VEEDER-ROOT

Eagle Signal Controls

Dynapar

Counters

Timers

... and more

Factory Automation & Feedback Controls

2008 Product Catalog

Dynapar

Eagle Signal Controls

VEEDER-ROOT

+1.800.390.6405

DANAHER SPECIALTY PRODUCTS

To Our Valued Customers . . .

INTRODUCING DANAHER SPECIALTY PRODUCTS

DSP was formed through the merger of the Veeder-Root Company, the best known name in counting, Eagle Signal Controls, the premier name in timing and the Dynapar Corporation, the motion control specialists. This total capability in factory automation brings youover 230 combined years of design, manufacturing, andapplications 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

This 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.

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 andgeneral purpose relays may be found in this catalog.

Dynapar brand products are backed by our extensive experience in digital systems used for display and control of speed, length, position and motion. Dynapar also provides a complete line of encoders, represented in a separate catalog.

TOTAL COMMITMENT TO THE CUSTOMER

Danaher Specialty Products' 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 DSP 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.

Each DSP 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 today, and our program for continuous improvement means that you can expect it tomorrow as well.

DANAHER SPECIALTY PRODUCTS AUTHORIZED DISTRIBUTORS

All of the products in this catalog are available from an authorized distributor near you. Our worldwide distributor locations receive constant training in the application, installation and operation ofour 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 distributor, contact us at the telephone numbers listed below.

DANAHER SPECIALTY PRODUCTS COMMUNICATIONS:

Customer Service:
Tel.: +1.800.390.6405 or
+1.910.862.2511
Fax: +1.910.879.5486
eagle-signal.custserv@dancon.com
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+1.910.862.2511
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eagle-signal.techsupport@dancon.com
veeder-root.techsupport@dancon.com

• www.eagle-signal.com • www.veeder-rootcounters.com

Welcome

OUR MODERN MANUFACTURING FACILITIES

Danaher Specialty Products 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 production facilities are located in Elizabethtown, North Carolina producing Veeder-Root, Eagle Signal and Dynaparf brand products.

Customer visits are always welcome at

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

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.

Design and Manufacturing Capability

Our Custom Solution Group applies more than 230 years of proven design, development and production competency to provide its customers with innovative product solutions featuring sustainable cost competitiveness and world-class quality.

In addition to manufacturing world renowned *Veeder-Root*, *Eagle Signal and Dynapar* lines of products, our Elizabethtown, North Carolina facility has the infrastructure and competencies to design, develop and manufacture custom counting and timing solutions for OEM's and end customers alike. As a "Danaher Manufacturing Center of Excellence", the Elizabethtown facility is vertically integrated and staffed to create innovative Mechanical and Electronic product Design and Tooling. The custom design will then be produced by our on-site Manufacturing Departments which utilizes modern circuit board equipment, custom plastic-molding machines, computer controlled machining, plating processes, mechanical assembly, and quality control/testing operations.

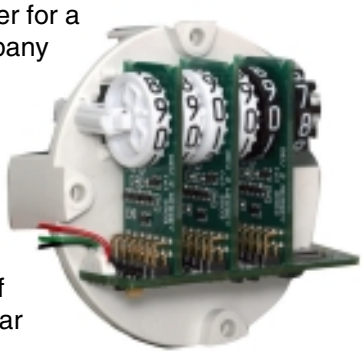
Our portfolio of custom products includes Liquid Dispensing Measure, Traditional and RF Utility Meters, Electronic Acreage Measurement Devices, and many more. Perhaps our past experience and current expertise deliver a perfect product solution to meet your needs.

Challenge: Design & produce a custom electronic register for a flow meter company

Delivered: A cost effective, low power, battery driven flow meter with custom software for greatest flexibility at volumes of over 1000 units per year

Challenge: Provide a combination mechanical and electronic register for a water metering company

Delivered: A highly reliable electronic assembly with very tight dimensional tolerances at volumes in excess of 100,000 units per year



Challenge: Create a custom index for a natural gas metering company

Delivered: A rugged mechanical counting device that can withstand a harsh outdoor environment for up to 20 years in excess of 10,000 units per year

Challenge: A custom mechanical counter for a land measurement company

Delivered: A custom mechanical measurement device that can withstand years of rough use in the construction industry. Produced with short lead times at volumes of over 50,000 units per year

What can we can deliver for you? To learn more, please contact our Custom OEM Sales department at 910-862-2511

Introducing the Dynapar/NorthStar brand Encoder Catalog!

The Dynapar and NorthStar product ranges of incremental and absolute encoders can be found in the E105 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.

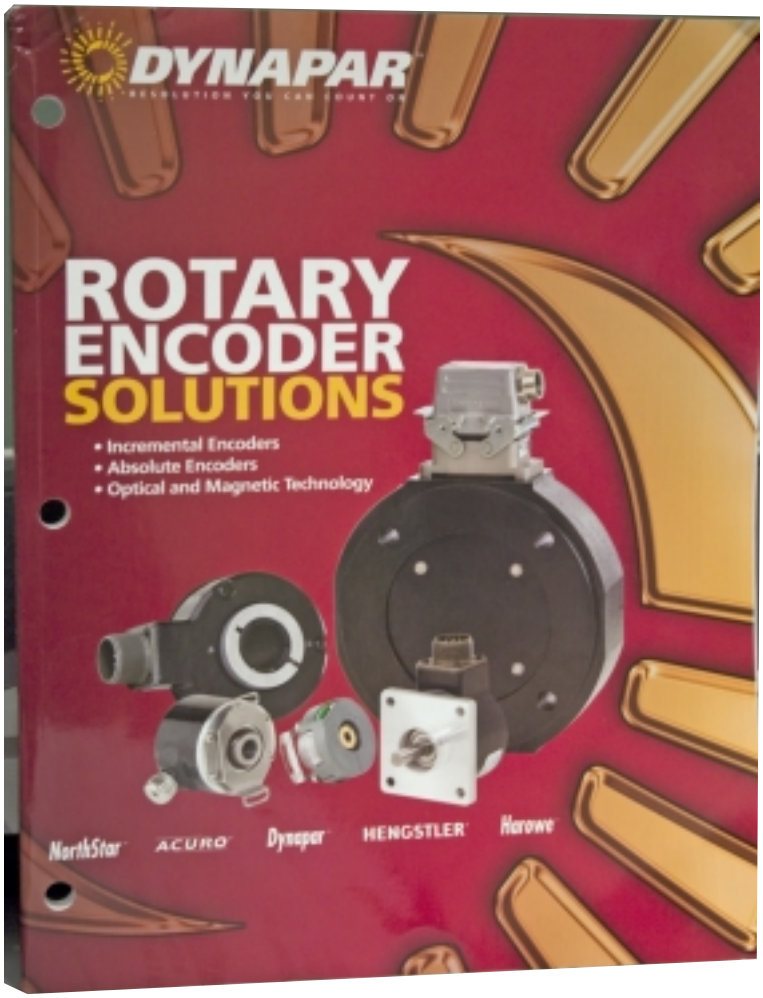
Product listings include selection guides, full electrical, mechanical and environments specifications, connection information and part number tables that let you order your encoder with the exact features that will best suit your application needs.

Order your copy of this handy reference guide and catalog today! Its free, and will be a valuable addition to your engineering library. To order, use one of the methods below. **Please reference the E105 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



E105 Encoder Catalog

Complete Dynapar & NorthStar brand Encoder information can also be found at our website: ***WWW.DYNAPAR.COM***

Introducing Thomson NYLINER Bearings

Thomson Molded Products Group provides customers with precision tolerance polymer bearing and fastener solutions in six diverse markets. More than half a century ago, in 1954, Thomson's engineers invented the ***Nyliner Bearing Product Line***.

