment to determine usage, maintenance, and warranty periods.

- ■ Easy to install
- ■ Compact and requires only a small panel cutout
- ■ Durable and shock resistant
- ■ Lightweight for use on portable equipment
- ■ Sealed against dirt and moisture
- ■ Tamper-proof and non-resettable
- ■ Easy to read figures

SPECIFICATIONS

Panel Mounting:
    Round Case: 2.00" diameter cutout
    Rectangular Case: 0.95" x 1.45" cutout

DC Hour Meters:
    Input: 10 to 32 VDC
    Accuracy: 0.02%
    Capacity: Up to 9999.9 hours, automatic recycle at zero
    Operating Temperature: –40° to +185 °F (–40° to +85 °C)

AC Hour Meters:
    Input: 120 VAC (range ± 10%), 60 Hz
    Accuracy: 0.02%
    Capacity: Up to 99999.9 hours, automatic recycle at zero
    Operating Temperature: –65° to +154 °F (–54° to +68°C)

Weight: 3 oz.

Model No.	Description
0779555-216	Round Case, 10 to 32 VDC, Spade Terminals
0779565-216	Rectangular Case, 10 to 32 VDC, Spade Terminals
0779516-201	Round Case, 120 VAC, Screw Terminals
0779526-201	Round Case, 120 VAC, 7" Leads
0779536-201	Rectangular Case, 120 VAC, Screw Terminals
0779546-201	Rectangular Case, 120 VAC, 7" Leads

For Electronic LCD Hour Meter, see Series C342
For Electronic LED Hour Meter, see Series C342 or C628

Typical Applications:
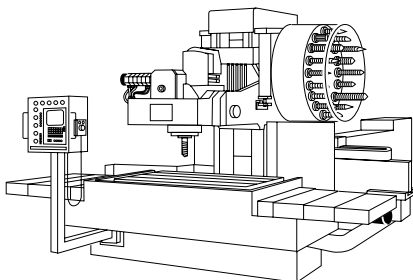
Dimensions:

DANAHER INDUSTRIAL CONTROLS has representatives and distributors located in major cities within the United States and throughout the world. For information about the distributor or sales office nearest you, contact our customer service department:

Customer Service	**Internet Presence**
call Toll Free 800.873.8731	E-Mail: dancon@dancon.com
or 847.662.2666	Worldwide Web: http://www.dancon.com

Veeder-Root

Dynapar

EagleSignal

Totalizes running time of electrically operated equipment... synchronous motor driven models for display of hours, minutes, or seconds

®U RECOGNIZED   ®CSA CERTIFIED

6

ELECTRIC TIMERS

The HK5 series totalizes the "ON" or running time of electrically operated equipment. Its features include:

- Large, easy to read digits
- Dust proof dial cover
- Maintenance free
- High impact plastic case
- Can be mounted in any position

OPERATION

The Eagle Signal brand HK5 series time totalizer has a synchronous motor which drives a set of digit readout wheels to indicate the total time the unit is energized. Six digit-wheels, including a 1/10 digit on hours and minutes, provide a fine, wide range of time measurement. The HK5 features a front mounted reset wheel. It can be reset to zero at any time during its operation.

SPECIFICATIONS

Time Ranges:
  Non-Reset

Sym.	Time Range
HK400	99999.9 Min.
HK410	99999.9 Hr.
HK420	999999 Sec.

  Reset

Sym.	Time Range
HK500	9999.9 Min.
HK510	9999.9 Hr.
HK520	99999 Sec.

Voltage/Frequency: 120V (+10, -15%), 50/60 Hz
  240V (+10, -15%), 50/60 Hz

Burden: 3W max.

Temperature Range: 0˚ to 140˚F (-17˚ to +60˚C)

Agency Approvals: UL Recognition E59290
  CSA Certification LR27967

MOUNTING

Requires 2 3/8 diameter panel cutout for mounting. 1/2 maximum mounting panel thickness.

(2) #6-32 Screws provided for captive mounting tabs.

2 1/4 DIA.
(57.15)

11/16
(17.46)

3 3/8
(85.72)

1/2
(12.7)

3 3/16
(80.96)

2 43/64
(67.86)

MINUTES

1/10

Eagle
Signal
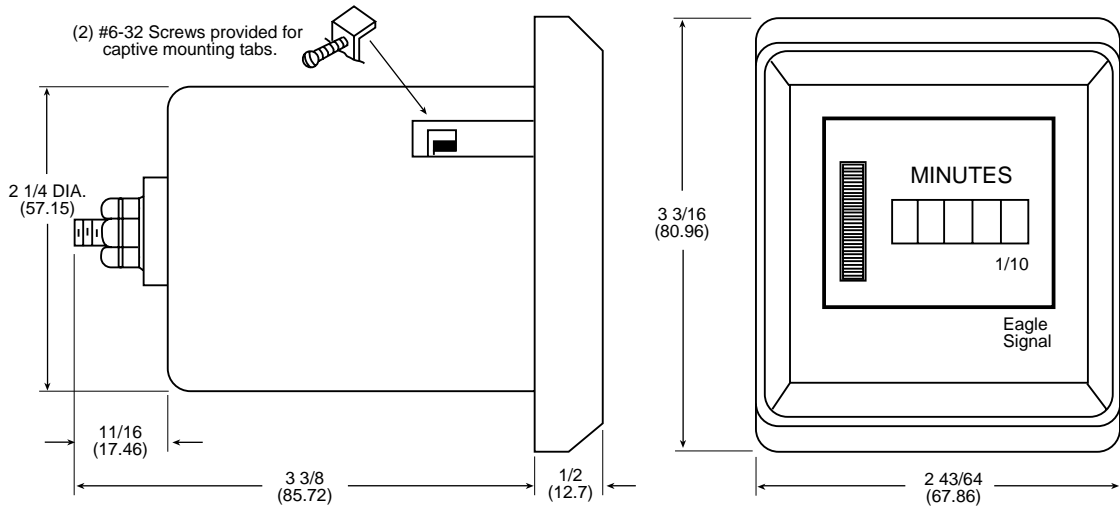
CAUTION: When resetting the HK5 unit, adjust odometer to position 00000 at top of window, as shown.

0 0 0 0 0
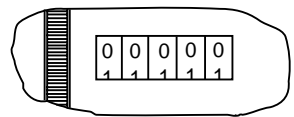
Typcial Applications:
Electronic Equipment
Computers and Office Machines
Machine Tool Lubrication
Maintenance Programs
Industrial Ovens
Electrical Equipment Rental
Industrial Cost Analysis
Nuclear Control Systems
Recording Machine Down Time
Radio Transmitters

ENCLOSURES

Model No.	Description
1701-0673	Surface Mounting Box NEMA 1

ACCESSORIES

Model No.	Description
HK500-07	Key Lock Cover

ORDERING INFORMATION

Consult Customer Service for availability of other voltages and frequencies.

HK   4   20   A6

Sym.	Description
4*	Non-Reset
5	Reset

*HK420 not available in A5 or B5 versions.

Sym.	Description
00	Minutes
10	Hours
20	Seconds

Sym.	Description
A5	120V, 50 Hz
A6	120V, 60 Hz
B5	240V, 50 Hz
B6	240V, 60 Hz

6

ELECTRIC TIMERS
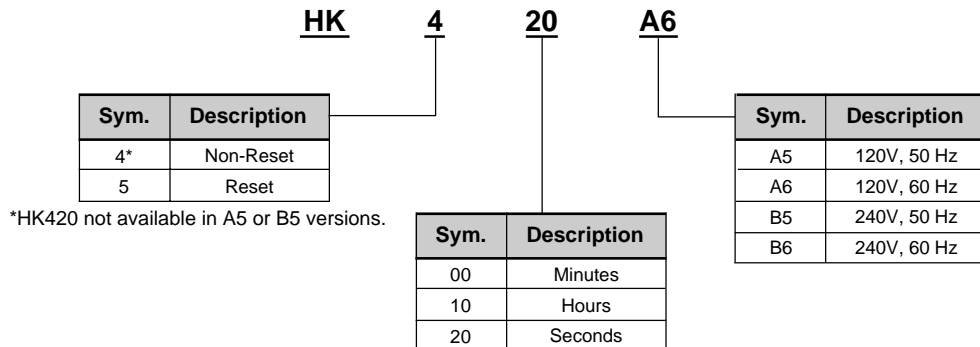
The high quality timer that has become an industry standard... knob setpoint, cycle progress pointer, pilot light, and patented plug-in housing

®U RECOGNIZED   CSA® CERTIFIED   FM APPROVED

6

E L E C T R I C   T I M E R S

The HP5 CYCL-FLEX® series timer is a high quality, synchronous motor driven reset timer housed in the standard CYCL-FLEX® plug-in housing.

■ 16 standard time ranges from 5 seconds to 60 hours

■ Knob adjustable time ranges - progress pointer for each

■ Highly visible, calibrated dials (7.85 inch circumference)

■ Easily read and well-spaced calibrations

■ Red progress pointer displays remaining time interval

■ Pilot light indicates when timer motor is energized

■ Standard timers supplied with "power on" clutch operation

■ Optional reverse action clutch will not reset on power failure

■ 15 terminal ABS (UL rated 94V-0) molded housing has high impact resistance and will not support combustion

OPERATION

Application of power to terminals 1, 2, and 11 energizes the clutch coil, closes contacts 9-10 and 6-8, and starts the timing period. At time out, contacts 4-3 close, 11-12 open, and the motor stops. The timer will remain in this condition until power is removed from the clutch coil.

Contacts 6-7-8 and 9-10-C are instantaneous contacts and operate with the application of power to the clutch coil. Contacts 3-4-5 and 11-12-A operate at time out with contacts 3-4-5 operating prior to contacts 11-12-A.

SPECIFICATIONS

Time Ranges:

Sym.	Dial	Minimum Setting	Dial Divisions	Repeat Accuracy
17	5 Sec.	1/6 Sec.	.05 Sec.	±.05 Sec.
15	10 Sec.	1/3 Sec.	1/6 Sec.	±.05 Sec.
14	15 Sec.	1/2 Sec.	1/4 Sec.	±.08 Sec.
0	30 Sec.	1 Sec.	1/2 Sec.	±.15 Sec.
1	60 Sec.	2 Sec.	1 Sec.	±.3 Sec.
2	150 Sec.	4.5 Sec.	2 Sec.	±.75 Sec.
3	5 Min.	9 Sec.	3 Sec.	±1.5 Sec.
4	10 Min.	20 Sec.	10 Sec.	±3 Sec.

Time Ranges Cont.:

Sym.	Dial	Minimum Setting	Dial Divisions	Repeat Accuracy
18	15 Min.	30 Sec.	15 Sec.	±4.5 Sec.
5	30 Min.	1 Min.	1/2 Min.	±9 Sec.
6	60 Min.	2 Min.	1 Min.	±18 Sec.
7	150 Min.	4.5 Min.	2 Min.	±45 Sec.
8	5 Hr.	9 Min.	3 Min.	±1.5 Min.
9	10 Hr.	20 Min.	10 Min.	±3 Min.
10	30 Hr.	1 Hr.	1/2 Hr.	±9 Min.
11	60 Hr.	2 Hr.	1 Hr.	±18 Min.

Reset Time: 1/2 second at max. setting

Voltage/Frequency: 120V (+10, -15%), 50/60 Hz
240V (+10, -15%), 50/60 Hz

Burden: Motor: 2.45 VA, 120 VAC
Clutch: 10.5 VA

Output Rating: 10 amps, resistive, 120 VAC
5 amps, resistive, 240 VAC

Electrical Lifetime: Contingent on load characteristics. Average contact life at full load is 250,000 operations. At 1 amp load, switch life increases to 5 million cycles. Inrush current should not exceed 10 amps.

Power On Response: 28 ms average pull-in
17 ms average drop-out

Temperature Range: 0° to 140°F (-18° to +60°C)

Vibration: Unaffected by 2.5G sinusoidal vibration magnitudes in both directions of three perpendicular mounting axes imposed from 10 to 900 Hz

Approximate Weight: 2 lb. 14 oz.

Agency Approvals: UL Recognition E61735
UL Recognition 71726 (Feature 92 only)
CSA Certification LR26861
CSA Certification (Feature 92 only)
FM Approval 15030

OPERATION

Standard and Reverse Start
Instantaneous contacts 9-10-C and 6-7-8 operate directly with the clutch offering different sequences of operation depending on the control circuit configuration.

Delayed contacts 4-3 and 11-A close and contacts 4-5 and 11-12 open when timer reaches a timed out condition. Contacts 4-5 and 11-12 close and contacts 4-3 and 11-A open when timer is reset.

Schematic Diagram
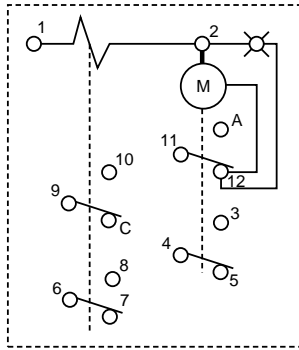
MOUNTING

DRILL AND TAP FOUR HOLES FOR 8-32 SCREWS (INCLUDED W/UNIT)

1.406 (35.71)

1.406 (35.71)

3.187 ±.062 (80.95 ±1.57) DIA. CUTOUT

1.406 (35.71)   1.406 (35.71)

MTG. HOLE USED FOR GROUNDING CASE

4.250 (107.95)

3.812 (96.82)

3.062 (77.77)

4.125 (104.78)   1.625 (41.27)

5.750 (146.05)

ENCLOSURES

Model No.	NEMA Class	Description
HN308	1	Surface Mtg. with terminal block
HN364	1	Surface Mtg. without terminal block
HN368	!A	Dual unit cabinet with 9 position terminal block, timer housings, and DPST toggle switch
HN370	1A	Dual unit cabinet less unit cases and toggle switch, with 9 terminal block

ACCESSORIES

Model No.	Description
H-5331	Mounting Brackets 2 req'd per timer
HP50-31	One Hole Mounting Ring
HP50-103	120 VAC, 50/60 Hz Repeat Cycle Kit Not applicable with Feature 19
HP50-131	CYCL-FLEX® Water-Sealed Housing
HP50-133	Surface Mounting Adapter to use in place of brackets
HP50-295	Dial Lock
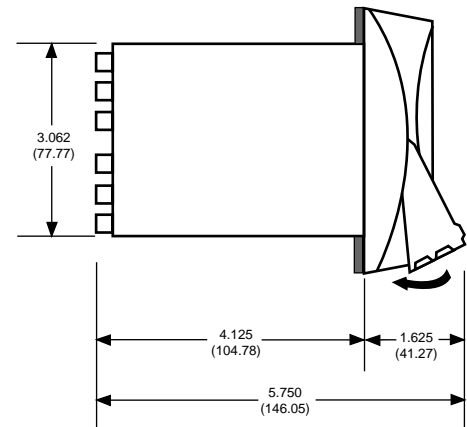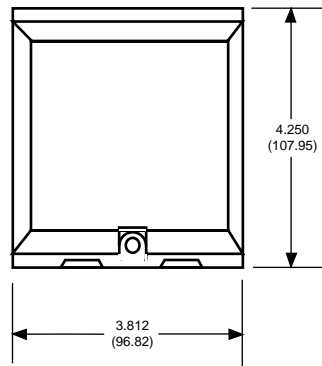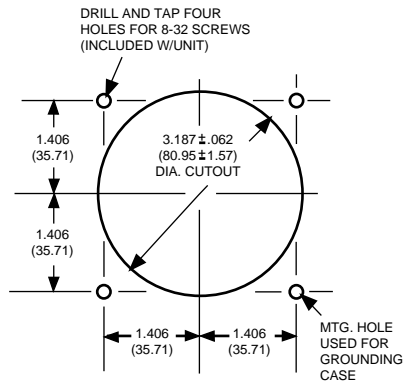
ORDERING INFORMATION

HP5   15   A6   01

TIME RANGE

Sym.	Description	Sym.	Description
17	0-5 Sec.	18	0-15 Min.
15	0-10 Sec.	5	0-30 Min.
14	0-15 Sec.	6	0-60 Min.
0	0-30 Sec.	7	0-150 Min.
1	0-60 Sec.	8	0-5 Hr.
2	0-150 Sec.	9	0-10 Hr.
3	0-5 Min.	10	0-30 Hr.
4	0-10 Min.	11	0-60 Hr.

VOLTAGE & FREQUENCY

Sym.	Description
A5	120V, 50 Hz
A6	120V, 60 Hz
B5	240V, 50 Hz
B6	240V, 60 Hz

FEATURES

Sym.	Description
01	Reverse Clutch Arrangement
05	Chrome Plated Bezel
07	Dial Lock
19	Revision for Mtg. to HN383 Explosion Proof Cabinet. Add when purchased without cabinet. DOES NOT have pilot light.
22	Water Resistant Window & Housing
92*	Enclosed in HN383 Explosion Proof Cabinet

*Laboratory Testing: UL Recognition E61735
CSA Certification LR45132-1

***On delay or reverse
start timing...
economical yet
versatile design***

®️ RECOGNIZED   ®️ CERTIFIED

"ON" delay or "REVERSE START" timing is achieved through the use of a clutch drive mechanism, usually not available on timers in the BR price category.

■ New clutch drive mechanism provides much faster reset time and substantially longer motor life

■ Instantaneous contacts operate directly with clutch - close instantly when clutch is energized and remain closed until clutch is reenergized

■ Instantaneous contacts allow use in much greater number of control circuit configurations than any other timer in its class

■ Screw terminals on rear of housing allow removal or replacement with minimal downtime

■ 14 terminal housing

SPECIFICATIONS

Time Ranges:

Sym.	Time Range
1	5 Sec.
3	15 Sec.
4	30 Sec.
5	60 Sec.
6	150 Sec.
7	5 Min.
8	10 Min.
9	30 Min.
10	60 Min.
11	5 Hr.
12	10 Hr.

Reset Time: 500 ms at max. setting

Voltage/Frequency: 120V (+10, -15%), 50/60 Hz
240V (+10, -15%), 50/60 Hz

Electrical Power Consumption: Motor: 3W
Clutch: 4 VA

Contact Rating: 10 amp, 1/6 HP, 120 VAC
10 amp, 1/4 HP, 240 VAC
UL Rating: 3 amp @ 120/240 VAC

Repeat Accuracy: ±1 3/4% of max. setting

Temperature Range: -10˚ to +140˚F (-23˚ to +60˚C)

Dial Setting: Accuracy ±1%
Minimum 3% of Full Scale

Speed: Pull-In: 30 ms
Drop-Out: 4 ms

Agency Approvals: UL Recognition E61735
CSA Certification LR27967

6

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MOUNTING

2 13/16 TYP. (71.42)

3 3/4 SQ. (95.25)

1 13/32 TYP. (35.71)

.171 (4.34) DIA. (4) MTG. HOLES

15/32 TYP. (11.88)

2 63/64 (75.79)

3 1/16 (77.77)

1/2 (12.7)

1 (25.4)

3 25/32 (96.03)

ENCLOSURES

Model No.	NEMA Class	Description
HN308	1	Surface Mtg. with terminal block
HN364	1	Surface Mtg. without terminal block
HN368	1A	Dual unit cabinet with 9 position terminal block, timer housings, and DPST toggle switch
HN370	1A	Dual unit cabinet less unit cases and toggle switch, with 9 terminal block

ACCESSORIES

Model No.	Description
H-5331	Mounting Brackets 2 req'd per timer
HP50-31	One Hole Mounting Ring
HP50-103	120 VAC, 50/60 Hz Repeat Cycle Kit

ORDERING INFORMATION

Consult Customer Service for availability of other time ranges, voltages, and frequencies.

BR4   1   A6   00

TIME RANGE

Sym.	Description	Sym.	Description
1	5 Sec.*	8	10 Min.
3	15 Sec.	9	30 Min.
4	30 Sec.	10	60 Min.
5	60 Sec.	11	5 Hr.
6	150 Sec.	12	10 Hr.
7	5 Min.		

*Not available in B5 and B6 versions

VOLTAGE & FREQUENCY

Sym.	Description
A6	120V, 60 Hz
B6	240V, 60 Hz
A5	120V, 50 Hz
B5	240V, 50 Hz

FEATURES

Sym.	Description
Blank	Standard Timer
01	Reverse Clutch

Low profile surface mount reset timer... features fast reset cycle and models for 11 time ranges

®U RECOGNIZED   ®CSA CERTIFIED   ◇FM APPROVED

The BR1 has an enclosed construction with front facing dial and knob.

■ Heavy duty terminal block with 9 screw terminals that readily accept 16 gauge wire (commonly used in industrial circuit wiring)

■ Injection molded Lexan® case (Lexan® is recognized by UL for use as sole support of current carrying components)

■ Lexan® case is self-extinguishing, has high impact strength, and has high dimensional stability

OPERATION

The BR series reset timers are synchronous motor driven. They provide an accurate adjustable time delay between the actuation of the control circuit and the operation of the load switches.

"On Delay" or "Reverse Start" timing is achieved through the use of an external clutch drive mechanism, usually not available on timers in the BR price category, that replaces the former "gear shift motor" drive. This clutch drive provides much faster reset times, longer time ranges, and substantially longer motor life. The instantaneous contact operates directly with the clutch and closes instantly when the clutch is energized, remaining closed until the clutch is deenergized. This instantaneous contact allows the BR timer to be used in a much greater number of control circuit configurations than any other timer in its class.

SPECIFICATIONS

Time Ranges:

Sym.	Maximum Setting	Minimum Setting	Dial Mark Divisions
1	5 Sec.	.15 Sec.	1/4 Sec.
3	15 Sec.	.45 Sec.	1 Sec.
4	30 Sec.	.9 Sec.	2 Sec.
5	60 Sec.	1.8 Sec.	2 Sec.
6	150 Sec.	4.5 Sec.	5 Sec.
7	5 Min.	9 Sec.	15 Sec.
8	10 Min.	18 Sec.	30 Sec.
9	30 Min.	54 Sec.	2 Min.
10	60 Min.	1.8 Min.	2 Min.
11	5 Hr.	9 Min.	15 Min.
12	10 Hr.	21.6 Min.	30 Min.

Repeatability: Typical ±3/4% of full scale

Reset Time: 200 ms

Voltage/Frequency: 120V (+10, -15%), 50/60 Hz
240V (+10, -15%), 50/60 Hz

Burden: Motor: 3 W
Clutch: 4 VA

Output Rating: 10 amp, 1/4 HP, 120/240 VAC
1/2 amp, 125 VDC
1/4 amp, 240 VDC

Power On Response: 30 ms clutch pull-in
4 ms drop-out

Temperature Range: -10˚ to 140˚F (-23˚ to +60˚C)

Dial Setting Accuracy: 2% of full scale

Minimum Setting: 3% of full scale

Agency Approvals: UL Recognition E61735
CSA Certification LR27967
FM Approval 21038

OPERATION

Standard Start
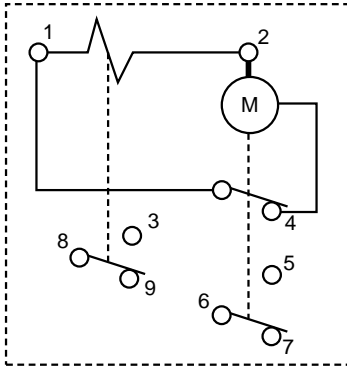
Reverse Start
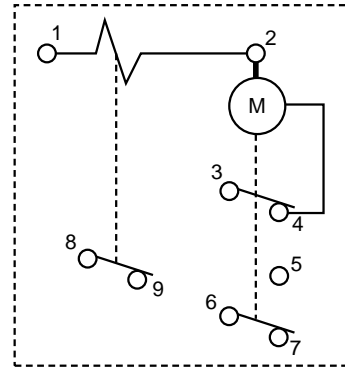
MOUNTING

BR dimensions enclosed construction with 9 position terminal block.
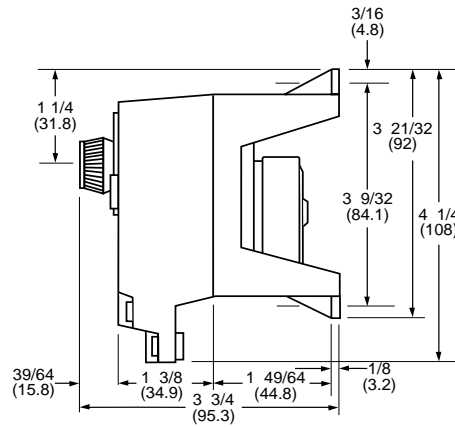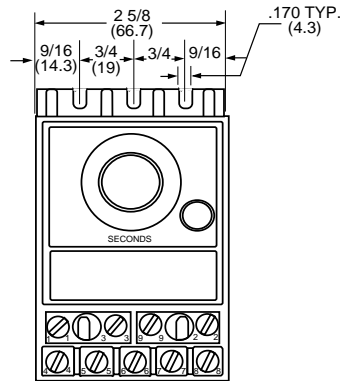
ACCESSORIES

Model No.	Description
HP50-103	120 VAC, 50/60 Hz Repeat Cycle Kit

ORDERING INFORMATION

BR   1   5   A6   01

Sym.	Description
1	Surface mounted with dial knob and 9 point screw type terminal block

FEATURES

Sym.	Description
Blank	Standard Timer
01	Reverse Start
03	No Instantaneous Contact
10	With Pilot Light

TIME RANGE

Sym.	Description	Sym.	Description
1	5 Sec.*	8	10 Min.
3	15 Sec.	9	30 Min.
4	30 Sec.	10	60 Min.
5	60 Sec.	11	5 Hr.
6	150 Sec.	12	10 Hr.
7	5 Min.		

*Not available in B6 version

VOLTAGE & FREQUENCY

Sym.	Description
A6	120V, 50/60 Hz
B6	240V, 50/60 Hz

MODEL 191
PUSHBUTTON RESET TIMER

Just set the dial and push the button to initiate an accurate time delay or interval cycle

The Model 191 is a push-button start, motor driven timer with cycle progress pointer, double make-double break snap action switch and is used to energize a load for a preset time period. The push-button is located in the center of the time set pointer knob on the panel mounted dial. When depressed momentarily, a mechanical latch and switch is engaged, starting the motor and timing period. After completion of timing, switch 3 and 4 open, 1 and 2 close, motor stops, and timer resets to setpoint. Timer is now ready for another timing operation.

The standard timer has cycle progress and a 3 5/8 inch square bezel with window. The "01" feature does not include cycle progress indicator or bezel and window assembly.

191	04	A6	01
	TIME RANGE	FEATURES	
		VOLTAGE & FREQUENCY	

For Complete Information, Request Bulletin No. 176

AB4 MANUFLEX®
HAND SET

Very easy to use... to start a cycle just turn the pointer knob to the desired time

The MANUFLEX® AB series timer is a manually set, synchronous motor driven timer, adjustable to a selected time range by a large, easy to read set pointer. To operate, turn the set pointer to the required time interval. A load circuit is closed when the pointer is turned from zero. The timer motor drives the pointer back to zero, at which point the load circuit opens. Timer is used where a device is to be turned on, runs a selected time and stops at the end of the time interval.

The AB has a hold position, enabling the load circuit to remain off or remain on without starting the timing motor.

AB4	3	A6	04
	TIME RANGE	FEATURES	
		VOLTAGE & FREQUENCY	

For Complete Information, Request Bulletin No. 174

TF HAND SET TIMER

A low cost, manually set interval timer... just turn knob to set and start
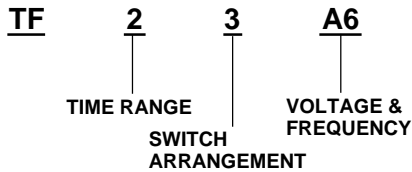
The TF series timer is a low cost, manually set, synchronous motor driven timer, adjustable to a selected timer interval by a pointer knob. The TF is available in 6 time ranges from 1 minute to 11 hours.

The TF panel mounts in a single 3/8 inch diameter hole with a 3/8 x 32 nut. The TF has a completely molded housing containing the reduction gears, motor mounting clips, and contact members. Terminations of contact members are 1/4 inch quick connect. Motor leads are separate and are 6 inches long.

TF   2   3   A6

TIME RANGE

SWITCH ARRANGEMENT

VOLTAGE & FREQUENCY

For Complete Information, Request Bulletin No. 175

6

ELECTRIC TIMERS

MODEL 90
MINIATURE PNEUMATIC TIMER

Small, pneumatic operated timer... opens or closes circuit after time delay

Standard Model: 90-01041

Pushbutton timer with solder type terminals on switch

The Series 90 Pneumatic timer opens or closes a circuit after an adjustable time delay. Its compact size allows it to fit in a 1 1/2 inch cube. The Lexan® plastic molded body has high impact strength and is corrosion resistant. No electricity is required to operate the timer. The time range is adjustable between 2 seconds and 60 seconds standard ±15%.

The Series 90 is ideally suited for security applications.

Repeat cycle timer features separate dial scales for ON and OFF time

6

ELECTRIC TIMERS

The HG1 is an ON-OFF repeat cycle timer engineered with the same features as the rest of the plug-in CYCL-FLEX® family.

■ Repeat cycle, two circuit timer housed in CYCL-FLEX® plug-in case

■ Separate dial scale for ON time and OFF time

■ Individually adjustable ON and OFF time intervals via concentric knobs on front of unit

■ Combination of ON and OFF time equals total time cycle of unit

OPERATION

A cycle progress pointer oscillates between the ON and OFF time setpoints. As this pointer crosses the zero point on the dial, two internal 10 amp SPDT output switches transfer. The transfer point of the output switches is adjustable to allow a make before break (overlap) or a break before make (dwell) switch action. The overlap or dwell time interval is limited to 1.5% of the total (ON plus OFF) time cycle.

A synchronous unidirectional motor drives the unit through precision gearing. Instant reversing of the progress pointer is accomplished by positive mechanical action.

SPECIFICATIONS

Time Ranges:

Sym.	Dial Range	Minimum Setting	Max. Dwell or Overlap
00	30 Sec.	.5 Sec.	.5 Sec.
01	60 Sec.	1 Sec,	1 Sec.
02	150 Sec.	2 Sec.	2 Sec.
03	5 Min.	5 Sec.	5 Sec.
04	10 Min.	10 Sec.	10 Sec.
05	30 Min.	30 Sec.	30 Sec.
06	60 Min.	1 Min.	1 Min.
07	150 Min.	2 Min.	2 Min.
08	5 Hr.	5 Min.	5 Min.
09	10 Hr.	10 Min.	10 Min.
10	30 Hr.	30 Min.	30 Min.

Voltage/Frequency: 120V, 60 Hz
240V, 60 Hz

Burden: 2.5 VA @ 120V AC

Output Rating: 10 amp 120 VAC, 5 amp 240 VAC Resistive
Mechanical Life: 10,000,000 operations
Switch Life: 250,000 under 10 amp, 120 VAC resistive load
1,000,000 under 5 amp, 120 VAC resistive load

Repeat Accuracy: 1/2 of 1% of dial

Temperature Range: -20˚ to 140˚F

Agency Approvals: UL Recognition E61735
CSA Certification LR26861

OPERATION

To Set

Move the black pointer to the desired OFF setting and the orange pointer to the desired ON setting (as shown in Figure 1). The sum of these ON and OFF intervals cannot exceed the total time of one scale. Switch contacts are tripped open or closed each time the indicator pointer passes 0. When the indicator pointer is in the OFF scale to the left of 0 contacts 4-3 and contacts 6-8 are closed and 4-5 and 6-7 are open. When the indicator pointer is in the ON scale to the right side of 0 contacts 4-5 and 6-7 are closed and 4-3 and 6-8 are open. The indicator pointer must travel to the preset limit and back to 0 to complete the total ON or OFF interval. The two switches can operate together or be set to allow a break before make (dwell) interval or make before break (overlap) between ON-OFF switching. Refer to the standard time range chart under specifications for the maximum dwell or overlap interval for each time range. Figure 2 illustrates the path of the indicator pointer and the switch action each time the zero point is passed. Figure 3 illustrates the terminal location on the rear of the unit case.

WIRING
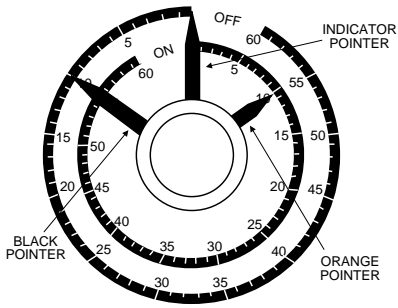
Figure 1
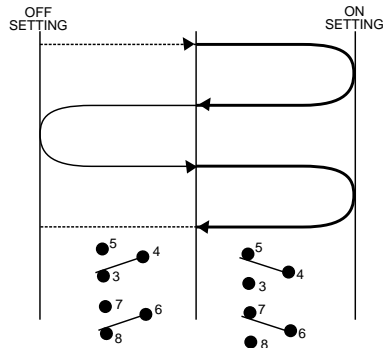
Figure 2
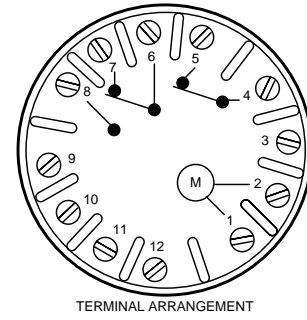
TERMINAL ARRANGEMENT

Figure 3 CONTACTS SHOWN IN "ON" POSITION

MOUNTING

DRILL AND TAP FOUR HOLES FOR 8-32 SCREWS (INCLUDED W/UNIT)

1.406 (35.71)

1.406 (35.71)

3.187 ±.062 (80.95 ±1.57) DIA. CUTOUT

1.406 (35.71)   1.406 (35.71)

MTG. HOLE USED FOR GROUNDING CASE

4.250 (107.95)

3.812 (96.82)

3.062 (77.77)

4.125 (104.78)   1.625 (41.27)

5.750 (146.05)

ENCLOSURES

Model No.	NEMA Class	Description
HN308	1	Surface Mtg. with terminal block
HN364	1	Surface Mtg. without terminal block
HN370	1A	Dual unit cabinet less unit cases and toggle switch, with 9 terminal block

ACCESSORIES

Model No.	Description
H-5331	Mounting Brackets 2 req'd per timer
HP50-31	One Hole Mounting Ring
HP50-133	Surface Mounting Adapter to use in place of brackets

ORDERING INFORMATION

Consult Customer Service for availability of other time ranges, voltages, and frequencies.

HG1   01   A6   05

TIME RANGE

See Specifications for Time Range Catalog Symbol

VOLTAGE & FREQUENCY

Sym.	Description
A5	120V, 50 Hz
A6	120V, 60 Hz
B5	240V, 50 Hz
B6	240V, 60 Hz

FEATURES

Sym.	Description
05	Revised for Mounting in Explosion Proof Housing
92	Enclosed in HN388 Explosion Proof Housing

Adjustable timing as a percentage of overall cycle... ideal for heat control, machine lubrication, etc.

The HQ9 offers accurate, efficient control for many industrial applications. These include motion control, electric heaters, ovens, program temperature controls, chemical feeding, and lubrication systems.

- ■ Electrically isolated pilot light
- ■ Cycle progress pointer
- ■ Compatible with CYCL-FLEX® series featuring unique plug-in mounting

OPERATION

A synchronous motor driven cam closes a snap action switch for a percentage of the total time cycle. Settings may be made or changed with the timer operating. Relationship of switch transfer point at zero and desired interval is made by adjustment of the setting pointer. As the progress pointer passes zero, the load switch transfers. The HQ9 continues to operate as a repeat cycle timer as long as power is supplied to the motor. ON time is adjustable from 5% to 100% of the toal time range. Load connections are made to terminals 4 and 3.

SPECIFICATIONS

Time Ranges:

Sym.	Time Range
01	15 Sec.
02	30 Sec.
03	60 Sec.
04	120 Sec.
06	5 Min.
07	10 Min.
08	15 Min.
09	30 Min.
10	60 Min.
11	120 Min.
14	20 Hr.

Voltage/Frequency: 120V (+10, -15%), 50/60 Hz
240V (+10, -15%), 50/60 Hz

Contact Rating: 10 amps at 120/240 VAC
1/3 HP at 125/250 VAC
1/2 amp at 125 VDC
1/4 amp at 250 VDC

Setability: ±1%

Timer Burden: 4 VA max.

Temperature Range: -10˚ to 140˚F (-23˚ to +60˚C)

Agency Approvals: UL Recognition E61735
CSA Certification LR26861

NOTE: Because of precise adjustment and calibration procedures, it is recommended that all repair or part replacement be done at the factory.

WIRING

Standard CW dial references the operation of the load when connected to terminal number 3. ON Time adjustable 5% to 100%.

MOUNTING

DRILL AND TAP FOUR
HOLES FOR 8-32 SCREWS
(INCLUDED W/UNIT)

1.406
(35.71)

1.406
(35.71)

3.187 ± .062
(80.95 ± 1.57)
DIA. CUTOUT

1.406   1.406
(35.71)   (35.71)

MTG. HOLE
USED FOR
GROUNDING
CASE

3.062
(77.77)

4.125
(104.78)

1.625
(41.27)

5.750
(146.05)

ENCLOSURES

Model No.	NEMA Class	Description
HN308	1	Surface Mtg. with terminal block
HN364	1	Surface Mtg. without terminal block
HN370	1A	Dual unit cabinet less unit cases and toggle switch, with 9 terminal block

ACCESSORIES

Model No.	Description
H-5331	Mounting Brackets 2 req'd per timer
HP50-31	One Hole Mounting Ring
HP50-133	Surface Mounting Adapter to use in place of brackets
HQ900-71	Dial Lock

ORDERING INFORMATION

Consult Customer Service for availability of other time ranges, voltages, and frequencies.

HQ9   06   A6   02

TIME RANGE

Sym.	Description	Sym.	Description
01	15 Sec.	08	15 Min.
02	30 Sec.	09	30 Min.
03	60 Sec.	10	60 Min.
04	120 Sec.	11	120 Min.
06	5 Min.	14*	20 Hr.
07	10 Min.		

*Available in A6 version only

VOLTAGE & FREQUENCY

Sym.	Description
A5	120V, 50 Hz
A6	120V, 60 Hz
B5	240V, 50 Hz
B6	240V, 60 Hz

60 cycle units can be used for 50 cycle application;
however, the motor will run at 5/6 speed

FEATURES

Sym.	Description
02	Timer only modified for mounting in NEMA VII explosion proof housing
07	Dial Lock

Economical, accurate percentage timer for adjustable on time of a fixed cycle... ideal for irrigation control, chemical injection, oven cycling, etc.

The HQ4 series 48 percentage timer is an accurate, economical, enclosed percentage timer designed for use in applications where a repetitive ON time of a fixed cycle needs to be variable. It is ideally suited for:

■ Irrigation controls

■ Chemical feeding

■ Program temperature controls

■ Electric heaters, ovens

■ Motor control

■ Lubrication systems

The HQ4 series 48 percentage timer is a panel mounted unit with exposed dial. The heavy duty front dial plate has 4 mounting studs for simple and secure mounting to panels up to 1/4 inch thick. The load switches and motor are enclosed for environmental protection. Connections to load switches and timing motor are made to screw terminals on the rear of the unit.

OPERATION

A synchronous motor driven cam closes a snap action switch for a selected percentage of the total time cycle of the unit. Percentage settings are made with a knob and dial on the front of the unit. Settings may be made or changed with the timer operating. With a dial setting between 5% and 100%, terminals 2 and 3 are closed relative to the setting. At 100% setting, terminals 2 and 3 are closed continuously. At 0% setting, terminals 2 and 3 are open continuously.

SPECIFICATIONS

Time Ranges:

Sym.	Time Range
01	15 Sec.
02	30 Sec.
03	60 Sec.
04	120 Sec.
05	4 Min.
06	5 Min.
07	10 Min.
08	15 Min.
09	30 Min.
10	60 Min.
11	120 Min.

Voltage/Frequency: 120 VAC (+10, -15%), 50/60 Hz
240 VAC (+10, -15%), 50/60 Hz

Burden: 4 VA max.