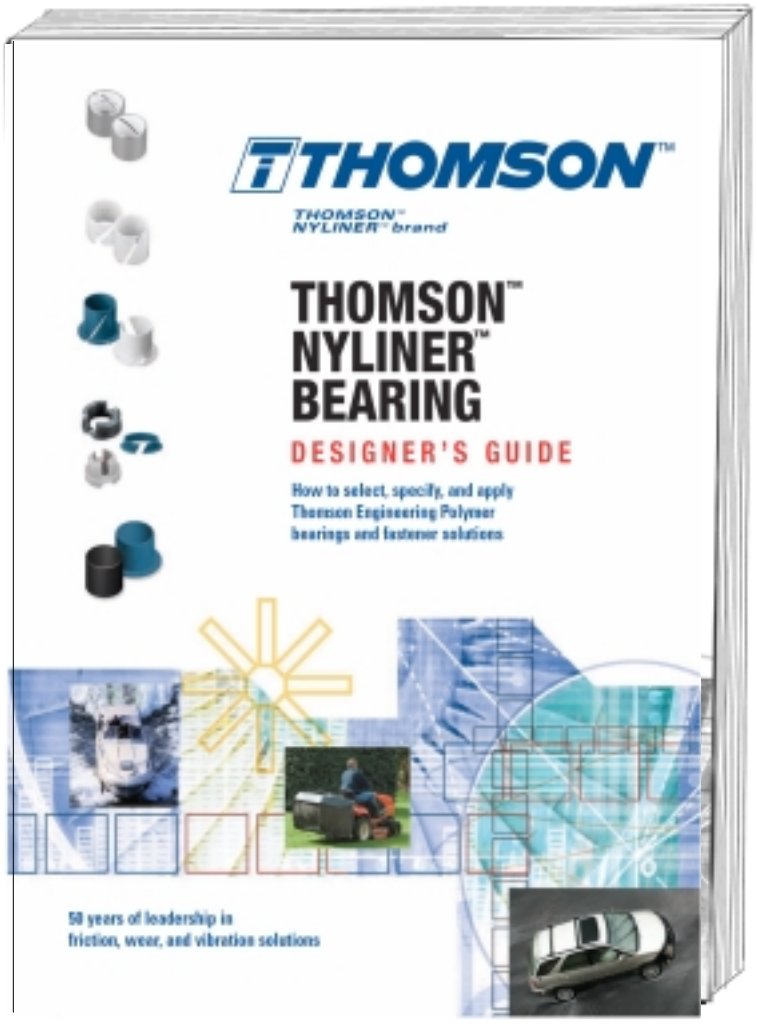
Unmatched expertise in polymer wear, friction, and fastener value-added-solutions has enabled our customers to enjoy benefits in the following areas:

- **Cost Reduction**
- **Part Consolidation**
- **Noise Isolation**
- **Vibration Dampening**
- **Reduced Friction**
- **Assembly Consolidation**
- **Weight Reduction**
- **Corrosion Resistance**

By Phone: 1-800-390-6405

By Fax: 910-879-5486

By Email: Please use the "Contact Us" area of our website, www.nyliner.com



Complete NYLINER Bearing information can also be found at our website.
WWW.NYLINER.COM

Superior Electric Voltage Control and Conditioning Equipment

Superior Electric has been manufacturing and marketing voltage control and conditioning equipment since 1938. Product diversity, quality and a strong, customer-focused sales and distribution network make Superior Electric a highly respected market and industry leader. Our customers have seen fit to classify our products as "top of the line". We take great pride in this. For almost as many years, Distribution has been a means of marketing Superior Electric products. We are equally proud to be considered by our Distributors and Resellers a "blue-chip" line.

Our extensive product offering is divided into two major groups: Voltage Control Components and Power Quality Solutions. Superior Electric is a Danaher Corporation company and part of the Danaher Specialty Products Group.

By Phone: 1-800-787-3532

By Fax: 1-800-821-1369

By Email: info@superiorelectric.com

Complete Superior Electric product information can also be found at our website.
WWW.SUPERIORELECTRIC.COM

DANAHER SPECIALTY PRODUCTS

Table of Contents

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

7 MULTIFUNCTION INDICATORS/CONTROLLERS

8 MOTION CONTROLLERS

9 PROCESS INDICATORS

10 DIGITAL ACCESSORIES

11 RELAYS & ACCESSORIES

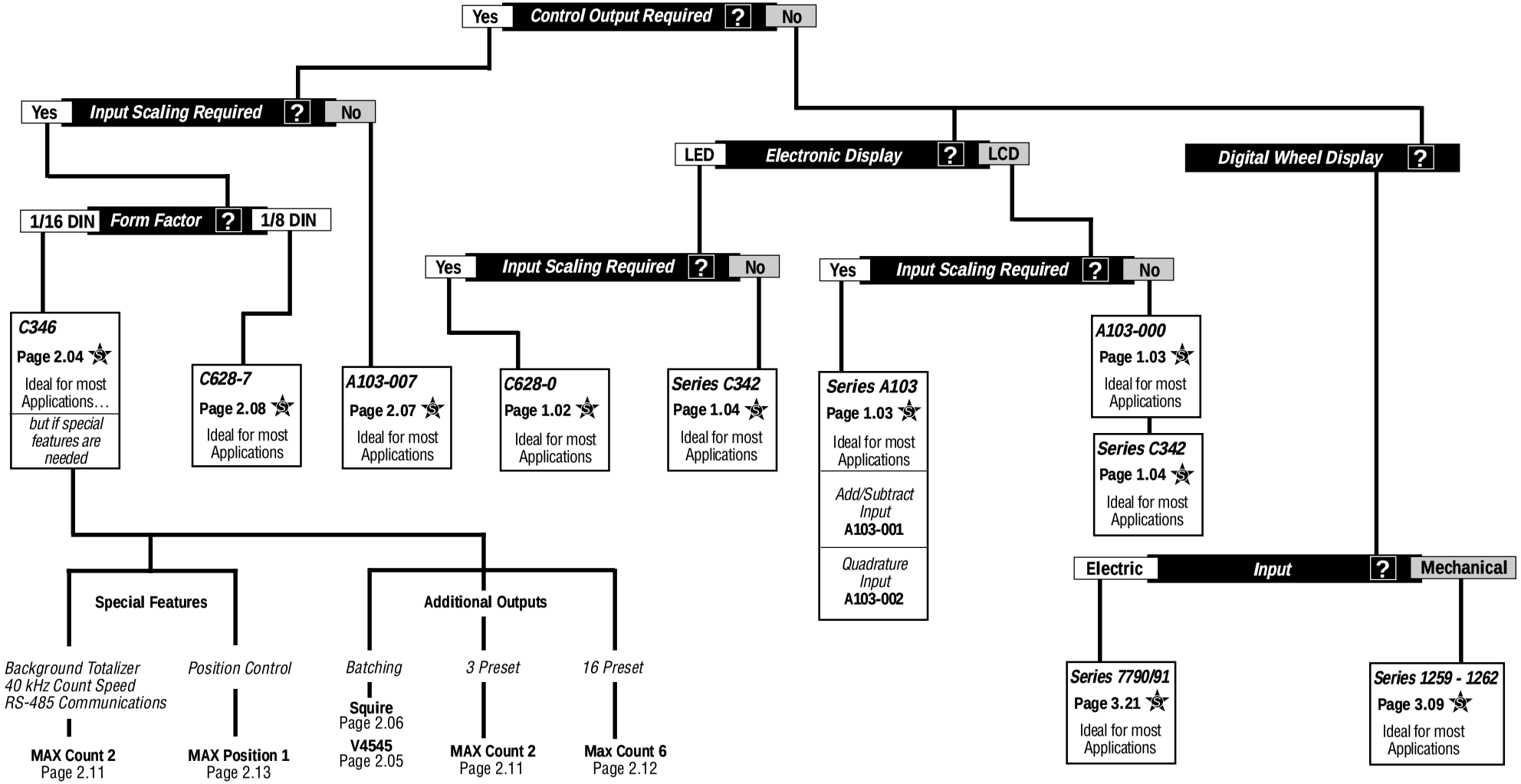
12 APPENDICES

See inside back cover for contact information

SNAPTRACK™ is a trademark of RDI/Reed Devices, Inc.