Contact Rating: 10 amps at 240 VAC
1/3 HP at 125/250 VAC
1/2 amp at 125 VDC
1/4 amp at 250 VDC

Setability: ±1% of total time cycle

Temperature Range: -10˚ to 140˚F (-23˚ to +60˚C)

Agency Approvals: UL Recognition E61735
CSA Certification LR26861

WIRING

MOUNTING

8 - 32 x 1/2 (12.7) MOUNTING STUD (4)

2.750 (69.85)

(34.925) 1.375

3 1/2 (88.9)

3/8 (9.525)

(34.925) 1.375

3/8 (9.525)

2.750 (69.85)

3 1/2 (88.9)

3 1/16 DIA. ± 1/64 (77.787 ± .396)

23/32 ± 1/32 (18.256 ± .793)

3 15/64 ± 1/32 (82.153 ± .793)

ORDERING INFORMATION

Consult Customer Service for availability of other time ranges, voltages, and frequencies.

HQ4   01   S48   A6   U

SERIES

TIME RANGE

Sym.	Description	Sym.	Description
01	15 Sec.	07	10 Min.
02	30 Sec.	08	15 Min.
03	60 Sec.	09	30 Min.
04	120 Sec.	10	60 Min.
05	4 Min.	11	120 Min.
06	5 Min.		

VOLTAGE & FREQUENCY

Sym.	Description
A5	120V, 50 Hz
A6	120V, 60 Hz
B5	240V, 50 Hz
B6	240V, 60 Hz

TM TIME/MODULE®
REPEAT CYCLE TIMER

Extremely flexible cam timer... modular construction allows custom configuration to solve almost any repeating time control problem

The TM series TIME/MODULE® consists of a series of modules, each interlocking with the other and keyed so they can be assembled only one way. Choosing the correct combination of modules will solve virtually all repeating time control problems. Standard units are available with one through ten switches.

There are six modules available, each distinctive in its separate function. They include a motor module with clutch, dial and knob module, a 10-1 reduction module, and three different switch modules as follows: one rise and drop tab with latch actuator (standard), two rise tabs with cam follower, and two 50-50 cam segments with cam follower.

TM	6	A6	05	01
	NUMBER OF CIRCUITS	VOLTAGE & FREQUENCY	TIME RANGE	FEATURES
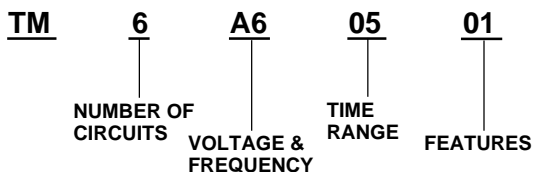
FOR FULL SPECIFICATIONS, REQUEST BULLETIN NUMBER 345

MP MULTIPULSE®
REPEAT CYCLE TIMER
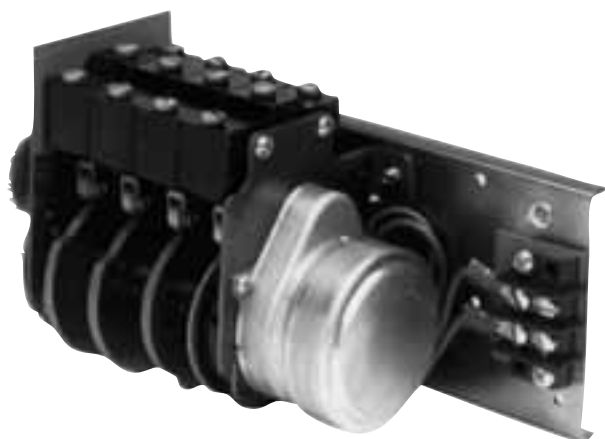
Cam timing for up to 12 circuits... more than 250 time cycles available

MP	6	A6	05	03
	NUMBER OF CIRCUITS	VOLTAGE & FREQUENCY	TIME RANGE	FEATURES

The MULTIPULSE® Repeat Cycle timer consists of a synchronous motor driving a cam shaft through a gear train. The cam shaft rotates continuously as long as the motor is energized. Adjustable cams determine the point of closing and opening a switch during each cam shaft revolution.

The MULTIPULSE® is ideally suited to applications where operations occur in a predetermined sequence as in operating a series of dampers in a dust collecting system for periodic cleaning.
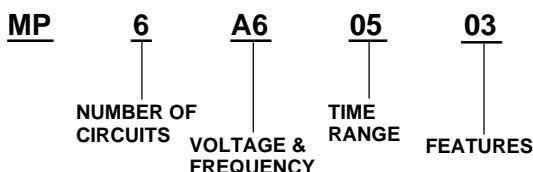
FOR FULL SPECIFICATIONS, REQUEST BULLETIN NUMBER 340

**MODEL 76
REPEAT CYCLE TIMER**

Compact cam timer for 1 to 3 circuits... with heavy duty 15 amp contacts

The Model 76 is a synchronous motor driven cam timer for 1, 2, or 3 circuits in 14 time ranges from 1 second to 60 minutes. The cam shaft is directly connected to the motor drive shaft. Cams and cam hubs are steel with set screws for cam adjustment. Friction type adjustable cams are available as a feature for cam adjustment without tools.

Switches are SPDT heavy duty snap action with screw terminals. Cam followers have steel rollers which ride on the outer surface of the cam.

Frame of the timer is "U" shaped formed steel for surface mounting in any position.

76	01	A6	01	04

NUMBER OF CIRCUITS **VOLTAGE & FREQUENCY** **TIME RANGE** **FEATURES**

6

ELECTRIC TIMERS

FOR FULL SPECIFICATIONS, REQUEST BULLETIN NUMBER 361

MT STEPSWITCH

A multi-circuit stepping programmer... provides a simplified, efficient means to control a number of circuits

The MT Stepswitch is an electromechanical multi-circuit stepping programmer available in three frame sizes. The MT Stepswitch provides a simplified and efficient approach to controlling a number of load circuits in a predetermined sequence. The combination of electrical and mechanical actions of the stepswitch provides interlocked operations without the use of complex relay circuitry.

Various devices or combinations of devices may be used to initiate the stepping action such as a limit, pressure, or foot switch or a timer or push-button. The MT is very rugged and is made for heavy continuous service.

MT	05	12	A6	2

NUMBER OF LOAD CIRCUITS **NUMBER OF STEPS** **VOLTAGE & FREQUENCY** **FEATURES**

FOR FULL SPECIFICATIONS, REQUEST BULLETIN NUMBER 910

HA MICROFLEX® SERIES
RESET TIMER

Synchronous motor driven reset timer

The MICROFLEX® is available in 9 time ranges from 20 seconds to 120 hours. A solenoid operated clutch engages motor driven gear assemblies and closes or opens 3 sets of 15 ampere silver contacts in any of 6 separate sequences. The timer has a 4" diameter outer dial and a smaller inner dial with a 20-1 turn ratio providing micrometer type adjustments. A cycle progress pointer and a locking setting knob are standard features.

HA4	O	A6	B212	J
	TIME RANGE	VOLTAGE & FREQUENCY	CONTACT SEQUENCE	FEATURES
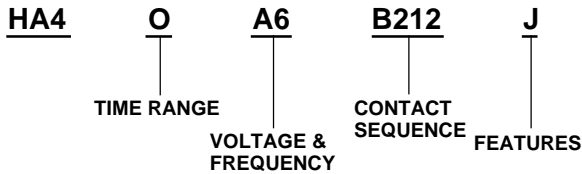
FOR FULL SPECIFICATIONS, REQUEST BULLETIN NUMBER 110

TIMOFLEX® RESET TIMER
HD3 HD4 HD5 SERIES

Powered by synchronous motor

HD	32	A6	21
	SERIES	VOLTAGE & FREQUENCY	TIME RANGE
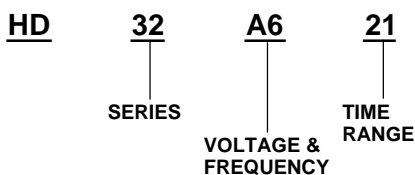
The TIMOFLEX® timer's synchronous motor turns a ratchet wheel carrying a calibrated time setting dial. Upon energizing the timer coil, a pawl is engaged with the ratchet. At the end of the preset time, the pawl moves the load switch to the "Timed Out" position. This position is held until the timer resets by de-energizing the timer coil.

FOR FULL SPECIFICATIONS, REQUEST BULLETIN NUMBER 170

HM SERIES
MULTIFLEX® RESET TIMER

Clutch operated, multiple circuit timer

6

HM	7	1	A6	2222222

NUMBER OF CIRCUITS

TIME RANGE

VOLTAGE & FREQUENCY

CONTACT ARRANGEMENT
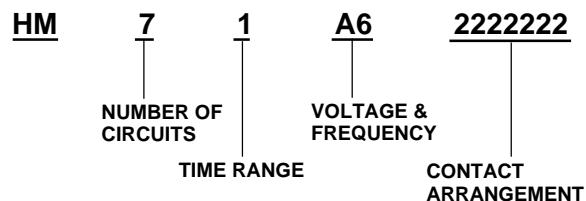
The MULTIFLEX® is available in 10 standard time ranges with up to 6 load circuits and 4 standard timing adjustment combinations. Time ranges are from 5 seconds to 60 minutes, externally adjustable from zero to maximum of the chosen time range. The unit is available in standard or reverse clutch operation. The reverse clutch unit will not reset on power failure. Maintained or momentary start operation is achieved by external wiring.

FOR FULL SPECIFICATIONS, REQUEST BULLETIN NUMBER 130

HO SERIES
POLYFLEX® TIMERS

Electromechanical synchronous motor driven multiple circuit reset timer

The HO Series POLYFLEX® timer is available in 3 frame sizes, with 3, 7, or 11 load circuits, and in 6 standard time ranges. The timer has one ON and one OFF generated curve type cam for each circuit, individually adjustable for any portion of the chosen time range. There are two terminals for each single pole-single throw switch circuit. Circuits may be normally open or normally closed, defined by the relative position of the ON cam with the OFF cam.

HO	43	03	A	A6	7	B

NUMBER OF CIRCUITS

TIME RANGE

CYCLE GEAR

VOLTAGE & FREQUENCY

FEATURES

WIRING CONFIGURATION
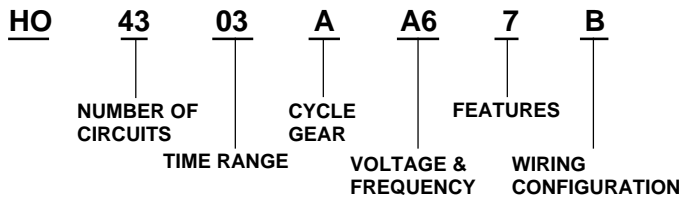
FOR FULL SPECIFICATIONS, REQUEST BULLETIN NUMBER 140

HP7 SERIES
REPEAT CYCLE TIMER

Electromechanical repeat cycle timer... housed in standard CYCL-FLEX® case

The HP7 Series timer is available in seven time ranges from 60 seconds to 10 hours. Time settings are made by a knob and pointer against a calibrated scale on the front of the unit. A second pointer indicates cycle progress. Output switch transfer at the end of each timing cycle provides an output pulse for the duration of 1% (nominal) of the maximum dial range. At the end of a 1 second reset period, the unit starts another timing cycle. The HP7 timer will not reset on power interruption or failure.

HP7	1	A6	07

TIME RANGE

VOLTAGE & FREQUENCY
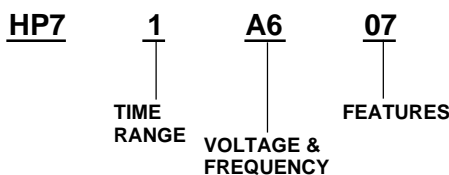
FEATURES

FOR FULL SPECIFICATIONS, REQUEST BULLETIN NUMBER 325

HZ MICROFLEX® SERIES
RESET COUNTER

Solenoid operated pawl and ratchet assembly

HZ4	O	A6	A242	J

- **COUNT RANGE** (O)
- **VOLTAGE & FREQUENCY** (A6)
- **CONTACT SEQUENCE** (A242)
- **FEATURES** (J)

The MICROFLEX® counter is available in three ranges. A solenoid operated clutch engages gear assemblies and closes or opens 3 sets of 15 ampere silver contacts in any of six separate sequences. The 1000 and 400 count units have a fixed outer dial and a micrometer adjustable inner dial and pointer with a 20 to 1 and 50 to 1 ratio for accurate setting. The 19 count setting knob drives the setting pointer directly. Set point knob can be locked into position to prevent setpoint error due to vibration. Progress indication is on all units. Registration of counts is on the trailing edge of the input pulse.

FOR FULL SPECIFICATIONS, REQUEST BULLETIN NUMBER 720

MTA SERIES
STEPPING PROGRAMMER

Multi-circuit sequence control device

MTA	220	A6	2

- **NUMBER OF CIRCUITS** (220)
- **VOLTAGE & FREQUENCY** (A6)
- **FEATURE** (2)

The heavy duty MTA stepping programmer has the following features: unidirectional or bidirectional operation, 10 SPDT load circuit modules, optional single or double 24 position tapswitch, and easy programming with flip-up, flip-down programming tabs. The MTA has 24 programming steps and comes in 10, 20, or 30 circuits units.

FOR FULL SPECIFICATIONS, REQUEST BULLETIN NUMBER 921

MT30-75
12 POSITION TAP SWITCH KIT

MT30-76
16 POSITION TAP SWITCH KIT

Provides additional circuits for pilot
lights or step switch input circuits.
Maximum switching current 1a,
steady state 5a.

H-5331
MOUNTING BRACKETS

Allows surface mounting of all
CYCL-FLEX® and BR4 products.
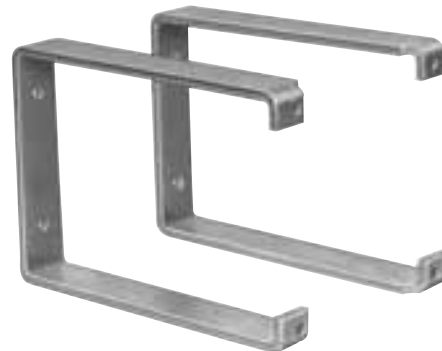
HA10-69
FLUSH MOUNT BEZEL ASSEMBLY

Allows flush mounting of HA or HZ4
series counter.

HP50-31
MOUNTING RING

Eliminates drilling and tapping the
four mounting holes for panel
mounting all CYCL-FLEX® products.

HP50-133
SURFACE MOUNT ADAPTER

Adapter to surface mount CYCL-
FLEX® products. Attaches to CYCL-
FLEX® case with terminal screws.
Terminal connections of adapter are
accessible from front.
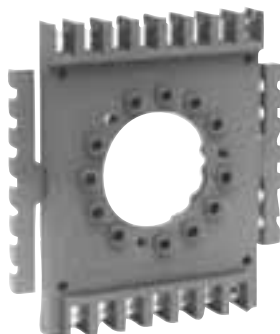
HK500-07
KEY LOCK COVER

Prevents unauthorized tampering
with HK series totalizer.

HZ170-121
DIAL LOCK ASSEMBLY

Prevents unauthorized changes in setpoint on HZ170 series counter. The key performs the setting.

HQ900-71
DIAL LOCK ASSEMBLY

Prevents unauthorized changes in setpoint on HQ9 series timer. Key performs the setting.

HP50-295
DIAL LOCK ASSEMBLY

Prevents unauthorized changes in setpoint on HP5 series timer. The key performs the setting.

HN-319
NEMA 1 ENCLOSURE

Single unit enclosure for AB4 series timer.

6

ELECTRIC TIMERS

Converts a single-cycle reset timer to a repeat cycle timer

®
RECOGNIZED

The HP50103 Recycle Module is an accessory designed to automatically reset reset timers and counters.

It provides a delay (adjustable from 0.2 to 1.5 seconds) to allow the timer to reset, and then automatically restarts the timer in the same manner as manually pushing a start button.

When the HP50103 Recycle Module is used with an Eagle Signal brand timer, an output pulse to operate a signal or load at preset intervals can be obtained by using one of the timer's contacts that closes in the reset operation.

The module is connected in serries with the timer coil and in parallel with the timer holding circuit.

Dimensions:

2.88
2.0
1.0
2.0
0.06
2.50
0.94
No. 6 MTG Screws
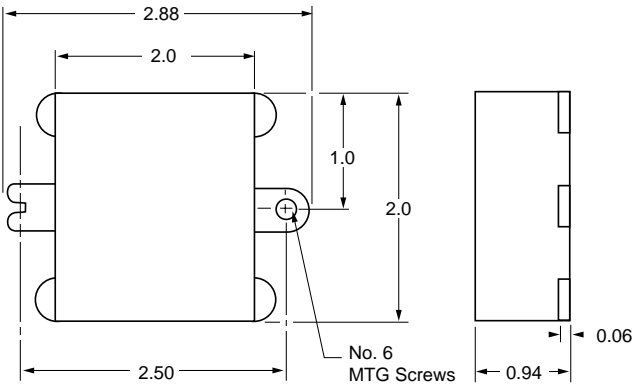
SPECIFICATIONS

1. The HP50103 is designed for use only with 120 VAC Eagle Signal brand timers and counters.

2. A delay time setting on the HP50-103 of 1.0 to 1.5 seconds is suggested as adequate for all Eagle Signal brand timers and counters. Shorter time settings can be used on certain timers and counters depending on the percent of full scale used.

3. The module should be connected across holding contacts with minimal resistance. If two contacts in series are used as a holding circuit, (Example: HP5 CYCL-FLEX®) the recycle module should be connected across the normally open contact only.

4. Timing may vary ±50% at 102 to 132 VAC, 72°F or ±40% over a 0-160°F temperature range.

5. Mounting tabs are molded into the module's case for easy mounting with #6 screws.

Compatibility: The following ranges of Eagle Signal brand timers are compatible with use of the HP50103 Recycle Module:

HP5	HA
BR3	HM
BR4	HO
CT530	HZ170
BR1	HZ172
BR2	CT510
HZ24	CT511

ORDERING INFORMATION

Model No.	Description
HP50103	Recycle Module, 120VAC, 50/60Hz

6

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DANAHER INDUSTRIAL CONTROLS has representatives and distributors located in major cities within the United States and throughout the world. For information about the distributor or sales office nearest you, contact our customer service department:

Customer Service
call Toll Free 800.873.8731
or 847.662.2666

Internet Presence
E-Mail: dancon@dancon.com
Worldwide Web: http://www.dancon.com

Veeder-Root

Dynapar

Eagle Signal

Many industrial and process applications require display of totalized quantities as well as indication of production rate or speed. In addition, control based on preset count or rate limits is frequently desired.

Although multiple functions can be accomplished by mounting several individual instruments on a control panel, each one will consume panel area, costs may be higher than necessary, and installation and wiring tasks can be unduly complex.

THERE'S A BETTER WAY

Our many years of experience in the design and application of counting, speed measuring, and related instrumentation has enabled us to define products that include the frequently combined functions of two or more products. Therefore, the multifunction instruments offered in this catalog have the benefits of compact size, simplified installation and wiring, and very low cost-per-function.

GENERAL FEATURES AND SPECIFICATIONS

Multifunction instruments are combinations of the totalizer, predetermining counter, and rate measurement techniques described elsewhere in this catalog. Therefore, we recommend a review of the introduction sections for these products as a means to better understand the products listed here.

WHAT TO SPECIFY

Start by reviewing the functions required in your new or existing application. Does it include totalizing tasks combined with tachometer or other speed indication? Our **Series 7975** may be just what's required for production monitoring tasks where totalized quantity and rate of production is important.

Will the application benefit by the control provided by a predetermining counter such as batching, cutting-to-length, or positioning? Could high/low speed alarms enhance the application? If two or more of these functions are required, a multifunction instrument such as our Series 7975 is a good choice for the job.

SPECIAL PURPOSE CONTROLLERS AND MONITORS

For applications that require a predetermining counter with more than six preset limits, the ideal controller may be our Series 7920 or Series 79201. These unique products will control multi-step sequential operations by count and/or time (79201).

Series 7920/79201

Our Series 7935 is a full featured production monitor. It collects and segregates data by up to 5 work-shifts – production totals, downtime, efficiency, and fault or stop reasons. In addition, the Series 7935 provides a two preset predetermining counter that can be used to control lot or batch size, dual rate or speed functions with ratio calculation and alarm limits, and RS-422 data communications.

Series 7935 Production Data Control

The SFC40 is ideal for liquid transfer and dispensing operations. It includes start/stop control outputs, a 7 digit totalizer, dual limit batch controller, and a flowrate indicator with high/low alarm limits.

SFC 40 Batch Controller

The following is a summary of our multifunction instrument features:

Model	Totals	Rate	Rate Alarm	Preset Count	Down Time	Data Out
7935	5 Shift	2+Ratio	Yes	Yes	5 Shift	Yes
7920				50 Limits		
79201				50 Limits		
SFC40	Yes	Yes	Yes	2 Limits		Yes

ELECTRONIC INPUT SIGNALS

Electronic counters need a signal that represents the unit to be counted, which is often available as a voltage pulse or contact closure that already exists on your machine or process. However, for cases where no signal is available, a suitable sensor will have to be furnished. Our Multifunction Indicators/ Controllers have the advantage of sharing a single sensor as input for several functions. Individual calibration factors allow the count and rate to be presented in different engineering units. For example, the totals and speed of a winding machine can be monitored, with totals displayed in feet, while speed can be shown in RPM – using the same sensor.

Anything that can be sensed can be counted and we offer several types of accessory sensors. There are four general catagories of counting applications. Each has specialized

ENCODERS

SERIES H20

SERIES 31/32

PROXIMITY SWITCHES

Inductive

Capacitive

SENSING DEVICES

sensing requirements:

Application	Example	Sensing Technique
Item Counting	Cartons, Parts, Bottles, Cans, Sheets, Pencils, or any other item	Inductivity Proximity Capacitive Proximity Photoelectric
Length Measuring	Paper, Cloth, Steel, Textiles, Lumber, or the linear measure of any other goods	Rotary Encoders Inductive Proximity
Positioning	Assembly Machinery, Drilling, Punching, Painting, or any other precision movement	Rotary Encoders
Specialized	Fluid/Gas Volume, Medical, Scientific, or anything else that can be sensed	Flowmeter, Particle Sensor, or other special device

This Selector Guide can assist you in determining the type of instrument that best fits your application requirements. Condensed description and specification information is provided. Complete information is available by turning to the referenced page number that appears above each product's picture. The ★ symbol denotes our "Star Products" which we recommend be given first consideration. They offer maximum functionality, performance, and value.

Danaher Industrial Controls	SFC40	SLRC	RDMC	
Page Number: The ★ symbol denotes our "Star Products" which we recommend be given first consideration. They offer maximum functionality, performance, and value. **Description and Features:** Condensed description and specification information is provided. Complete information is available by turning to the referenced page number that appears above each product's picture.	Page: 7.04 ■ Designed specifically for applications that require monitoring and control of liquid flow ■ Hi and Low alarm outputs for flow rate ■ Background totalization and batch control	Page: 7.05 ■ Uniquely suited for paper, film and foil converting applications ■ Sheet length controller monitors web delivery and radial knife position ■ Ream and Batch control output enables complete process automation	Page: 7.06 ■ Roll Diameter indicator and controller for use in both wind and unwind applications ■ 3 presets for control of Roll full/empty status ■ 10 VDC output can be used as a trim input to a speed controller	
Dimensions	74mm x 144mm	74mm x 144mm	74mm x 144	
Display Type	LED	LED	LED	
Number of Digits	7 (0.6" high)	6 (0.6" high)	5 (0.6" high)	
Power Supply	115, 240VAC (switch selectable) or 12 VDC	115, 240VAC (switch selectable)	115, 240VAC (switch selectable) or 12 VDC	
Calibrator	Ind. multipliers, 0.0001 to 9.9999, for Rate and Batch	Multiplier 0.0001 to 9.9999	Multiplier 0.0001 to 9.9999	
Max Frequency	10 kHz	10 kHz Web input; 5 kHz knife input	20 kHz	
Signal Input Type	Sourcing	Sourcing	Sourcing	
Control Inputs	Start, Stop, Inhibit, Batch Reset, Total Reset	Inhibit, Batch Reset, Ream Reset, Total Reset	Inhibit, Select A/B, Reset	
Number of Presets	2 Batch, 2 Rate	Ream Preset, Batch Preset, Short & Long Alarms	3	
Control Outputs	4 NPN transistors. Optional 2 SPDT Relays - 5 Amp	6 NPN transistor	3 NPN transistors	
Sensor Power Supply	12 VDC	12 VDC	12 VDC	
Front Panel Rating	NEMA 4	NEMA 4	NEMA 4	
Serial Communication	RS-422/485	RS-422/485	RS-422/485	

Series 7920	Series 79201	Series 7935		
Page: 7.07	Page: 7.08	Page: 7.09		
■ 50 preset counter for complex operations ■ Programmable individual prewarn outputs	■ Program library stores unique operating sequences that can be called up automatically or through the front panel ■ Up to 100 stored presets in a maximum of 50 programs ■ Timing functions provide Interval or Delay operation of outputs	■ Production monitor tracks key data such as totals, rate, ratio, downtime, % efficiency, number of events (by fault code) and time lost ■ Serves as a dual preset counter ■ RS-422 port enables production data to be downloaded to a computer		
152mm x 201mm LED 6 (0.43" high)	152mm x 201mm LED 6 (0.43" high)	136mm x 215mm LED 6 (0.56" high)		
120 VAC Multiplier 0.00001 to 10.0 10 kHz	120 VAC Multiplier 0.00024 to 10.0 10 kHz	115, 240VAC (switch selectable) Multiplier or Divider 1 to 999999 1 kHz		
Sinking Reset 50	Sinking Halt, Execute, Index 50	Sinking Count Direction, Run/Stop, Reset, Security, Fault 2		
16 NPN transistors 12 VDC IP54 No	16 NPN transistors 12 VDC IP54 No	2 SPDT Relays - 5 Amps and 2 NPN transistors 12 VDC NEMA 4 RS-422		

7

M U L T I F U N C T I O N

P R O D U C T S

A complete liquid-flow measurement and delivery control system . . . includes: totalizer, rate indicator, and dual preset batch counter

The SFC40 integrates three necessary functions required for efficient delivery, transfer, or dispensing of liquids. A seven decade totalizer keeps an accurate inventory of total volume. Flow rate can be instantly displayed, while high/low presets immediately produce alarm outputs if flow rate deviates outside of acceptable limits. Its six decade batch counter includes dual presets, each with an independent output, for use in two-stage flow control. Front-panel START and STOP buttons coordinate the outputs in the command of pump control circuitry. A full complement of programmable features assure that the SFC40 can be easily calibrated and configured to specific application requirements.

■ Replaces individual totalizer, rate indicator, and batch controller

■ Two calibrators: rate indicator, and batch controller/totalizer

■ Bright, easy-to-see red LED display with programmable decimal point

■ Rugged industrial grade enclosure – NEMA-4 rated front panel

■ Totalizer provides grand total of all flow – 7 decades capacity

■ Rate indicator with high/low alarm outputs

■ Batch controller with dual limits and outputs

■ Front panel START/STOP buttons, plus remote START, STOP, INHIBIT, and RESETS

■ RS-422/485 communications for computer, printer, or PLC data transfer

■ Non-volatile memory of program, preset, and counted data

The SFC40 can be used with any flow meter, or calibrated pump, that is compatible with the substance to be measured, and which provides suitable signal levels. It may also be applied to a variety of other production applications that require totalization, rate monitoring, and control of batch or lot size.

SPECIFICATIONS

Input Power: 100 to 130 VAC or 200 to 260 VAC, 50/60 Hz, 20 VA max.

Accessory Power: 12 VDC ±5% @ 175 mA

Rate Indicator: Decades: 5; Accuracy: 0.01%; Update Time: 0.8 seconds; Calibrator: 5-decade, 0.0001 to 9.9999

Totalizer: Decades: 7; Calibrator: 5-decade, 0.0001 to 9.9999 shared with batch controller

Batch Controller: Decades: 6; Presets: 2, 6-decade

Input Frequency: 0 to 10 kHz (x1 logic); .1 to 10 kHz for rate

Signal Input: 3.5 to 15 volt squarewave @ 3.25 mA source

Control Inputs: Contact closure or 10 to 20 volt squarewave @ 2.5 mA sink

Outputs: Type: 4 solid state, current sink 100 mA max.; 28 VDC max.; 2 SPDT, 5 amp relays optional for batch controller; Operation: Batch controller is latch or momentary (0 to 99.99 seconds); Rate Alarms: Latch, momentary, follow

Serial Communications: RS-485/422

Operating Temperature: 32° to 122°F (0° to 50°C)

Diagnostics: User initiated tests of inputs, outputs, keyboard

Model No.	Description
SFC400S00	**SFC40** without relays; 115 or 240 VAC, selectable
SFC401S00	**SFC40** with relays; 115 or 240 VAC, selectable

For additional production monitoring features, see Series 7935 production data control

Typical Applications:

Pulse Output Flow Meter

Fast Fill Valve

Slow Fill Valve

Filling System
· 2 Preset Batch Control
· Flow Totalizing
· Production Rate
· Alarms

SFC40

Dimensions:

5.67" 144 mm

5.35" 136 mm

FRONT

.39" 10 mm

2.91" 74 mm

5.20" 132 mm

SIDE

.50" 13 mm

2.60" 66 mm

Panel Dims: Cutout: 2.68" x 5.43". Thickness: 1/16" to 1/14". Depth: 5.68" min.

7
MULTIFUNCTION PRODUCTS
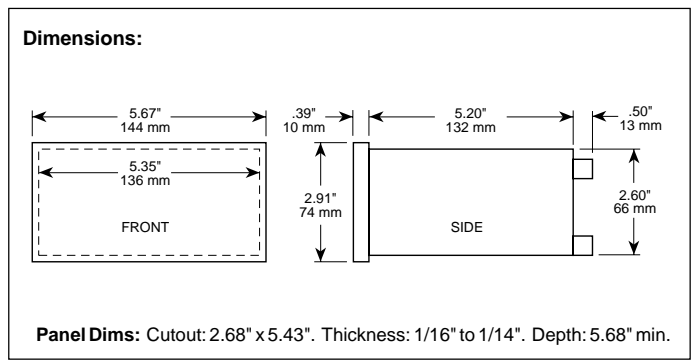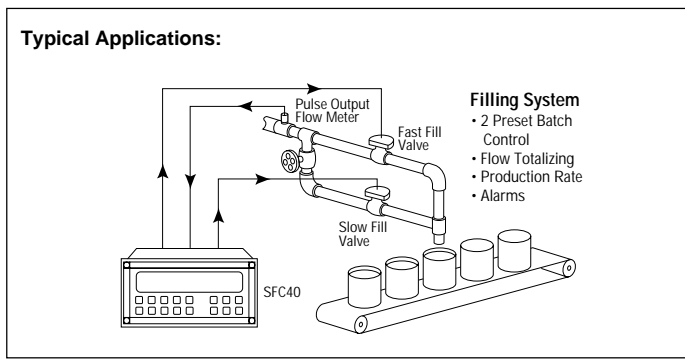
Sheet length and ream control . . . for web processing applications

The **MAX S.L.R.C.** monitors the radial position of rotary cutters, and the linear delivery of web transport, calculates the resultant sheet length, and produces alarm outputs if length is out of tolerance from high/low limits. In addition, web length throughput is totalized, sheet production is counted, ream size can be preset, and a batch counter will control the lot size produced. All production information is readily available via the unit's display panel – plus RS-422/485 data communications can be used to produce printed reports, or interface with a computer or PLC.

- Web and cutter inputs for complete machine control
- 4 presets, high and low sheet length, ream quantity, batch quantity
- 5 decade sheet length monitor, ream counter, and batch counter
- 6 decade sheet and length totalizers
- Big, 0.6" high (15.2 mm) LED display – plus illuminated annunciators
- Programmable scale factors, decimal point, and output action
- Non-volatile memory of program and preset values
- Security locks for programming and user access
- RS-422/485 data allows local printer or remote system interface
- NEMA-4 rated, sealed front panel – tactile response keyboard
- Self diagnostics checks inputs, outputs, keyboard, display, memory

Many convenience features, such as 115/230 VAC operation, power supply output for encoders and other transducers, and easy screw-terminal-block wiring are included.

For more presets, see MAX Count 6

Typical Applications:
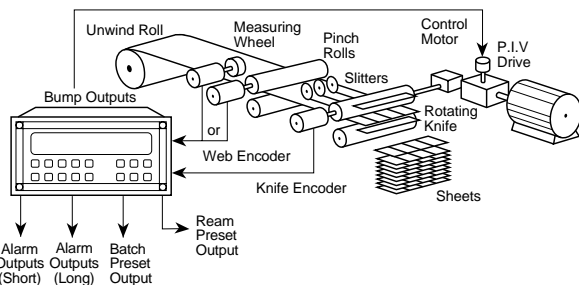
Application Note: For the web or length encoder, choose an encoder which has at least 1 pulse for every 2 of the smallest units or increments to be displayed. For example, for a .01 inch resolution, you need at least 1 pulse per every .02 inch of web travel.

For the knife or cut signal, 1 pulse per cut is recommended. A zero speed pickup such as a 58M or 53Z may be used instead of a 1 PPR encoder.

If using encoders on both the web and the knife, check your power supply draw. PM41S accessory power supplies are recommended.

SPECIFICATIONS

Input Power: 100 to 130 VAC or 200 to 260 VAC, 50/60 Hz, 20 VA

Accessory Power: 12 VDC @ 175 mA

Sheet Length Monitor: 5 decades; Alarm Presets: 2 individual; Operation: Gated operation using the web input gated with the knife input; Web Input: DC to 10kHz, x2 logic, single channel; Knife Input: DC to 5 kHz, x1 logic, single channel, (the scaled knife signal, knife input/knife divider, cannot exceed 175 Hz); Web Calibrator Range: 5 decade, 0.0001 to 9.9999; Operation: Calibrates web input signal into usable engineering units; Knife Divider Range: 3 decade, 1 to 999; Operation: Used to scale the knife input signal to produce 1 pulse per revolution of the knife; Web and Knife Input Signals: 3.5 to 15 VDC square wave @ 3.25 mA source

Ream Counter: 5 decade; Web Multiplier: 1 to 99; single 5 decade preset

Batch Counter: 5 decade with preset

Sheet Totalizer: 6 decade, multiplied by web multiplier

Length Totalizer: 6 decade; Scaler: 1 to 9999, used to divide the calibrated web signal

Control Inputs: Input Frequency: 20 Hz maximum, current sinking, both edge and level sensitive as defined by input use; High Input Level: 10 VDC min. to 20 VDC max.; Input Low Level: 0 VDC min. to 2 VDC max.

Display: Decades: 8 decade, 0.6" red LED; Decimal Point: Programmable range; XX.XXX to XXXXX

Program Security: System LOCK and programmable preset lock

Outputs: Type: 6 solid state, 100 mA sink, 28 VDC max. programmable operation

Serial Interface: RS-485/422; Baud Rate: Selectable, 300, 600, 1200, 2400; 7 bit ASCII

Operating Temperature: 32° to 122°F (0° to 50°C)

Model No.	Description
SLRC0S00	**MAX** S.L.R.C. Sheet Length and Ream Control

Dimensions:

Panel Dims: Cutout: 2.68" x 5.43". Depth: 5.68" min.
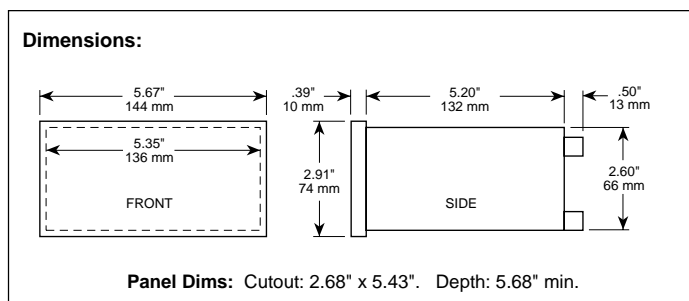
7
M U L T I F U N C T I O N **P R O D U C T S**

Roll diameter measurement for windup, unwind and traverse control

MAX Roll Diameter Monitor and Control (R.D.M.C.) combines all of the measurement and control functions for windup and unwind applications in a single, economical unit. Productivity improvements are made through the elimination of expensive scrap and automation of time-consuming rethreading.

MAX R.D.M.C.'s optional analog output provides a voltage signal directly or inversely proportional to the measured diameter for use in data recording, remote monitoring and tension or traverse speed control.

■ Diameter measurement with 3 presets

■ Dual roll inputs for duplex turret applications

■ Wind up or unwind operation

■ Programmable sample averaging

■ Programmable zero and full scale analog output points

■ RS-422/485 data port with selectable baud rate

■ Sealed NEMA 4 front panel

■ DIN-sized panel mounting

■ Non-volatile memory during power loss

MAX R.D.M.C.'s calibration provides direct readout of diameter in engineering units. Its unique sample averaging feature eliminates problems caused by uneven rolls. Operation and setup is easy with the full numeric keypad and menu-driven programming.

For isolated power supply, see PM41S

SPECIFICATIONS

Input Power: 100 to 130 VAC or 200 to 260 VAC, 50/60 Hz, 20 VA

Accessory Power: 12 VDC @ 175 mA., short circuit protected

Diameter Counter: 5 digit with 3 presets; Programmable decimal point; Maximum frequency: 20 kHz with X1 input logic

Calibrator Range: 0.0001 to 9.9999

Program Security: Individual program and preset locks

Signal Inputs: 3.5 to 15 VDC square wave @ 3.25 mA source

Outputs: 3 solid state, 100 mA sink, 28 VDC max.

Serial Communications: RS-422/485 differential, ASCII

Operating Temperature: 32° to 122°F (0° to 50°C)

Model No.	Description
RDMC0S00	**MAX** R.D.M.C., (115/230 VAC, selectable)

Typical Applications:
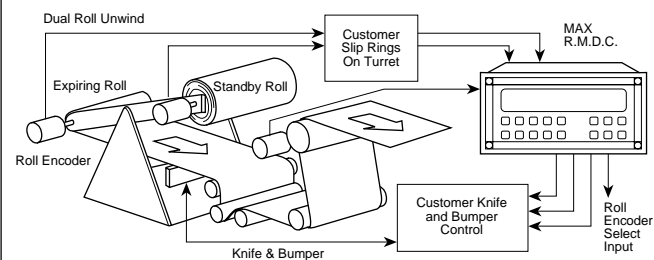
Dimensions:
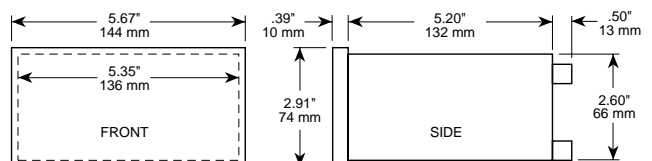
Panel Dims: Cutout: 2.68" x 5.43". Thickness: 1/16" to 1/14". Depth: 5.68" min.

50 presets with programmable configuration and 16 control outputs . . . exceptional flexibility for drilling, punching, forming and many other applications

High speed uni- and bidirectional counting, and 50 presets, make difficult application problems easy to solve, without shortcut or compromise. Series 7920, Programmable Multicontroller, will control complex operations with maximum reliability and accuracy. Its full numeric keypad and display prompting allows error-free entry of preset values. A nonvolatile memory stores all program data, and captures count values instantly at loss of AC power.

- 6 decade capacities counter and presets – speed to 10 kHz
- Nonvolatile memory protects program and counted data
- Bidirectional or unidirectional count input with calibration factor
- 50 presets and 16 outputs with programmable assignments
- Prewarn function signal at selected count before any preset
- Two preset processing modes: sequential; ascending
- Lockout function removes or reinstates presets within sequence
- Output logic includes LATCH and MOMENTARY-TIME
- Auxiliary DC power output of 12 volts, 500 mA – filtered and regulated
- Security lock restricts access to program content, and panel controls

Programmable input modes provide add/subtract, count/direction, and quadrature operation with X1, X2, X4 selectable count logic.