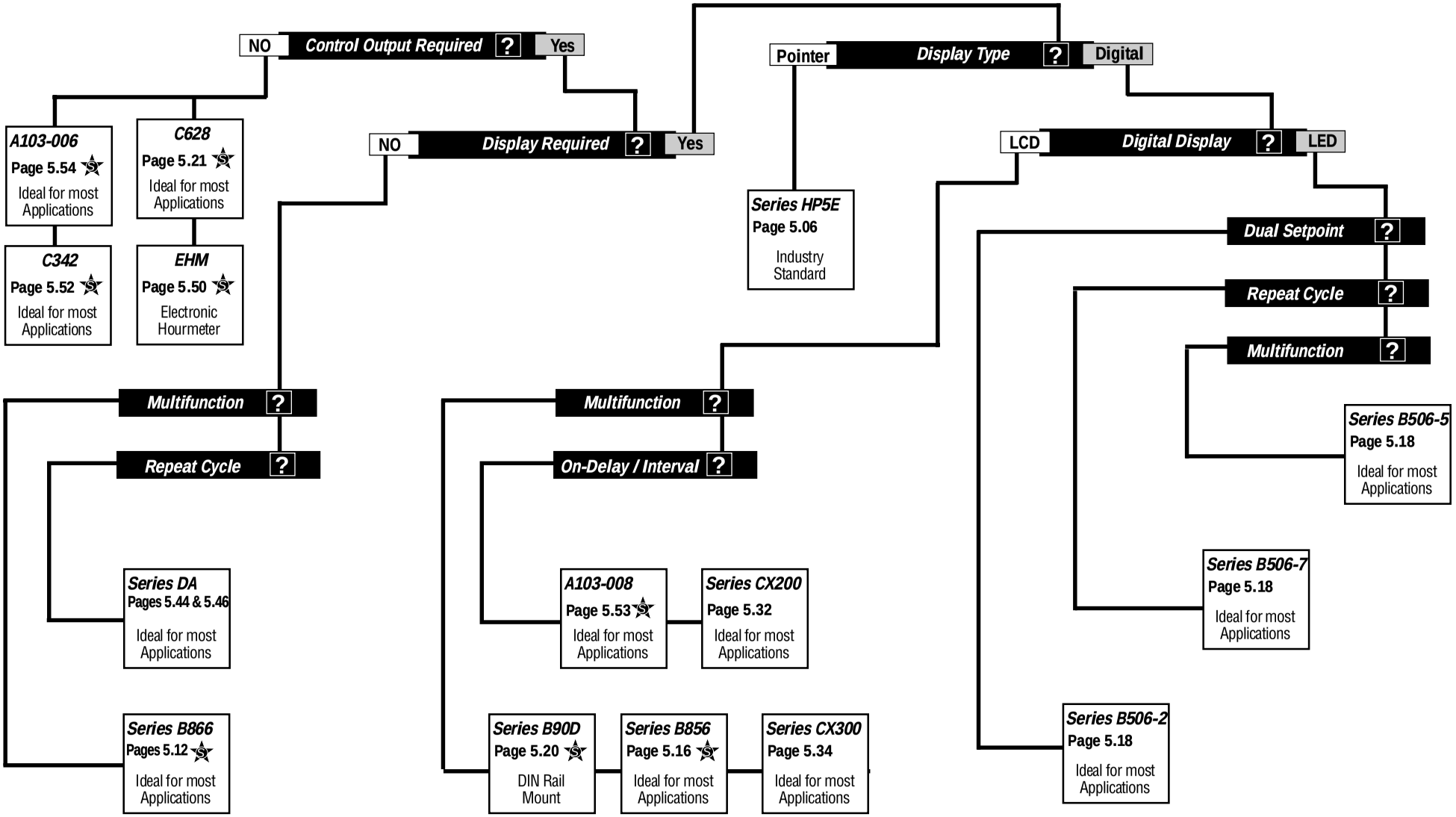
QUICK CHOICE — Totalizing and Predetermining Counters

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.



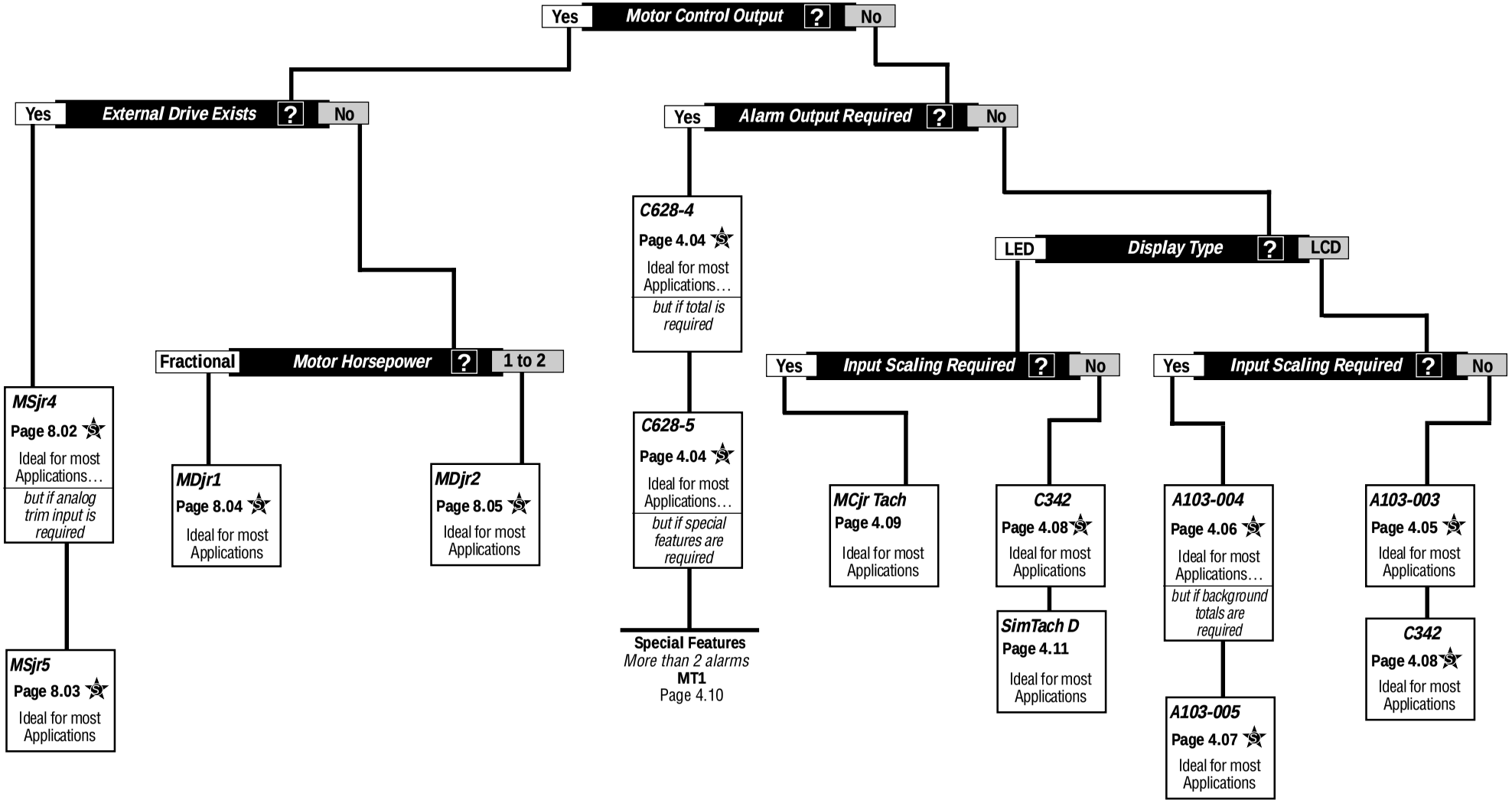
Timers

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.



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.



Notes

DANAHER SPECIALTY PRODUCTS 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 +1.800.390.6405
or +1.910.862.2511
eagle-signal.custserv@dancon.com
veeder-root.custserv@dancon.com

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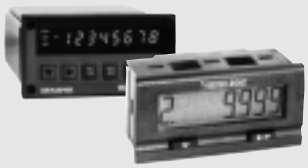
eagle-signal.techsupport@dancon.com
veeder-root.techsupport@dancon.com

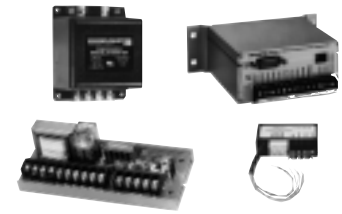
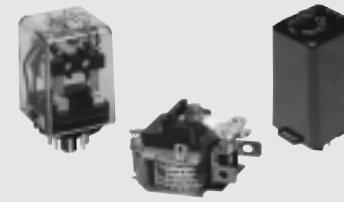
Websites
www.eagle-signal.com
www.veeder-rootcounters.com

Veeder-Root
Dynapar
Eagle Signal

Product Functions

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.

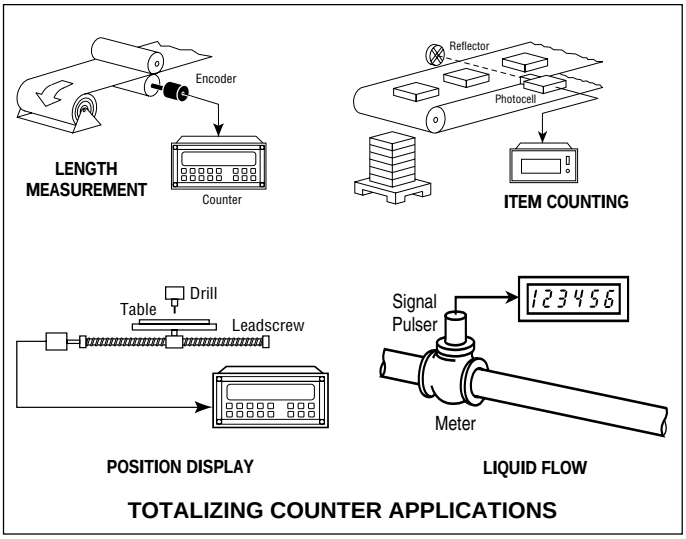
Product		Function	Applications	Location
Totalizing Counters		A totalizer is a counter that sums the "total" number of cycles applied to its input. Many applications require only additive counting, but we also offer electronic totalizers with bidirectional (add and subtract) capability for specialized 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*
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 10:** 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 11:** 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.



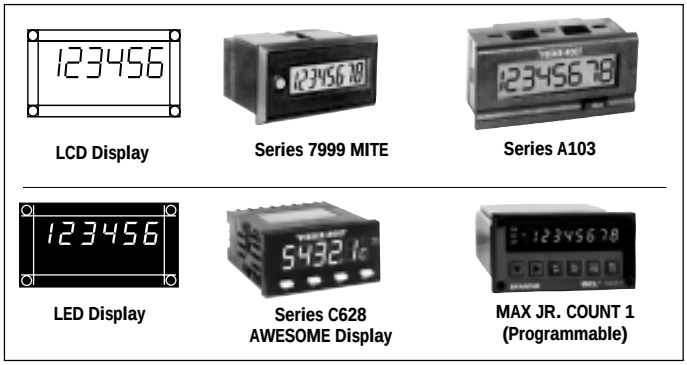
TOTALIZING COUNTER APPLICATIONS

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.



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

SELECTOR GUIDE Electronic Totalizing Counters

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.	**Page: 1.02** ★	**Page: 1.03** ★	**Page: 1.04** ★	**Page: 1.05** ★
				
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.	■ **AWESOME 0.71" high digit LED display** ■ **Programmable color change display based on an event** ■ **Scalable, bidirectional input**	■ **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**	■ **Very compact and low priced. Choose LCD or LED display** ■ **Unidirectional or bidirectional (position indicator) models are standard**	■ **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.

C628 AWESOME Display Totalizer

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
RECOGNIZED RECOGNIZED

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.

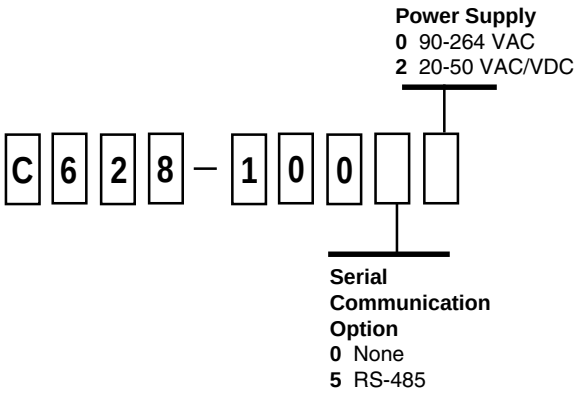
- AWESOME 0.71" high digit LED display (27% larger than other 1/8 DIN units)
- Programmable color change display based on an event
- Programmable help function and secondary legend display
- Choice of NPN or PNP primary input
- Filter speed settable for 20, 200, or 10,000 Hz
- Front panel reset enable 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.

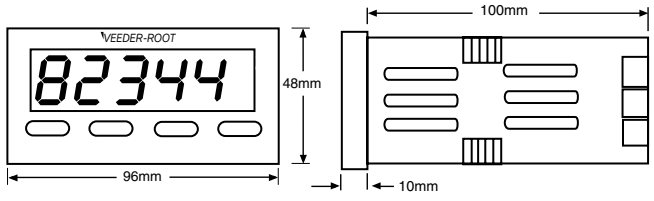
SPECIFICATIONS

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:



Dimensions:



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

A103 Totalizers

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 batteries
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

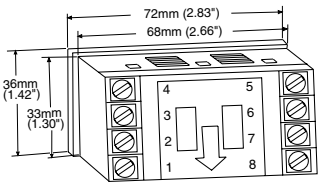
Model No.	Description
A103-001	A103 Add/Subtract Totalizer
A103-002	A103 Position Indicator (encoder input only)

The following option modules attach to the rear of A103 totalizers:

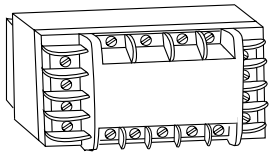
Model No.	AC Power Supply	Low Voltage Input	High Voltage Input
A103-A12	X		
A103-A17		X	
A103-A19	X	X	
A103-A10			X
A103-A14	X		X