> **For combined time & count programs, see Series 79201**
> **For production monitoring capabilities, see Series 7935**

SPECIFICATIONS

Number of Decades: Counter: 6 decades plus 6 decades each preset register; Batch Counter: 6 decades with preset

Display: 0.43" red LEDs; 6-digit count display and 2-digit level display

Count Input: Programmable for operation in unidirectional and bidirectional input modes; Maximum Count Speed: 10 kHz, 30 Hz typical when internal switch-contact bounce filter is used

Preset Levels: 50 levels standard; presets may be examined without disrupting counting/control process

Lockout: Any preset level may be deleted from the operating sequence by means of lockout; preset values for locked out levels retained in memory for subsequent return to sequence

Prewarn Levels: One level of common prewarn with equal effect on all active preset levels; individual prewarn levels, each affecting only its assigned preset level may be programmed

Control Outputs: 16 open collector NPN transistors, normally off; rated for 24 VDC and 150 milliamps maximum

Control Output Timing: Output(s) will actuate within 10 ms of preset coincidence; outputs may be programmed for hold-time of 0.1, 0.2, 0.5, 1, 2, 5, 10 or 20 seconds or for latch

Panel Reset: Reset to zero; preset level sequence is returned to level 01 or lowest level which is not in lockout condition; any latched outputs are released at reset

Remote Reset: Reset command may be initiated by remote contact closure, pulse or open collector NPN transistor

Calibrator Factor: Multiplication factor of 0.00001 to 10.0 may be applied for factoring count input signal

Accessory Equipment Power Supply: Regulated 12 VDC provided for operation of external sensor and relays; maximum current demand not to exceed 500 mA

Power Requirement: 105 to 120 VAC, 50/60 Hz, 25 watts

Operating Temperature: +32° to +131°F (0° to +55°C)

Mounting: Panel mount or secured bench mounting using hardware supplied; accommodates up to 0.25" (6.35 mm) panel

Typical Applications:
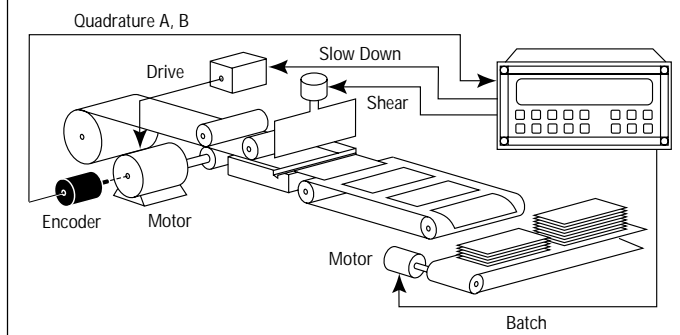
Model No.	Description
0792006-101	Programmable Multicontroller, 115 VAC

Dimensions:

Panel Cutout: 7.323" x 5.433" (186.0 mm x 138.0 mm).

7
MULTIFUNCTION **PRODUCTS**
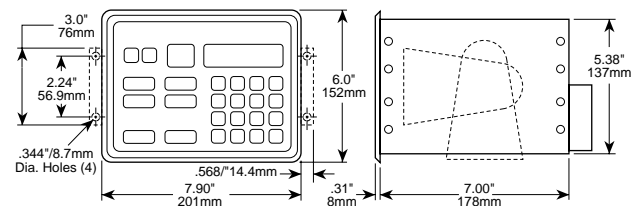
*A powerful multi-step
sequential controller . . .
manages complex
positioning and processing
tasks – by count or time*

The Production Programmer's extensive instruction set and flexible configuration easily adapts to many manufacturing and process industry applications. It stores up to 50 sequential preset count and/or timing steps which control as many as 16 external circuits. In addition, a number of unique operating sequences can be maintained in its program "library", ready to be effortlessly called to action by a few quick keystrokes. This feature can save hours of set-up and reprogramming, as required with other multi-step controllers.

- Counting steps have 6 decade capacities
- Nonvolatile memory protects program and counted data
- Bidirectional or unidirectional count input with calibration factor
- Timing steps duration from 0000.01 second, to 9999.99 minutes
- 16 outputs with programmable assignment to any step
- Output logic includes LATCH, TOGGLE, or MOMENTARY
- Instruction set includes repeat loops, and nested loops
- Program "library" allows flexible assignment of steps per program
- Auxiliary DC power output of 12 volts, 500 mA – filtered and regulated
- Security lock restricts access to program content, and panel controls

Many applications using mechanical cam-timers, or limit switch sensing of position, are plagued with slow, tedious setup. The Series 79201 can replace these devices and provide fast, easy programmable adjustment of process variables.

**For production monitor features, see Series 7935, SFC40
For related products, see Series 7920, MAX Count 6**

SPECIFICATIONS

Display: 0.43" high red LEDs; 6-digit data display and 2-digit identification display are used in conjunction with keyboard for all operating and programming functions

Counting Functions: Preset: Program steps assigned as presets compare the content of the 79201's 6-decade counting register with the step's entered operating value; when count becomes equal to or greater than the operating value, the step's output function will be performed and program progresses to next step; instruction codes provide the flexibility for automatic reset or non-reset of the counting register at completion of step; Prewarn: Provides an early-warning output prior to any individual preset step's output

Count Input: Programmable via internal switches for operation in unidirectional input modes; Maximum Count Speed: 10 kHz, 40 Hz typical when internal switch-contact bounce filter is used; Prescaling Factor: Multiplication factor of 0.00024 to 10.00000 may be applied for calibrating or correcting count input signal

Timing Functions: Program steps assigned as timers provide an output during timing duration (interval) or after timing duration (delay)

Timer Resolution: Each step is individually programmable for resolution of XXXX.XX seconds or XXXX.XX minutes

Output Channels: 16 open collector NPN transistors, normally OFF; rated for 24 VDC and 150 mA maximum

Output Functions: Latch: Output turns ON until unlatch or toggle instruction is provided by subsequent program step; Unlatch: Turns ON-output OFF; Toggle: Reverses state of output, turns ON-output OFF, OFF-output ON; Momentary (Hold Times): At completion of program step, output turns ON and times for momentary duration; Output Cycle Time: Output(s) will initiate assigned function within 1 ms of program step completion

Security: Provides protection against unauthorized access to program storage and operating controls

Accessory Equipment Power Supply: Regulated 12 VDC provided for operation of external sensor and relays; maximum current demand not to exceed 500 mA

Electrical Connection: Power line via captive 3-wire line cord, 6 feet; input/output and command interface via two 25-pin bulkhead connectors on rear panel; mating connectors provided

Power Requirements: 115 VAC ±10%, 50/60 Hz, 25 watts

Operating Temperature: 32° to 131°F (0° to 55C)

Weight: 7 lbs (3.18 kg)

Model No.	Description
0792016-001	Production Programmer, 115 VAC

Typical Applications:

Dimensions:

Panel Cutout: 7.323" x 5.433" (186.0 mm x 138.0 mm).
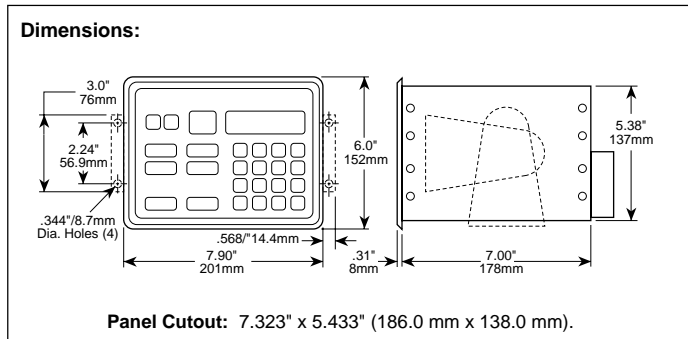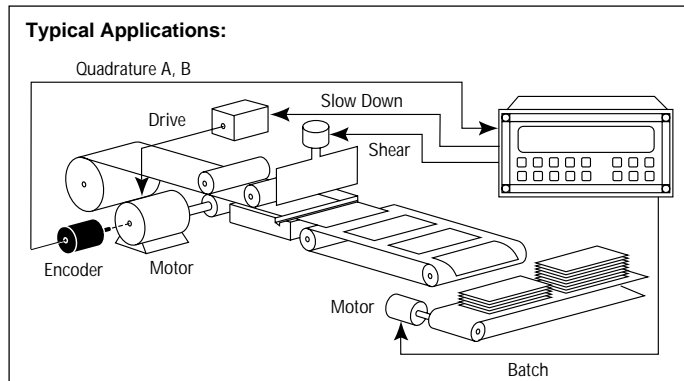
A complete production information center . . . totals, speeds, ratio, downtime by reason, efficiency and more – plus RS-422 data communications

The factors affecting production yields and efficiency require constant analysis in order to maintain quality standards. Series 7935 Production Data Control gives factory and management personnel instant access to vital information needed to make necessary evaluations and corrections. Production totals, downtime (or uptime), percentage efficiency, plus a full history of stop-reasons including total events and time lost, are collected for each work shift – up to five shifts.

■ Increases manufacturing yields and quality by identifying stop reasons

■ Five shift segregation of important production information

■ Brilliant 0.56" (14.2 mm) red LED display

■ Compact – panel mount, NEMA-4 rated front panel

■ Accurate production count with preset, prevents overrun and underrun

■ Records production totals, downtime, efficiency, and stops

■ Monitors speed by RPM, length or parts per minute, or other unit

■ Provides alarm outputs at high/low speed limits or ratio deviation

■ Predetermining counter for controlling batch or lot size

■ RS-422 communications permits centralized reporting by computer

Additional features include a 2-preset counter for controlling production batch or lot size, dual rate/ratio indicators with preset alarms, and a total running hour meter. Up to 100 units may be networked to a PC or other computer via its RS-422 data interface. The computer can generate reports by exception, grouping, statistic, or other programmable conditions.

For specialized flow measurement and control, see SFC40
For sheet-length and ream control/monitor, see MAX S.L.R.C.

SPECIFICATIONS

Display: Red, 0.56" high (14.2 mm) LED, 6 data digits, 2 identification digits; programmable decimal point position.

Front Panel: Membrane laminate, moisture- and dust-tight when panel mounted with gasket, tactile response keys

Input Power: Selectable 115/230 VAC, ± 10%; 50/60 Hz; 20 watts, maximum

Transducer Power: Output of 12 VDC regulated ±5%, 120 mA, maximum

Shift Functions: Acquired for 5 work shifts; production count, downtime (or uptime), efficiency, fault data

Machine Functions: Rate-1, Rate-2, Ratio, Running Hours, Preset Counter

Memory: Nonvolatile, retains all program and data during absence of power

Security: Multiple level, programmable digital code security-locks

Signal Inputs: 2 inputs, NPN transistor; 1 kHz, 500 µsec. min. pulse width; programmable filter for switch-contact: 25 Hz, 20 msec. min. pulse width
Primary Input: Signal for shift total, running total, preset counter, rate-1, and ratio features
Secondary Input: Signal for rate-2 and ratio features

Calibrator: 6 independent scalers provided for counted data, rate, and ratio

Command Inputs: Run/stop, remote reset, remote shift change, selectable direction or stop count; NPN transistor or switch contact, 50 msec. min. pulse width

Fault Reason Inputs: 7 inputs for external sensors (or switches) that signal fault or other unusual process condition

Preset Counter Outputs: 2 form-c relays rated 115/230 VAC, 5 amp noninductive, 2 NPN transistors rated 30 VDC, 100 mA

Rate Alarm Outputs: 2 NPN transistors rated 30 VDC, 100 mA

Serial Interface: RS-422, ASCII, programmable baud rate

Operating Temperature: 32° to 131°F (0° to 55°C)

Weight: 3.25 lbs. (1.47 kg.)
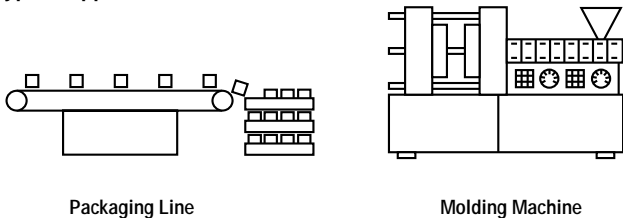
Model No.	Description
0793506-260	Series 7935 with RS-422 interface

Dimensions:

Typical Applications:

Packaging Line   Molding Machine

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MULTIFUNCTION
PRODUCTS

DANAHER INDUSTRIAL CONTROLS has representatives and distributors located in major cities within the United States and throughout the world. For information about the distributor or sales office nearest you, contact our customer service department:

Customer Service
call Toll Free 800.873.8731
or 847.662.2666

Internet Presence
E-Mail: dancon@dancon.com
Worldwide Web: http://www.dancon.com

Veeder-Root
Dynapar
Eagle Signal

DANAHER INDUSTRIAL CONTROLS

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MULTIFUNCTION

PRODUCTS

Customer Service
call Toll Free 800.873.8731
or 847.662.2666

Internet Presence
E-Mail: dancon@dancon.com
Worldwide Web: http://www.dancon.com

Veeder-Root

Dynapar

Eagle Signal

Over thirty years experience in electronics and motion control applications to provide the widest selection of Dynapar brand products for the industrial drive control market. These products bring unprecedented ease of use, increased flexibility and better performance into the mainstream of industrial control. A full line of Dynapar brand encoders and accessories complement the electronic controllers and allow one stop shopping for complete motion control solutions.

MOTION CONTROL FUNCTIONS

Closed loop speed controls use an electronic controller and a feedback device which is coupled to the system. By knowing the desired speed and measuring the actual speed, the controller can make adjustments continuously to provide better accuracy, load regulation and isolation from power line disturbances.

Master speed controls regulate a single motor or drive using an operator adjustable setpoint. The speed is usually entered numerically with a keyboard and display; some products also include a means of remote adjustment. Other functions may include the ability to start and stop at preprogrammed rates for smooth acceleration and deceleration. Applications that are ideal for closed loop speed control, such as extrusions pumps, are typical of processes that depend upon speed to maintain quality.

Speed follower controls are used to make one part of a system track another. Conveyor applications might require the takeaway line to go slightly faster than the feed line. Mixing applications often use speed followers to maintain a balance of materials even though the production rate of the system may vary.

SPECIFYING A MOTION CONTROLLER

In choosing a master speed control, the primary consideration is given to the accuracy needed. This is usually a price/performance issue, with higher accuracy control costing more. Accuracies can range from 0.1% to 0.01%. Better performance will also enter into the feedback device selection, the drive/motor combination and even the mechanical design of the machinery. How the operator sets the speed is another requirement; it may be a keyboard entry, a knob adjustment, pushbuttons or a combination of these. The simplest products offer a single setpoint and method of adjustment while more complex products have multiple setpoints or means of adjustment. Added functionality such as ramping and open loop operation may be important.

For speed followers accuracy is also a factor in system performance. If the follower is at least as accurate as the signal it is following, performance will not be compromised. Our motion control products include features which make them very easy to setup and operate. Setpoints can be programmed in meaningful units such as length or a percentage of the master rate. Calibration for speed readout and ramp control are typical of the attention paid to user interface details.

Web Speed & Draw Control

Web Process – Surface   Speed and Draw Control

Encoder
Motor
Drive
1234
MSJR5 as a leader

Encoder
Motor
Drive
Reference Frequency
1234
MSJR5 as a follower

Precise Pump Control

Motor   Motor
Encoder   Encoder
Pump   Pump
Mixing Chamber
1234   1234
MDJR1 as a leader   MDJR1 as a leader

Precise Conveyor Speed Control

Drive
Encoder
Motor
Drive
1234   1234
MSJR4 as a leader   MSJR4 as a follower

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MOTION CONTROLLERS

This Selector Guide can assist you in determining the type of motion controller that best fits your application requirements. Condensed description and specification information is provided. Complete information is available by turning to the referenced page number that appears above each product's picture. The ☆ symbol denotes our "Star Products" which we recommend be given first consideration. They offer maximum functionality, performance, and value.

Dynapar brand	MSjr 4 & 5	MDjr 1	MDjr 2	
Page Number: The ☆ symbol denotes our "Star Products" which we recommend be given first consideration. They offer maximum functionality, performance, and value.	Page: 8.02, 8.03 ☆	Page: 8.04 ☆	Page: 8.05 ☆	
Description and Features: Condensed description and specification information is provided. Complete information is available by turning to the referenced page number that appears above each product's picture.	■ Cost effecient solution for applications that can benefit from closed loop PID speed control such as material handling conveyors, extruders, mixing pumps, etc. ■ Programmable to be a stand-alone controller or as a follower to coordinate with the speed or another motor ■ MSJR5 provides analog trim input for automated dancer control	■ Digital front end PID control with built in DC drive simplifies wiring and installation ■ Chose MDJR1 for for 90 or 180 VDC fractional horsepower motors	■ Digital front end PID control with built in DC drive simplifies wiring and installation ■ Chose MDJR2 for 90 or 180 VDC motors up to 2 HP	
Dimensions	48mm x 96mm	48mm x 96mm	96mm x 96mm	
Display Type	LED	LED	LED	
Number of Digits	5	5	5	
Power Supply	85 - 265 VAC	85 - 265 VAC	85 - 265 VAC	
Control Outputs	0-10 VDC internal reference 0-15 VDC external reference	0 - 90 VDC at 115 VAC input; 0 - 180 VDC at 230 VAC input	0 - 90 VDC at 115 VAC input; 0 - 180 VDC at 230 VAC input	
Alarm Outputs	2 NPN transistors	2 NPN transistors	2 NPN transistors	
Signal Input Type	Sinking, Sourcing, Magnetic	Sinking, Sourcing, Magnetic	Sinking, Sourcing, Magnetic	
Control Inputs	Auto/Manual, Trim Reset/ Jog, Ramp Hold	Auto/Manual, Trim Reset/ Jog, Ramp Hold	Auto/Manual, Trim Reset/ Jog, Ramp Hold	
Max Frequency	20 kHz	20 kHz	20 kHz	
Sensor Power Supply	Selectable 5 or 12 VDC	Selectable 5 or 12 VDC	Selectable 5 or 12 VDC	
Front Panel Rating	NEMA 4	NEMA 4	NEMA 4	

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MOTION CONTROLLERS

The most economical way to add digitally precise, PID speed regulation to stand-alone or multi-section systems

The Dynapar brand MSJR4 improves the speed regulation and adds new capabilities to variable speed drives. Regulating extruders, mixing pumps or material handling conveyors eliminates speed variations from temperature, power line voltage or motor load changes, and results in consistently higher quality production. The MSJR4 also operates in minutes and seconds, for food and beverage applications that need to control the cooking time of ovens and broilers.

In the follower mode, the MSJR4 will precisely match the speed of one motor, machine section or manufacturing process to another. With the assurance of zero cumulative error (drift) over time, it economically automates transfer lines, coating or draw of plastics film, and paper or plastics winding/unwinding.

Inherent in the MSJR4 is a large, LED display of actual process time or speed, which can be scaled into meaningful units (feet per minute, gallons per second, or RPM) for operator ease in monitoring and setting the desired speed.

General features include:
■ Leader or follower operation
■ Speed or Process Time (inverse speed) setpoints
■ PID with velocity feedforward
■ Programmable Accel/Decel ramp rate
■ Speed display calibration in engineering units
■ High and Low alarms in setpoint units or percentage of setpoint
■ Three level security of setpoints, loop gains and program data
■ NEMA4/IP66 front panel washdown rating
■ Nonvolatile memory

Installation is simplified through the use of pluggable terminals and simple input and output diagnostics. The rugged metal enclosure and isolated drive output provide complete immunity from electrical noise and the universal power input is fully filtered for low emissions.

SPECIFICATIONS

Input Power: universal, 85 to 265 VAC, 50-60 Hz, 18 VA

Sensor Power: selectable, 5 or 12 VDC ± 10%, 0 to 125 mA max

Display: 5 digit, 0.56" bright red 7-segment LED; 9 program and status display annunciators

Setpoints: Speed: 4 digit, programmable decimal point; Ratio: 4 digit, fixed decimal point X.XXX; Process Time: 4 digit, fixed format MM:SS; Jog Speed: 4 digit

Alarms: high and low; programmable as actual value or percentage of sepoint

Security: 3 levels: Program (Disable/Enable); Setup (Off/On) and Setpoint Adjustment (Incremental/Digit by Digit/Both/None)

Signal Inputs: Feedback and Reference: squarewave (pulse) or sinewave (magnetic), 20 kHz max each

Control Inputs: Auto/Manual; Trim Reset/Jog; Ramp Hold

Analog Output: 0 to 10 VDC at 5 mA max using internal reference; or 0 to external Reference voltage, 15 VDC max

Alarm Outputs: open collector, 100 mA max. sink, 28 VDC max

Regulation: Leader (speed): 0.05%; Follower (ratio): 0.05% with zero long term drift; Process Time: 0.05%

Loop Time: 16 milliseconds

Operating Temperature: 32° to 122°F (0° to 50°C)

Model No.	Description
MSJR4U00	Digital Speed Controller

Typical Applications:

Precise Conveyor Speed Control

MSJR4 as a leader

MSJR4 as a follower

Dimensions:

Panel Dims: Cutout: 1.78" x 3.58" (45 x 92 mm). Thickness: 1/16" (1.6 mm) to 1/4" (6.4 mm). Depth behind panel: 5.75" (147 mm) min.

Sidebar: **8** MOTION CONTROLLERS
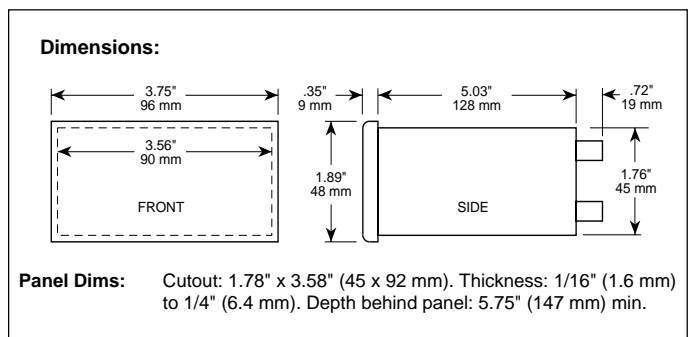
A new standard for price and performance in full PID digital speed regulation, with analog input for control of dancer position or web tension

The Dynapar brand MSJR5 offers improved speed regulation and new capabilities for variable speed drives. It is similar in function to the MSJR4, with the addition of an analog input. In speed control of pumps or conveyors, an easy-to-use operator device for setting the speed is a simple potentiometer. The MSJR5 will adjust and display the setpoint directly from the pot.

For plastics converting or metal processing applications, the follower capability matches the speed of one section to another. The analog trim input allows direct control of dancer position in web processes, or tension sensing in winding or slitting operations.

The MSJR5 has a large, LED display, which can be scaled to show RPM, feet per minute, or sheets per hour, for easy monitoring and speed setting.

General features include:
■ Leader or follower operation
■ Speed or Process Time (inverse speed) setpoints
■ Analog input for remote setpoint or trim adjustment
■ PID with velocity feedforward
■ Programmable Accel/Decel ramp rate
■ Speed display calibration in engineering units
■ High and Low alarms in setpoint units or percentage of setpoint
■ Three level security of setpoints, loop gains and program data
■ NEMA4/IP66 front panel washdown rating
■ Nonvolatile memory

Installation is simplified through the use of pluggable terminals and simple input and output diagnostics. The rugged metal enclosure and isolated drive output provide complete immunity from electrical noise and the universal power input is fully filtered for low emissions.

SPECIFICATIONS

Input Power: universal, 85 to 265 VAC, 50-60 Hz, 18 VA

Sensor Power: selectable, 5 or 12 VDC ± 10%, 0 to 125 mA max

Display: 5 digit, 0.56" bright red 7-segment LED; 9 program and status display annunciators

Setpoints: Speed: 4 digit, programmable decimal point; Ratio: 4 digit, fixed decimal point X.XXX; Process Time: 4 digit, fixed format MM:SS; Jog Speed: 4 digit

Alarms: high and low; programmable as actual value or percentage of sepoint

Security: 3 levels: Program (Disable/Enable); Setup (Off/On) and Setpoint Adjustment (Incremental/Digit by Digit/Both/None)

Analog Trim Input: Range: 0 to 10 VDC max; Resolution 10 mV (0.1% of full scale); Scaling: Zero Reference and Gain Adjust

Signal Inputs: Feedback and Reference: squarewave (pulse) or sinewave (magnetic), 20 kHz max each

Control Inputs: Auto/Manual; Trim Reset/Jog; Ramp Hold

Analog Output: 0 to 10 VDC at 5 mA max using internal reference; or 0 to external Reference voltage, 15 VDC max

Alarm Outputs: open collector, 100 mA max. sink, 28 VDC max

Regulation: Leader (speed): 0.05%; Follower (ratio): 0.05% with zero long term drift; Process Time: 0.05%

Loop Time: 16 milliseconds

Operating Temperature: 32° to 122°F (0° to 50°C)
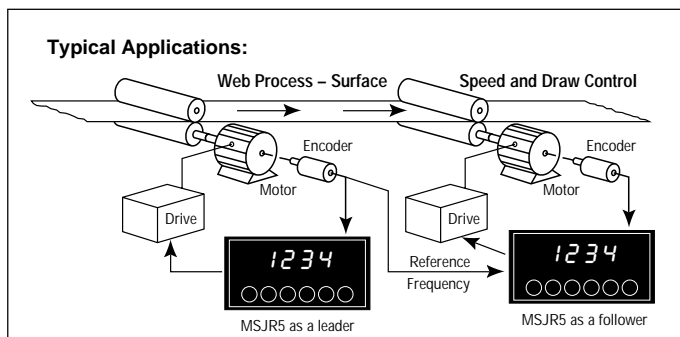
Model No.	Description
MSJR5U00	Digital Speed Controller with Analog Trim Input
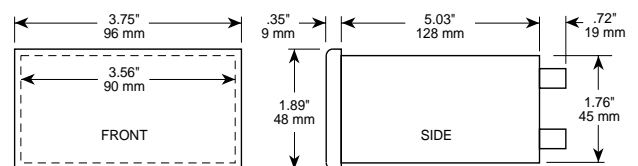
Typical Applications:

Web Process – Surface   Speed and Draw Control

MSJR5 as a leader   MSJR5 as a follower

Dimensions:

3.75" / 96 mm   .35" / 9 mm   5.03" / 128 mm   .72" / 19 mm

3.56" / 90 mm   FRONT   1.89" / 48 mm   SIDE   1.76" / 45 mm

Panel Dims: Cutout: 1.78" x 3.58" (45 x 92 mm). Thickness: 1/16" (1.6 mm) to 1/4" (6.4 mm). Depth behind panel: 5.75" (147 mm) min.

The most economical and compact fractional horespower digital DC drive, with full PID control, leader/follower and process time capabilities

The Dynapar brand MDJR1 provides superior speed regulation and unique capabilities for control of small DC motors. Extruders, mixing pumps and material handling conveyors benefit from the elimination of speed variations from temperature, power line voltage or motor load changes; the result is consistently higher quality production. The MDJR1 also operates in minutes and seconds, for food and beverage applications that need to control the cooking time of ovens and broilers.

The follower mode of the MDJR1 precisely matches its motor speed to another motor, machine section or manufacturing process. With the assurance of zero cumulative error (drift) over time, it economically automates transfer lines, coating or draw of plastics film, and paper or plastics winding/unwinding.

The MDJR1 has a large, LED display. Actual process time or speed can be scaled into meaningful units (feet per minute, gallons per second, or RPM) for operator ease in monitoring and setting the desired speed.

General features include:
- Leader or follower operation
- Speed or Process Time (inverse speed) setpoints
- Fractional horsepower DC drive
- PID with velocity feedforward
- Programmable Accel/Decel ramp rate
- Speed display calibration in engineering units
- High and Low alarms in setpoint units or percentage of setpoint
- Three level security of setpoints, loop gains and program data
- NEMA4/IP66 front panel washdown rating
- Nonvolatile memory

Installation is simplified through the use of pluggable terminals and simple input and output diagnostics. The rugged metal enclosure and isolated drive output provide complete immunity from electrical noise and the universal power input is fully filtered for low emissions.

For speed control without drive, see MSJR4, MSJR5
For higher HP rated DC drive, see MDJR2
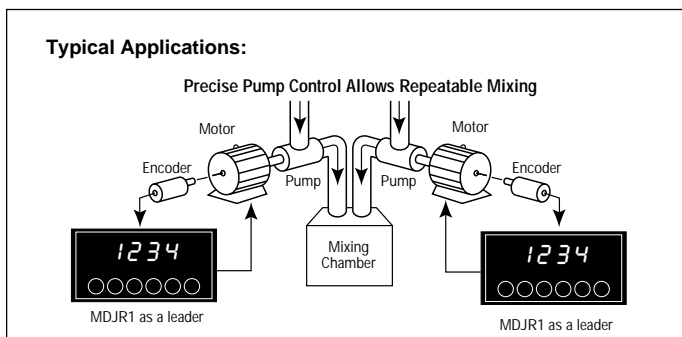
SPECIFICATIONS

Input Power: universal, 85 to 265 VAC, 50-60 Hz, 18 VA

Output Power: 0 to 90 VDC typical at 115 VAC input (0 to 180 VDC typical at 230 VAC input)

Maximum HP Rating: 1/3 HP at 115 VAC input; 2/3 HP at 230 VAC input

Overload Capacity: 200 % for 1 minute

Sensor Power: selectable, 5 or 12 VDC ± 10%, 0 to 125 mA max

Display: 5 digit, 0.56" bright red 7-segment LED; 9 program and status display annunciators

Setpoints: Speed: 4 digit, programmable decimal point; Ratio: 4 digit, fixed decimal point X.XXX; Process Time: 4 digit, fixed format MM:SS; Jog Speed: 4 digit

Alarms: high and low; programmable as actual value or percentage of sepoint

Security: 3 levels: Program (Disable/Enable); Setup (Off/On) and Setpoint Adjustment (Incremental/Digit by Digit/Both/None)

Signal Inputs: Feedback and Reference: squarewave (pulse) or sinewave (magnetic), 20 kHz max each

Control Inputs: Auto/Manual; Trim Reset/Jog; Ramp Hold

Alarm Outputs: open collector, 100 mA max. sink, 28 VDC max

Regulation: Leader (speed): 0.05%; Follower (ratio): 0.05% with zero long term drift; Process Time: 0.05%

Loop Time: 16 milliseconds

Operating Temperature: 32° to 122°F (0° to 50°C)

Model No.	Description
MDJR1U00	**MDjr1** 1/8 DIN Digital DC Drive

Typical Applications:

Precise Pump Control Allows Repeatable Mixing

MDJR1 as a leader

MDJR1 as a leader

Dimensions:

3.75" 96 mm
3.56" 90 mm
FRONT
.35" 9 mm
5.03" 128 mm
1.89" 48 mm
SIDE
.72" 19 mm
1.76" 45 mm

Panel Dims: Cutout: 1.78" x 3.58" (45 x 92 mm). Thickness: 1/16" (1.6 mm) to 1/4" (6.4 mm). Depth behind panel: 5.75" (147 mm) min.

8

MOTION CONTROLLERS
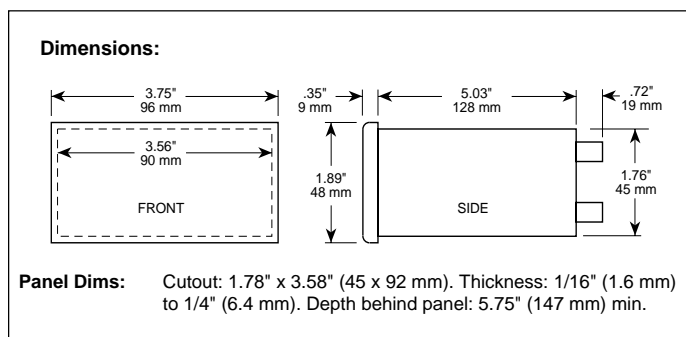
A new standard for price and performance in compact digital DC drives, with full PID control, leader/follower and process time capabilities

The Dynapar brand MDJR2 provides superior speed regulation and unique capabilities for control of DC motors. Extruders, mixing pumps and material handling conveyors benefit from the elimination of speed variations from temperature, power line voltage or motor load changes; the result is consistently higher quality production. The MDJR2 also operates in minutes and seconds, for food and beverage applications that need to control the cooking time of ovens and broilers.

The follower mode of the MDJR2 precisely matches its motor speed to another motor, machine section or manufacturing process. With the assurance of zero cumulative error (drift) over time, it economically automates transfer lines, coating or draw of plastics film, and paper or plastics winding/unwinding.

The MDJR2 has a large, LED display. Actual process time or speed can be scaled into meaningful units (feet per minute, gallons per second, or RPM) for operator ease in monitoring and setting the desired speed.

General features include:
■ Leader or follower operation
■ Speed or Process Time (inverse speed) setpoints
■ Integral horsepower DC drive
■ PID with velocity feedforward
■ Programmable Accel/Decel ramp rate
■ Speed display calibration in engineering units
■ High and Low alarms in setpoint units or percentage of setpoint
■ Three level security of setpoints, loop gains and program data
■ NEMA4/IP66 front panel washdown rating
■ Nonvolatile memory

Installation is simplified through the use of pluggable terminals and simple input and output diagnostics. The rugged metal enclosure and isolated drive output provide complete immunity from electrical noise and the universal power input is fully filtered for low emissions.

For speed control without drive, see MSJR4, MSJR5
For smaller DC drive, see MDJR1
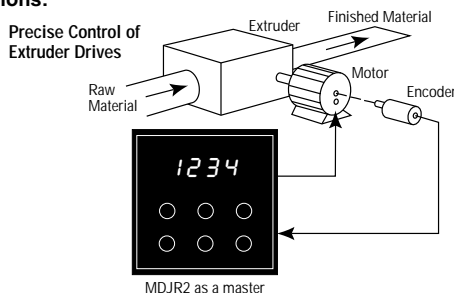
SPECIFICATIONS

Input Power: universal, 85 to 265 VAC, 50-60 Hz, 18 VA

Output Power: 0 to 90 VDC typical at 115 VAC input (0 to 180 VDC typical at 230 VAC input)

Maximum HP Rating: 1 HP at 115 VAC input; 2 HP at 230 VAC input

Overload Capacity: 200 % for 1 minute

Sensor Power: selectable, 5 or 12 VDC ± 10%, 0 to 125 mA max

Display: 5 digit, 0.56" bright red 7-segment LED; 9 program and status display annunciators

Setpoints: Speed: 4 digit, programmable decimal point; Ratio: 4 digit, fixed decimal point X.XXX; Process Time: 4 digit, fixed format MM:SS; Jog Speed: 4 digit

Alarms: high and low; programmable as actual value or percentage of sepoint

Security: 3 levels: Program (Disable/Enable); Setup (Off/On) and Setpoint Adjustment (Incremental/Digit by Digit/Both/None)

Signal Inputs: Feedback and Reference: squarewave (pulse) or sinewave (magnetic), 20 kHz max each

Control Inputs: Auto/Manual; Trim Reset/Jog; Ramp Hold

Alarm Outputs: open collector, 100 mA max. sink, 28 VDC max

Regulation: Leader (speed): 0.05%; Follower (ratio): 0.05% with zero long term drift; Process Time: 0.05%

Loop Time: 16 milliseconds

Operating Temperature: 32° to 122°F (0° to 50°C)

Model No.	Description
MDJR2U00	1/4 DIN Digital DC Drive

Typical Applications:

Precise Control of Extruder Drives

MDJR2 as a master

Dimensions:

Panel Dims: Cutout: 3.58" x 3.58" (92 x 92 mm). Thickness: 1/16" (1.6 mm) to 1/4" (6.4 mm). Depth behind panel: 5.75" (147 mm) min.

8

MOTION CONTROLLERS

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DANAHER INDUSTRIAL CONTROLS has representatives and distributors located in major cities within the United States and throughout the world. For information about the distributor or sales office nearest you, contact our customer service department:

Customer Service
call Toll Free 800.873.8731
or 847.662.2666

Internet Presence
E-Mail: dancon@dancon.com
Worldwide Web: http://www.dancon.com

Veeder-Root
Dynapar
Eagle Signal

8

M O T I O N C O N T R O L L E R S

DANAHER INDUSTRIAL CONTROLS has representatives and distributors located in major cities within the United States and throughout the world. For information about the distributor or sales office nearest you, contact our customer service department:

Customer Service	**Internet Presence**
call Toll Free 800.873.8731	E-Mail: dancon@dancon.com
or 847.662.2666	Worldwide Web: http://www.dancon.com

Veeder-Root

Dynapar

Eagle Signal

Process indicators are used for display and/or control of process variables in applications that use analog signals representing pressure, temperature, weight, etc. Our Dynapar brand instruments are especially well suited for analog-input measurements in industrial environments. Danaher Controls' leadership in designing products suitable for severe industrial environments ensures the highest level of value and performance.

DIGITAL PANEL METER FUNCTIONS

DC Volt Meters will display in proportion to the voltage applied to the input. Several input ranges allow their use in a variety of applications. In the lowest range, DC volt meters can replace old analog meters and provide more resolution and accuracy. Through the use of a shunt (resistor), DC volt meters can also be used to display motor load currents. The middle ranges accommodate operator input devices or process control electronics. On the high range, these meters can readout power supply or DC motor voltages.

Speed Setpoint Indicator
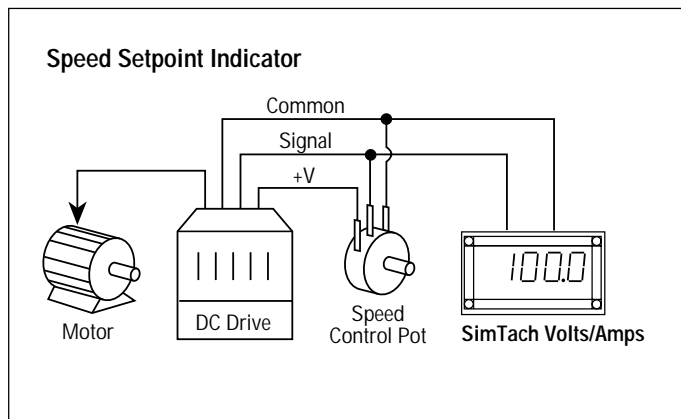
DC Current Meters are popular when noise interference can disrupt voltage levels and are common signals used to drive old analog meters. Reference outputs of 0 to 1 mA, 0 to 5 mA, and 0 to 10 mA which are proportional to motor speed are also available from some AC drives.

Process Volt Meters and Current Loop Indicators operate similar to DC voltage and current meters, but include more extensive span and zero adjustments. Some popular signal ranges include –10 to +10 VDC, 4 to 20 mA and 10 to 50 mA current loops. These sensors are popular in industrial environments when their signals must be reliably transmitted over large distances, or when the signal is needed by more than one device. The minimum and maximum signal levels require adjustments at both ends of the range in order to provide a meaningful display.
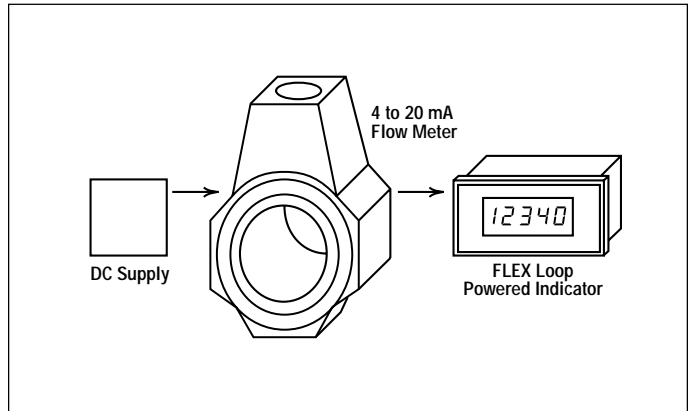
DISPLAY TYPES

Light emitting diode (LED) and liquid crystal displays (LCD) are two popular choices for digital display of numeric information. Our products are offered in a range of price and size selections, in addition to the display type.

LED's can be viewed in very dimly lit areas since they produce their own light. Their high contrast presentation makes them the preferred type when the display must be observed from a distance.