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

Dimensions:



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")

C342 Totalizing Counter

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**

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

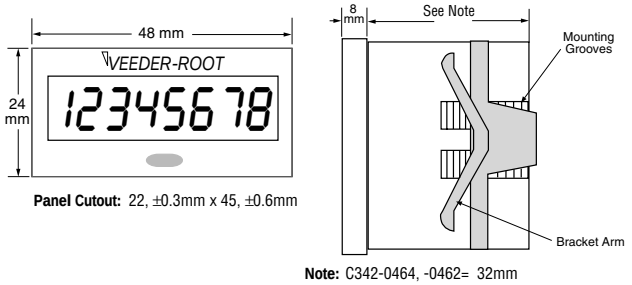
Front Panel Rating: IEC IP65

Approvals: CE, RoHS

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:



Panel Cutout: 22, ±0.3mm x 45, ±0.6mm

Note: C342-0464, -0462= 32mm
C342 -0474, -0562, -8562= 60mm

7999 Mite

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

Specific Models
RECOGNIZED CERTIFIED

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

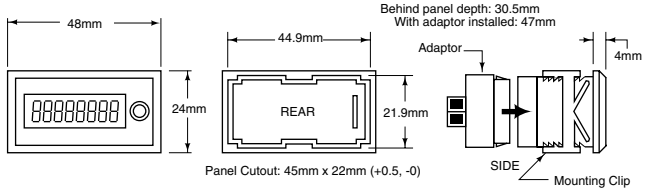
Model No.	Description
079998D-110	MITE Totalizer
079998D-410	MITE Totalizer, Add/Subtract

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:



MicroMITE 799988-402/412

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.

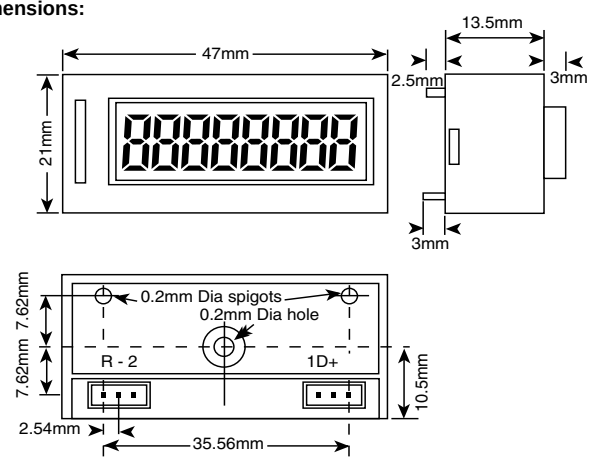
Its bidirectional counting inputs, accepts count pulses on one input while a second input commands the counting direction.

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

Dimensions:



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

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

See Section 5 for matching MicroMITE elapsed time indicators. Models 799988-602/612

MicroMITE 799986-302/402

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.

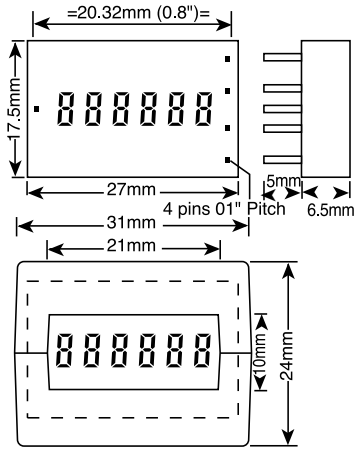
PCB solder-pins are provided for electrical connections. An attractive panel mount installation can be made using the provided bezel.

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

Operating temperature: -10°C to +60°C

Storage temperature: -10°C to +60°C

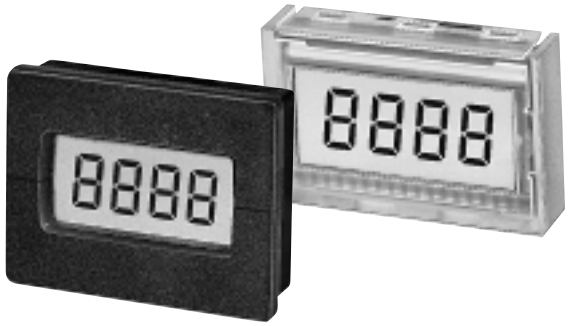
Material: Clear polycarbonate

Environmental Protection: IP40/DIN40050

Weight: 7.5 grams

Model Number	Description
0799986-302	Totalizing Counter, unidirectional

MicroMITE 799984-322



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.

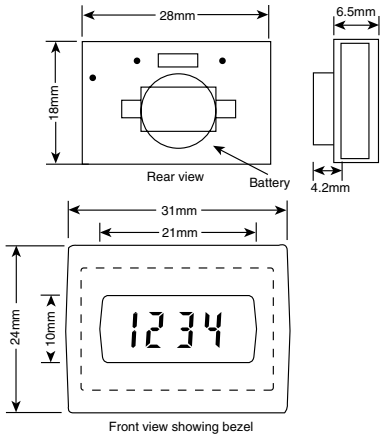
An integral switch-bounce filter allows error free counting from the mechanical contacts of switches or relays.

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:



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

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.

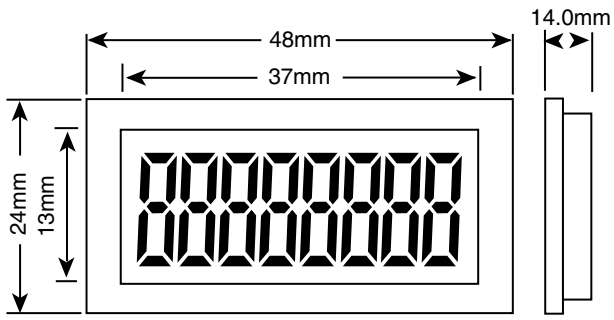
Count speeds to 10kHz are possible. An internal contact-bounce filter allows accurate counting from switch or relay contacts.

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

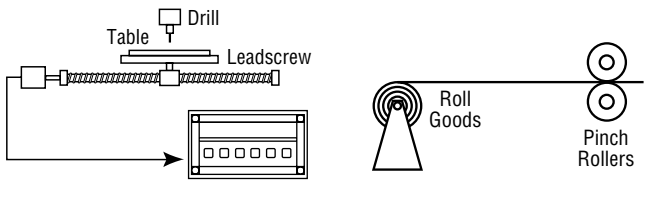
Diagnostics: Tests for signal and control inputs, panel keys, and display

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

Weight: 1.4 lbs (453.6 g)

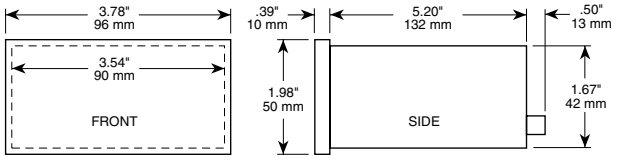
Model No.	Description
MCJR1S00	**MAXjr** Count 1 (115/230 VAC, 50/60 Hz)
MCJR1D00	**MAXjr** Count 1 (10-26 VDC operation)

Typical Applications:



Positioning **Length Measuring**

Dimensions:



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

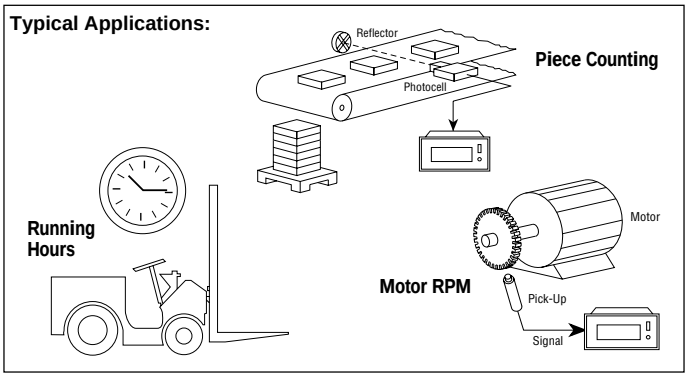
Power Source: Internal lithium battery; eight-year typical life

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

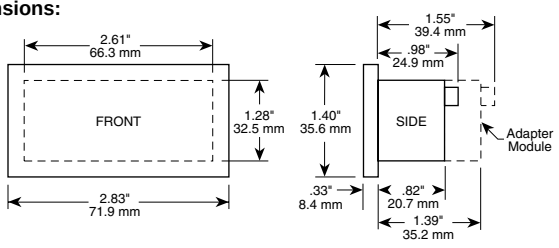
Elapsed Time Indicator: Eight-digit capacity; programmable ranging for resolution of hours, minutes, (decimal placement for whole units, tenths, or hundredths); or seconds

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.

7998 Mini-LX

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

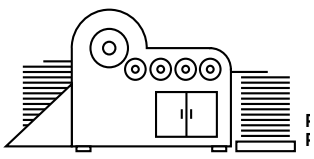
Operating Temperature: +32° to +122° F (0° to +50° C)

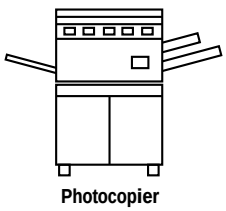
Materials: Case: Molded black modified polyphenylene; Crystal: Clear polycarbonate

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)

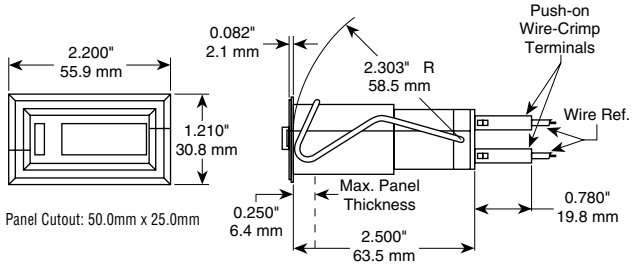
Typical Applications:


Printing Press


Photocopier

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

Dimensions:



DX100 Time/Count Totalizer

Totalizes count or elapsed time… convienient surface mount in relay socket or panel mount

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

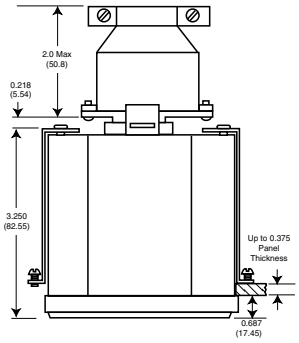
Approvals: UL Recognition E96337

ACCESSORIES

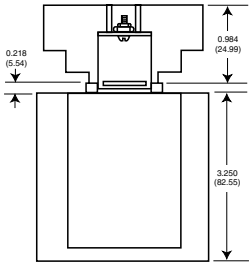
Model No.	Description
DZ100-51	Bezel Kit for panel mounting
DZ100-52	Strain Relief Kit
DZ100-54	Plug-In Housing for panel mounting units
DZ100-56	Latch and Latch Release Kit for surface mounting
60SR3BO5	Square Base Relay Socket

MOUNTING

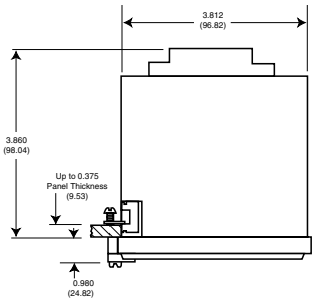
Panel Mount

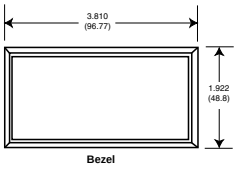


Surface Mount

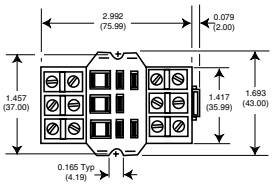


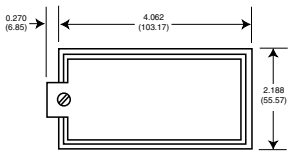
Plug-In Mount

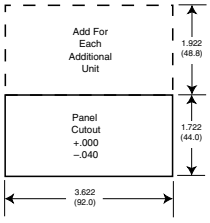


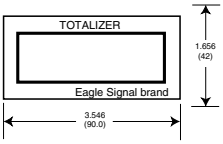


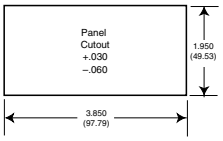
Bezel











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

Notes

DANAHER SPECIALTY PRODUCTS 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:

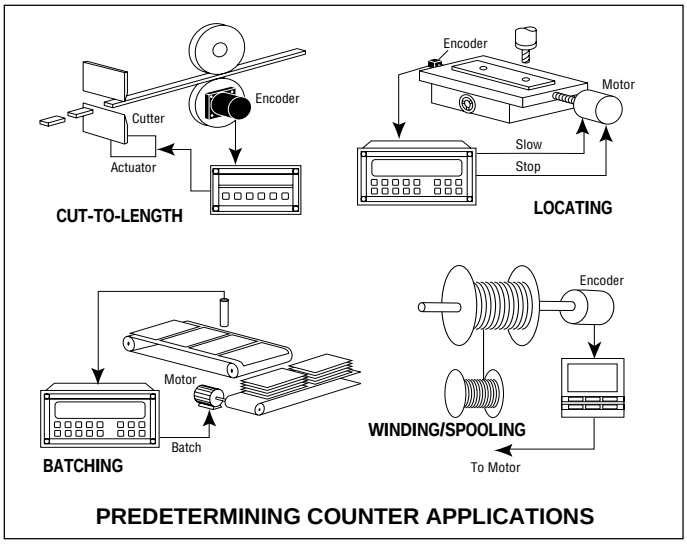
Customer Service
call Toll Free +1.800.390.6405
or +1.910.862.2511
eagle-signal.custserv@dancon.com
veeder-root.custserv@dancon.com

Technical Support
call Toll Free +1.800.390.6405
or +1.910.862.2511
eagle-signal.techsupport@dancon.com
veeder-root.techsupport@dancon.com

Websites
www.eagle-signal.com
www.veeder-rootcounters.com

Veeder-Root
Dynapar
Eagle Signal

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.

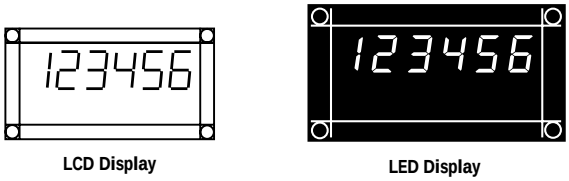
For your most challenging applications, consider our state-of-the-art programmable counters. They offer maximum flexibility through user selected advanced features such as: input calibrators, movable decimal point, bidirectional counting modes, and output logic options.

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.