LCD's are best suited for installation in areas where there is reasonably good lighting. They are superior to most other display types when viewed in very bright ambient light, such as direct sunlight. Our S628 AWESOME Series feature an LED display that can change color when an alarm or limit is reached.

SPECIFYING A DIGITAL PANEL METER

The selection of an LED or LCD display is dictated by the amount of ambient light in the area. LCD's are better suited to sunlit environments while LED's work well in dimly lit areas. LCD displays usually come in smaller package sizes and are often chosen when space constraints are present.

Applications require a certain display range, which is determined by the number of digits. For example, a 3-1/2 digit panel meter can indicate value to ±1,999. A 7200 RPM motor speed indicator would require a 4-1/2 digit meter whose range is ±19,999. For process control signals, the minimum display may not be 0. Zero adjustments allow the minimum signal level to be set to indicate the value desired while Span adjustments handle the maximum level.

Finally, other convenience features should be considered. Setup and calibration methods can be potentiometer adjustments or switch settings. Accessory power may be needed to power sensing devices.

ELECTRONIC INPUT SIGNALS

Digital panel meters can be used with a variety of input sensors. DC voltage sources include pots, power supplies, motor drives and DC tachometers. DC current sources include instrumentation, speed references and process controllers. Current loop and process volts signals can originate with flow meters, pressure transducers, temperature sensors and signal transmitters.

Indicator Function	Input Type
Operator Setpoint, Power Supply Voltage	DC Voltage
Speed Reference	DC Current
Rate of Flow, Temperature	Current Loop
Pressure	Process Volts

Actual Speed Indicator Using Motor Armature Voltage

9

This Selector Guide can assist you in determining the type of process indicator that best fits your application requirements. Condensed description and specification information is provided. Complete information is available by turning to the referenced page number that appears above each product's picture. The ✬ symbol denotes our "Star Products" which we recommend be given first consideration. They offer maximum functionality, performance, and value.

Dynapar brand	**S628 DC Process**	**S628 Temp. Indicator**	**S628 DC Volts/Amps**	**S628 AC Volts/Amps**
Page Number: The ✬ symbol denotes our "Star Products" which we recommend be given first consideration. They offer maximum functionality, performance, and value.	Page: 9.06 ✬	Page: 9.07 ✬	Page: 9.08 ✬	Page: 9.09 ✬
Description and Features: Condensed description and specification information is provided. Complete information is available by turning to the referenced page number that appears above each product's picture.	■ DC Process meter with AWESOME, large display that changes color at alarm value ■ Programmable help function and secondary legend display ■ Field configurable alarm outputs ■ Maximum and minimum value capture	■ Temperature indicator with AWESOME, large display that changes color at alarm value ■ Accepts most standard thermocouple types and 3 & 4 wire RTDs ■ Standard outputs: 2 NPN transistors & 1 relay (optional 2nd relay) ■ Maximum and minimum value capture	■ DC meter with AWESOME, large display that changes color at alarm value ■ Inputs from 0-100 mV to 0-600 VDC, 0-1 mA to 0-2 amps ■ Standard outputs: 2 NPN transistors & 1 relay (optional 2nd relay) ■ Maximum and minimum value capture	■ True RMS AC meter with AWESOME, large display that changes color at alarm value ■ Inputs from 0-1 VAC to 0-600 VAC, 0-1 mA to 0-1 amp ■ Standard outputs: 2 NPN transistors & 1 relay (optional 2nd relay) ■ Maximum and minimum value capture
Dimensions	48mm x 96mm	48mm x 96mm	48mm x 96mm	48mm x 96mm
Display Type	LED, Programmable Red or Green color	LED, Programmable Red or Green color	LED, Programmable Red or Green color	LED, Programmable Red or Green color
Number of Digits	5 (0.71" high)	5 (0.71" high)	5 (0.71" high)	5 (0.71" high)
Power Supply	90-240 VAC, 20-50 VAC/DC 50/60 Hz, 4 Watts	90-240 VAC, 20-50 VAC/DC 50/60 Hz, 4 Watts	90-240 VAC, 20-50 VAC/DC 50/60 Hz, 4 Watts	90-240 VAC, 20-50 VAC/DC 50/60 Hz, 4 Watts
Input Ranges	mA to 50mA, DCV to ±10 Volts and ±100 mV	B, J, K, N, S, and T thermocouples, 14 bits	From 0-100 mV to 0-600 VDC, 0-1 mA to 0-2 amps	From 0-1 VAC to 0-600 VAC, 0-1 mA to 0-1 amp
Input Scaling	Front panel coordinate input scaling	Front panel coordinate input scaling	Front panel coordinate input scaling	Front panel coordinate input scaling
Accuracy	±0.01% of span	±0.01% of span	±0.1% of span	±0.1% of span (20 Hz to 5kHz)
Outputs	NPN: 100 mA; Relay: SPDT, 2A; Linear Current & Voltage	NPN: 100 mA; Relay: SPDT, 2A; Linear Current & Voltage	NPN: 100 mA; Relay: SPDT, 2A; Linear Current & Voltage	NPN: 100 mA; Relay: SPDT, 2A; Linear Current & Voltage
Serial Communication	RS-485; Serial asynchronous	RS-485; Serial asynchronous	RS-485; Serial asynchronous	RS-485; Serial asynchronous
Front Panel Rating	NEMA 4X/IEC IP65	NEMA 4X/IEC IP65	NEMA 4X/IEC IP65	NEMA 4X/IEC IP65

9

PROCESS INDICATORS

For locating products which do not appear in this selector guide, refer to the table of contents or the product to page number index in Section 15.

Series S428a	Simtach Process	Simtach Volts/Amps	Simtach A	
Page: 9.10	Page: 9.11	Page: 9.12	Page: 9.13	
■ Universal input and front panel scaling allows calibrated display of a variety of process signals ■ Unique, powerful alarm functions enhance application flexibility: latching operation; elapsed time display; and combinational logic ■ Up to 3 outputs	■ Economically priced panel meter is configurable to accept most common process signals and display an engineering unit value ■ Select STL for use with AC or DC voltage signals ■ Select STP for applications that require an AC or DC current input	■ Economically priced panel meter accepts inputs up to 200 Volts or 2 amps ■ Chose STB for DC signals ■ Chose STC for AC signals	■ DC voltmeter with 4 1/2 digit LED display ■ Input range up to 600 VDC ■ Choice of Offset, Span adjustment scaling, or 3 digit BCD multiplier	
48mm x 96mm	50mm x 96mm	50mm x 96mm	50mm x 96mm	
Red or Green LED	LED	LED	LED	
4 (0.56" high)	3 1/2 (0.56" high)	3 1/2 (0.56" high)	4 1/2 (0.56" high)	
90- 264 VAC	115, 230 VAC (switch selectable)	115, 230 VAC (switch selectable)	115, 230 VAC	
Thermocouple, RTD, DC mA, DC V	VDC: ±5; ±10; ±20, Current Loop: 4 - 20, 10 - 50 mA	0 to .2, 2 20, 200 Volts, 0 to 2, 20, 200, 2000 mA, AC /DC	0 to 20, 200, 600 VDC	
Auto for TC & RTD, front panel for DC mA & DC V	Offset and Span adjustment with Internal reference	Offset and Span adjustment	Span adjust or digital (BCD) calibrator	
0.05%	0.1%	0.1%	0.1%	
Up to 3 Alarm Relays; 20 - 28 VDC Accessory Power	None	None	None	
RS-485 (Modbus or Open ASCII)	None	None	None	
NEMA 4X/IP65	NEMA 4	NEMA 4	NEMA 4	

This Selector Guide can assist you in determining the type of process indicator that best fits your application requirements. Condensed description and specification information is provided. Complete information is available by turning to the referenced page number that appears above each product's picture. The ☆ symbol denotes our "Star Products" which we recommend be given first consideration. They offer maximum functionality, performance, and value.

Dynapar brand	**FLEX LPI**	**FLEX DCV**	**FLEX DCI**	**MicroMITE 7999F3**
Page Number: The ☆ symbol denotes our "Star Products" which we recommend be given first consideration. They offer maximum functionality, performance, and value. **Description and Features:** Condensed description and specification information is provided. Complete information is available by turning to the referenced page number that appears above each product's picture.	Page: 9.14	Page: 9.15	Page: 9.16	Page: 9.17 ☆
	■ Loop powered 3 1/2 digit LCD indicator for 4 -20 mA or 10 -50 mA current loops ■ Compact 36mm x 72mm bezel size ■ Rugged metal case	■ 3 1/2 digit LCD indicator for displaying DC voltage inputs up to 199.9 Volts ■ Compact 36mm x 72mm bezel size ■ Rugged metal case	■ 3 1/2 digit LCD indicator for displaying DC current inputs up to 199.9 mA ■ Compact 36mm x 72mm bezel size ■ Rugged metal case	■ 3 1/2 digit LCD with back-lighting ■ 200mV full scale can be externally ranged for popular DC measurements ■ Compact 24mm x 48mm or 36mm x 72mm bezel size
Dimensions	36mm x 72mm	36mm x 72mm	36mm x 72mm	24 x 48mm or 36 x 72mm
Display Type	LCD	LCD	LCD	LCD with backlight
Number of Digits	3 1/2 (0.5" high)	3 1/2 (0.5" high)	3 1/2 (0.5" high)	3 1/2 (10mm or 14mm high)
Power Supply	Loop powered	5 VDC	5 VDC	5 or 9 VDC
Input Ranges	4 - 20 mA, 10 - 50 mA	0 - 199.9 mVDC, 0 -1.999, 19.99, 199.9 VDC	0 to 199.9 µA, 0 to 1.999, 19.99, 199.9 mA	200 mV full scale
Input Scaling	Offset and Span adjustment	Offset and Span adjustment	Offset and Span adjustment	Offset and Span adjustment
Accuracy	0.1%	0.1%	0.1%	.05%, ±1 LSD
Outputs	None	None	None	None
Serial Communication	None	None	None	None
Front Panel Rating	NEMA 4	NEMA 4	Nema 4	–

9
PROCESS INDICATORS

Veeder-Root

Dynapar

Eagle Signal

DC Process analog unit with blazing bright, large, color-changing display… optional tare function

CE

The Veeder-Root brand S628 DC Process is a member of a family of 1/8 DIN instruments which offer breakthrough display technology as well as easy-to-program user setup. Its large LED display features the ability to change color based on process status such as exceeding an alarm value. Therefore, when monitoring process variables in applications using analog signals, the S628 provides operators with an instant visual alert to changes in the application's status.

■ AWESOME 0.71" high digit LED display (27% larger than other 1/8 DIN units)

■ Programmable color change display based on an event

■ Programmable help function and secondary legend display

■ Field configurable alarm outputs

■ Max. and min. value capture

■ Plug in option cards include: 2nd relay, digital input, linear output, RS-485 communication

■ Transmitter power simplifies wiring

■ mA inputs to 50mA, DCV inputs to ±10 Volts and ±100 mV

■ Tare function

■ Standard outputs: 2 NPN transistors & 1 relay (optional 2nd relay)

■ 100 ms sample time with 0.03% accuracy

■ CE approved

Process inputs are easily scaled into engineering units by programming two input values and their corresponding display values through the front panel. For nonlinear applications, up to 10 scale points can be entered. A teach function, which automatically inputs the current sensor reading as a scale point, further simplifies setup. The two alarms can be setup for high or low operation, reverse or direct acting, and can be latched. An integrating totalizer can be used to accumulate flow or other values where tracking a total may be useful.

SPECIFICATIONS

Process Input: To 50 mA, ±10 Volts DC, ±100 mV
  Accuracy: ±0.01% of span
  Sample Rate: 100 ms
  Resolution: 14 bits
  Sensor Break: Detected within 2 seconds
Control Inputs: Sourcing, Edge Sensitive
  Logic Low ≤ 2.0 VDC, Logic High ≥ 3.0
  Impedance: 4.7 KΩ to + voltage - Sourcing
  Function: Programmable
Outputs: Solid State: NPN open collector, 30 VDC max., 100 mA max.
  Relay: SPDT, 5A resistive@ 110 VAC
  Latency: 75 μ seconds, plus 8 ms for relay pull-in
Linear Outputs: 0-20mA, 4-20mA, 0-10V, 2-10V, 0-5V, 1-5V
  Accuracy: ±0.25% (mA at 250Ω, V at 2kΩ); degrades linearly to ±0.5%
  Resolution: 8 bits in 250ms (10 bits in 1s typ.)
  Update: Approximately 4/s
  Load Impedance: mA ranges: 500Ω max.; V ranges: 500Ω min.

Communication: RS-485; Serial asynchronous, UART to UART;
  Open ASCII: One start bit, even parity, seven data bits, one stop bit;
  Baud Rate selectable from 9600, 4800, 2400, or 1200
  Maximum Zones: 99
Supply Voltage: 90-264 VAC, 50/60 Hz, or 20-50 VAC/VDC; 4 Watts
Accessory Power Supply: Voltage: 20-28 VDC, 24 VDC nominal;
  Min. Impedance: 910Ω (22 mA @ 20 VDC)
Display: Red/Green, 7 segment LED
  Primary display: 5 digits, 0.71" (18mm) height
  Secondary display: single digit, 0.3" (7mm) height
  Annunciators: Output 1 & Output 2 status
Dimensions: 48mm x 96mm, 110mm deep
Mounting: Panel mount (mounting bracket supplied), 45mm x 92mm cutout
Connections: Screw type terminals - combination head
Front Panel Rating: NEMA 4X/IEC IP65
Case Material: GE Lexan 940
Weight: 0.56 lbs.
Operating Temp.: 0° to 55° Celsius, 32° to 131° Fahrenheit
Storage Temp.: -20° to 80° Celsius, -4° to 176° Fahrenheit
Relative Humidity: 20% to 95% non-condensing
Approvals: CE

Ordering Information:

Dimensions:

Panel Cutout: 45mm x 92mm (1.77" x 3.62")

Temperature indicator with blazing bright, large display… changes color when reaches alarm value

CE

The Veeder-Root brand S628 Temperature Indicator is a member of a family of 1/8 DIN instruments which offer breakthrough display technology as well as easy-to-program user setup. Its large LED display features the ability to change color based on process status such as exceeding an alarm value. Therefore, when monitoring temperature as a critical value, the S628 provides operators with an instant visual alert to changes in the application's status.

■ AWESOME 0.71" high digit LED display (27% larger than other 1/8 DIN units)

■ Programmable color change display based on an event

■ Programmable help function and secondary legend display

■ Field configurable alarm outputs

■ Max. and min. value capture

■ Plug in option cards include: 2nd relay, digital input, linear output, and RS-485 communication

■ Accepts most standard thermocouple types and 3 & 4 wire RTDs

■ Standard outputs: 2 NPN transistors & 1 relay (optional 2nd relay)

■ 250 ms sample time with 0.1% accuracy

■ CE approved

Selection of input type is done easily from the front panel. Programmable filtering is used to ensure an accurate display even in electrically noisy environments, while a programmable offset value can be used to correct for known errors in the process. The two alarms can be setup for high or low operation, reverse or direct acting, and can be latched.

SPECIFICATIONS

Sensor Input: B, J, K, N, S, and T thermocouples
   Accuracy: ±0.1% of span
   Sample Rate: 250 ms
   Resolution: 14 bits
   Sensor Break: Detected within 2 seconds
Control Inputs: Sourcing, Edge Sensitive
   Logic Low ≤ 2.0 VDC, Logic High ≥ 3.0
   Impedance: 4.7 KΩ to + voltage - Sourcing
   Response Time: 25 ms
   Function: Programmable
Outputs: Solid State: NPN open collector, 30 VDC max., 100 mA max.
   Relay: SPDT, 5A resistive @ 110 VAC
   Latency: 75 μ seconds, plus 8 ms for relay pull-in
Linear Outputs: 0-20mA, 4-20mA, 0-10V, 2-10V, 0-5V, 1-5V
   Accuracy: ±0.25% (mA at 250Ω, V at 2kΩ); degrades linearly to ±0.5%
   Resolution: 8 bits in 250ms (10 bits in 1s typ.)
   Update: Approximately 4/s
   Load Impedance: mA ranges: 500Ω max.; V ranges: 500Ω min.
Communication: RS-485; Serial asynchronous, UART to UART;
   Open ASCII: One start bit, even parity seven data bits, one stop bit;
   Baud Rate selectable from 9600, 4800, 2400, or 1200
   Maximum Zones: 99

Supply Voltage: 90-264 VAC, 50/60 Hz, or 20-50 VAC/VDC; 4 Watts
Accessory Power Supply: 24 VDC @ 30 mA
Display: Red/Green, 7 segment LED
   Primary display: 5 digits, 0.71" (18mm) height
   Secondary display: single digit, 0.3" (7mm) height
   Annunciators: Output 1 & Output 2 status
Dimensions: 48mm x 96mm, 110mm deep
Mounting: Panel mount (mounting bracket supplied), 45mm x 92mm cutout
Connections: Screw type terminals - combination head
Front Panel Rating: NEMA 4X/IEC IP65
Case Material: GE Lexan 940
Weight: 0.56 lbs.
Operating Temp.: 0° to 55° Celsius, 32° to 131° Fahrenheit
Storage Temp.: -20° to 80° Celsius, -4° to 176° Fahrenheit
Relative Humidity: 20% to 95% non-condensing
Approvals: CE

Ordering Information:

Linear Output Option
0 None
3 Linear Output

Power Supply
0 90-264 VAC
2 20-50 VAC/VDC

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2nd Relay Option
0 None
1 2nd Relay

Serial Communication Option
0 None
5 RS-485
6 Digital Input

Dimensions:

VEEDER-ROOT
82344

48mm

96mm

100mm

10mm
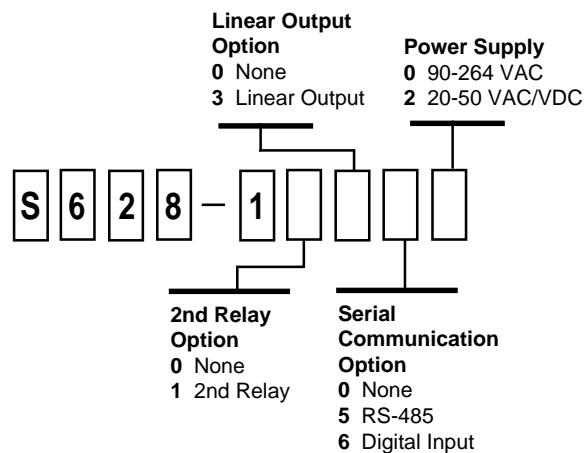
Panel Cutout: 45mm x 92mm (1.77" x 3.62")

DC Volts/Amps analog unit with blazing bright, large, color-changing display

CE

The Veeder-Root brand S628 DC Volts/Amps is a member of a family of 1/8 DIN instruments which offer breakthrough display technology as well as easy-to-program user setup. Its large LED display features the ability to change color based on process status such as exceeding an alarm value. Therefore, when monitoring process variables in applications using analog signals, the S628 provides operators with an instant visual alert to changes in the application's status.

- AWESOME 0.71" high digit LED display (27% larger than other 1/8 DIN units)
- Programmable color change display based on an event
- Programmable help function and secondary legend display
- Field configurable alarm outputs
- Max. and min. value capture
- Plug in option cards include: 2nd relay, digital input, linear output, RS-485 communication
- Transmitter power simplifies wiring
- Inputs from 0-100 mV to 0-600 VDC, 0-1 mA to 0-2 amps
- Standard outputs: 2 NPN transistors & 1 relay (optional 2nd relay)
- 250 ms sample time with 0.1% accuracy
- CE approved

Process inputs are easily scaled into engineering units by programming two input values and their corresponding display values through the front panel. A teach function, which automatically inputs the current sensor reading as a scale point, further simplifies setup. The two alarms can be setup for high or low operation, reverse or direct acting, and can be latched.

SPECIFICATIONS

Process Input: From 0-100 mV to 0-600 VDC, 0-1 mA to 0-2 amps
   Accuracy: ±0.1% of span
   Sample Rate: 250 ms
   Resolution: 14 bits

Control Inputs: Sourcing, Edge Sensitive
   Logic Low ≤ 2.0 VDC, Logic High ≥ 3.0
   Impedance: 4.7 KΩ to + voltage - Sourcing
   Response Time: 25 ms
   Function: Programmable

Outputs: Solid State: NPN open collector, 30 VDC max., 100 mA max.
   Relay: SPDT, 5A resistive@ 110 VAC
   Latency: 75 μ seconds, plus 8 ms for relay pull-in

Linear Outputs: 0-20mA, 4-20mA, 0-10V, 2-10V, 0-5V, 1-5V
   Accuracy: ±0.25% (mA at 250Ω, V at 2kΩ); degrades linearly to ±0.5%
   Resolution: 8 bits in 250ms (10 bits in 1s typ.)
   Update: Approximately 4/s
   Load Impedance: mA ranges: 500Ω max.; V ranges: 500Ω min.

Communication: RS-485; Serial asynchronous, UART to UART;
   Open ASCII: One start bit, even parity seven data bits, one stop bit;
   Baud Rate selectable from 9600, 4800, 2400, or 1200
   Maximum Zones: 99

Supply Voltage: 90-264 VAC, 50/60 Hz, or 20-50 VAC/VDC; 4 Watts
Accessory Power Supply: Voltage: 20-28 VDC, 24 VDC nominal;
   Min. Impedance: 910Ω (22 mA @ 20 VDC)
Display: Red/Green, 7 segment LED
   Primary display: 5 digits, 0.71" (18mm) height
   Secondary display: single digit, 0.3" (7mm) height
   Annunciators: Output 1 & Output 2 status
Dimensions: 48mm x 96mm, 110mm deep
Mounting: Panel mount (mounting bracket supplied), 45mm x 92mm cutout
Connections: Screw type terminals - combination head
Front Panel Rating: NEMA 4X/IEC IP65
Case Material: GE Lexan 940
Weight: 0.56 lbs.
Operating Temp.: 0° to 55° Celsius, 32° to 131° Fahrenheit
Storage Temp.: -20° to 80° Celsius, -4° to 176° Fahrenheit
Relative Humidity: 20% to 95% non-condensing
Approvals: CE

Ordering Information:

Linear Output Option
0 None
3 Linear Output

Power Supply
0 90-264 VAC
2 20-50 VAC/VDC

S 6 2 8 - 5 ☐ ☐

2nd Relay Option
0 None
1 2nd Relay

Serial Communication Option
0 None
5 RS-485
6 Digital Input

Dimensions:

VEEDER-ROOT
82344

100mm
48mm
96mm
10mm

Panel Cutout: 45mm x 92mm (1.77" x 3.62")

AC Volts/Amps analog unit with blazing bright, large, color-changing display… true RMS measurement

CE

The Veeder-Root brand S628 AC Volts/Amps is a member of a family of 1/8 DIN instruments which offer breakthrough display technology as well as easy-to-program user setup. Its large LED display features the ability to change color based on process status such as exceeding an alarm value. Therefore, when monitoring process variables in applications using analog signals, the S628 provides operators with an instant visual alert to changes in the application's status.

■ AWESOME 0.71" high digit LED display (27% larger than other 1/8 DIN units)

■ Programmable color change display based on an event

■ Programmable help function and secondary legend display

■ Field configurable alarm outputs

■ Max. and min. value capture

■ Plug in option cards include: 2nd relay, digital input, linear output, RS-485 communication

■ Transmitter power simplifies wiring

■ Inputs from 0-1 VAC to 0-600 VAC, 0-1 mA to 0-1 amp

■ True RMS measurement

■ Standard outputs: 2 NPN transistors & 1 relay (optional 2nd relay)

■ 250 ms sample time with 0.1% accuracy

■ CE approved

Process inputs are easily scaled into engineering units by programming two input values and their corresponding display values through the front panel. A teach function, which automatically inputs the current sensor reading as a scale point, further simplifies setup. The two alarms can be setup for high or low operation, reverse or direct acting, and can be latched.

SPECIFICATIONS

Process Input: From 0-1 VAC to 0-600 VAC, 0-1 mA to 0-1 amp
Frequency: 20 Hz to 5kHz - degrades at higher frequencies
Accuracy: ±0.1% of span
Sample Rate: 250 ms
Resolution: 14 bits

Control Inputs: Sourcing, Edge Sensitive
Logic Low ≤ 2.0 VDC, Logic High ≥ 3.0
Impedance: 4.7 KΩ to + voltage - Sourcing
Response Time: 25 ms
Function: Programmable

Outputs: Solid State: NPN open collector, 30 VDC max., 100 mA max.
Relay: SPDT, 5A resistive @ 110 VAC
Latency: 75 μ seconds, plus 8 ms for relay pull-in

Linear Outputs: 0-20mA, 4-20mA, 0-10V, 2-10V, 0-5V, 1-5V
Accuracy: ±0.25% (mA at 250Ω, V at 2kΩ); degrades linearly to ±0.5%
Resolution: 8 bits in 250ms (10 bits in 1s typ.)
Update: Approximately 4/s
Load Impedance: mA ranges: 500Ω max.; V ranges: 500Ω min.

Communication: RS-485; Serial asynchronous, UART to UART;
Open ASCII: One start bit, even parity, seven data bits, one stop bit;

Baud Rate selectable from 9600, 4800, 2400, or 1200
Maximum Zones: 99

Supply Voltage: 90-264 VAC, 50/60 Hz, or 20-50 VAC/VDC; 4 Watts

Accessory Power Supply: Voltage: 20-28 VDC, 24 VDC nominal; Min. Impedance: 910Ω (22 mA @ 20 VDC)

Display: Red/Green, 7 segment LED
Primary display: 5 digits, 0.71" (18mm) height
Secondary display: single digit, 0.3" (7mm) height
Annunciators: Output 1 & Output 2 status

Dimensions: 48mm x 96mm, 110mm deep

Mounting: Panel mount (mounting bracket supplied), 45mm x 92mm cutout

Connections: Screw type terminals - combination head

Front Panel Rating: NEMA 4X/IEC IP65

Case Material: GE Lexan 940

Weight: 0.56 lbs.

Operating Temp.: 0° to 55° Celsius, 32° to 131° Fahrenheit

Storage Temp.: -20° to 80° Celsius, -4° to 176° Fahrenheit

Relative Humidity: 20% to 95% non-condensing

Approvals: CE

Ordering Information:

	Linear Output Option		Power Supply
	0 None		0 90-264 VAC
	3 Linear Output		2 20-50 VAC/VDC

S 6 2 8 – 3 ☐ ☐ ☐

2nd Relay Option
0 None
1 2nd Relay

Serial Communication Option
0 None
5 RS-485
6 Digital Input

Dimensions:

VEEDER-ROOT

82344

100mm
48mm
96mm
10mm

Panel Cutout: 45mm x 92mm (1.77" x 3.62")

9
PROCESS INDICATORS

Volts, Current, Thermocouple, or RTD Process Measurements with Intelligent Features… available with red, green or color changing LED display

File No.: 67237

® **UL** RECOGNIZED   C ® **UL** RECOGNIZED

CE

The Dynapar S428A is a new digital panel indicator providing a high contrast, high visibility display, designed for optimal ease of use in a wide variety of process measurement applications. Fast, and accurate, the new generation S428A features a user-selectable dual color display option with fixed red or green displays or a green to red color change when an alarm condition occurs. Plug-in modules allow PV retransmission or transmitter power supply and up to 5 alarm relays (latching or non-latching).

The S428a ike its predecessor, the S428, is an easy to use low cost solution for process display applications including temperature, pressure and force - providing excellent visibility and high accuracy all within an affordable and ultra compact housing.

- **S428A is a highly improved direct replacement for previous S428 models**
- **10V SSR driver output allows drive of up to 3 typical SSR/ SCR inputs**
- **Plug-in Output Modules for SSR driver, Triac, Relay and linear outputs – easily field changeable**
- **Latching Alarms - Included as standard**
- **Jumperless configuration with self-recognition of optionboards – promotes simple, error free set-up**
- **Multi-point Scaling and Tare features included as standard**
- **NEMA 4X/IP66 rated front panel for use in washdown environments**
- **Available Transmitter Power Supply simplifies wiring**
- **Universal AC power supply**

Optional RS-485 serial communications supports Modbus or West ASCII protocol.

Alarm outputs can be field configured for operation that best suits the application.

SPECIFICATIONS

Inputs:
Sample Rate: 4 per second

T/C's: J, T, K, L, N, B, R, S, C; Pt Rh20% vs. Pt 40% Rh

RTD: 3-wire, PT100

DC Linear (Scalable –1999 to +9999):
   Volts: 0-5V, 1-5V, 0-10V, 2-10V
   DC milliamps: 0-20mA or 4-20mA
   DC millivolts: 0-50mV, 10-50mV

Outputs: (see "Models" for available output Configurations)
Relay: SPDT (Form C); 2A resistive at 120/240 VAC
DC: 0-20mA, 4-20mA; 0-10V, 1-5V, 2-10V, 0-5V
Transmitter Power: Optional 24 VDC

General:
Power Supply: 100-240V, 50/60Hz, Optional 20-48VAC 50/60Hz / 22-65VDC; Power Consumption: 5W / 7.5 VA Maximum
Display: Red or Green, or color changing 7 segment LED; 4 digit primary display, single digit secondary display; Height: 0.53" (13mm) primary display, 0.39" (10mm) secondary display; Annunciators: LED indicators for output and status
Weight: 0.46 lbs (0.21 kg)
Conformance: CE, UR, cUR UL File # 67237; Safety: EN61010, EMC: EN61326

Environmental:
Operating Temp: 32° to 131°F (0° to 55°C)
Storage Temp: -4° to 176°F (-20° to 80°C)
Humidity: 20% to 95% non-condensing RH

Front Panel Rating: NEMA 4X/IEC IP66

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P R O C E S S   I N D I C A T O R S

Dimensions:

1.89" 48mm
3.78" 96mm
3.93" 100mm
aprox. 0.39" 10mm
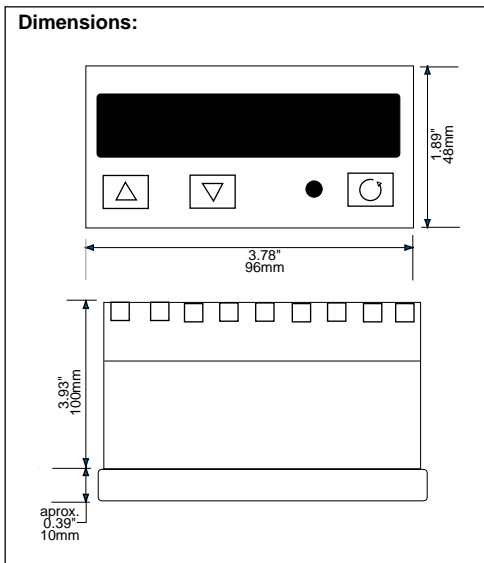
Models

Code 1: Model #	Code 2: Input Type	Code 3: Option Slot 1	Code 4: Option Slot 2	Code 5: Option Slot 3	Code 6: Option Slot A	Code 7: Power Supply	Code 8: Display Color
S428A	☐	☐	☐	☐	☐	☐	☐
I/8 DIN Indicator with Alarm Function	1 3 Wire RTD or DC mV 2 Thermo-couple 3 DC mA 4 DC Voltage	0 Not Fitted 1 Relay 2 DC for SSR 3 DC 0-10V 4 DC 0-20mA 5 DC 0-5V 6 DC 2-10V 7 DC 4-20mA 8 Triac*	0 Not Fitted 1 Relay 2 DC for SSR 3 DC 0-10V 4 DC 0-20mA 5 DC 0-5V 6 DC 2-10V 7 DC 4-20mA 8 Triac* 9 Dual Relay	0 Not Fitted 1 Relay 2 DC for SSR 3 DC 0-10V 4 DC 0-20mA 5 DC 0-5V 6 DC 2-10V 7 DC 4-20mA 8 Transmitter Power Supply 9 Dual Relay	0 Not fitted 1 RS-485 Serial Communication 3 Remote Setpoint Input (digital)	0 100-240 AC 2 24-48 AC or DC	0 Red Display 1 Green Display 4 Color Change Display (Red/Green)

Economical indicators in a compact package with convenience features and "off-line" calibration mode

The Dynapar brand SimTach Process Volts/Amps Panel Meters offer a unique combination of convenience and functionality in a compact, economical package suitable for industrial applications. Standard convenience features include pluggable terminal strips and rear access to setup jumpers. The unique Calibration Mode allows quick and easy setup of the display to indicate process or engineering units, without the use of signal generators and additional reference meters.

■ Calibration Mode for easy "off-line" display setup

■ Large, bright 0.56" high red LED display

■ Full ±3-1/2 digit range with selectable "dummy zero"

■ Selectable input voltage or current range

■ Sealed NEMA4/IP65 front panel

■ Programmable decimal point position

■ Selectable fast or slow input response filter

The SimTach panel meters are packaged in a 1/8 DIN cutout, aluminum enclosure for NEMA4/IP65 protection, offering the superior noise immunity and ruggedness required in tough industrial environments.

SPECIFICATIONS

Panel Mounting: 1/8 DIN cutout 45x92mm (1.78" x 3.56"); 100mm (4.0") depth behind panel

Accuracy: ± 0.1% of full scale ±1 digit; stability: ±100 ppm per °C

Input Ranges
Process Volts: ±5, ±10 or ±20 VDC selectable
Process Current: 4 – 20 mA or 10 – 50 mA selectable

Display: ± 3-1/2 digit plus "dummy zero", 14mm (0.56") high LED

Decimal Points: None, .X, .XX, .XXX, or .XXXX

Calibration
Offset Range: >1000 counts
Span Range: 0 to full scale display
Calibration Mode: internal 4.3V or 15mA reference

Power Requirements: 95 to 130, or 190 to 260 VAC, 50/60 Hz, 6 VA

Optional Excitation Power Output: 24VDC, unregulated; 50 mA max.

Operating Temperature: 4° to +140 °F (–20° to +60°C)

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For AC or DC applications, see SimTach Volts/Amps Digital Panel Meters.
For 600VDC applications, see SimTach A.

Model No.	Description
STLS0	SimTach Current Loop Meter, 115/230VAC
STLS1	STLS0 (above) with excitation supply
STPS0	SimTach Process Volts Meter, 115/230VAC
STPS1	STPS0 (above) with excitation supply

Typical Applications:

4 to 20 mA Flow Meter

720
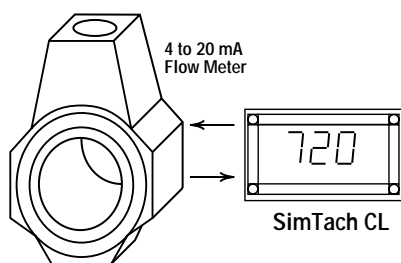
SimTach CL

Dimensions:
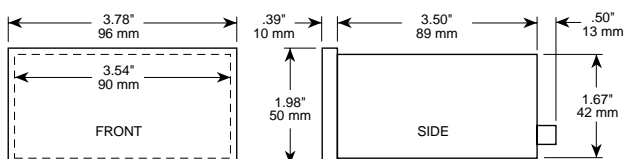
Economical indicators in a compact package with convenience features

The Dynapar brand SimTach Volts/Amps Digital Panel Meters offer a unique combination of convenience and functionality in a compact, economical package suitable for industrial applications. By combining both voltage and current capabilities and a wide input range selection, a single model serves almost any simple monitoring need. Standard convenience features include: pluggable terminal strips; Offset and Span adjustments; and rear access to setup jumpers. The Scaling feature allows these meters to indicate in engineering or process units.

■ Selectable scaling for display in engineering units

■ Large, bright 0.56" high red LED display

■ Full ±3-1/2 digit range with selectable "dummy zero"

■ Selectable input voltage or current range

■ Sealed NEMA 4 front panel

■ Programmable decimal point position

■ Selectable fast or slow input response filter

The SimTach panel meters are packaged in a 1/8 DIN cutout, aluminum enclosure for NEMA4/IP65 protection, offering the superior noise immunity and ruggedness required in tough industrial environments.

SPECIFICATIONS

Panel Mounting: 1/8 DIN cutout, 45x92mm (1.77" x 3.62"); 100mm (4.0") depth behind panel

Accuracy: ± 0.1% of full scale ±1 digit; stability: ±100 ppm per °C

Input Ranges: 0 to .2, 2, 20 or 200 V; 0 to 2, 20, 200 or 2000 mA selectable

Display: ± 3-1/2 digit plus "dummy zero", 14mm (0.56") high LEDs

Decimal Points: None, .X, .XX, .XXX, or .XXXX

Calibration: Zero and Full Scale Span adjustable; selectable Scaling allows continuous full scale adjustment

Power Requirements: 95 to 130, or 190 to 260 VAC, 50/60 Hz, 6 VA

Operating Temperature: 4° to +140 °F (–20° to +60°C)

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P R O C E S S   I N D I C A T O R S

Model No.	Description
STBS0	SimTach DC Volts/Amps Meter, 115/230VAC
STCS0	SimTach AC Volts/Amps Meter, 115/230VAC
108226-0001	Measured Units Labels for SimTach Panel Meters
605498-0001	10 Amp Shunt, produces 100mV at full scale
605498-0002	100 Amp Shunt, produces 100mV at full scale

Typical Applications:

Oven Temperature Setting

Dimensions:

DYNAPAR brand
Process Indicators
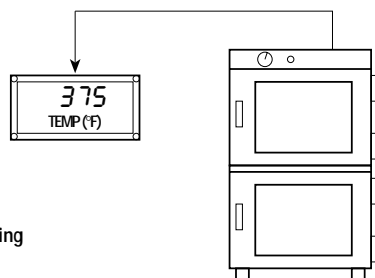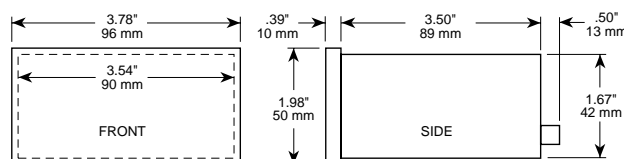
SimTach A

DC voltmeter with a full complement of easy-to-use features makes it a best value

The SimTach A breaks new ground for industrial panel meters. It combines high performance and wide range operation with convenient, switch selectable features such as decimal point position, display update rate and input range selection, making installation and configuration amazingly simple. Its unique "off line" Digital Calibrator option allows the input scale factor to be calculated and set on the BCD switches while the unit is being installed. It is no longer necessary to obtain a precise process speed measurement with another device and "twiddle" potentiometers until the correct readout is obtained.

■ Large, bright 0.56" high red LED display

■ Full ±4-1/2 digit display

■ Selectable input voltage range

■ Sealed NEMA 4 front panel

■ Programmable decimal point position

■ Switchable fast or slow display update rate

The SimTach A DC Volts Panel Meter is a perfect indicator for a variety of applications: speed setting potentiometers and analog output instrumentation; DC tachometer feedback; field or armature voltage to DC motors.

SPECIFICATIONS

Panel Mounting: 1.78" x 3.56" cutout; 5.68" depth

Accuracy: ± .0.1%; stability: ≤ 75 ppm per °C

Input Ranges: 0 to ±20, 0 to ±200, or 0 to ±600 VDC selectable

Display: ± 4-1/2 digit, 0.56" LED; update rate selectable 1/2 second or 2 seconds

Decimal Points: None, .X, .XX, .XXX, or .XXXX

Calibration: Multi-turn potentiometer range: 5 to 200%; optional digital calibrator (STAx1 models): 3 digit BCD multiplier 0.XXX range: 0.001 to 0.999 (0.000 setting equals 1.000)

Power Requirements: 95 to 130, or 190 to 260 VAC, 50/60 Hz, 6 VA

Operating Temperature: 32° to +122 °F (0° to +50°C)

Model No.	Description
STA00	115 VAC, DC Volts Panel Meter
STAE0	230 VAC, DC Volts Panel Meter
STAS0	115 or 230 VAC, DC Volts Panel Meter
STA01	115 VAC, DC Volts Panel Meter with Digital Calibration
STAE1	230 VAC, DC Volts Panel Meter with Digital Calibration
STAS1	115 or 230 VAC, DC Volts Panel Meter with Digital Calibration

For digital (pulsed) inputs, see SimTach D
For readout with alarm capability , use a MAXjr Tach 1
**   with a PM64S Analog to Frequency Converter**

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Typical Applications:

Actual Speed Indicator
Using DC Tach Feedback

DC Drive   Motor   DC Tach   SimTach A

Dimensions:

3.78" / 96 mm   .39" / 10 mm   5.20" / 132 mm   .50" / 13 mm

3.54" / 90 mm   FRONT   1.98" / 50 mm   SIDE   1.67" / 42 mm
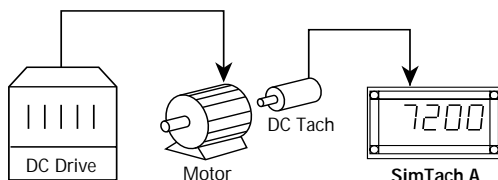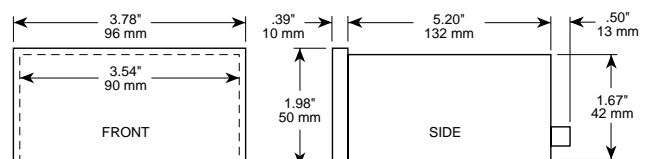
For low cost display of analog data – temperature; pressure; flow; position; etc.

The **FLEX** LPI is ideal for calibrated current loop indication in new system designs or in adding display to existing control loops. Its rugged die-cast enclosure is NEMA-4/IP65 rated, allowing installation in demanding industrial environments including wash-down applications.

- Requires no power connections – operates from loop current
- Large, high-contrast LCD with 3-1/2 active digits
- Minus sign and overflow indicators
- Selectable right-hand "Dummy Zero"
- Programmable decimal point – tenths, hundredths, or thousandths
- Operates in 4-20mA or 10-50mA current loops
- Coarse and fine potentiometer adjustments for zero and span
- Reading rate of 2.5 updates per second
- Wide operating temperature range, -20° to +60° C
- Meets NEMA-4 requirements for water- and dust-tight seal

The **FLEX** LPI features coarse and fine adjustments for zero (offset) and span, for quick and easy calibration. A quick-disconnect plug-in connector and panel mounting hardware and gasket is provided.

For Process Current Meter, see FLEX DCI
For Process Volt Meter, see FLEX DCV

SPECIFICATIONS

Display: 0.5" high LCD. 3-1/2 digit with minus sign (-1999 to 1999); Selectable decimal point (X.X.X.X) or right-hand dummy zero

Overrange: Indicated by display of "1" in the most significant digit and the blanking of the lower order digits

Operating Power: Derived from loop current; Input signal: 4-20mA, 10-50mA, 100mA maximum.

Forward Voltage Drop: 3 volts, typical

Span Scaling Range: Approx. 100 to 1999 (4-20mA); approx. 300 to 1999 (10-50mA)

Offset Scaling Range: Approx. -500 to +1500

Reading Rate: 2.5 per second, nominal

Linearity: ±0.1% of reading, ±1 counts, at 25° C

Operating Temperature: -20° C to +60° C

Zero Stability: ±0.1 count per ° C, typical; ±0.3 count per ° C, maximum

Span Stability: ±0.005% of span per ° C, typical; ±0.015% maximum

Materials: Diecast bezel, high impact plastic lens and insert; Front surface meets NEMA-4 requirements when panel mounted with gasket provided

Weight: 5.5 oz. (156 g)

Model No.	Description
FLPI00	**FLEX** LPI digital panel meter

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Typical Applications:

4 to 20 mA Flow Meter

DC Supply

FLEX Loop Powered Indicator

Dimensions:

2.830" 72mm
2.610" 66mm
1.400" 36mm
1.280" 32.5mm
0.715" 18mm

Panel Cutout: 1.31" H x 2.63" W (33 mm H x 67 mm W)
Depth Behind Bezel: 0.72" (18 mm)
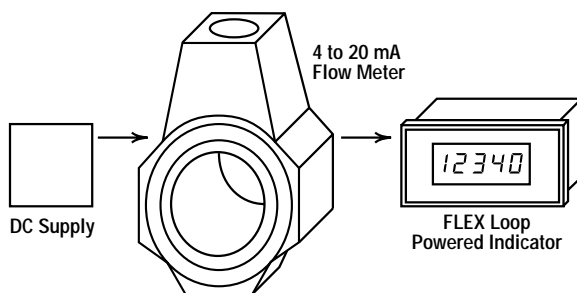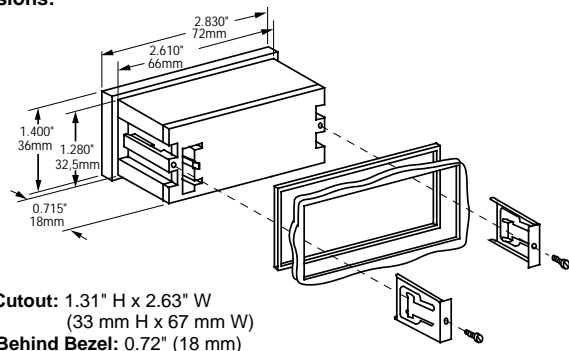
A compact, rugged industrial process volt meter . . . includes calibration for zero and range.

The **FLEX** DCV is ideal for calibrated indication of voltage related units. It's ideal for use in new system designs or for adding display to existing voltage controlled processes. Its rugged die-cast enclosure is NEMA-4/IP65 rated, allowing installation in demanding industrial environments including wash-down applications.

- Large, high-contrast LCD with 3-1/2 active digits
- Four selectable input ranges from 199.9mVDC to 199.9VDC
- Minus sign and overflow indicators
- Accuracy to ±0.1%
- Selectable right-hand "Dummy Zero"
- Programmable decimal point – tenths, hundredths, or thousandths
- Overrange protection and indication
- Potentiometer adjustments for zero, zero-offset, and scale
- Reading rate of 2.5 updates per second
- Wide operating temperature range, -20° to +60°C
- Meets NEMA-4 requirements for water- and dust-tight seal

For Loop Powered Current Indicator, see FLEX LPI
For Process Current Meter, see FLEX DCI

The **FLEX** DCV features auto-zero circuitry and scaling provision to display in engineering units other than range voltage, allowing quick and easy calibration. A quick-disconnect plug-in connector and panel mounting hardware and gasket is provided.

SPECIFICATIONS

Display: 0.5" high LCD, 3-1/2 digit with minus sign (-1999 to 1999); Selectable decimal point (X.X.X.X) or right-hand dummy zero

Operating Power: 5VDC @ 2mA nominal; Absolute Minimum & Maximum: 4VDC & 7VDC

Input Ranges: Selectable 0-199.9mVDC, 0-1.999VDC, 0-19.99VDC, 0-199.9VDC

Overrange: Indicated by display of "1" in the most significant digit and the blanking of the lower order digits

Maximum Voltage: 0-199.9mVDC Range: 30VDC; All Other Ranges: 300VDC

Input Impedance: 1 Megohm

Accuracy: ±0.1%, ±1 digit

Reading Rate: 2.5 per second, nominal

Settling Time: 1.5 seconds

Scaling Adjustment: Adjustable from approx. 200 to 1999 counts using scale (coarse) and span (fine) adjustment potentiometers

Offset Adjustment (selectable): approx. -100 to +300 counts; Auto zero is disabled if offset feature is selected

Operating Temperature: -20°C to +60°C

Span Temperature Coefficient: With Scaling Adjustment Disabled: ±0.005% of span/°C; With Scaling Adjustment Enabled: 0.015% of span/°C

Zero Temperature Coefficient: ±0.03% of span/°C with offset adjustment enabled

Materials: Diecast bezel, high impact plastic lens and insert; front surface meets NEMA-4 requirements when panel mounted with gasket provided

Weight: 5.5 oz. (156 g)

Model No.	Description
FDCV00	**FLEX** DCV, digital panel meter, DC voltage
0328992-120	PANEL OPENING ADAPTOR; lets FLEX fit in 3.78" x 1.75" cutouts.

Typical Applications:

Motor — Motor Speed Control — Speed Control Potentiometer — **FLEX DCV**

Dimensions:

2.61" / 66.3 mm — 2.83" / 71.9 mm — FRONT — 1.28" / 32.5 mm — 1.40" / 35.6 mm — SIDE — .98" / 24.9 mm — .33" / 8.4 mm — .82" / 20.7 mm
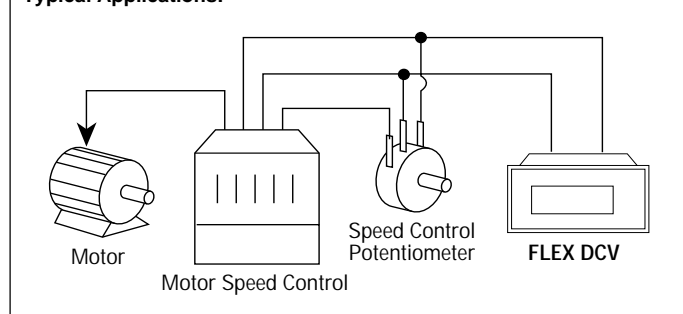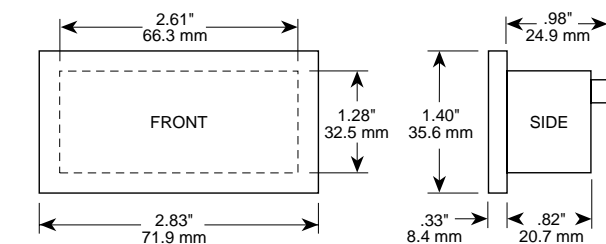
Panel Dims: Cutout: 2.63" x 1.31". Thickness: 0.08" to 0.25". Depth: 0.70" min.

A compact, rugged industrial process current meter . . . includes calibration for zero and range.

The **FLEX** DCI is ideal for DC current, or calibrated indication of current related units. It's ideal for use in new system designs or for adding display to existing current controlled processes. Its rugged die-cast enclosure is NEMA-4/IP65 rated, allowing installation in demanding industrial environments including wash-down applications.

- Large, high-contrast LCD with 3-1/2 active digits
- Four selectable input ranges from 199.9µADC to 199.9mADC
- Minus sign and overflow indicators
- Accuracy to ±0.1%
- Selectable right-hand "Dummy Zero"
- Programmable decimal point – tenths, hundredths, or thousandths
- Overrange protection and indication
- Potentiometer adjustments for zero, zero-offset, and scale
- Reading rate of 2.5 updates per second
- Wide operating temperature range, -20° to +60° C
- Meets NEMA-4 requirements for water- and dust-tight seal

For Loop Powered Current Indicator, see FLEX LPI
For Process Volt Meter, see FLEX DCV

SPECIFICATIONS

Display: 0.5" high LCD, 3-1/2 digit with minus sign (-1999 to 1999); Selectable decimal point (X.X.X.X) or right-hand dummy zero

Operating Power: 5 VDC @ 2 mA nominal; 4 VDC min., 7 VDC max.

Input Ranges: Selectable 0-199.9µADC, 0-1.999mADC, 0-19.99mADC, 0-199.9mADC

Overrange: Indicated by display of "1" in the most significant digit and the blanking of the lower order digits

Maximum Current: 0-199.9mADC Range: 1 Amp; All Other Ranges: Maximum range current x 10

Input Impedance: 1 Ohm to 909 Ohm, dependent on selected range

Accuracy: 199.9mA range: ±0.15%, ±1 digit; All Other Ranges: ±0.1%, ±1 digit

Reading Rate: 2.5 per second, nominal

Settling Time: 1.5 seconds

Scaling Adjustment: Adjustable from approx. 200 to 1999 counts using scale (coarse) and span (fine) adjustment potentiometers

Offset Adjustment (selectable): Approx. -100 to +300 counts; Auto zero is disabled if offset feature is selected

Operating Temperature: -20°C to +60°C

Span Temperature Coefficient: With Scaling Adjustment Disabled: ±0.005% of span/°C; With Scaling Adjustment Enabled: 0.015% of span/°C

Zero Temperature Coefficient: ±0.005% of span/°C with offset adjustment enabled

Materials: Diecast bezel, high impact plastic lens and insert; front surface meets NEMA-4 requirements when panel mounted with gasket provided

Weight: 5.5 oz. (156 g)

Model No.	Description
FDCI00	**FLEX** DCI, digital panel meter, DC current
0328992-120	PANEL OPENING ADAPTOR; lets FLEX fit in 3.78" x 1.75" cutouts.

Typical Applications:

Programmable Current Output

Motor

AC Motor Speed Control

FLEX DCI

Dimensions:

2.61" 66.3 mm

.98" 24.9 mm

FRONT

1.28" 32.5 mm

1.40" 35.6 mm

SIDE

2.83" 71.9 mm

.33" 8.4 mm

.82" 20.7 mm
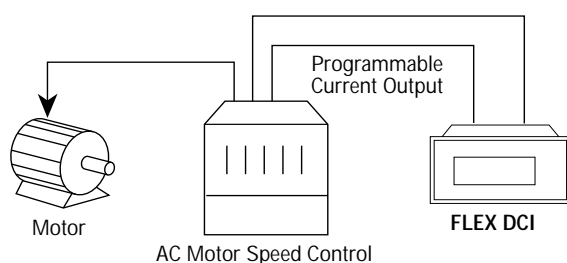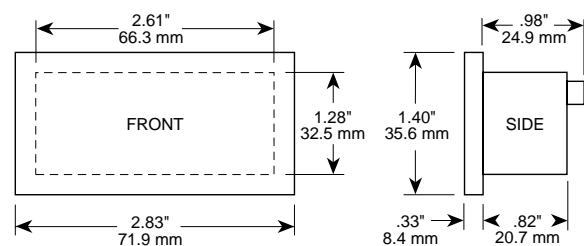
Panel Dims: Cutout: 2.63" x 1.31". Thickness: 0.08" to 0.25". Depth: 0.70" min.

Compact digital multimeters available in 24 x 48mm and 36 x 72mm packages… high contrast backlighted LCD

A compact panel meter module for printed circuit board mounting features a 3-1/2 digit, LCD display with backlight capability.   Available in two package sizes: 24 x 48mm (10mm high display) and 36 x 72mm (14mm high display). It may be powered by an external 5 or 9 volt DC battery or power supply (not included).

LED backlighting provides crisp, clear display under every lighting condition,

PCB solder-pins are provided for electrical connections and integral bezel allows convienient panel mounting.

Using external resistor networks or other components, the panel meter's 200mV full-scale reading may be calibrated for measurement of voltage and multirange voltage, voltage ratio, current and multirange current, resistance and resistance ratio and temperature. Easy to use annuncia- tors and programmable decimal point produce a friendly user interface.

■ 3-1/2 digit backlighted LCD

■ 5 or 9 volt dc operation

■ Low battery indication

■ Display on-hold function

■ 200 mV full scale sensitivity

■ Easy to use annunciators

■ Automatic polarity and zero

Ideal applications are: test equipment, process instrumentation, medical equipment, environmental monitors and many more. Low current consumption and low battery indicator (9 volt operation only) allow use in portable equipment.

Dimensions:

Specifications

	Min	Typ	Max	Units
Accuracy (±1 LSD)		0.05	0.1	%
Linearity			±1	LSD
Sample Rate		3		per sec
Temperature Stability		30		ppm/°C
Operating temperature range	0		50	°C
Supply voltage (5v mode)	3	5	7	Vdc
Supply voltage (9v mode)	7	9	12	Vdc
Supply current		2		mA
Backlight current (24 x 48mm)		80		mA
Backlight current (36 x 72mm)		160		mA
Input impedance	100			MΩ
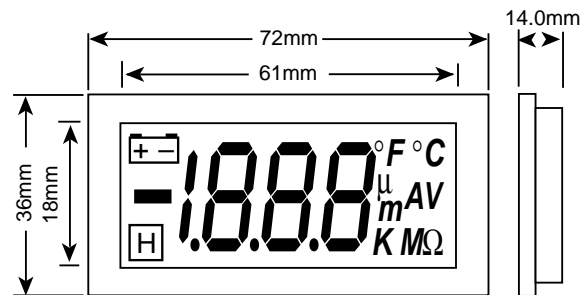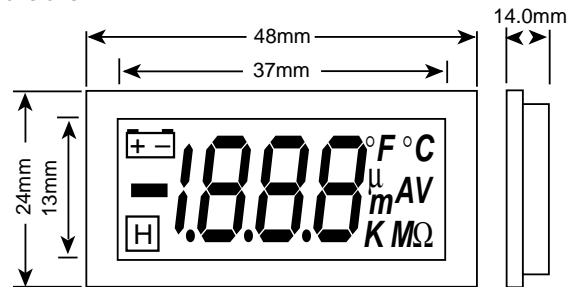
Model Number	Description
07999F3-003	Panel Meter 36 x 72mm, 14mm LCD
07999F3-004	Panel Meter 24 x 48mm, 8mm LCD

Introducing the FAE200 Dynapar/NorthStar brand Encoder Catalog!

Our product range of incremental and absolute encoders is now represented in this first issue of the full-color FAE200 Catalog.

This comprehensive document includes useful tutorial content which provides an easy to understand of the operating principles, features and applications of all popular encoder configurations and technologies.

Product listings include selection guides, full electrical, mechanical and environmenta specifications, connection information and part number tables that let you order your encoder with the exact features that will best suit your application needs.

Order your copy of this handy reference guide and catalog today! Its free, and will be a valuable addition to oyur engineering library. To order, use one of the methods below. **Please reference the FAE200 Catalog and provide your name, title and complete mailing address.**

By Phone: 1-800-873-8731 – follow menu to Literature Department

By Fax: 847-662-6633

By Email: Lit@dancon.com

FAE200 Encoder Catalog

Complete Dynapar brand Encoder information can also be found at our website.
WWW.FEEDBACKDEVICES.COM

Customer Service	**Internet Presence**
call Toll Free 800.873.8731	E-Mail: dancon@dancon.com
or 847.662.2666	Worldwide Web: http://www.dancon.com

Veeder-Root

Dynapar

Eagle Signal

10.01

A proximity switch is a solid-state sensor that will detect the presence of any suitable material (referred to as the "target"), and produce an electrical output while the target is within its sensing field.

Veeder-Root brand provides the two popular technologies used in the design of proximity switches: Inductive and capacative – each having its own unique applications and advantages.

INDUCTIVE PROXIMITY SWITCHES

Inductive proximity switches generate a sensing field that can detect the presence of any metal target. In many applications, inductive proximity switches are used to replace the function of a mechanical switch – without need for physical contact with the cams, levers, or actuators required for mechanical devices.

Another primary application for these versatile sensors is material handling. Various metallic parts or items can be detected as they are moved about manufacturing or assembly operations. The proximity switch can be used to confirm their presence or location, and provide signals used for counting, sorting, diverting, inspection or other automatic processes.

PROXIMITY SWITCH APPLICATIONS
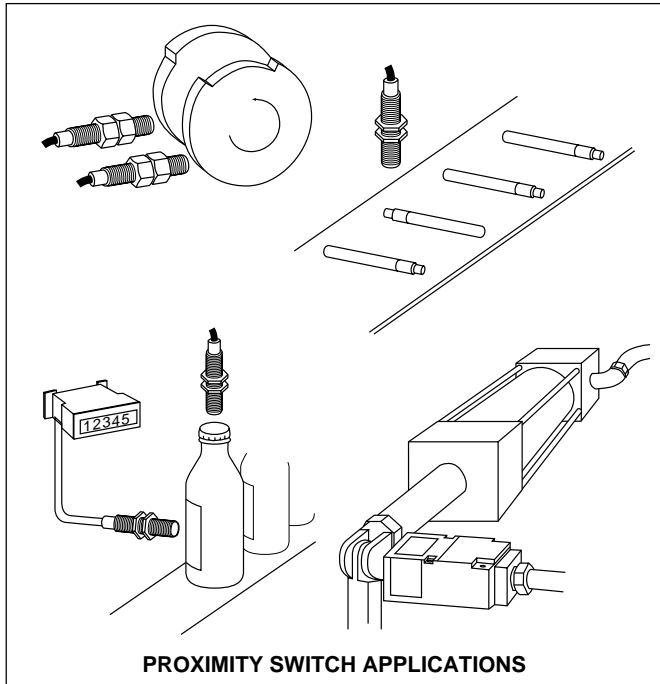
CAPACITIVE PROXIMITY SWITCHES

Like the inductive proximity switch, the capacitive switch is also a simple, trouble free sensor, for the detection of objects at short distances.

Capacitive proximity switches sense a change in dielectric mass rather than the presence of a metal object. Therefore they can detect many materials; liquids, metal, glass, plastic, porcelain, ceramic, wood, leather, rubber, food, water, oil, etc.

The ability to discriminate changes in mass allows their use in unique applications that would otherwise be very difficult to resolve. For example, they can "see" through a container or vessel and determine the presence of the contents inside – great for checking the fill level of powdered material in a box, or liquid in a bottle.

SELECTING A PROXIMITY SWITCH

To fit a specific application, a proximity switch must be considered for its technology (inductive or capacitive), enclosure size, mounting requirements, and electrical output characteristics.

Inductive vs. Capacitive: The inductive switch is generally the choice when replacing mechanical switches that sequence or synchronize machinery. They can sense, without contacting, the cam, rod, or other metal actuator that would have operated a mechanical switch. Inductive switches are also frequently used to sense the production flow, or feed, of metal parts or items.

The capacitive switch can sense the presence or location of objects made of almost any material. However, it is especially useful when the material is non-metallic, or in determining additional information about the object, such as: is a box properly filled? is the material wet or dry?

Enclosure Size and Shape: We offer inductive proximity switches in a wide variety of enclosure styles and sizes:

■ **Tubular Styles:**
Most space efficient body style
Available in six diameters
Threaded mounts permit easy installation and adjustment
Stainless steel or nickel-brass bodies endure harsh environments
Include captive cable; quick disconnect (with integral connector) also available

■ **Limit Switch Styles:**
Directly mount in place of mechanical limit switches
Screw terminal connections and conduit fittings

Inductive   **Capacitive**

Tubular   Limit Switch

POPULAR ENCLOSURE STYLES
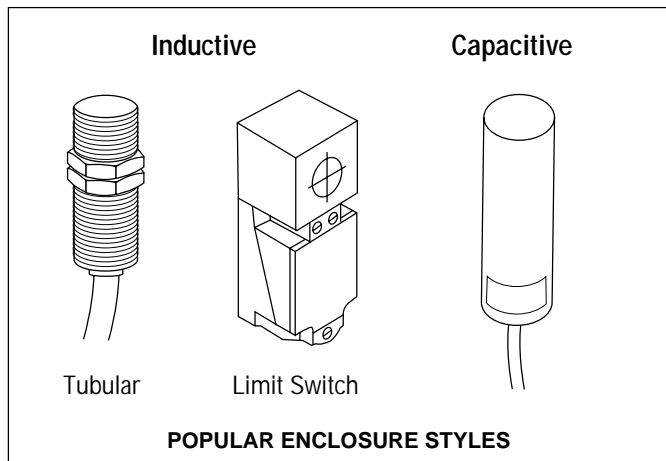
Power Requirement and Outputs: Proximity switches must be selected for compatibility with the AC or DC power source and external load that they will control. Our designs are specialized for operation with either AC or DC circuits, and the proper type must be selected for the application.

■ **DC Types:**
Operate over wide range of popular voltages
Compatible with DC inputs of programmable controllers, counters, and other equipment
Available with NPN or PNP output circuits
Output can directly switch DC relays, solenoids, etc.

■ **AC Types:**
Popular models operate over 90 to 220 VAC range

Special high impedance models for direct connection to programmable controller's 20 to 250 VAC inputs

Simple two-wire series connection with external load

Can directly switch AC relays, solenoids, etc.

ADDITIONAL CONSIDERATIONS

Familiarity with a few of the specifications for Inductive Proximity Switches that are provided in the following catalog pages will help in their selection.

Shielded and Unshielded Types: Unshielded inductive proximity switches can be recognized by their plastic sensing tip extending beyond the surrounding metal tube. Unshielded types have the advantage of maximum sensing for a given size switch, usually at least 50% greater than shielded designs. However, they must not be mounted in a manner that places metallic surfaces near the extended tip.

Shielded types have their sensing face flush with the front of their metal tube. They can be mounted without regard to surrounding metal surfaces, other than in the front focused sensing field.

EFFECTS OF SHIELDING
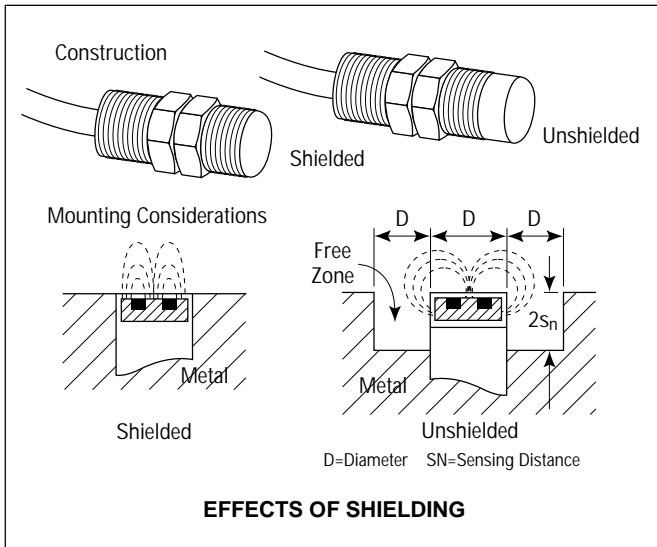
Sensing Distance: Represents the maximum working distance between the sensor and the target, and is somewhat proportional to the physical size of the unit – larger proximity switches have greater sensing distance than smaller ones. The specification is based on target material being mild steel, and of equal, or greater size than the proximity switches sensing face. Non-ferrous metals, or smaller targets will reduce the practical sensing distance.

Speed: A proximity switch's speed specification is related to its ability to detect repetitive target cycles, or acknowledge a target that is within its sensing field for a short duration. Generally, DC powered types are considerably faster than AC versions.

MOTION DETECTOR PROXIMITY SWITCH

A unique inductive proximity switch that will produce its output only when the time between targets exceeds a set adjustable duration. Among its many applications are: protecting motors from burn-out due to binding or jammed mechanical parts, warning of backed up or bound conveyor systems, and confirmation of proper rotation of fans, pumps, etc. Its output will occur within one underspeed revolution of the monitored target.

TYPICAL APPLICATIONS

Every day, there are new and creative applications for inductive and capacitive proximity switches being discovered by people like you. Here are just a few:

Inductive Proximity:
Sorting & counting metallic parts
Missing Parts Control
Robotics
Broken Tool Detection
Valve Position Confirmation
Jam Detection

Capacitive Proximity:
Non-Metallic parts
Liquid or Powder Level Control
Confirming Contents of Sealed
    Package
Web Detection
Bottling Overspill/Underfill Control
End of Roll Alarm

ULTRA-PRECISION SWITCH

Although the devices in this catalog section are primarily non-contact sensors, there is an exception to the rule. Our Ultra-Precision Switch (UPS) products although similar in appearance to tubular proximity switches, are actually highly accurate mechanically actuated switches.

The UPS can be used for measurement and control tasks such as gauging, positioning, and measuring in industrial machinery or robotics applications. All have repeatability to 0.00004 inch (.001 mm), very low actuating force, and mechanical life of 10,000,000 operations.

ULTRA-PRECISION SWITCHES

Noncontact sensing of metals and other materials

FOIL
POUCH

CAPACATIVE
SWITCH

FLOUR MIX
IN PAPER

CAKE MIX

CAKE MIX
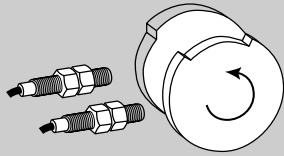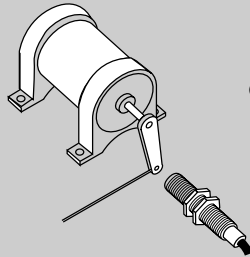
CAM TIMING	**POSITION CONFIRMATION**	**LEVEL CHECKING**	**TURN COUNTING**
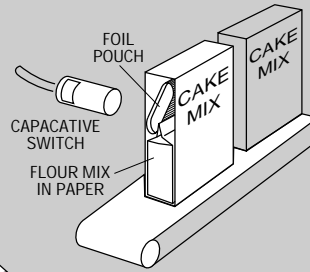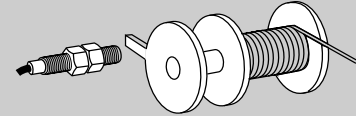
VEEDER-ROOT brand

GENERAL PURPOSE

Advantages
- ■ Low cost
- ■ Many diameters

VEEDER-ROOT brand

SHORT TUBE

Advantages
- ■ 40% shorter size
- ■ Many diameters

VEEDER-ROOT brand

EXTENDED RANGE

Advantages
- ■ Most sensitivity
- ■ Short tube

Series 6508-6530, General Purpose DC
See page 11.04
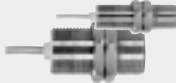
- ■ 8 to 30 mm diameters
- ■ Shielded and unshielded

Series 6504-6512, Short Tube, DC Powered
See page 11.06

- ■ Fits tight areas
- ■ No sacrifice of range

Series 6512-6530, General Purpose AC
See page 11.05
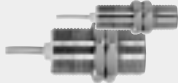
- ■ 2 wire connection
- ■ Shielded and unshielded

Series 6512 Ring LED, DC Powered
See page 11.08

- ■ 360° visible indicator
- ■ Quick disconnect cable

Series 6508/6512, Short Tube, DC Powered, Extended Range
See page 11.07

- ■ Up to 100% extra range
- ■ Shielded design

Series 6600, Limit Switch
See page 11.09

- ■ Universal sensing head
- ■ Replaces mechanical switch

Series 6725, Capacitive Proximity Switches
See page 11.10

- ■ Detects all materials
- ■ Low cost

11

PROXIMITY AND

PRECISION SWITCHES

ACCESSORIES

For Proximity and Ultra-Precision Switches
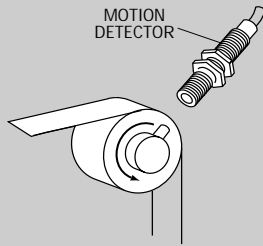
MOTION DETECTION
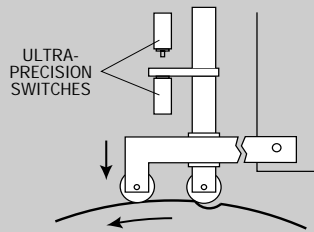
SURFACE IRREGULARITY CHECKING

VEEDER-ROOT brand

MOTION DETECTORS

Advantages
- ■ Protects machinery
- ■ Economical

VEEDER-ROOT brand

ULTRA-PRECISION SWITCH

Advantages
- ■ Precise to .00004"
- ■ Rugged construction

Series 109888, AC/DC Motion Detectors
See page 11.11

- ■ Simple 2 wire connection
- ■ Protects in one revolution

Series 669220, Quick Disconnect S12 Cable
See page 11.13

- ■ For ring-LED proximity
- ■ 2 or 5 foot versions

Series 7483-7486, Ultra Precision Switches
See page 11.12

- ■ Contact or transistor output
- ■ Precise, in-touch sensing

Series 669010, Remote Power Supply
See page 11.13

- ■ For ultra-precision switch
- ■ Relay support

11

PROXIMITY AND PRECISION SWITCHES
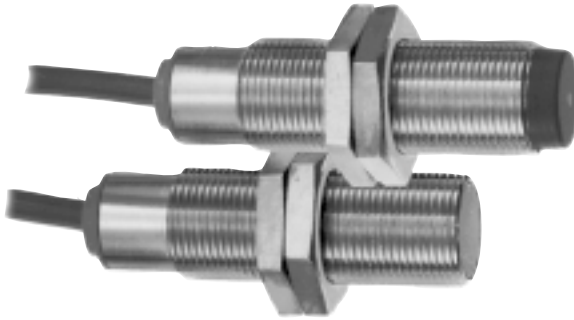
Popular tubular designs available with shielded and unshielded construction . . . sizes from 8 mm to 30 mm diameter

Detects the presence of ferrous and nonferrous metals by producing a switched transistor output. Threaded tubular housing for easy mounting to machine structures or brackets. An LED indicator confirms proper alignment and operation. *Shielded* types are not influenced by metallic material surrounding their face-circumference, therefore can be flush-mounted in a metal surface. *Unshielded* types have a sensing face that extends beyond their metal housing, gaining about 50% extra sensing distance over equivalent shielded units, but can not be flush-mounted in metal. Models are offered with output circuits combining NPN or PNP transistors, and normally open configurations.

- Quality construction and materials – NEMA-4/IP67 rated
- Replaces mechanical switches – does the job without contact or wear
- Operates over -13° to +167°F (-24° to +75°C) temperature range
- Reverse polarity and transient protected
- Wide operating voltage range – 5 to 24, or 10 to 50 VDC
- Fast 1 kHz switching speed capability
- Can switch load currents to 200 mA, such as DC relays or solenoids
- NPN or PNP output circuits
- LED indicator confirms proper target alignment

They provide a long-life, noncontact, alternative to mechanical limit-switches in many machine control and object sensing applications.

SPECIFICATIONS

Electrical Characteristics:

Operating Voltage Range: 5-24 VDC, diameter < 18 mm; 10-50 VDC, diameter ≥ 18 mm

Maximum Voltage Ripple: 10%

Load Current: Maximum Continuous Load: 200 mA; Minimum Continuous Load: 0.30 mA; Leakage Current: Supply Current (excluding load): 12 mA; On-State Voltage Drop: <2V; Output Transistor Type: NPN current sinking, PNP current sourcing

Operating Characteristics:

Sensing Distance Tolerance: ±20% @ 5-9 VDC, ±15% @ 10-50 VDC

Switching Frequency: 8 mm = 5 kHz; 12 mm = 2 kHz; 18 mm = 1 kHz; 30 mm = 500 Hz

Hysteresis: 30% max. @ 5-9 V, 20% max. @ 10-50 V

Operating Temperature: -13° to +167°F (-25° to +75°C)

Repeatability: 5%

Standard Protections: Reverse polarity, transient

Enclosure Ratings: NEMA-4, -13 (IP67)

200 mA Maximum Load Current									
Model Number				Sens. Dist. (mm)	Voltage Range DC	Dimensions			Tube Matrl.
NPN	PNP	LED	Shld.			D	L	C	
0650800-010	0650802-010	Yes	Yes	1.5	10 to 30	8 mm	30 mm	2M	Metal
0650800-030	0650802-030	Yes	Yes	2.0	10 to 30	8 mm	30 mm	2M	Metal
0651210-010	0651212-010	Yes	Yes	2.0	5 to 24	12 mm	50 mm	2M	Metal
0651210-030	0651212-030	Yes	No	4.0	5 to 24	12 mm	54 mm	2M	Metal
0651200-708	0651200-718	Yes	No	4.0	5 to 24	12mm	54mm	4M*	Metal
0651810-010	0651812-010	Yes	Yes	5.0	10 to 50	18 mm	50 mm	2M	Metal
0651810-030	0651812-030	Yes	No	8.0	10 to 50	18 mm	58 mm	2M	Metal
0651820-030		Yes	No	8.0	10 to 50	18 mm	80 mm	2M	Plastic
0653010-010		Yes	Yes	10.0	10 to 50	30 mm	60 mm	2M	Metal

*Shielded Cable

Dimensions:
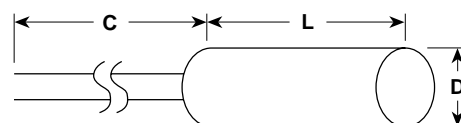
See ordering table for dimensions.

11
PROXIMITY AND PRECISION SWITCHES
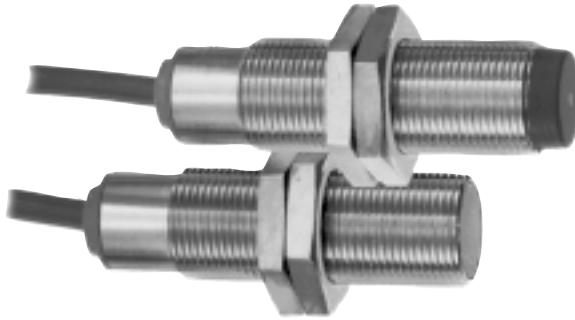
Just two wires – connects like a conventional switch . . . delivers repeatable, wear-free operation

Detects the presence of ferrous and nonferrous metals and produces a control output to switch AC circuits. Completely self-contained, they provide a long-life, noncontact, alternative to mechanical limit-switches in many machine control and object sensing applications. Threaded tubular housing for easy mounting to machine structures or brackets. *Shielded* types are not influenced by metallic material surrounding their face-circumference, therefore can be flush-mounted in a metal surface. *Unshielded* types have a sensing face that extends beyond their metal housing, gaining about 50% extra sensing distance over equivalent shielded units, but can not be flush-mounted in metal. Several models feature an LED indicator that confirms proper alignment and operation.

■ Quality construction and materials – NEMA-4/IP67 rated

■ Replaces mechanical switches – does the job without contact or wear

■ Noncontact sensing – does not touch detected object

■ Operation at -13° to +167°F (-25° to +75°C) temperature range

■ Suited for solid-state as well as conventional loads

■ Wide operating voltage and power frequency range

■ Can directly switch moderate loads, such as AC relays or solenoids

■ Available diameters: 12 mm, 18 mm, 30 mm; shielded and unshielded

■ LED indicator confirms proper target alignment

Using just two wires, they simply connect in series with the AC load to be controlled – relay, light, valve, solenoid, etc. Many high impedance loads, such as PLC AC-input modules, solid-state relays, and electronic counters can be switched, generally not requiring an external load resistor.

SPECIFICATIONS

Electrical Characteristics:
Operating Voltage Range: 90-250 (±10%) VAC, 50/60 Hz
Configuration: Normally Open
Load Current:
Maximum Continuous at 50°C (linearly derated above 50°C):
12mm Types: 150mA; 18mm & 30mm Types: 200mA
Minimum Continuous: 5mA
Leakage Current: <1.5mA @ 110V; <3.0mA @ 220V
On-State Voltage Drop: <8V
Operating Characteristics (all devices):
Sensing Distance Tolerance: ±10%
Min./Max. Hysteresis (% of nom.): 3/20
` **Operating Temperature:** -13° to +167°F (-25° to +75°C)
Switching Frequency: 10 Hz Max.
Enclosure Material: Nickel plated brass
Enclosure Ratings: NEMA-4, -13 (IP67)
Termination Type: 2-conductor, 2-meter cable

Model Number	LED	Shld.	Sens. Dist. (mm)	Load Current		Dimensions		
				Minimum	Maximum	D	L	C
2-Wire AC, Normally Open, 90 to 250 VAC Operation								
0651210-700	Yes	Yes	2.0	5 mA	150 mA	12 mm	60 mm	2M
0651210-701	Yes	No	4.0	5 mA	150 mA	12 mm	64 mm	2M
0651810-600	Yes	Yes	5.0	5 mA	200 mA	18 mm	65 mm	2M
0651810-601	Yes	No	8.0	5 mA	200 mA	18 mm	73 mm	2M
0653010-700	Yes	Yes	10.0	5 mA	200 mA	30 mm	60 mm	2M
0653010-701	Yes	No	15.0	5 mA	200 mA	30 mm	70 mm	2M

For limit switch housing, see Series 6600

11
PROXIMITY AND
PRECISION SWITCHES

Dimensions:

See ordering table for dimensions.
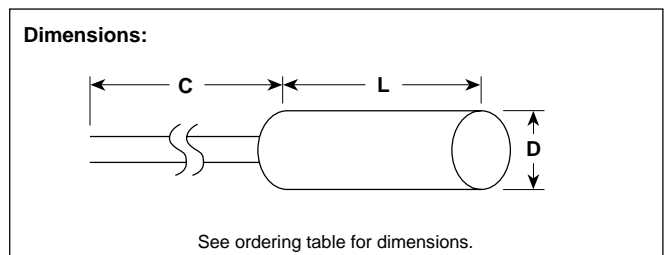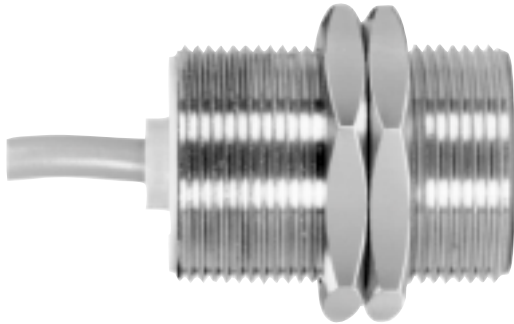
Space efficient – 40 percent shorter than conventional types without sacrifice of performance . . . diameters from 4 mm to 12 mm, with shielded and unshielded construction

Detects the presence of ferrous and nonferrous metals and produces a switched transistor output. Short length, threaded tubular housing for easy mounting to machine structures or brackets. Completely self-contained, they offer a long-life, high-speed, noncontact alternative to mechanical limit-switches in many machine control and object sensing applications. *Shielded* types are not influenced by metallic material surrounding their face-circumference, therefore can be flush-mounted in a metal surface. *Unshielded* types have a sensing face that extends beyond their metal housing, gaining about 50% extra sensing distance over equivalent shielded units, but can not be flush-mounted in metal. Models are offered with NPN (current sinking) or PNP (current sourcing) transistor output circuits.