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

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:

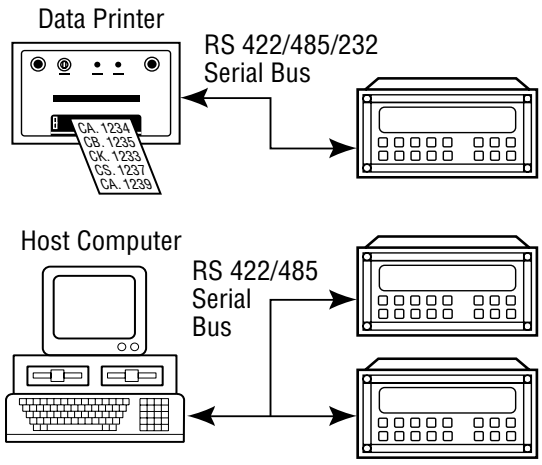
Group	Example	Sensor
Item Counting	Cartons, Parts, Bottles, Cans, Sheets, Pencils, or any other item.	Inductive Proximity Capacitive Proximity Photoelectric.
Length Measuring	Paper, Cloth, Steel, Textiles, Lumber, or the linear measure of any other goods.	Rotary Encoders Inductive Proximity
Positioning	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

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.



DATA COMMUNICATIONS

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 backlit LCD provides simultaneous display of count value and preset**	**Page: 2.07** ★  ■ **Compact, economical preset 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

C346 Full-Feature LCD & LED

LCD Models

LED Models

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.

CE RoHS

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.

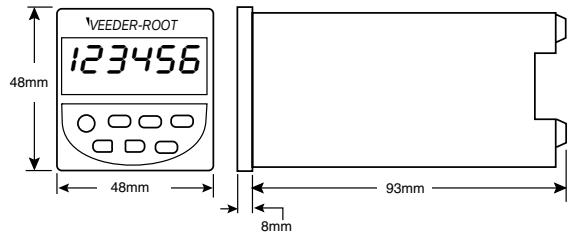
For ultra-compact size, See A103
For three presets, see MAX Count 2

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, RoHS, 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:



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

V4545 High Visibility

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

File No.: E185087

RECOGNIZED RECOGNIZED

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.

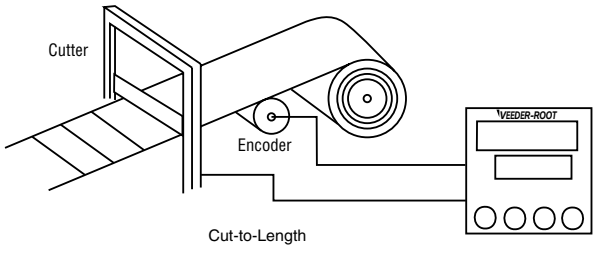
For LCD display, see SQUIRE
For three presets, see MAX Count 2

SPECIFICATIONS

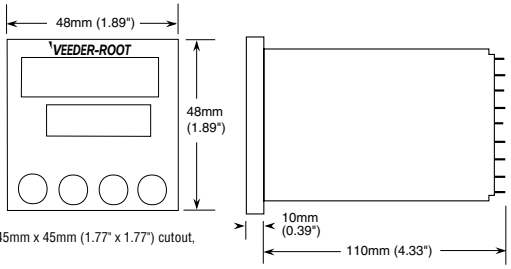
Count Modes: Add/Subtract (A-B) or quadrature field selectable
Count Speed: 20 Hz, 200 Hz, or 10kHz (5kHz, quadrature) field selectable
Presets: 4 digit, Single (V45450-1); Dual (V45450-2); or Single with Batch (V45450-3)
Reset: Front panel (selectable enable); remote input; or automatic
Calibrator: 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:



Dimensions:



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

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

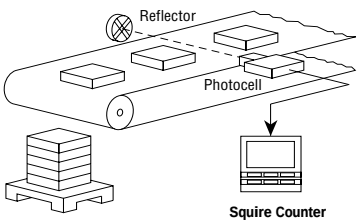
SPECIFICATIONS

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

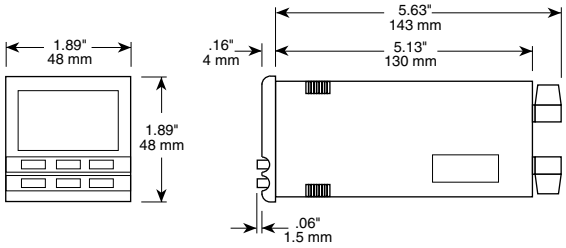
Model No.	Count Rate	Count Modes	Preset 1	Preset 2	Batch Preset	Calibrator & Dec. Pt.
SQC1100U	20 Hz	add/sub	yes	no	no	no
SQC1200U	2.4 kHz	a/s, quad	yes	no	no	yes
SQC2200U	2.4 kHz	a/s, quad	yes	yes	no	yes
SQB2200U	2.4 kHz	a/s, quad	yes	no	yes	yes

Typical Applications:

Item Counting & Batch Control



Dimensions:



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

A103 Preset Counter

CE

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

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.

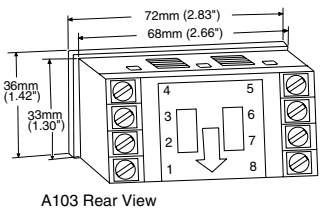
AC Power Supply: Provides 10 - 20 VDC @ 50mA for display backlighting and/or sensor. Requires connection to 115 or 230 VAC, 50/60 Hz
Low Voltage Input: Allows A103 to accept 5 to 30 VAC or VDC for count input
High Voltage Input: Allows A103 to accept 100 to 260 Volt AC/DC for count input
Mechanical Relay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

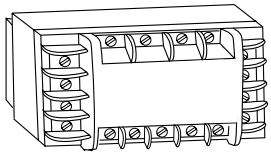
The following option modules attach to the rear of A103 Preset Counters:

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:



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")

C628 Preset & Batch Counters

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.

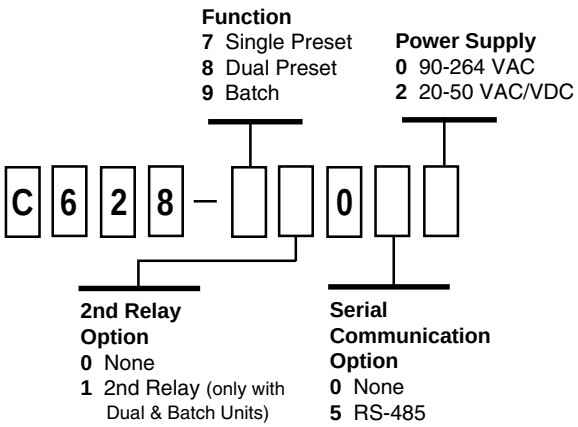
Operating Temp.: 0° to 55° Celsius, 32° to 131° Fahrenheit

Storage Temp.: -20° to 80° Celsius, -4° to 176° Fahrenheit

Relative Humidity: 20% to 95% non-condensing

Approvals: CE; UL, CUL recognized

Ordering Information:



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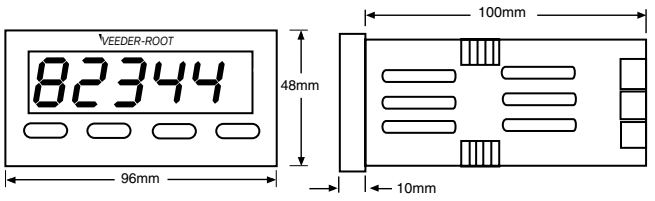


Panel Cutout: 45mm x 92mm(1.77" x 3.62")

C628 Position Indicator

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

RECOGNIZED RECOGNIZED

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 ≤ 2.0 VDC, Logic High ≥ 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 ≤ 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