- Quality construction and materials – NEMA-4/IP67 rated
- Short length fits limited space areas that restrict use of longer models
- Replaces mechanical switches – does the job without contact or wear
- Operation at -13° to +167°F (-24° to +75°C) temperature range
- Reverse polarity and transient protected
- Wide operating voltage range: 5 to 24, or 10 to 50 VDC
- Fast 1 kHz switching speed capability
- Can switch load currents to 200 mA, such as DC relays or solenoids
- NPN or PNP, normally open output circuits
- Requires less than 10 mA supply current

Many short tube switches are short-circuit protected and some feature an LED indicator for easy setup.

For extended sensing range, see page 11.07

SPECIFICATIONS

Electrical Characteristics:
   Operating Voltage Range: ≤12 mm dia.: 5-24 VDC, 10-30 VDC; ≥18 mm dia.: 10-50 VDC
   Maximum Voltage Ripple: 10%
   Maximum Continuous Load Current: 75, 200, 250 mA
   Supply Current: ≤10 mA
   On-State Voltage Drop: ≤2.5 VDC
   Output Transistor Type: Current Sinking: NPN; Current Sourcing: PNP
   Termination: 2m (6.6') PVC cable
   Number of Connecting Wires: 3
Operating Characteristics:
   Switching Frequency: 4 mm and 5 mm = 2 kHz; 8 mm = 5 kHz; 12 mm = 2 kHz
   Hysteresis (max. % of nominal): 20
   Repeatability: 5%
   Operating Temperature: -13° to 167°F (-25° to 75°C)
   Standard Protections: Reverse polarity, transient, many devices short circuit protected
   Enclosure Ratings: NEMA-4, -13 (IP 67)

Model Number				Sens. Dist. (mm)	Load Current (mA)	Dimensions			Tube Matrl.
NPN	PNP	LED	Shld.			D	L	C	
5 to 24 VDC (SCP = Short Circuit Protected)									
0650800-050	0650802-050	Yes	Yes	1.5	200	8 mm	30 mm	2M	INOX
	0650802-070	Yes	No	2.0	200	8 mm	32 mm	2M	INOX
0651210-050	0651212-050	Yes	Yes	2.0	200	12 mm	30 mm	2M	MS
0651210-070	0651212-070	Yes	No	4.0	200	12 mm	34 mm	2M	MS
10 to 30 VDC (Short Circuit Protected)									
	0650802-450	Yes	Yes	1.5	200 (SCP)	8 mm	30 mm	2M	INOX
0651210-450		Yes	Yes	2.0	250 (SCP)	12 mm	30 mm	2M	INOX
0650430-400		No	Yes	0.8	75 (SCP)	4 mm	27 mm	2M	INOX
	0650502-400	No	Yes	0.8	75 (SCP)	5 mm	27 mm	2M	INOX

Dimensions:
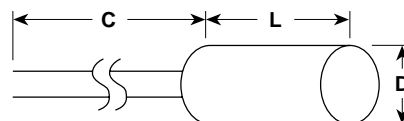
See ordering table for dimensions.

For typical applications, see Proximity Switch Introduction and Selection Guide, pages 11.00-11.03

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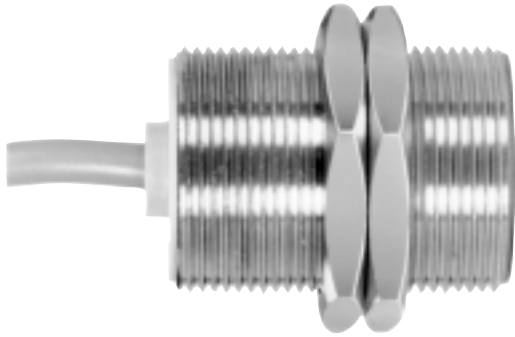
40 percent shorter than conventional types with up to 100 percent greater sensing range . . . shielded construction in 8 mm and 12 mm diameters

Detects the presence of ferrous and nonferrous metals and produces a switched transistor output. Short length, threaded tubular housing for easy mounting to machine structures or brackets – plus shielded construction, but with equivalent sensing range to unshielded units. *Shielded* types are not influenced by metallic material surrounding their face-circumference, therefore can be flush-mounted in a metal surface. Completely self contained, they offer a long-life, high-speed, noncontact alternative to mechanical limit-switches in many machine control and object sensing applications. Models are offered with NPN (current sinking) or PNP (current sourcing) transistor output circuits.

- Quality construction and materials – NEMA-4/IP67 rated
- Same sensing range as larger, more expensive models
- Short length fits limited space that restricts use of conventional models
- Replaces mechanical switches – does the job without contact or wear
- Operation at -13° to +167° F (-25° to +75° C) temperature range
- Reverse polarity and transient protected
- Wide operating voltage range: 12 to 30 VDC
- Fast 1 kHz switching speed capability
- Can switch load currents to 200 mA, such as DC relays or solenoids
- Requires less than 10 mA supply current

Many models are short-circuit protected and some feature an LED indicator for easy setup.

For power supply, see page 13.14

SPECIFICATIONS

Electrical Characteristics:
   Operating Voltage Range: 12-30 VDC
   Voltage Range Tolerance: 0%
   Max. Continuous Load Current: 200 mA
   Supply Current (Excluding Load): 10 mA
   On-State Voltage Drop: <2.5 VDC
   Output Transistor Type: NPN Current Sinking; PNP Current Sourcing
   Number of Conductors: 3
Operating Characteristics:
   Switching Frequency: 8mm = 5 kHz, 12mm = 2 kHz
   Hysteresis: (Max. % of Nominal): 20
   Repeatability : 5%
   Operating Temperature: -13° to +167°F (-25° to +75°C)
   Enclosure Rating: NEMA-4, -13 (IP67).

12 to 30 VDC; Short Circuit Protection								
Model Number				Sens. Dist. (mm)	Load Current (mA)	Dimensions		
NPN	PNP	LED	Shld.			D	L	C
0650890-450	0650892-450	Yes	Yes	2.0	200 mA	8 mm	30 mm	2M
0651290-450		Yes	Yes	4.0	200 mA	12 mm	30 mm	2M
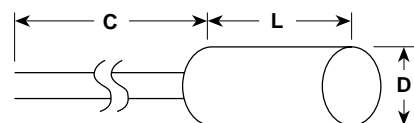
For typical applications, see Proximity Switch Introduction and Selection Guide, pages 11.00-11.03

Dimensions:

See ordering table for dimensions.
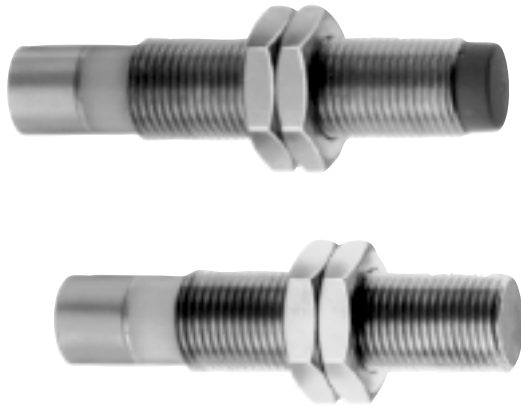
Quick-disconnect cable and 360˚ visibility Ring-LED indicator . . . for quick, easy, installation and alignment

Detects the presence of ferrous and nonferrous metals by producing a switched transistor output. Available in 12 mm diameter, with threaded housing for easy mounting to machine structures or brackets. An easy-to-see Ring-LED indicator confirms proper alignment and operation. They provide a long-life, noncontact alternative to mechanical limit-switches in many machine control and object sensing applications.

- Quality construction and materials
- Ring-LED indicator confirms proper target alignment
- Replaces mechanical switches – does the job without contact or wear
- Operation at -13° to +167° F (-25° to +75° C) temperature range
- Reverse polarity and transient protected
- Wide operating voltage range: 5 to 24 VDC
- Fast 2 kHz switching speed capability
- Can switch load currents to 200 mA, such as DC relays or solenoids
- NPN or PNP, normally open or closed, output circuits
- Requires less than 10 mA supply current

Shielded types are not influenced by metallic material surrounding their face-circumference, therefore can be flush-mounted in a metal surface. *Unshielded* types have a sensing face that extends beyond their metal housing, gaining extra sensing distance over equivalent shielded units, but can not be flush-mounted in metal. Models are offered with output circuits combining NPN or PNP transistors, and normally open or normally closed configurations.

SPECIFICATIONS

Electrical Characteristics:
Operating Voltage Range: 5-24 VDC
Voltage Range Tolerance (%): -0,24V + 20%
Max. Continuous Load Current: 200 mA
Supply Current (Excluding Load): 10 mA
On-State Voltage Drop: 1 VDC
Number of Connecting Wires: 3
Operating Characteristics:
Switching Frequency: 2 kHz
Hysteresis (max. % of Nominal): 20@10-24v; 30@5-9v
Repeatability: 5%
Operating Temperature: -13° to +167°F (-25° to +75°C)
Standard Protections: Transient

Model No.	Sensing Distance (mm)	Enclosure Dimensions (mm)	Operating Voltage Range (volts)	Termination Type	Enclosure Material
Shielded, 3- & 4-Wire DC, Current Sinking					
0651210-015	2.0	(M12 x 1) x 55	5-24	S12	MS
Shielded, 3- & 4-Wire DC, Current Sourcing					
0651212-015	2.0	(M12 x 1) x 55	5-24	S12	MS
Unshielded, 3- & 4-Wire DC, Current Sinking					
0651220-035	4.0	(M12 x 1) x 59	5-24	S12	Plastic

MS = Nickel-Plated Brass
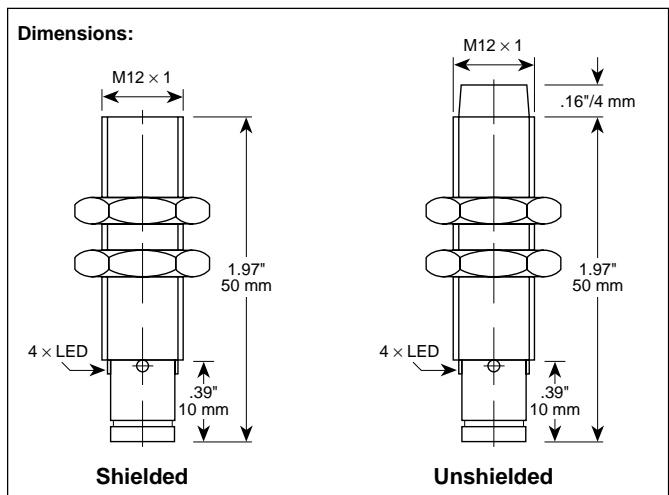
Dimensions:

Shielded

Unshielded

11 PROXIMITY AND PRECISION SWITCHES
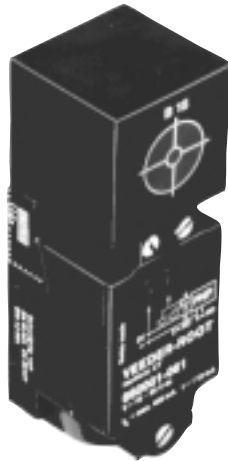
Direct non-contact replacement for mechanical industrial limit switch package . . . long-life, reliable operation

For heavy-duty use to detect ferrous and nonferrous metals in many industrial machinery applications. It features modular design allowing the sensing face to be precisely positioned left, right, front, rear, or top, even after installation. Water-, dust-, and oil-tight construction with conduit fitting and sealed wiring box. Wide range solid-state, 2-wire, AC control output, with normally-open or normally-closed wiring option.

- Rugged, industrial package – NEMA-4/IP65 rated
- Five-position, universal-sensing head
- Easy-to-install, 2-wire AC connection – 25 to 250 volts
- Selectable, normally-open, or normally-closed switching
- Convenient screw-terminal wiring box with conduit fitting
- Reliable operation over wide temperature range
- Noncontact, no-wear, replacement for industrial limit switch units
- LED indicators for power and output status
- Long-life, reliable, no-moving-parts design

Wiring is the same as with conventional switches – simply connect it in series with the controlled load, but the Series 6600 has no mechanical contacts to deteriorate or arc.

SPECIFICATIONS

Threaded Conduit Entry: 1/2"-14 NPT
Operating Temperature: -13° to 167°F (-25° to +75°C)
Voltage Range: 25-250 VAC
Supply Current, Maximum Continuous Load: 500 mA
Current, Minimum Continuous Load: 5 mA
Current, Leakage Current: 2 mA
On-State Voltage Drop: 9V nominal
Operating Speed: 20 Hz
Output Configuration: Selectable
Enclosure Ratings: NEMA-4, -13, IP65 (IEC 144)
Short Circuit and Reverse Polarity: No

2-Wire AC with Selectable Output						
Model Number	Sensing Distance (mm)	Shielded	Termination	Maximum Continuous Current (mA)	Sensing Face Location	Output Config. Current Type
0660001-041	15	Yes	Screw Term.	500	Universal	Selectable

For tubular AC switches, see page 11.05

For typical applications, see Proximity Switch Introduction and Selection Guide, pages 11.00-11.03

Dimensions:

1.575" / 40 mm
1.811" / 46 mm
.984" / 25 mm
Power LED
Target or Output LED
2.362" / 60 mm
1.181" / 30 mm
1.575" / 40 mm
4.646" / 118 mm
1/2"–14 NPT or Metric PG 13.5

11
PROXIMITY AND
PRECISION SWITCHES
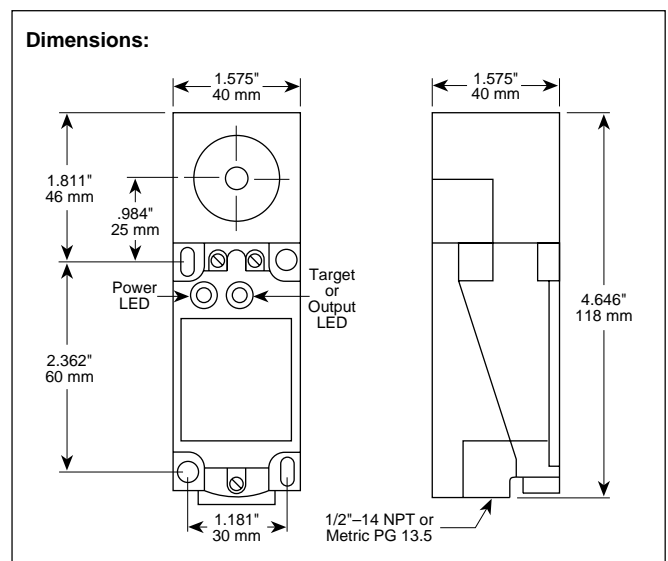
The proximity sensor that detects all materials – liquids, powders, solids . . . can even "see" a substance within a container

Non-contact sensing of wood, rubber, glass, leather, plastic, water, foods, and just about any other material. Capacitive proximity sensors can also be used to check an item for moisture, or to control fill-level of material in a cardboard container. They are equally compatible with simple control devices or sophisticated systems, such as: programmable controllers, counters, relay-logic, and computer-based test equipment.

- Detects virtually any material
- Sensitivity adjustment and LED target indicator make setup easy
- Highly accurate and stable – repeatable to ±1 percent
- Reliable performance over wide temperature range
- Broad operating voltage tolerance – 10 to 30 volts DC
- Front connection allows extra or remote sensing area
- Sensing distance to 0.5" (12.7 mm), further with extra surface attached
- Available with NPN output – normally-open, or normally-closed
- Sensing unaffected by object's color or reflectance
- Non-corrosive ABS cast epoxy enclosure, extra long cable

Series 6725 can resolve the presence of liquid, or powder behind a nonmetallic barrier – ideal for level or fill sensing applications. A unique front connection allows attachment of an extra sensing surface for detection of low density materials, or remote location of the sensing area.

SPECIFICATIONS

Electrical Characteristics:
 Operating Voltage: 10-30 VDC
 Maximum Ripple on Operating Voltage: ≤10%
 Power Consumption: ≤20 mA @ 30 VDC
 Leakage Current: ≤1 mA @ 30 VAC @ 55°C
 Maximum Load Current: 100 mA
 On-State Voltage Drop: ≤0.5V @ 100 mA
 Output Transistor Type: NPN
 Output Action: N.O. or N.C.
Operating Characteristics:
 Sensor Construction: Unshielded
 Maximum Sensing Distance: 0.5" (12.7 mm); extended distance possible
 Hysteresis (% of nominal): 3-15%
 Repeatability: ±1%
 Target Indicator: LED
 Sensitivity Adjustment: 20-turn potentiometer
 Switching Frequency: 20 Hz
 Transient Protection: Yes
 Operating Temperature: 0°F to +130°F (-20°C to +55°C)
 Humidity: 0 to 95%
 Enclosure Ratings: Cable Entry: NEMA 3 and 12
General Characteristics:
 Construction: Cast epoxy in ABS housing
 Cable: 3 conductor, 3 meter length
 Weight: 6 oz. (17 Kg)
 Accessory Mounting Brackets: Part number 669221-125

Model Number	Description	Tube Dia. x Length (mm)
0672550-530	NPN current sinking, normally open	25.4 x 82.6
0672551-530	NPN current sinking, normally closed	25.4 x 82.6

Typical Applications:

.5"
12.7mm

Proximity Switch

Standard Proximity Switch

1.5"
38mm

Proximity Switch

Capacitive Proximity Switch with 2" (50mm) Sensing Plate Added

Proximity Switch

Glass or Plastic Container

Sheet Metal Sensing Surface

Capacitive Proximity Switch with Remote Sensing Surface

Dimensions:

3.25"
82.6mm

1.0"
25.4mm

.5"/12.7mm
Nominal Sensing Field

.48" Dia.
12.2mm

.33"
8.3mm

1.9"
48.3mm

1.3"
33.0mm

1.2"
30.5mm

.7"/17.8mm

.38"
9.5mm

.5"/12.7mm

.25" Dia.
6.4mm

1.0"
25.4mm

.45"
11.4mm

.2"
5.1mm

Mounting Brackets

Combined speed sensor and controller . . . stops jammed or overloaded motors and machines before damage occurs

CE

Detects under-speed conditions in conveyor lines, machine tools, ventilating systems, or any other rotating shaft where a minimum speed requirement exists. Typically, a "flat", keyway, or bolt-head, is detected, precisely timed, and compared during each revolution to a set-point adjustment made at "minimum" speed. Any drop in speed immediately produces an output which may be used for emergency stop or other control function. The Motion Detectors operate as AC or DC switches and are available with high- and low-speed ranges.

■ Economical protection of equipment – can easily pay for itself
■ Detects under-speed in one shaft revolution
■ Self-contained tubular design is easy to install and adjust
■ AC or DC operation within same model
■ Power-up delay timer bypasses control during start up
■ High- and low-range types for 6 to 3000 RPM operation
■ Accurate and repeatable to 5% of nominal speed
■ Reliable operation over wide temperature range
■ 25 turn potentiometer and LED indicator simplifies precise set-point adjustment

Use of these protective devices in many applications throughout a plant can save many times their cost in reduced downtime and equipment repairs.

SPECIFICATIONS

Electrical Characteristics:
 Operating Voltage Range: 20-264 AC/DC
 Operating Line Frequency (Hz): DC: 0; AC: 45-65
 On-State Voltage Drop (volts): 5.7 Max.
 Load Current:
  Maximum Continuous (mA): DC: 200; AC: 350
  Minimum Continuous (mA): 5
  Inrush (A): 2
 Leakage Current (mA): 1.5
 Output State: Speed above set-point: Closed, below set-point: Open
 Termination: 2-wire cable, 20 AWG, PVC Jacket, 2 meters long

Operating Characteristics:
 Nominal Sensing Distance (mm): 0 to 8
 Power-Up Time Delay (seconds): 9, fixed
Adjustable Frequency Range (set-point):
 109888-0001: 6 to 150 pulses-per-minute
 109888-0002: 120 to 3000 pulses-per-minute
Maximum Operating Frequency:
 109888-0001: 6000 pulses-per-minute
 109888-0002: 48,000 pulses-per-minute
Hysteresis (% of nominal): 5 to 15
Repeatability (% of nominal): 3
Operating Temperature Range: -13° to +158°F (-25° to +70°C)
Enclosure Ratings: NEMA type: 1, 3, 4, 6, 12, 13, 13; CENELEC type: IP67
Enclosure Material: Nickel-plated brass

Application:
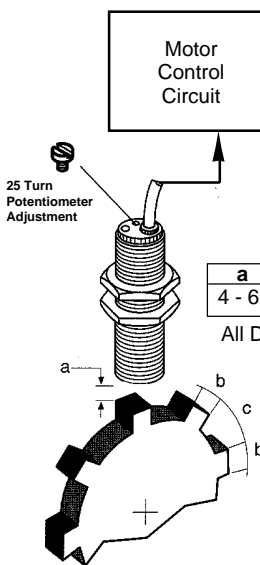
Setpoint adjustment: A 25 turn potentiometer is used to set the speed threshold (pulses per minute) to the normal operating speed. The output circuit will remain closed unless the speed falls below the setpoint at which time it will open. At power up, a 9 second delay overrides under-speed detection to allow the equipment to reach normal operating speed.

Motor Control Circuit

25 Turn Potentiometer Adjustment

a	b	c
4 - 6	30 x 30	60

All Dimensions in mm

A single or multiple targets may be used (even numbers are recommended to maintain mechanical balance). The more targets, the faster the response to an underspeed condition. The number of targets is limited by the maximum operating frequency stated in Specifications.

Model No.	Adjustable Speed Detection Range (Targets/Minute)	Operating Voltage Range	Power-Up Time Delay (Seconds)	Program-mable Controller Compatible	LED	Output Func.	Max. Sens. Dist. (mm)
109888-0001	6-150 (0.1-2.5 Hz)	20-264 VAC/DC	9 ±20%	Yes	Yes	N.O.	8
109888-0002	120-3000 (2-50 Hz)	20-264 VAC/DC	9 ±20%	Yes	Yes	N.O.	8

Dimensions:

M30 x 1.5
O.D. 1.18"

1.42"
36mm

2.24"
57mm

.94"
24mm

11
PROXIMITY AND
PRECISION SWITCHES

A B C G D E H F
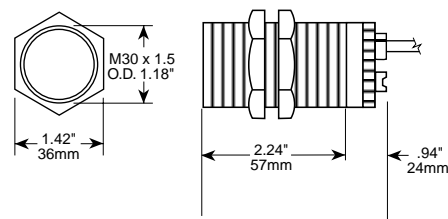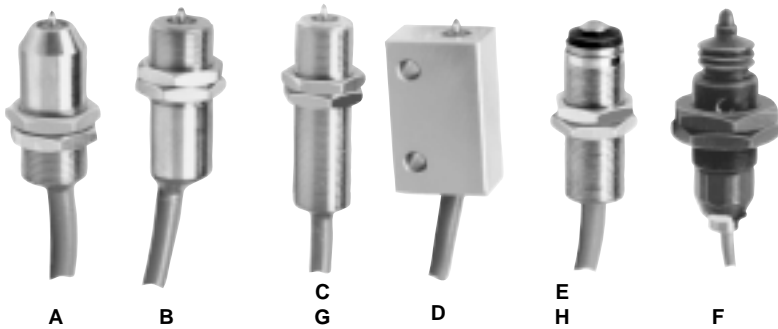
Extremely precise control switches . . . combines rugged construction with repeatability to 0.00004" (0.001 mm)

Ultra-Precision Switches provide very accurate control for measuring, gauging, robotics, positioning, and other automated equipment. Operation is by physical contact with the switch's sensing-stylus, which produces a contact or solid-state output. One rectangular and nine cylindrical models accommodate a variety of mounting requirements and space limitations. For severe applications, where dust, dirt, oils, or coolants are a problem, extra-heavy-duty Series 7486 features a special housing with a flexible rubber sealing-boot.

- -0.00004 inch (0.001 mm) repeatability and accuracy
- Mechanical life of 10,000,000 operations
- Models with contact-closure or transistor outputs
- Contact output models switch AC or DC, need no operating power
- Transistor output models with NPN or PNP configuration
- Extra-heavy-duty and water-tight models
- Wide, -4° to +167°F (-20° to +75°C) operating temperature range
- Hardened steel or precious mineral stylus materials
- Captive, sealed-egress cable
- Accessory power supply/relay module available

Precision switches are ideal for use as positioning control stops in drilling, milling, grinding, and turning operations. In addition they can measure slight expansion due to temperature and pressure changes.

For power supply/amplifier, see page 11.13

SPECIFICATIONS

Mechanical Characteristics:
   Repeatability: ±0.001 mm
   Hysteresis: ≤0.002 mm
   Mechanical Life: 10,000,000 operations
   Switching Frequency: 10 Hz
   Operating Temperature: -4° to +167°F (-20° to +75°C)
   Cable Length: 31.5" (80 cm)
Electrical Characteristics:
   Contact Closure Output (Normally Closed):
      Maximum Alternating Voltage: 24 VAC
      Maximum AC Load Current: 50 mA
      Maximum DC Voltage: 15 VDC
      Maximum DC Load Current: 2 mA
   Transistor Output (Normally Open):
      Supply Voltage Range: 5-36 VDC
      Maximum Switching Current @ 24 V: 50 mA
      Minimum Load Resistance: 480Ω

Model Number	Picture	Stylus	Activating Force (gr)	Special Features	Output	Dimensions D	L
0748310-005	A	Sapphire	50		Contact	8 mm	20 mm
0748300-003	B	Sapphire	30		Contact	8 mm	20 mm
0748320-007	C	Sapphire	75		Contact	8 mm	27 mm
0748430-010	D	Sapphire	100		Contact	*	*
0748520-007	E	Ruby	75	Watertight	Contact	8 mm	25 mm
0748620-025	F	Hard Steel	250	HD + Water	Contact	16 mm	56 mm
0748321-107	G	Sapphire	75		Transistor NPN	8 mm	27 mm
0748322-107	G	Sapphire	75		Transistor PNP	8 mm	27 mm
0748521-107	H	Ruby	75	Watertight	Transistor NPN	8 mm	34 mm
0748522-107	H	Ruby	75	Watertight	Transistor PNP	8 mm	34 mm

*Rectangular: .79" x .47" x .31" (20 x 12 x 8 mm)

Typical Applications:

ULTRA-PRECISION SWITCHES

Dimensions:

31.5" 80 cm   L   D

Tubular: See ordering table for dimensions.

REMOTE POWER SUPPLY RELAY OUTPUT

Power supply for use with Veeder-Root Series 7483, 7484, 7485 and 7486 Ultra-Precision Switches.

SPECIFICATIONS:

Supply Voltage: 110 VAC ± 10%, 50-60 Hz, max. 3, 5 VA
Control Circuit: 8.2 VDC ±10%
Internal Resistance: 1 kΩ
Relay Output:
    Contacts: DPDT
    Contact Material: Hard silver
    Switching Voltage: 250 V max.
    Switching Current: 4 A ohmic
    Test Voltage: 2.5 kV eff.
    Standard: LED indicator
    Accessories: Plug socket 669140-100 (see below)

(Plug socket optional — see below)

Model No.	Description
0669010-100	Remote Power Supply
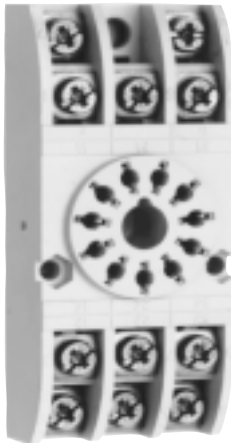
PLUG SOCKET

For use with 0669010-100 Remote Power Supply.

Model No.	Description
60SR3P05	Plug Socket

QUICK-DISCONNECT S12 TERMINATION

For use with Veeder-Root Ring-LED proximity switches. Quick-disconnect feature makes installation simpler and eliminates the need for re-wiring when a switch is replaced.

Model No. Number	Termination Type	Output Configuration	Cable Length Meters (Ft.)
0669220-212	S12	NO or NC	2 (6.6)
0669220-512	S12	NO or NC	5 (16.4)

11
PROXIMITY AND PRECISION SWITCHES

DANAHER INDUSTRIAL CONTROLS has representatives and distributors located in major cities within the United States and throughout the world. For information about the distributor or sales office nearest you, contact our customer service department:

<table>
<tr><td>Customer Service
call Toll Free 800.873.8731
or 847.662.2666</td><td>Internet Presence
E-Mail: dancon@dancon.com
Worldwide Web: http://www.dancon.com</td><td><i>Veeder-Root</i>
<i>Dynapar</i>
<i>Eagle Signal</i></td></tr>
</table>

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Worldwide Web: http://www.dancon.com

Veeder-Root
Dynapar
Eagle Signal

Computer peripheral input devices come in many forms. From simple key pads and keyboards to more sophisticated "touchscreens," input devices allow operators to interface with computers. In applications where cursor or element positioning are required, "mice" and trackballs are popular choices.

ADVANTAGES OF TRACKBALLS

Trackballs are particularly advantageous in workstation and other applications where space is at a premium. Whereas a mouse requires a large amount of desktop "real estate" to accomplish cursor movement, desktop trackballs economize on space and give workstations a cleaner appearance.

MOUSE

TRACKBALL

TRACKBALLS FOR YOUR TOUGHEST APPLICATIONS

Dynapar brand trackballs are designed and built to provide you with the environmental protection and durability required in industrial, commercial and medical applications. Dynapar brand trackballs offer resolutions not found in cheaper consumer input devices. Higher resolutions mean higher precision in your toughest applications.

MEDICAL

INDUSTRIAL

Our high quality trackballs have proven themelves in:
- ■ Medical imaging applications
- ■ Radar installations
- ■ Process control systems
- ■ Industrial computers as mouse replacements

A MECHANICAL CONFIGURATION FOR EVERY NEED

A wide range of models allow mechanical configurations that meet the needs of every original equipment manufacturer. The balls themselves come in various diameters to achieve the optimum tradeoff between size and sensitivity. Ball color, finish and feel can be customer specified. The mechanism itself can be ordered with or without a housing. Housings are available in various materials and designs for keyboard mounting, panel mounting, or stand alone desktop applications.

VARIOUS OUTPUT FORMATS OFFER FLEXIBILITY

Output formats can generally be classified as serial or incremental. Serial output formats communicate ball movement using a packet of information fixed in length. Incremental output formats transmit ball movement using packets of information proportional in length to the ball movement itself. Serial output types include RS-232C, CMOS/TTL and RS-422A. Incremental output types offered include quadrature and direction decoded waveforms.

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OPERATOR INTERFACE

Certain software manufacturers directly support the output formats of Dynapar trackballs. Additionally, available trackball outputs emulate some popular pointing device formats and may be "plug and play" compatible as replacement input peripherals. Many OEM's have written softwave "drivers" to interface Dynapar brand trackballs with their computers.

We suggest customers familiarize themselves with their system's requirements to insure compatibility with Dynapar Trackballs.

PRECISE CURSOR CONTROL

Trackballs are used to convert hand movement to cursor movement on a screen in both a vertical and horizontal axis.

TWO AXIS MOVEMENT

KEYBOARD MOUNT

PANEL MOUNT

DESKTOP
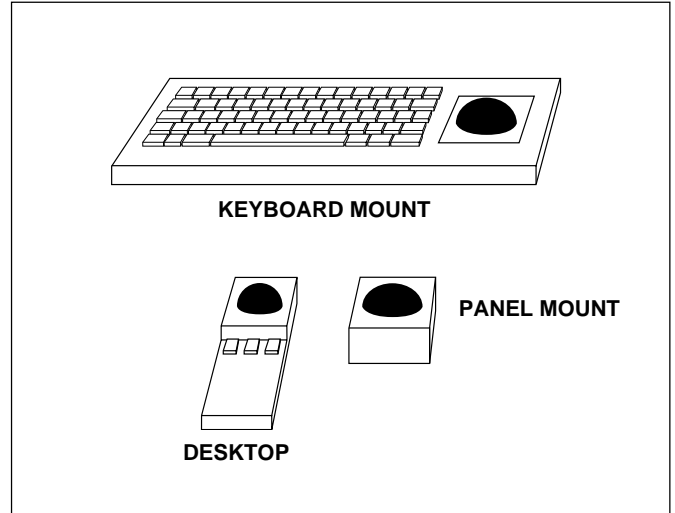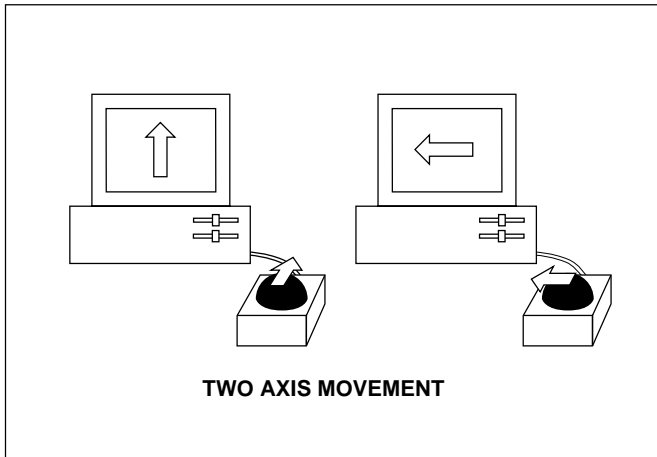
FOR COMPLETE SPECIFICATIONS AND MODELS

Dynapar brand Operator Interface Products are available in many standard and custom configurations. Please contact your Danaher Controls Sales Representative for a complete evaluation of your application.

Series 200

■ Low Cost
■ 2" Ball Diameter

Series 225

■ Compact Housing
■ 2.25" Ball Diameter

LX200

■ Desktop or Hand Held
■ 2" Ball Diameter

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OPERATOR INTERFACE
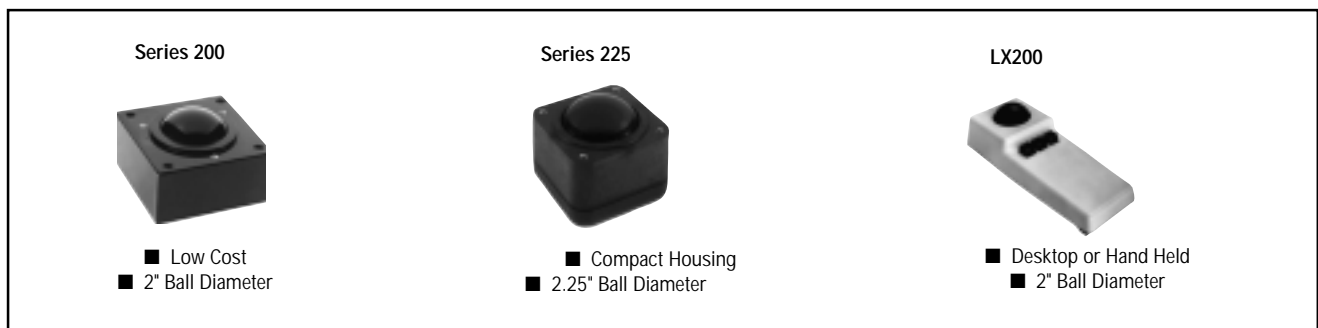
Digital accessories are designed to enhance the performance and extend the capabilities of electronic indicators and controllers to meet differing application needs. These accessories have been specially selected for mechanical and electrical compatibility with Veeder-Root, Dynapar, and Eagle Signal brand products.

ONLY WHAT YOU NEED

Our indicators and controllers provide a carefully selected group of features to satisfy most application needs, yet keep the products cost effective and easy to apply. Digital accessories offer you the added functionality you need only when you need it, making product selection easy while keeping system cost and application complexity to a minimum.

TYPES OF DIGITAL ACCESSORIES

In this section, digital accessories are grouped into five product categories: Input Modules; Output Modules; Power Supplies; Communications Converters; and Enclosures and Mounting Accessories. In the Encoder and Accessories section of this catalog are more products for encoder interfacing.

INPUT MODULES

These products receive signals from encoders and sensors and condition or modify them for use by an indicator or controller. Input amplifiers accept many types of transducer signals and can improve the quality and reliability of signal transmission. Dividers extend the operating frequency of indicators and controllers when process speeds that are beyond the product's

input range are encountered. Analog Converters translate a voltage or current loop process variable into a digital frequency that can be counted, measured or controlled. (Converters that translate digital signals back to voltage or current appear in the Encoders and Accessories section.)

OUTPUT MODULES

Relay Modules can interface a controller to a motor, solenoid, clutch, or almost any type of machine load. They can be located near the load to minimize wiring costs. Relays also provide a means of isolating the sensor and controller electronics from the rest of the machine or system. Some relay modules have self-contained power supplies, for use with sensors or precision switches in the absence of an electronic control. Analog Isolators provide an electrical barrier between two devices that must use a voltage signal, such as a speed controller and drive. The isolator receives the voltage and retransmits it while keeping both sides separated from each other.

Signal

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DIGITAL ACCESSORIES
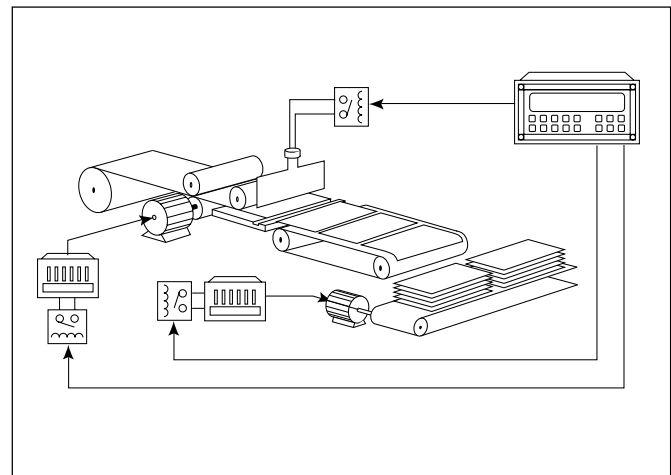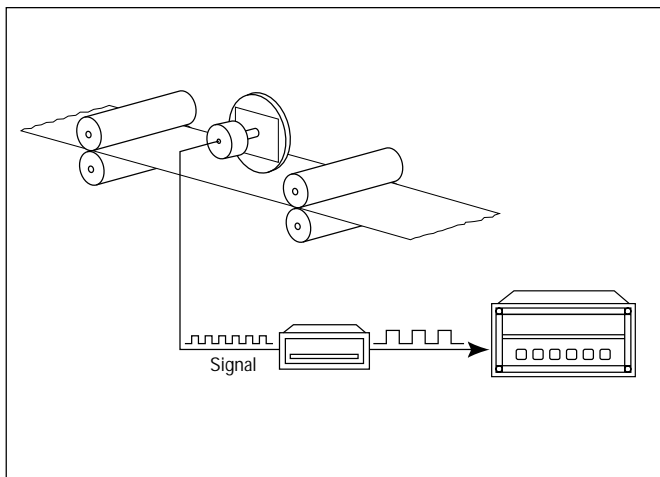
POWER SUPPLIES

A source of power is needed for encoders, sensors, relays and other peripheral devices. When an indicator or controller's built-in supply is insufficient for an application's needs, an external supply can be added. We offer supplies with 12 or 15 volt outputs for compatibility with Dynapar and Veeder-Root products.
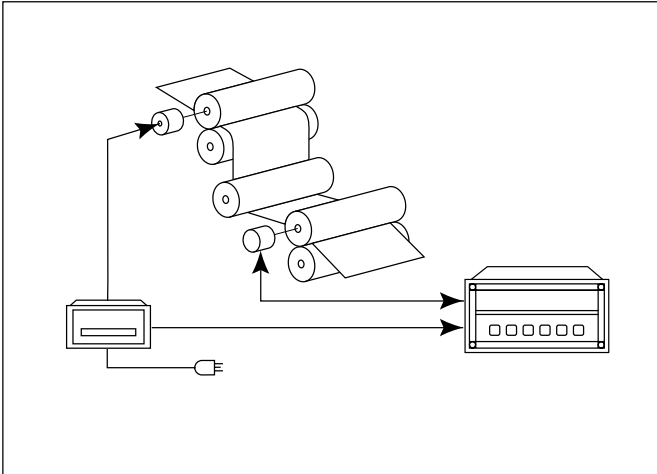
COMMUNICATIONS CONVERTERS

Some systems need process information to be transferred between an indicator or controller and a remote display, printer, programmable logic controller (PLC) or host computer. Many
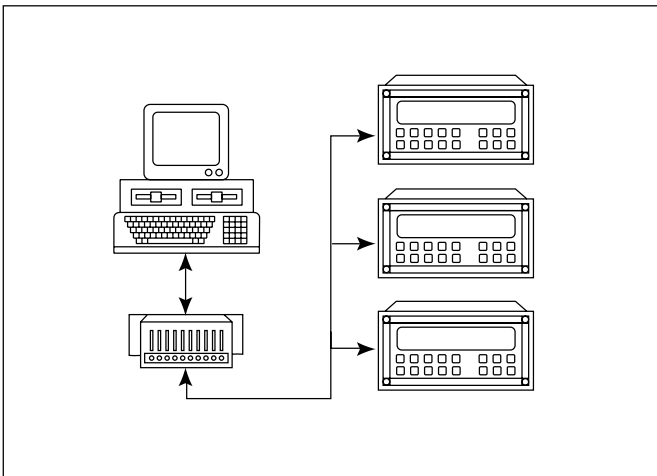
Dynapar and Veeder-Root products use the RS-232 or RS-422/485 interface standard. The RS-232 interface is the most popular method for connecting computers, terminals and printers. The benefits of an RS-422/485 network – lower wiring costs and higher performance – make it a popular choice for factory automation applications. Our RS-232 to RS-422/485 converter allows the optimal combination of both standards in a system. Another interface permits high speed transfer of Binary Coded Decimal (BCD) data in parallel fashion. This method is used by some printers, PLCs and computers. We offer a BCD output buffer for those applications.

ENCLOSURES AND MOUNTING ACCESSORIES

When there is very little room or no panel space for mounting indicators, controllers and accessories, desktop enclosures provide a panel with ready-made cutouts for instruments, conduit knockouts and additional space for mounting accessories and operator switches or lights. They are
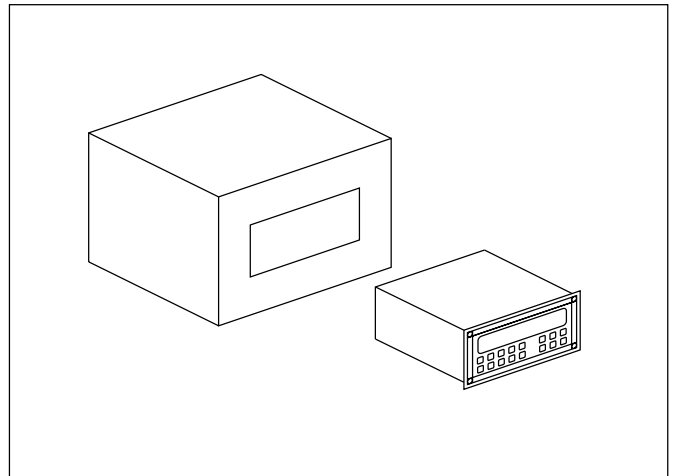
available in a variety of sizes and panel configurations. Also available are relay and power supply mounting rails which feature easy snap-in installation.

INPUT MODULES:

- ■ Improve Signal Quality
- ■ Extend Operating Range
- ■ Perform Conversion

OUTPUT MODULES:

- ■ Switch High Power Loads
- ■ Povide Electrical Isolation

INPUT CONVERSION
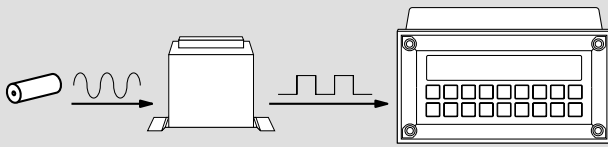
OUTPUT BUFFER
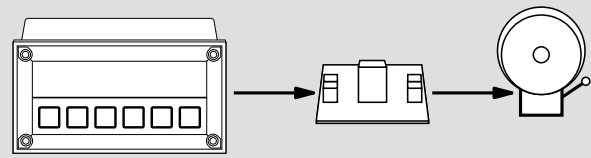
DYNAPAR brand

PM21S Differential Line Receiver and Supply
See page 13.05

- ■ Differential Inputs
- ■ Built-in Encoder Power Supply

VEEDER-ROOT brand

619010 Remote Power Supply
See page 11.09

- ■ DPDT Relay
- ■ Precision Switch Input

DYNAPAR brand

PM28S Dual Universal Input Amplifier
See page 13.04

- ■ Universal Inputs (configurable)
- ■ Optically Isolated Outputs

DYNAPAR brand

PM31 Relay Module
See page 13.10

- ■ 7.5 Amp SPDT Relay
- ■ Contact Supression/Protection

DYNAPAR brand

PM64S Analog to Frequency Converter
See page 13.09

- ■ Analog Input to Frequency Output
- ■ Voltage or Current Loop Input

DYNAPAR brand

PM63S Analog Isolator
See page 13.06

- ■ ±20 VDC to ±10 VDC Isolation
- ■ 0.1% Accuracy

DYNAPAR brand

High Frequency Dividers
See page 13.07 & 13.08

- ■ HFD10 – 2 Channels, ÷10
- ■ HFDQ4– Quadrature plus Index ÷4

13

DIGITAL ACCESSORIES

POWER SUPPLIES:

■ **Provide Power for Accessories**
■ **Allow Use of Additional Sensors**

COMMUNICATIONS PRODUCTS:

■ **Convert Serial Data**
■ **Buffer Parallel Data**
■ **Print Data Reports**

ENCLOSURES:

■ **Mount Relays and Power Supplies**
■ **Mount Indicators, Controllers and Accessories**

ENCODER POWER
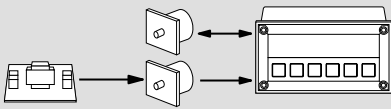
DATA LOGGING
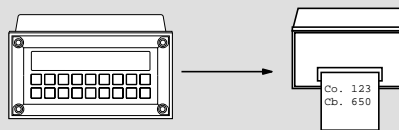
PANEL MOUNTING
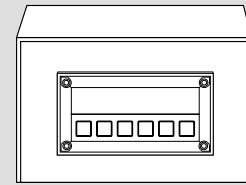
DYNAPAR brand

PM41S Power Supply Module
See page 13.11

■ +12 VDC, 200 mA Output

DYNAPAR brand

PM61S Converter
See page 13.13

■ RS-232 to RS-422/485 Conversion
■ Control Lines and Termination

VEEDER-ROOT brand

16000700234 SNAPTRACK™
See page 13.12

■ Snap-In Convenience
■ Mounts PM41S Power Supply & PM31 Relays

13

DIGITAL ACCESSORIES
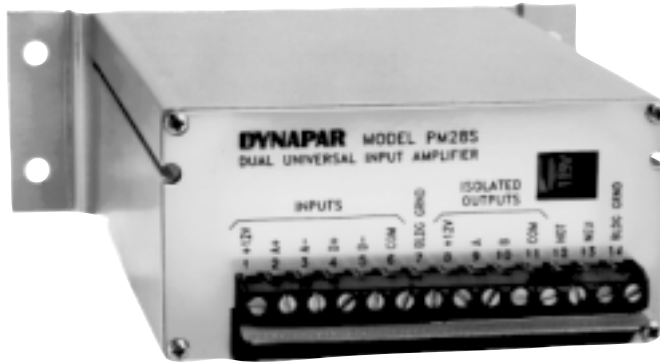
Dual universal input amplifier . . . provides 6 types of input functions

The model PM28S provides six types of input functions in one easy-to-use, two-channel isolated product.

As an amplifier, it accepts differential line driver, single-ended, and magnetic signals, converting them to single-ended signals for use with counters and indicators. This unit is isolated from input to output, and allows input signals to travel long distances without degradation. The isolation provides higher noise immunity for the total system.

The input termination is programmable to match most encoders, pickups and other input devices, including many low level flow meters.

The PM28S also provides a power source for encoders, pickups and other input devices. Its special MOSFET output will drive up to six Dynapar **MAX** or **MAXjr** products.

The two channels operate independently, so any combination of inputs can be used. All field connections are made through a terminal strip which accepts number 22 through 12 AWG.

■ Two independent channels

■ Selectable inputs – differential inputs, 12V inputs, 5V inputs, TTL inputs, magnetic inputs, 50 mv inputs for low level flowmeters

■ Transducer supply

■ Selectable line termination

■ Hysteresis on inputs

■ Noise filtering

■ Isolated MOSFET line driver outputs – allows user to drive 6 **MAX** or **MAXjr** products

■ Selectable 115/230 VAC operation

SPECIFICATIONS

Input Power: 115/230 VAC, ±10%; 50/60 Hz; 6 VA

Input Transducer Power: +12 VDC ±5% @ 150 mA

Isolated Output Power: +12 VDC ±5% @ 150 mA

Transducer Inputs:

12V Inputs: Voltage Range: 12-30 VDC; High Trip Point: 9 VDC min.; Low Trip Point: 3 VDC max.

5V Inputs: Voltage Range: 5-12 VDC; High Trip Point: 3.5 VDC min.; Low Trip Point: 1.0 VDC max., Input Frequency: 100 kHz max.

TTL Inputs: Voltage Range: 2.5-5 VDC; High Trip Point: 1.8 VDC min.; Low Trip Point: .8 VDC max.

Magnetic Inputs: Voltage Range: 2-30 VPP; High Trip Point: .8 VDC min.; Low Trip Point: .2 VDC max.

Flow Meter Inputs: Voltage Range: 50-500 mVP; High Trip Point: 50 mVDC min.; Low Trip Point: 15 mVDC max; Input Frequency: 100 kHz max.

Outputs:

V_{OL}: 0.5 V typ. @ 70 mA sink

V_{OH}: 11.1 V typ. @ 70 mA source

Output Resistance: 15 ohm @ 10 mA typ.

Rise Time: 40 nS max.

Fall Time: 40 nS max.

Peak Output Current: 1.5 A max.

Output Current: 120 mA max.

Output Frequency: 100 kHz max.

Number of MAX or MAXjr loads: 6 per channel

Environmental:

Operating Temperature: 32° to 122°F (0° to 50°C)

Storage Temperature: 0° to 186°F (-18° to 85°C)

Relative Humidity: 0% to 90% non-condensing

13

DIGITAL ACCESSORIES

PM28S replaces PM21, PM25 and 101UA
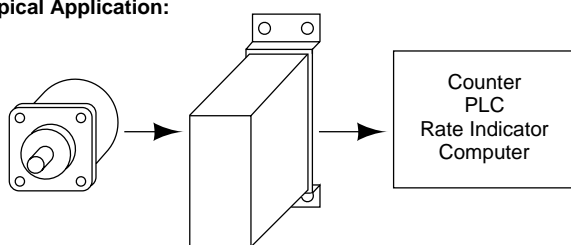
Model No.	Description
PM28S00	Dual Universal Input Amplifier

Typical Application:

Counter
PLC
Rate Indicator
Computer

Dimensions:

5.90" O.A.
149.9 mm

5.10"
129.5 mm

0.22"
5.6 mm

5.00"
127.0 mm

3.54"
89.9 mm

1.74"
44.2 mm

1.00"
25.4 mm

SIDE VIEW

FRONT VIEW

0.20 Dia.
5.1 mm

4.50"
114.3 mm
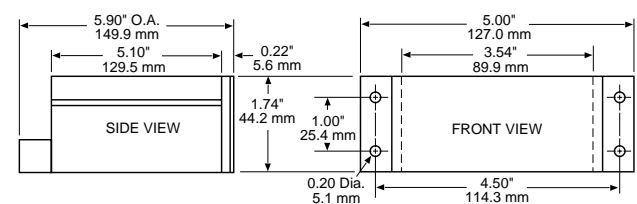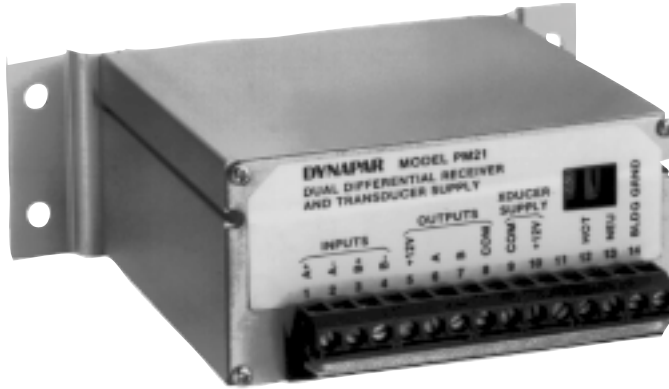
Differential Line Receiver and Power Supply

The PM21S provides two functions in one easy-to-use product. As a receiver, it accepts differential line driver signals and converts them to single ended signals for use with counters and indicators. This unit is located near the counter or indicator and allows input signals to travel long distances without degradation and with higher noise immunity.

As a power supply, it also provides a power source for encoders, pickups and other devices that have high current requirements.

The differential receiver and power supply operate independently, so only the features that are required need to be connected. All field connections are made through a terminal strip which accepts number 22 through 12 AWG.

- Two independent channels
- Differential inputs
- High capacity transducer supply
- Internal line termination
- Hysteresis on inputs
- Noise filtering
- Short circuit protected outputs
- Selectable 115/230 VAC Operation

SPECIFICATIONS

Input Power:
    Ext. Receiver Supply: +12 VDC @ 25 mA max.
    Int. Transducer Supply: 115/230 VAC; ±10%, 50/660 Hz, 6 VA
Transducer Output Power: +12 VDC ±5% @ 225 mA
Differential Inputs:
    Voltage Range: ±15 VDC max.
    Input Sensitivity: 200 mV
    Input Hysteresis: 50 mV
    Input Impedance: approx. 5 kΩ
    Input Frequency: 100 kHz max.
    Line Receiver: DM88C20
    Compatible Line Drivers: DM88C30, DM8830 or equivalent
Outputs:
    V_{OL}**:** 0.5V typ. @ 2.5 mA sink
    V_{OH}**:** 9.75 V typ. @ 0.6 mA source
Environmental:
    Operating Temperature: 32°F to 122°F; 0°C to 50°C
    Storage Temperature: 0°F to 186°F; -18°C to 85°C
    Relative Humidity: 0% to 90% non-condensing

Model No.	Description
PM21S00	Differential Line Receiver and Supply

13

D A
I C
G C
I E
T S
A S
L O
R
I
E
S

Typical Applications:

PM21S00

Counter
PLC
Rate indicator
Computer

Dimensions:

3.95" O.A.
100.3 mm

3.15"
80.0 mm

0.22"
5.6 mm

1.74"
44.2 mm

1.00"
25.4 mm

SIDE VIEW

0.20 Dia.
5.1 mm

5.00"
127.0 mm

3.54"
89.9 mm

FRONT VIEW

4.50"
114.3 mm

The PM21 may be mounted either horizontally or vertically, as required, using standard #10 hardware.

DYNAPAR brand
Digital Accessories

PM63S Bipolar Analog Isolator
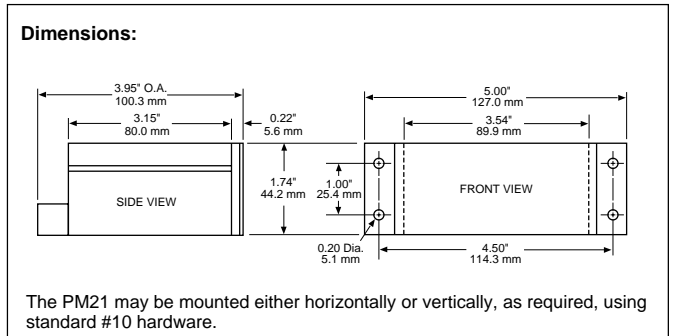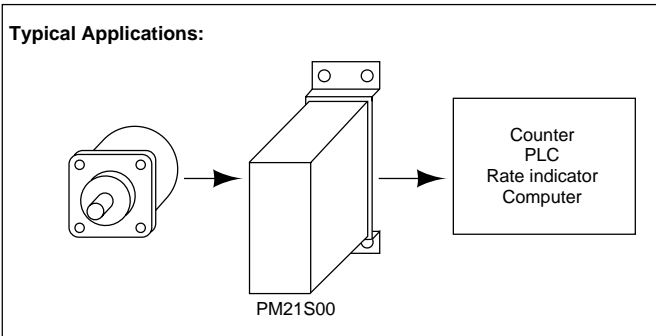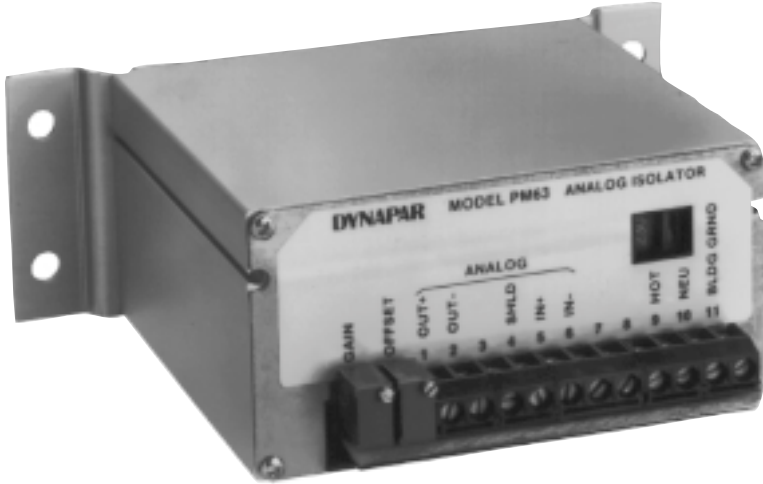
Bipolar Analog Isolator

The model PM63S is a Bipolar Analog Isolator which provides a high degree of electrical isolation between electronic controls and equipment that have high common mode voltage differentials such as DC and AC drives.

The PM63S is optically isolated and has none of the inherent noise problems associated with transformer coupled isolation amplifiers. The module is self-contained with its own power supplies and is powered from an AC source. All field connections are made through a terminal strip which accepts number 22 thru 12 AWG.

- 1000 VAC peak or DC isolation
- Unity gain amplifier with zero and gain adjust
- Compatible with unipolar and bipolar signals
- Self contained, no external supplies required
- Output is short circuit protected
- Input voltage span -10 to +10 VDC
- Output voltage span -10 to +10 VDC
- All metal enclosure
- Easy installation
- Compact size

SPECIFICATIONS

Input Power: 115/230 VAC, ±15%, 50/60 Hz, 2.5VA

Amplifier Characteristics
Inputs
    Voltage Range: -10 to +10 VDC
    Impedance: 2kΩ
    Freq. Resp.: DC to 150 Hz
    Isolation (in/out): 1000 VAC peak or DC
    Leakage Current: 0.3 µA max. @ 240 Vrms 60 Hz
    Zero Adjust: ±0.2 VDC
Output
    Voltage Range: -10 to ±10 VDC
    Output Current: 5mA
    Output Imped.: 1 kΩ
    Gain Adjust: 0.9 to 1.1 (11 max.) VDC
    Gain Error: 0.005% per °C typ.
    Offset Error: 1mV per °C max.
    Linearity: 0.02% typ.

Environmental
    Operating Temperature: 32°F to 122°F; 0°C to 50°C
    Storage Temperature: 0°F to 186°F; -18°C to 85°C
    Relative Humidity: 0% to 90% non-condensing

Model No.	Description
PM63S00	Analog Isolator

Typical Applications:
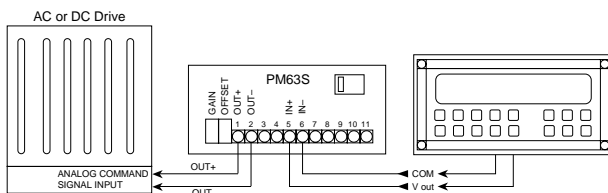
Dimensions:
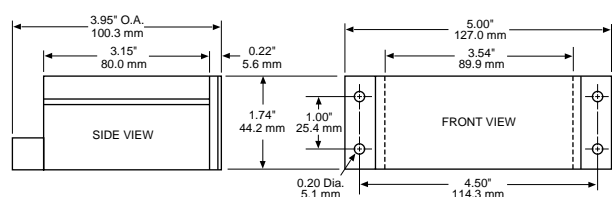
The PM63S may be mounted either horizontally or vertically, as required, using standard #10 hardware.

For interfacing high frequency signals to the MAXjr Tach products

A dual channel, high frequency divider (÷10) that extends the input frequency capability of **MAXjr** tachometers by a factor of 10 (100 kHz max.) without loss of speed resolution. Programmable input switches accommodate the same range of inputs as **MAXjr** tachometers. The HFD-10 requires 12 VDC from the tachometer. Output signal is +5V squarewave. The HFD-10 mounts on the back of **MAXjr** tachometers. It may be used with counters for non-quadrature applications only.

■ Two independent channels
■ Wide input voltage range (11:1)
■ Interfaces high frequency signals to the **MAXjr** Tach
■ Terminal strip field connections
■ Easy installation, no holes to drill
■ Small package size
■ Low cost

SPECIFICATIONS

Signal Inputs: Switch programmable
  Solid State (current sourcing)
    Input High: 1.7 min. to 20 max. VDC
    Input Low: 0 min. to 0.8 max. VDC
    Input Impedance: 3 kΩ min.
    Input Current: 0.6 ma min. source
    Input Response: 5 μs min. high and low time

Open Collector (current sinking)
  Input High: open or 1.7 min. to 20 max. VDC
  Input Low: 0 min. to 0.8 max. VDC
  Input Impedance: 1.2 kΩ min.
  Input Current: 1.0 mA min. source
  Input Response: 5 μs min. high and low time

Magnetic:
  Input High: +0.5 min. to +20 volts peak
  Input Low: -20 min. to -0.5 volts peak
  Input Impedance: 3 kΩ min.
  Input Current: 0.2 mA min. sink and source
  Input Response: 5 μs min. high and low time

Output:
  Output High: 1.9 V min. @ 0.6 mA source, 5 V max.
  Output Low: 0.45 V max. @ 10 mA sink

Supply Voltage: +12 VDC (+10%, -25%) @ 60 mA max.

Environmental
  Storage Temp.: -18 to 85°C
  Operating Temp.: 0 to 55°C
  Humidity: 90% and non-condensing

Model No.	Description
HFD100	High Frequency Divider

Functional Diagram:

Typical Applications:

MAXjr Tach 1
or
MAXjr Tach 2

HFD100

Dimensions/Installation:

.6"
15.2 mm

2.00"
50.8 mm

1.05"
26.7 mm

1.41"
35.8 mm
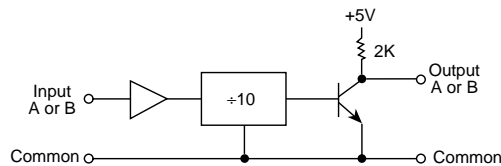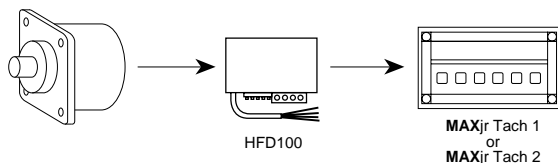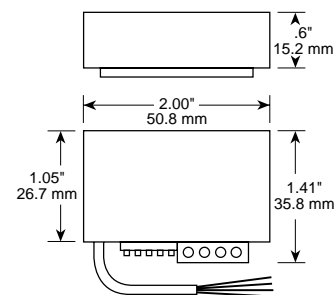
Output cable is 5"/127 mm long.
Wire ends are stripped and tinned.

Mount unit at top/rear of **MAXjr** Tach enclosure using double-sided tape provided with unit.

HFDQ-4 High Frequency Divider
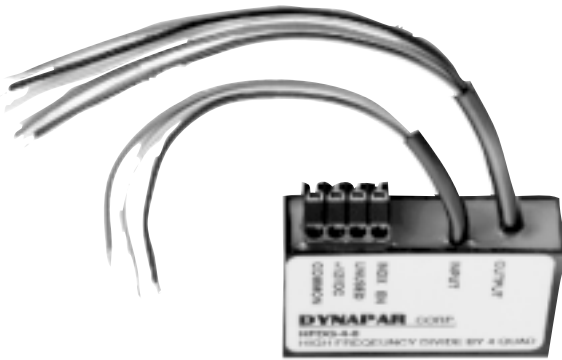
High Frequency Quadrature Divider

The model HFDQ-4 is a quadrature high frequency interface module which divides the input rate by four. The HFDQ-4 interfaces with the **MAX** Motion 1 to allow quadrature encoder inputs up to 50KHz.

■ Quadrature input/output with ability to force output phase with index input

■ Interfaces with high frequency signals to the **MAX** Motion 1

■ Easy installation, no holes to drill

■ Small package size

■ Low cost

Functional Diagram:

Typical Application:

NOTES:
FOR OPERATION OF ENABLE/INDEX FUNCTION WITH "SOURCING" ENCODERS CHANNEL A, CHANNEL B, INDEX AND REFERENCE ENABLE INPUTS MUST BE "HIGH" SIMULTANEOUSLY.

FOR OPERATION OF ENABLE/INDEX FUNCTION WITH "SINKING" ENCODERS CHANNEL A, CHANNEL B, AND INDEX INPUTS MUST BE "LOW" AND ENABLE INPUT MUST BE "HIGH" SIMULTANEOUSLY.
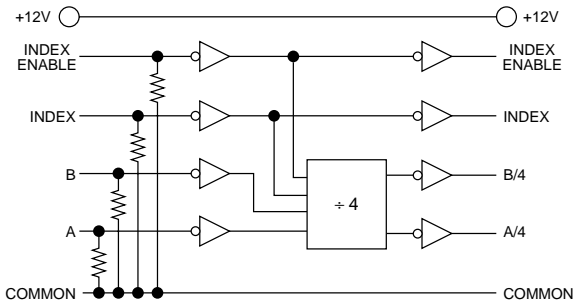
SPECIFICATIONS

Inputs
Index Enable: Provided with internal 1K pull-down resistor. Input must be raised above 3.0 volts to enable index. Index, A and B are designed to be driven from **MAX** Motion 1 opto-isolator output.

Outputs: Designed to drive **MAX** Motion inputs.
Input/Output Phasing: When all four inputs are high, A and B output phases will be forced HIGH. Output phase relative to input will then be as shown below:
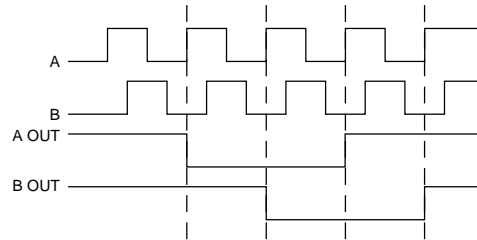
Supply Voltage: +12 VDC (+10%, -25%) @ 60 mA max.

Environment:
Storage Temperature: -18° to 25°C (0° to 77°F)
Operating Temperature: 0° to 55°C (32° to 131°F)
Humidity: 0% to 90% non-condensing

Model No.	Description
HFDQ40	High Frequency Quadrature Divider

Dimensions/Installation:

.75"
19.0 mm

2.65"
67.3 mm

1.52"
38.6 mm

1.85"
47.0 mm
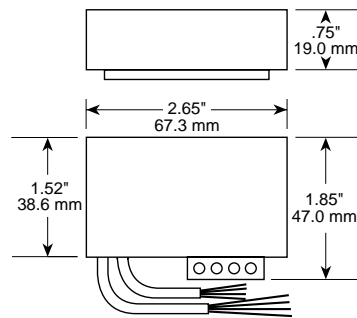
Cables are 6" (152 mm) long.
Wire ends are stripped and tinned.

Mount unit at top/rear of **MAX** Motion 1 enclosure using double-sided tape provided with unit.
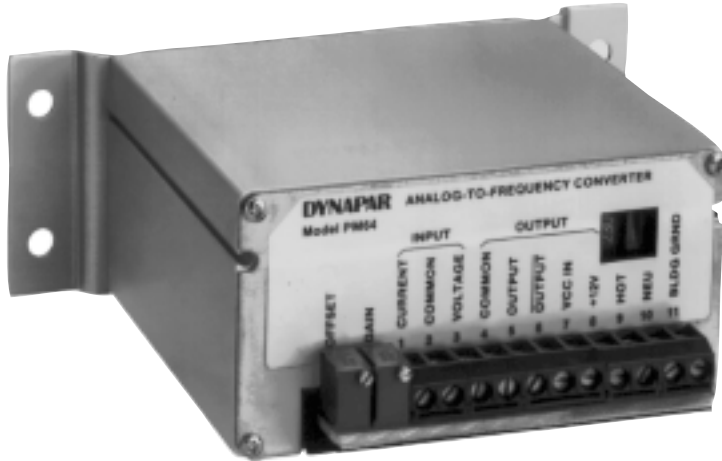
Analog to Frequency Converter

The model PM64S is an analog to frequency converter which provides an accurate and stable frequency output from either current or voltage inputs. It is recommended for use with Dynapar's **MAX** Speed products in those applications providing an analog input. It is also useful in interfacing either **MAX** or **MAXjr** Tachometers to analog signals. This allows tachometers to monitor and alarm analog variables in calibrated engineering units.

- Voltage input range: 0 to +10 VDC
- Current input range: 4 to 20 mA
- Field programmable for voltage or current input operation
- Offset and gain adjustments
- High accuracy: 0.1% typical
- Good stability: 250 ppm/ °C
- Dielectric output isolation: 750 VAC peak, 750 VDC
- Compatible with **MAX** and **MAXjr** products
- 115/230 VAC selectable input
- Extruded aluminum enclosure
- Compact package size
- Easy user installation and wiring

The PM64S features both voltage and current inputs (field programmable) with user accessible GAIN and OFFSET potentiometers. Optical isolation provides a high degree of electrical isolation between the analog inputs and the frequency output.

The PM64S is self contained with its own isolated power supplies. All field terminations are through a terminal strip which accepts AWG #14 through #22.

SPECIFICATIONS

Input Power: 115/230 VAC; ±10%, 50/60 Hz, 2.5 VA
Analog Inputs:
    Current Input:
        Range: 4 to 20 mA + 10% overrange
        Impedance: 100 Ω
    Voltage Input:
        Range: 0 to +10 VDC + 20% overrange
        Impedance: 5 kΩ
        Response: 3 msec. for 10% to 90% of full scale change

Isolated Output: Differential line driver (88C30)
    Supply: 5 to 15 VDC @ 30 mA external; 12 VDC internal
    Range: 0 to 10 kHz + 20% overrange
    Drive: 20 mA source @ Vcc - 0.8 V; 20 mA sink @ 0.4 V

Adjustments:
    Offset: ±3 VDC for voltage mode at nominal gain; ±6 mA for current mode at nominal gain
    Gain: ±3 kHz of full scale

Linearity: 0.1% of full scale when adjusted for 0 error at 10 Hz and 10 kHz

Stability: 250 ppm per °C

Environmental:
    Operating Temperature: 32°F to 122°F; 0°C to 50°C
    Storage Temperature: 0°F to 186°F; -18°C to 85°C
    Relative Humidity: 0% to 90% non-condensing

Model No.	Description
PM64S00	Analog to Frequency Converter

13

D I G I T A L — A C C E S S O R I E S

Typical Applications:

MASTER SPEED CONTROL
The PM64S converts a speed command voltage to Reference Frequency for use by slave controllers.
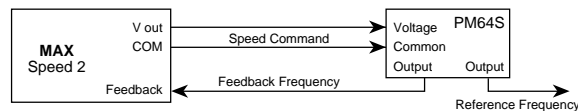
ANALOG TACHOMETER INPUT
The PM64S converts a 4-20 mA current loop signal to a proportional frequency for input to a tachometer for monitoring and scaling.

Dimensions:

The PM61 may be mounted either horizontally or vertically, as required, using standard #10 hardware.
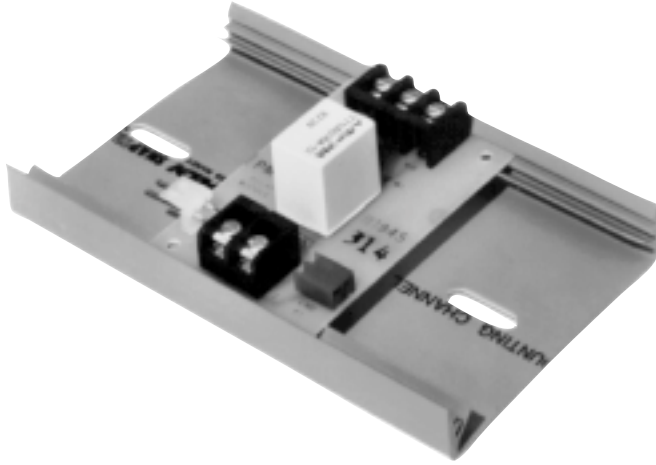
*General purpose
form C relay module*

A general purpose, form C relay module that provides high current, high voltage load switching capability from transistor inputs. It features contact protection, noise suppression, and easy SNAPTRACK™ installation. Compatible with solid state outputs for use with **MAX** and **MAXjr** counters. Requires 12 VDC from counter or PM41S power supply.

- S.P.D.T. (Form C) Configuration
- M.O.V. and R-C Noise suppression
- 900 watt RMS rating
- 180 watt DC rating
- Low coil power dissipation
- Easy SNAPTRACK™ installation
- Small size
- Low cost

Bussed relay power is provided by connectors P1 and J1. These connectors allow multiple relay modules to be daisy chained together and be powered by the PM41 power supply module. Electrical connection for this relay power bus is made simply by sliding modules together on the SNAPTRACK™ mounting chassis.

Functional Diagram:
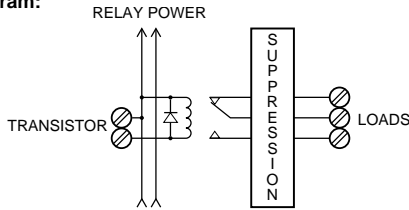
Coil connections are made thru terminal strip TB 1. Connect the output signal of the instrument to terminal 2 "Coil." Connect 12 VDC, ±25%, to terminal 1 "+Vr." Omit this connection when using the PM41 module.

Load connections are made thru terminal strip TB2. Keep loads within the limits specified. **Route all load switching conductors away from signal lines.**

SPECIFICATIONS

Coil:
  Voltage: 12 VDC nom.
  Current: 30 ma. typ.
  Resistance: 400 ohms
  Pickup Voltage: 9.6 VDC min.

Contacts:
  Type: 1 SPDT (form C)
  Ratings: 6.5A @ 28 VDC resistive; 7.5A @ 120 VAC resistive; 3.0A @ 120 VAC tungsten

Expected Life: 100,000 operations at full rated load

Termination: Terminal strip accepts #22 thru #14 AWG

Environmental:
  Storage Temp.: -18 to 85°C
  Operating Temp.: 0 to 55° C
  Humidity: 90% and non-condensing

INSTALLATION & WIRING

SNAPTRACK™ mounting chassis are available from DYNAPAR in 12" lengths. (Refer to SNAPTRACK™ product information in this section of the product catalog.) They may be trimmed by the customer for his particular need.

Install the SNAPTRACK™ by using rivets or screws thru the slots provided, or with double faced tape as the application permits.

Mount the PM31 module by inserting one edge of the board into the guide then press down on the board until it snaps into place.

Model No.	Description
PM3100	Relay Module
16000700234	SNAPTRACK™ 12" long

Wiring Diagram:
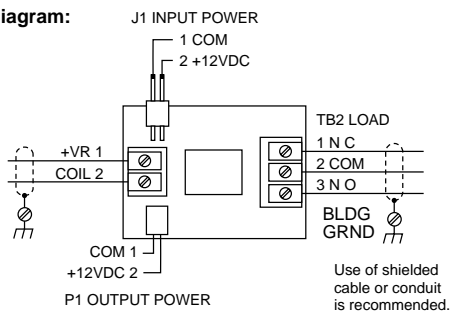
Package Dimensions/Specifications:

I**nterconnect:** Terminal strips for coil and contact connections, .045" pin and socket connectors for 12 V bussing for coil power.
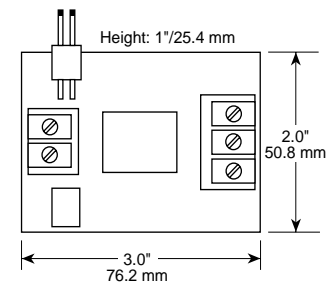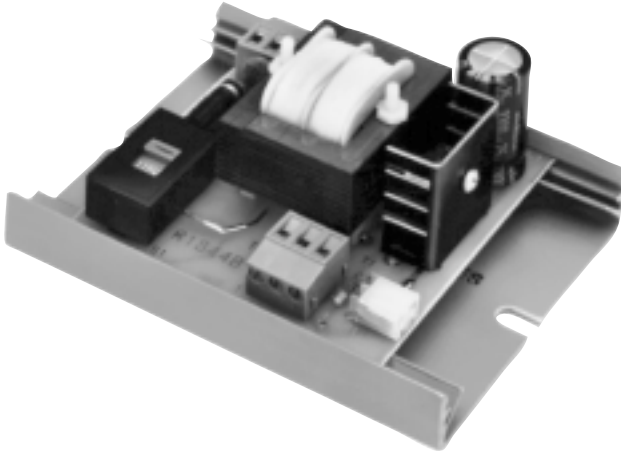
12 VDC power supply module

The model MP41S is a 12 VDC power supply module. It provides power to user accessories and to the PM31 relay modules. All field connections are made thru terminal strips. The module has switch selectable line input voltage, 115/230 VAC. A unique connector system distributes power to other SNAPTRACK™ modules in a daisy chain configuration.

- Output power: 12 VDC ±5%
- Output current: 200 mA
- Selectable 115/230 VAC operation
- Easy SNAPTRACK™ installation
- Small size
- Low cost

SPECIFICATIONS

Input Power: 115/230 VAC, ±10%, 50/60 Hz, 6 VA

Output Power: 12 VDC ±5% @ 200 mA

Output Loading: Up to 6, PM31 Relay Modules (30mA each)

Termination: Terminal strip accepts #22 thru #14 AWG

Environmental:
   Operating Temperature: 32°F to 122°F; 0°C to 50°C
   Storage Temperature: 0°F to 186°F; -18°C to 85°C
   Relative Humidity: 0% to 90% non-condensing

INSTALLATION

SNAPTRACK™ mounting chassis are available from DYNAPAR in 12" lengths. (Refer to SNAPTRACK™ product information in this section of the catalog.) They may be trimmed by the customer for his particular application.

Install the SNAPTRACK™ by using rivets or screws thru the slots provided, or with double faced tape as the application permits.

Mount the PM41S module by inserting one edge of the board into the guide, then press down on the board until it snaps into place.

PM31 RELAY MODULES can be mounted in the same SNAPTRACK™. The P1 connector system will power the PM31 Relay Module.

Model No.	Description
PM41S00	Power Supply Module
16000700234	SNAPTRACK™ 12" long

Refer to SNAPTRACK™ product information in this section of the catalog.

Functional Diagram and Wiring:

FUNCTION DIAGRAM and WIRING
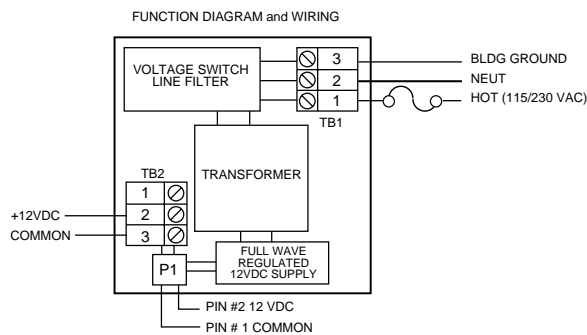
Bussed power to other SNAPTRACK modules (PM31) is provided by P1. Electrical connection is made by sliding the modules together.

Dimensions:

3.0
76.2 mm

3.0
76.2 mm

Height:1.4"/35.6 mm
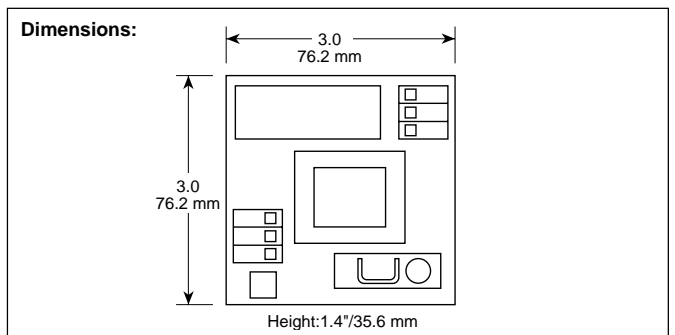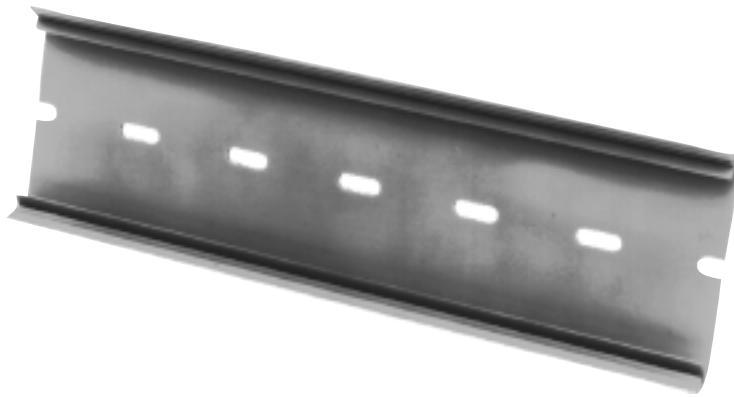
SNAPTRACK™ . . . mounting channel required for PM31 and PM41S accessories.

SNAPTRACK™ is a 12" long mounting channel required with PM31 and MP41S modules. Each SNAPTRACK™ holds one PM41S and four PM31 modules or six PM31 modules. They can be trimmed shorter by customer. PC boards snap-in from front, and are held securely by integral ribs that absorb shock when PC board is flexed. SNAPTRACK™ allows convenient PC board removal for field servicing.

INSTALLATION

Install the SNAPTRACK™ by using rivets or screws thru the slots provided, or with double faced tape as the application permits.

Mount the PM41S module by inserting one edge of the board into the guide then press down on the board until it snaps into place.

PM31 RELAY MODULES can be mounted in the same SNAPTRACK™. The P1 connector system will power the PM31 Relay Module.

Typical Applications:
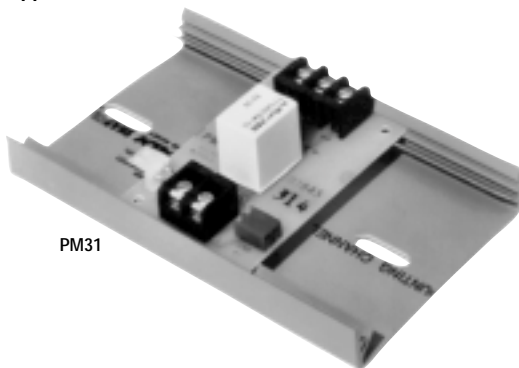
PM31
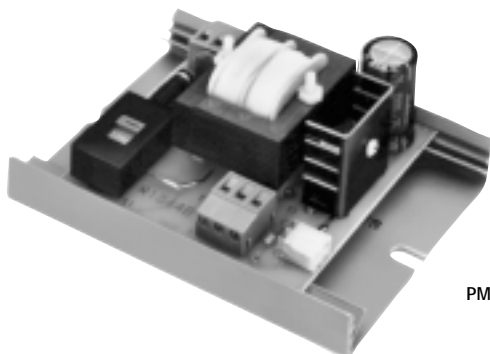
PM41S

Model No.	Description
16000700234	SNAPTRACK™ 12" long

Dimensions:

.75
.187
3.16
MODULE AREA
SLOTS REPEAT ON 2" CENTERS
12.0
1.25 .70

SNAPTRACK™ is a trademark of RDI/Reed Devices, Inc.

13

D I G I T A L

A C C E S S O R I E S
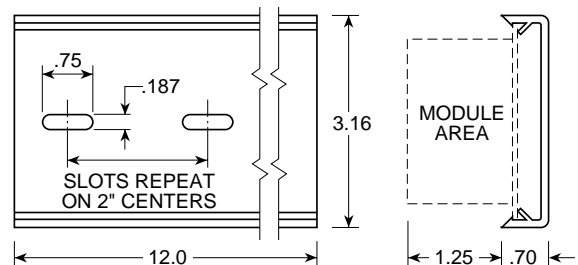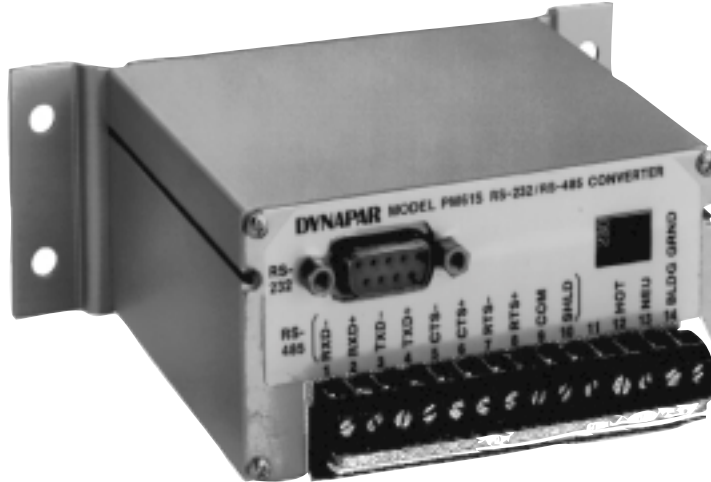
*Model PM61S
RS-232C/RS-485
serial converter . . .
ideal for use with the
MAX product family*

The model PM61S is a compact, easy-to-use product that performs the necessary voltage level conversions to interface RS-232C and RS-422A/485 equipment. The PM61S is an ideal interface product for use with the **MAX** product family from Dynapar. This module allows the **MAX** controls to be interfaced with RS-232C equipped terminals, computers, and programmable logic controllers.

■ EIA RS-232C and RS-422A/RS-485 compatability
■ Meets "power-down" specifications
■ Full-duplex or half-duplex operation
■ Standard DE9S, RS-232C connector
■ Internal RS-422A/485 line termination
■ Built-in RS-232C noise filters
■ Signals supported: transmit data, clear to send, data set ready, receive data, request to send, data terminal ready

By supporting more than the usual Transmit and Receive Data signals, the user can adapt equipment with a variety of handshaking needs. These include 4-wire Half-Duplex, Multiple-Master configurations, and mixed RS-232C and RS-422A/485 equipment.

The PM61 can be quickly and conveniently installed in almost any communications environment. Ideally, the PM61 module should be located near the RS-232C equipment, since the RS-422A/485 devices may be located up to 5000 feet from this module without signal degradation.

SPECIFICATIONS

Input Power: 115/230 VAC, ±10%, 50/60 Hz, 3 VA
RS-422A/485 Interface:
   Mode: Differential; Input Sensitivity: 200 mV; Input Hysteresis: 50 mV; Input Impedance: 12 kΩ min.; Input Termination: 10 kΩ typ.; Output Voltage: ±1.5 V into 100 Ω; Output Current: ±60 mA
RS-232C Interface:
   Mode: Single ended; Input Sensitivity: ±3; Input Hysteresis: 0.25 V; Input Impedance: 3 kΩ min.; Output Voltage: ±6 V into 3 kΩ; Output Current: ±10 mA
Environmental:
   Operating Temperature: 32°F, to 122°F; 0°C to 50°C
   Storage Temperature: 0°F to 186°F; -18°C to 85°C
   Relative Humidity: 0% to 90% non-condensing

RS-232C WIRING
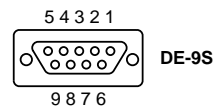
RS-232C SIGNAL TABLE

DE9S Pin #	Signal Name	Description	PM61 Direction
1	—	Protective Ground	÷
3	TXD	Transmitted Data	out
2	RXD	Received Data	in
4	RTS	Request to Send	in
5	CTS	Clear to Send	out
6	DSR	Data Set Ready	out
7	GND	Signal Ground	÷
8	DTR	Data Terminal Ready	in
9	—	(RS-232C logic 1 "high")	out

Typical Applications:

View of typical cable

Use multiple twisted pair cable with separate shields for each pair.
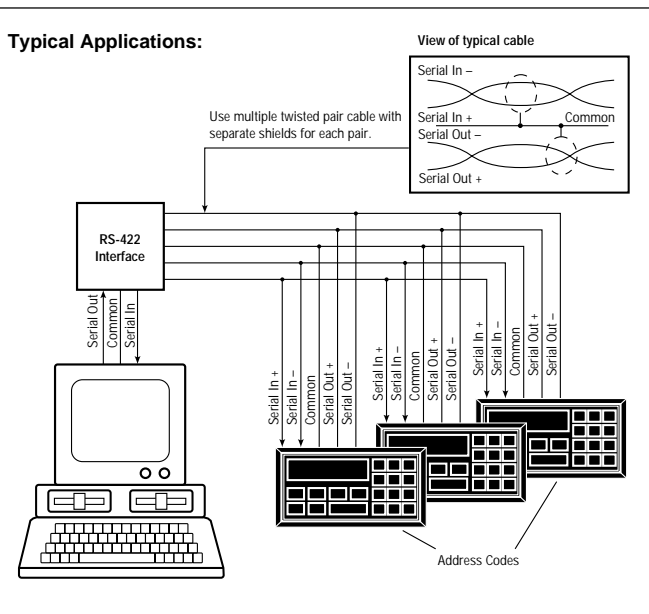
Model No.	Description
PM61S00	RS-232C/RS-485 (422) Converter
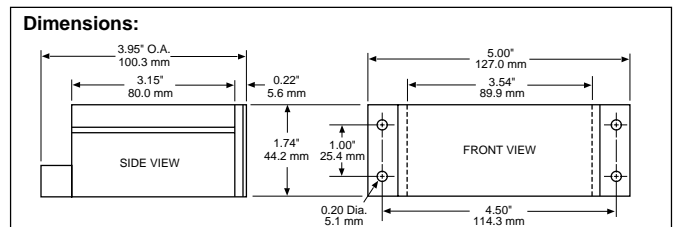
Dimensions:

The PM61 may be mounted either horizontally or vertically, as required, using standard #10 hardware.

13
DIGITAL ACCESSORIES

DZ100-51
BEZEL KIT

Panel mount hardware for 1/8 DIN DA, DG, DX, and DZ series products.
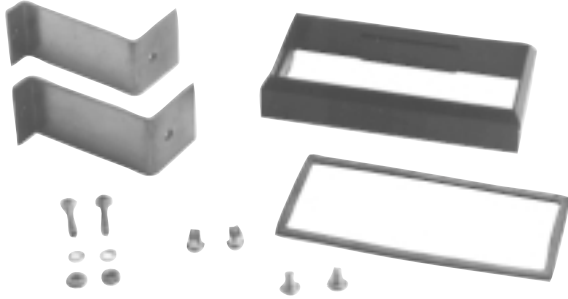
ABV03141P001
FLEXIBLE DUST COVER KIT

Provides dust and liquid protection for LZ and LX series products. Allows changing thumbwheel and push-button settings.

DZ100-56
LATCH AND RELEASE KIT

Contains clips to latch 1/8 DIN DA, DG, DX, and DZ series products to socket. Release device mounts directly to unit. Requires 1 kit/unit.

H-5331
MOUNTING BRACKETS
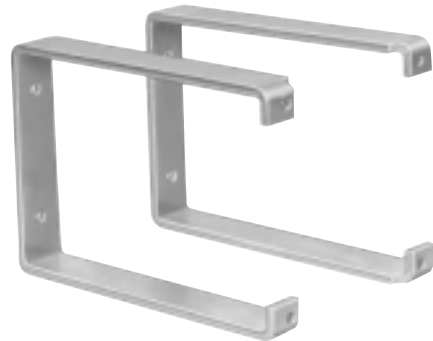
Allows surface mounting of all CYCL-FLEX® and BR4 products.

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HP50-31
MOUNTING RING

Eliminates drilling and tapping the four mounting holes for panel mounting all CYCL-FLEX® products.

DZ100-54
PLUG-IN HOUSING

Plug-in housing for 1/8 DIN products DA, DG, DX, and DZ.
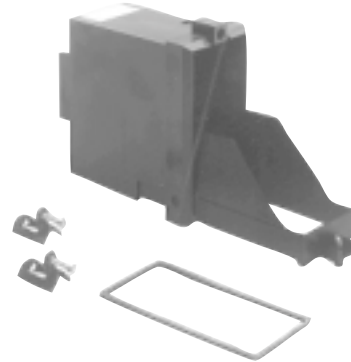
PDM 534
ADAPTER PLATE

Adapts 1/4 DIN cutout to CYCL-FLEX® plug-in case products.
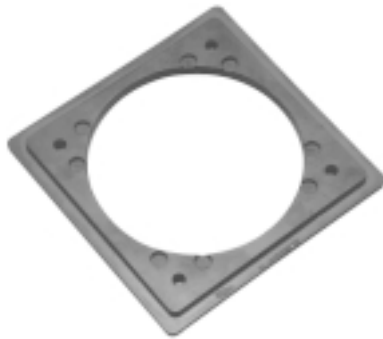
HP50-131
CYCL-FLEX® WATER-SEALED HOUSING

Standard HP50130 housing with gasket added between chrome plate and plastic housing. Provides NEMA 4 Hosedown test rating for CX series timers/counters.
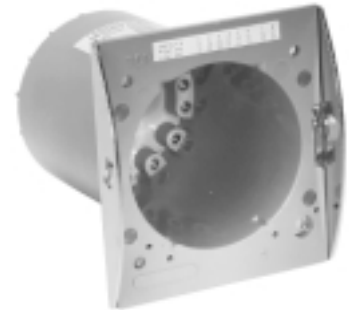
FFR11059P001
FLEXIBLE DUST COVER

Provides dust and liquid protection for DZ100 series counter. Allows changing thumbwheel settings.

DZ100-52
STRAIN RELIEF KIT

Provides cable connection to panel mounted unit.

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DIGITAL ACCESSORIES

DANAHER INDUSTRIAL CONTROLS has representatives and distributors located in major cities within the United States and throughout the world. For information about the distributor or sales office nearest you, contact our customer service department:

Customer Service
call Toll Free 800.873.8731
or 847.662.2666

Internet Presence
E-Mail: dancon@dancon.com
Worldwide Web: http://www.dancon.com

Veeder-Root
Dynapar
Eagle Signal

+/- Go through 0   A type of circuit that enables direction sensing from a reference zero; necessary for position indication.

X2, X4 Logic   A type of logic that multiplies the signal by a factor of 2 or 4 respectively.

115/230 VAC   The standard line voltages available in the U.S. and some other countries. It is alternating current used to power devices.

50/60 Hz   The frequency of alternations of current flow in the line. The U.S. uses 60 Hz; Europe and some other countries use 50 Hz.

10-26 VDC   The range of voltage available for use in Dynapar devices that use direct current (D.C.) type power.

5PY   A type of D.C. tachometer that has a specific bolt pattern.

(A-B) Input   A type of input used on counters and position indicators; The B input pulses are subtracted from the A input pulses.

(A+B) Input   A type of input used on counters and position indicators; The A and B input pulses are added together.

ABS Plastic   A terpolymer made from three monomers: acrylonitrile, butadiene, and styrene.

A/D Converter   A device that converts a sampled analog signal to a digital code that represents the amplitude of the original signal sample.

ASCII   This most common code is the American Standard Code for Information Interchange; it is a seven or eight bit code consisting of ones and zeros that represent letters, numbers, and control characters. Seven bits allow for the encoding of 128 possible values.

BC42   A type of D.C. tachometer that has a specific bolt pattern.

BC46   A type of D.C. tachometer that has a specific bolt pattern.

ABEC   An association (Annular Bearing Engineers' Committee) that assists in the drafting of standards and specifications associated with bearings and their manufacture.

Absolute Encoder   An encoder that gives a digital or (sine/cosine) output that indicates position based on a multichannel code. This type of encoder would require no reference since each discreet position has an independent code.

Acceleration   The rate of change in velocity of a moving object expressed in units of distance per second squared or in radians per second squared.

Accessory Power   An extra source of power built into an instrument that aids in its versatility (ie. powers transducers etc.).

Accuracy   The percentage of deviation between the actual position and the theoretical position of each bit edge.

Add/Subtract   The ability to count up or down.

Advance   A control input on the MAX Motion available in the auto mode; it causes the control to sequence to the next enabled position when taken low.

Analog   A signal that varies continuously in amplitude without interruption.

Analog Output   A circuit whose output is an exact reproduction of its input. It may or may not be amplified, but is usually used to control a motor drive.

Annunciators   A light on a panel that indicates when a certain event is taking place.

Auto Averaging   A function in the circuitry of some tachometers that automatically averages the input frequency over time every .9 seconds.

Auto Feed   A functional input on the MAX Motion that allows an auto feed cycle to start when the unit is in the auto mode.

Automatic Reset   An activity that can be programmed to occur in a counter at a given count; it can be reset to zero or another number.

Axial End Play   The variation in shaft end surface position with reference to the motor mounting surface with a specified axial load applied in each direction.

Axial Load   The maximum load weight an encoder shaft can have applied to it in a direction along the axis of rotation.

AWG   A rated standard of American Wire Gauge that indicates the diameter of the wire or group of wires.

Batch Reset   A function that can be programmed on a counter to occur at a given count; it can be reset to zero or another number. This deals only with the batch counter (a batch is equivalent to a set number of counts).

Baud Rate   This refers to the rate at which each bit is transferred to and from a device.

BCD   Binary Coded Decimal; a number representation system in which each decimal digit is identified by a unique arrangement of binary digits.

Bearing   Part of an encoder that supports the rotational movement of another part.

Bidirectional   This refers to an encoder output code format from which direction of travel can be determined by sensing the phasing between outputs. This applies to quadrature encoders.

Binary   This refers to the number 2 or a system with a radix of 2 (base 2); eg. the function of a switch (on/off) can be represented by ones and zeros.

BAO   Bipolar Analog Output is an output capable of both positive and negative voltage; this is very useful in indicating direction.

BIT   The abbreviation for binary digit; a bit is the basic unit of the binary system whose value may be either true or false.

Channel   An information path; a single channel encoder produces one incremental output.

Closed Loop   A control system in which feedback produces an error signal from output to input. The error signal is used to adjust the output signal thus reducing the error.

CMOS   Complementary Metal Oxide Semiconductor. An integrated circuit fabrication technique using both p-channel and n-channel mos transistors.

Code   A system of representation for a finite number of values in a particular sequence.

Collimated   A means of using lenses to direct waves of light in a parallel path.

Complementary   This refers to two separate outputs that are controlled by the same logic; one is on when the other is off and both reverse state when the logic switches.

Compliance   Generally this is defined to be the voltage range over which a device will operate.

Contact Closure   A mechanical switch or relay in which a physical connection between the two poles represents closure and controls an electric circuit.

Counter   A device which sums input pulses and produces an output after a certain count has been reached if it is a preset counter.

Count Error   A missing transition or an additional transition from the intended coded output.

Count Rate   The frequency of pulses that determines how quickly the counter changes states.

Count Transition   A voltage level where the output changes state from zero to one and vice versa. CMOS and TTL have different thresholds for this logic state change.

Correction constant   A fixed value that is multiplied by or divided by the incoming pulse waveform to enable the device to display in engineering units.

Current Sink   A transistor output configured so that the load is wired from the + side of the power source to the output and the transistor makes the circuit sink to common.

Current Source   A transistor output configured so that the load is wired from the output of the sensor to the common side of the power source. The transistor turns on and sources voltage to the load.

Cycle Error   The difference between the actual cycle width and the theoretically correct cycle width which is nominally 1/ resolution and expressed in electrical degrees or in per cent of cycle width.

Cycle reset   A function on the MAX Motion that when enabled will reset the position register to the value of the reference preset when the sequence cycle has been completed.

Cycle Progress   A feature of a timer or counter that shows the progression point in a time or count cycle. Cycle progress can be shown by a digital display or a pointer on a scale or dial.

D/A Converter   Digital to Analog converter; a circuit that accepts digital input signals and converts them to analog output signals.

Data Rate   The speed at which the digital code is changing; it is usually expressed in pulses per second or bits per second.

Dead Band   Typically a tolerance limit that is acceptable to the process being used; the MAX Length and MAX Motion use both position and torque dead band.

Decade   The interval between two quantities where one is ten times the other. At Dynapar it indicates the number of digits used in the display.

Deceleration   Negative acceleration or the rate of change of velocity of a moving object expressed in distance per unit time squared. This type of change decreases the velocity of the object.

Delay ON Release   A mode of timer operation where the delay timing period starts when a control switch is opened.

Delayed Contacts   Output contacts that transfer when the timer timed out.

Differential   A signal whose value is determined by the difference between the levels present on one line and that of another line.

Differential Line Driver   An output circuit that increases the current and allows the signal greater immunity to noise due to using the difference signal between two lines.

Differential Output   Refers to the complementary outputs from a feedback device when the signals are excited by a line driver. Best performance occurs when receiver input impedance is matched to the line driver output.

Digital   Representing information in discreet or quantified form or in the form of pieces such as bits or digits.

DIN   A Deutsche Industrial Norme standard; Many Dynapar products utilize these dimensional standards.

Direction of Rotation   In a bidirectional incremental encoder, channel A will lead channel B for one direction of rotation. If the direction of rotation is reversed, channel B will lead channel A.

Direction Sensing   The technique for detecting the direction of angular or linear motion where the output levels are logic 1 (high) for one direction of motion and logic 0 (low) for the opposite direction of motion.

Display Hold   An input that when activated causes the display to remain as it was at the instant of activation; until the input is deactivated, however counting is not affected.

Distortion   An undesirable change in a reproduced signal that reduces the fidelity.

Draw   The relationship of rate between two inputs can be expressed as A/B = ratio, (A-B)/A, (A-B)/B, and A-B.

Drive (motor)   A device that controls the power available to a motor in order to alter its speed. These can be A.C. or D.C. type drives.

Dual Channel   An encoder that produces two incremental outputs.

Dual Counter   Two single independent counters built into one chassis.

Duty Cycle   A statement of energized and de-energized time in repetitive operation; for example, 2 seconds on, 6 seconds off. Often expressed as the energized percentage of total time cycle.

Early Trip Contacts   An independent set of contacts that will transfer at a setpoint that occurs before the end of a timing or count cycle.

Early Warning Output   A second preset which fires within a set count value of the active preset; warns that the active preset is near.

Edge Separation   The separation between a transition in the output of channel A and the neighboring transition in the output of channel B. There are four states per cycle, each nominally 90 electrical degrees apart for quadrature output.

Electrical Degree   An electrical degree is 1/360 of a cycle and is related to mechanical degrees through resolution. It is mathematically expressed as follows; Resolution x 360 electrical degrees = 360 mechanical degrees.

EMI   Electro Magnetic Interference.

Enable/Disable   Preprogrammed on/off control of each preset.

Encode   To express given information by means of a code.

Encoder   An electro-mechanical device that translate mechanical motion or position into electrical signals.

End Play   Amount of shaft axial movement with maximum axial load.

Engineering Units   Units that identify values that are being recorded according to the measurements being made; eg., gallons, feet, etc.

Error Alarm   An alarm that can be set on the MAX Length, MAX Speed and MAX Motion; it indicates when an error exceeds the alarm set point programmed in.

Error Code   A code that is displayed on the front panel and indicates a malfunction.

Error Counter   Displays the difference in pulses between an internally generated speed reference and an actual feedback device.

Error Register   A multiple digit stage inside a device to provide temporary storage of the error count value.

Escape Code Sequence   A group of special commands used for bus orientation systems; all MAX products recognize these commands.

Excitation   The external electrical energy applied to a transducer for its proper operation.

Fall Time   The time interval between the points at which the instantaneous value falls from 90% to 10% of the specified upper limit.

Feed Back   Returning a portion of the energy from the output of a system to its input. Positive feedback reinforces and is called regeneration, negative feedback reduces energy and is called degeneration.

Field Programmable   Timers and counters that have user programmable parameters such as time/count ranges and output sequences. Units are programmed by miniature rockerswitches located inside the timer or by moving wires to different connection points.

Flow Input   The signal input from a flowmeter or a transducer that is available on the SFC40.

Flutter   Variation in cycle width from cycle to adjacent cycle.

Follow Operation   An output operation that follows the input. It is either on or off at any point. The preset determine where this change takes place.

Frequency Modulation   In encoders, this is the deviation from a theoretically correct frequency when the input shaft is rotated at a constant velocity.

Frequency to Voltage Converter   An electronic device which directly converts a frequency input to a voltage output.

Gain   Any increase in the current, voltage, or power level of a signal. A gain is expressed as output/input.

Gated Index   A type of circuit that causes the marker pulse to arrive coincidentally with the same pulse width as channel B.

Go   An input on the MAX Motion that in Auto mode causes the control to sequence to the next enabled position preset and then move to that position when taken low (except after advance).

Go Home Function   An input on the MAX Motion that when taken low in the Auto mode causes a profiled move to the home position.

Hand Set   This term applies to timers that are set manually after each operation. The operator turns the set pointer to the required time interval and during timing the timer motor drives the pointer back to zero.

High/Low Speed Inputs   The high speed inputs are for signals from a transducer usually greater than 20 Hz; the low speed inputs are usually from a relay or switch with a frequency less than 20 Hz.

Hysteresis   Is a switching error which is deliberately induced in an electrical circuit to prevent oscillation around a transition point.

Illumination   An area where a light source aids in viewing.

Impedance   The opposition (measures in ohms) of circuit elements to alternating current. Includes resistance, inductive reactance, and capacitive reactance.

Incremental Encoder   A device that provides a series of periodic signals due to mechanical motion. The number of successive cycles (signals) corresponds to the resolvable mechanical increments of motion or position.

Index   A separate output signal generated by a special track which produces a single pulse or transition change at a unique position on the disc. It is used to identify center, home, zero, or reset point.

Input Debounce   A circuit generally used for low speed inputs where mechanical switches are used. It prevents bouncing or multiple pulses from occurring when the contacts bounce back and forth after being actuated.

Input Response   This specification refers to the minimum duration of a given condition for the input circuitry to recognize that the condition exists.

Instantaneous Contacts   Output contacts that transfer when the timer begins timing.

Integral Gain   This type of gain applies to a fixed level voltage applied only to the error counter.

Interpolation   A mathematical process that estimates a missing functional value by taking a weighted average of known functional values at neighboring points. This is done electronically in some devices.

Interval Timer   A timer that has its output occur during the timing state.

Jitter   Phase jitter is the variation in the phase relationship between Channel A and Channel B over 360 degrees of rotation by the encoder disc. It is measured from the rising edge of Channel A with respect to the rising edge of channel B.

KHZ   "KiloHertz", a measure of frequency.

Latched Operation   Latched operation indicates that an output is fired when a preset is met or exceeded and stays fired even if this condition no longer exists.

Lexan   General Electric's tradename for polycarbonate.

Linearity   The percentage of maximum output that any point varies from a straight line through zero, determined by the least squares method.

Line Count   The number of equally spaced radial lines per 360 degrees on the code disc.

Line Driver   A circuit used to provide greater output current capability.

Lithium Battery   A small long life type cell that uses lithium as one of its constituent parts.

Logic State Width Error   The deviation in electrical degrees of the state width from the ideal value. In a quadrature encoder the ideal state width is 90 degrees.

LSIC   "Large Scale Integrated Circuit" A design method used in semiconductor fabrication where all elements of a circuit are fabricated on one large chip.

Magnetic Feedback Transducer   Any transducer which relies on changes in its magnetic field to send its output.

Magnetic Hysteresis   The amount of time lag between the application of a magnetic force and the time when it is detected.

Magnetic threshold   The minimum pulse voltage from a magnetic pickup that is necessary for the control device to function properly.

Magneto resistive   A technology where a highly sensitive bridge circuit reacts to the movement of ferromagnetic gear teeth. The circuit imbalance is amplified to create the output signal; zero speed, high reliability, and wide temperature range are its advantages.

Measuring Wheel   A wheel connected to an incremental encoder, thus changing linear distance to rotational movement.

Minimum Free Path   A term dealing with a quadrature signals phase; the minimum phase difference between channels A and B necessary for quadrature action to take place.

Momentary Operation   An output that fires for a selected length of time once preset conditions are met.

MOP   "Motor Operated Potentiometer"

MOV   "Metal Oxide Varistor" Used to prevent power surges and spikes.

MTBF   "Mean Time Between Failure" An indication of the average life expectancy of a unit when operated within its design limitations.

Mounting Surface Perpendicularity   The relationship between the shaft center line about the axis of rotation and the mounting surface of the motor.

Mount   The type of mechanical coupling between an encoder and a motor. There are four types of mounts: servo, flange, base, and face.

Multidrive   An application where more than one motor is being controlled by one controller; there are three types, parallel, progressive, and cascaded.

Multiplication   Any technique used to obtain an output resolution different from the line count.

NEMA 4   "National Electrical Manufacturers Association; Type 4" An enclosure type which provides protection against wind blown dust and rain, splashing water and hose directed water.

NEMA 56C   "National Electrical Manufacturers Association; Type 56C" A standard motor face whereby mounting to the motor requires a device with similar bolt hole dimensions, etc.

NPN   A type of transistor with a P-type base sandwiched between a N-type emitter and an N-type collector.

OOX Output Sequence   Output switch is open during reset, open during timing, and closed during the timed out condition.

OXO Output Sequence   Output switch is open during reset, closed during timing, and open during the timed out condition.

OFF Delay   A timer that begins timing when power is removed completely from the unit.

ON Delay   A timer that starts timing when power is applied and output contacts transfer at the end of the timing period. On delay timers reset during power failure.

On Line Editing   The SFC40 unit provides this function to enable changes in the rate alarm and preset set points while the process is being controlled.

On-The-Fly Programming   A circuit, usually in counters, that enables the user to alter setpoints while the counter is operating.

Open Collector   A type of output where the collector portion of the output transistor is left open for the user to complete the circuit.

Open Loop   An electrical circuit that uses no form of feedback in its operation.

Operating Speed   Speed (usually expressed in RPM) of the encoder at a given instant. There are mechanical limitations on the maximum operating speed.

Operating Temperature   The temperature range over which a product will operate and maintain its specified performance criteria.

Optical Isolator   Also called an optocoupler. A device that isolates two stages of a circuit; eg., input and output from each other so that interference in one will not effect the other.

Optical Isolation   A method of reducing noise interference between two circuits.

Output   The quantity such as current, voltage or switching that a device delivers.

Output Control   The function of a given output is controlled by the programming of the MAX unit and a signal on this input.

Output Impedance   The impedance presented by a source to a load.

Output Rating   The voltage and current carrying capability of control devices output circuit.

Output Ripple   Variation in voltage from the ideal. This is a good indication of how well regulated a power supply is.

Output Unlatch   Another name for resetting an output or turning it off.

Output Waveform   The graphical representation of the output during one pulse interval.

Parity   Addition of all the bits in a word is compared to the parity bit (even or odd). If they are both the same the data is accepted otherwise it is rejected.

Percentage Timer   The time cycle of a percentage timer is a fixed time. The percentage of time for which the external load will be energized can be selected. For example, a 60 second percentage timer could be set at 20% ON (12 seconds) and 80% OFF (48 seconds). Percentage timers are repeat cycle timers.

Phase   The electrical degrees of displacement between two encoder outputs; typically 90 degrees in quadrature encoders.

Phase Error   The deviation in electrical degrees from a specified phase relationship between any two channels. This is nominally 90 degrees in a quadrature encoder.

Phase Sense   A quadrature input circuit uses this to determine the direction of rotation.

Phenolic   A plastic resin, phenol formaldehyde, commonly referred to as Bakelite.

PID   "Proportional Integral Derivative" control; error rate control in which the output of the controller is proportional to the rate of change of the measured variable.

Plug-In Housing   This type of enclosure facilitates easy replacement of a timer or counter in a control panel because the unit does not have to be rewired. The timer or counter mechanism unit simply draws out of the enclosure for adjustment, reprogramming or replacement.

Position Error   The difference between the theoretically correct shaft position and its position as indicated by the encoder cycle count.

Position Lock   A method of having two devices totally synchronized with each other; a fluctuation in one will also occur in the other.

Potentiometer   A variable resistor.

Predetermining Counter   A counter that accumulates pulses and compares the total to a preset value todetermine when to initiate a control action.

Preset   A programmed value that causes an execution of output when its condition is met.

Programmable Calibrator   A numeric constant that is programmed into one of the control units. The incoming pulses are then multiplied or divided by the constant to obtain an engineering unit value on the display.

Programmable Count Retention   The ability to exit into program mode and retain the displayed count value at the point in time that exiting took place.

Pulses Per Revolution   The number of pulse intervals of an output signal for each revolution of the input shaft.

Pulse Width Error   The deviation in electrical degrees of the pulse width from the ideal value of 180 degrees.

Pushbutton Timer   A timer with a momentary start switch on the front of the timer. When the switch is depressed the timer starts.

Quadrature   The term for two nearby identical periodic signals when the phase displacement is nominally 90 electrical degrees.

Quadrature Error   The phase error when the specified phase relationship between any two channels is nominally 90 electrical degrees.

Quartz Crystal Oscillator   A device used for timing. A piece of quartz has an inherent vibration that is extremely accurate.

Radial Load   The maximum force that may be applied perpendicularly to the shaft axis at a specified point along the shaft without affecting encoder performance.

Radial Play   The amount of shaft radial movement with maximum radial load.

RAM   Random Access Memory (usually volatile).

Ramp   A programmed value that determines how quickly accel/decel takes place.

Ramp/Freeze   A switch on a speed control unit that stops acceleration/deceleration from occurring and holds a steady speed.

Range   Refers to the span between the maximum and minimum signal levels where proper functioning can still occur.

Rate   Velocity or distance/unit time; can be rotational distance.

RC   "Resistive/Capacitive" circuit; used in digital circuits to establish a time base.

Reference Input   The input on the control device that takes in the reference position of the encoder.

Register   A location in memory to store digital data.

Regulation   A term that deals with how much variation there is in a power supply voltage; the better the regulation, the less fluctuation in output voltage.

Relay   An electromechanical or solid state device capable of allowing a small current to switch a larger current.

Reluctance Type Encoder   An encoder which uses ferromagnetic gear teeth to disturb the flux and cause a change in reluctance. A pulsed voltage proportional to the input is generated. This type of encoder works well above 100 RPM.

Remote   The term indicates that an operation can take place away from the controlling device.

Remote Reset   The capability of a timer or counter to be reset remotely by means of a switch closure or other signal.

Repeatability   Ability of a transducer to reproduce output readings when the same input is applied consecutively under the same conditions and in the same direction. For rotary encoders, the input is shaft position.

Repeat Accuracy   A timer's ability to produce repeated results within tolerance limits.

Resolution   The available number of divisions per turn for rotary encoders or per inch for linear encoders. It is theoretically not related to accuracy.

Reset   A function that stops activity and sets it back to the setpoint.

RFI   Radio Frequency Interference.

Ring Kit   A kit which includes a ring with a magnetic sensor mounted in it and a matched gear. The unit fits standard motor mounts.

Rise Time   The time interval between the points that the instantaneous value rises from 10% to 90% of the specified upper limit.

ROM   Read Only Memory (nonvolatile).

RPG   "Rotary Pulse Generator", an incremental encoder.

RS 485/422/232   Standards recommended by the EIA for serial data transmission between digital devices.

Run/Stop   A switch that turns the counter on and off.

Running Torque   Rotary force that is necessary to keep an encoder shaft turning, it is typically expressed in ounce inches.

Self Diagnostic   A device with preprogrammed ability to check its functioning and display if something is defective.

Serial Interface   An interface between two devices in which digital data occurs on one line, one after the other in time sequence.

Sequential   A type of program that allows presets to fire in the order they are programmed regardless of value.

Shaft Loading   Amount of force that can be applied to a shaft radially or axially; usually measured in pounds.

Shaft Runout   Amount of shaft movement while spinning.

Shock   A transient motion which is capable of exciting mechanical resonances.

Short Circuit Protection   A feature that causes the solid state output to either withstand or turn off if exposed to a short circuit load condition.

Single Shot   A mode of operation where a control switch (momentary or sustained) initiates a timing period during which the output is energized. After the timing period, the output is de-energized and the timer resets.

Slew Speed (Maximum Velocity)   The maximum shaft speed which will not mechanically affect the rated performance of the encoder. This is usually expressed in RPM.

Solid State   Any semiconductor device that controls electrons, electric fields, or magnetic fields in a solid material.

Solid State Control Outputs   An output that is non mechanical in nature; eg., a transistor.

Squarewave   A repetitive waveform (usually A.C.) whose shape is essentially square or rectangular (usually with an equal duty cycle).

Stability   Ability of an encoder to retain its performance characteristics over a long period of time.

Standard Start Timer   For electromechanical timers, the clutch is normally open in reset, with no power applied to the clutch coil.

Power must be applied to the clutch coil to close the clutch, and to start timing.

Starting Torque (Breakaway)   The rotary force required to overcome friction and cause the encoder shaft to begin rotating.

State   This usually refers to the logic level at a given instant.

State Width   Same as edge separation.

Stop Count   An input to a counter which when activated stops the counter from counting.

Symmetry   Ratio of the on time to the off time of the output signal; ideally this is 50/50.

Tachometer (digital)   The term for an incremental encoder that is used to indicate or control speed.

Torque   Twisting effect or movement exerted by a force acting at a distance on a body, equal to the force multiplied by the perpendicular distance between the line of action of the force and the center of rotation at which it is exerted.

Torque Offset   A method of compensating for drives that do not respond to low voltages. Used for positioning in the final position to overcome friction.

Totalizer   A type of counter with no outputs, which is used for totalizing, counting input frequency and displaying accumulated totals.

Transducer   A device that converts mechanical, thermal, hydraulic, pneumatic, light or various other types of energy to an electrical signal.

TIR (Shaft Runout)   The difference between the maximum reading and the minimum reading of an indicator when probing the shaft surface at a specified point when the shaft is rotated 360 degrees.

TRIAC   A four layer, three terminal semiconductor switch used for controlling A.C. power in electrical/electronic circuits.

Trim Reset   Open loop operation input on a speed control device.

TTL   Transistor Transistor Logic.

Unidirectional   An encoder whose output is the same in either direction at the same speed.

Unipolar   An output which is usually a varying D.C. value from a unidirectional encoder. It does not indicate direction as in a bipolar output.

Velocity   An indication of speed measured in units of distance per unit of time.

Vibration   Periodic change in a displacement with respect to a fixed reference.

Viton   A fluoropolymer using plasticizing agents to increase flexibility. It is very chemically resistant.

Zero Speed Encoder   An encoder which will give an output signal down to zero speed.

Zero Index   An output signal from an encoder produced once in some specified displacement.

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