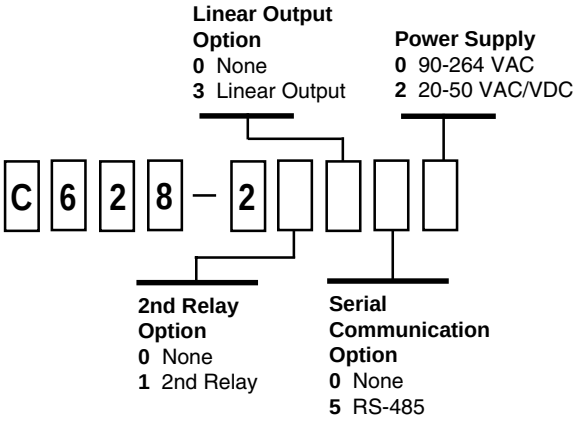
Outputs: Solid State: NPN open collector, 30 VDC max., 100 mA max.
Relay: SPDT, 2 amp resistive @ 110 VAC
Latency: 75 μ seconds, plus 8 ms for relay pull-in

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

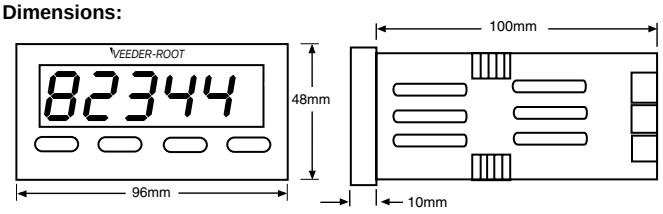
Communication: RS-485; Serial asynchronous, UART to UART;
Open ASCII: One start bit, even parity seven data bits, one stop bit;
Baud Rate selectable from 9600, 4800, 2400, or 1200
Maximum Zones: 99

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, CUL recognized

Ordering Information:



Dimensions:



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

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.

SPECIFICATIONS

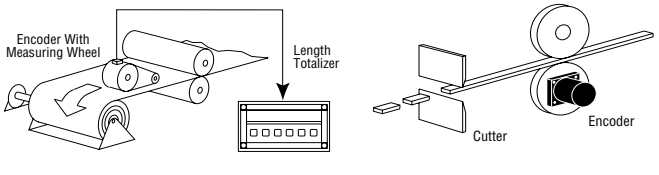
Input Power: Switch selectable 115 (95 to 130) VAC, or, 230 (190 to 260) VAC, 50/60 Hz, 6 VA; Optional: 10 to 26 VDC, 0.4 A maximum
Accessory Power: DC output provided for transducer, 12 VDC ±25%, 125 mA maximum
Display: 5 digit, 0.56" (14.2 mm) red LED. 8 annunciators for ease of programming and operation.
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)

For matching totalizer, see MAXjr Count 1

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

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

Typical Application:



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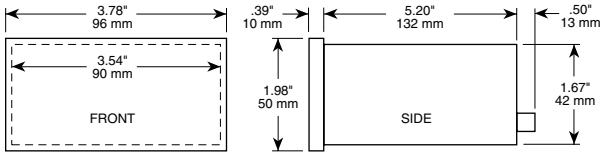


Panel Dims: Cutout: 3.58" x 1.78". Thickness: 1/16" to 1/4". Depth: 5.68" min.

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.

For more presets, see MAX Count 6
For position indication, see MAX Position 1

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.

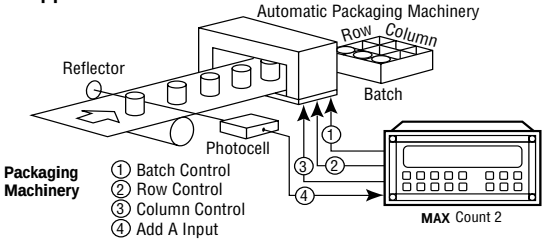
Serial Communications: RS-485/422 Differential, ASCII.

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

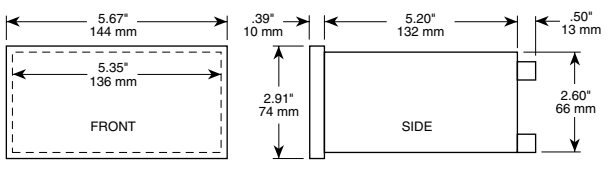
Model No.	Description
MC200S00	**MAX** Count 2 w/Solid State Outputs, A-B, A+B
MC201S00	**MAX** Count 2 w/Solid State and Relay Outputs, A-B, A+B
MC210S00	**MAX** Count 2 w/Solid State Outputs, A-B, A+B, Quad
MC211S00	**MAX** Count 2 w/Solid State and Relay Outputs, A-B, A+B, Quad

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

Typical Application:



Dimensions:



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

MAX® Count 6

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.

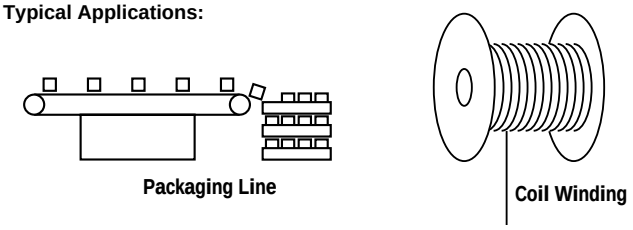
For more presets, see Series 7920, Series 79201
For specialized web control, see MAX S.L.R.C.

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)

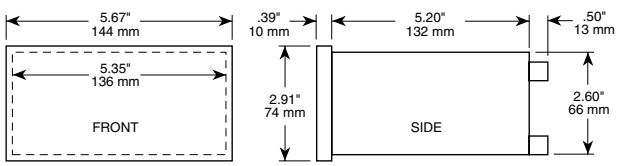
Model No.	Description
MC600S00	**MAX** Count 6, Standard Model, AC Powered
MC600D00	**MAX** Count 6, Standard Model, DC Powered
MC60SS00	**MAX** Count 6, Sequential Model, AC Powered
MC60SD00	**MAX** Count 6, Sequential Model, DC Powered

Typical Applications:



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

Dimensions:



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

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

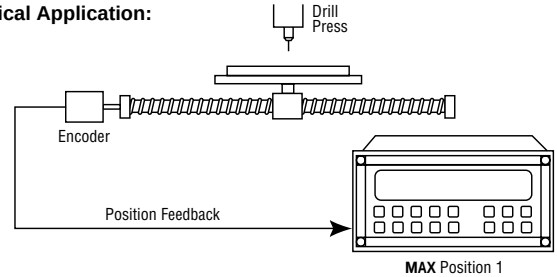
Serial Interface: RS-422, ASCII, programmable baud rate

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

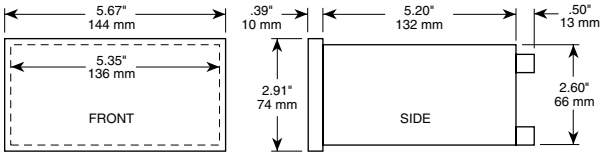
Weight: 2.5 lbs. (1.13 kg.)

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.

DZ100 MINIFLEX®

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

RECOGNIZED CERTIFIED

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

Notes

DANAHER SPECIALTY PRODUCTS 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 +1.800.390.6405
or +1.910.862.2511
eagle-signal.custserv@dancon.com
veeder-root.custserv@dancon.com

Technical Support
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or +1.910.862.2511
eagle-signal.techsupport@dancon.com
veeder-root.techsupport@dancon.com

Websites
www.eagle-signal.com
www.veeder-rootcounters.com

Veeder-Root
Dynapar
Eagle Signal

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www.eagle-signal.com
www.veeder-rootcounters.com

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Eagle Signal

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veeder-root.techsupport@dancon.com

Websites
www.eagle-signal.com
www.veeder-rootcounters.com

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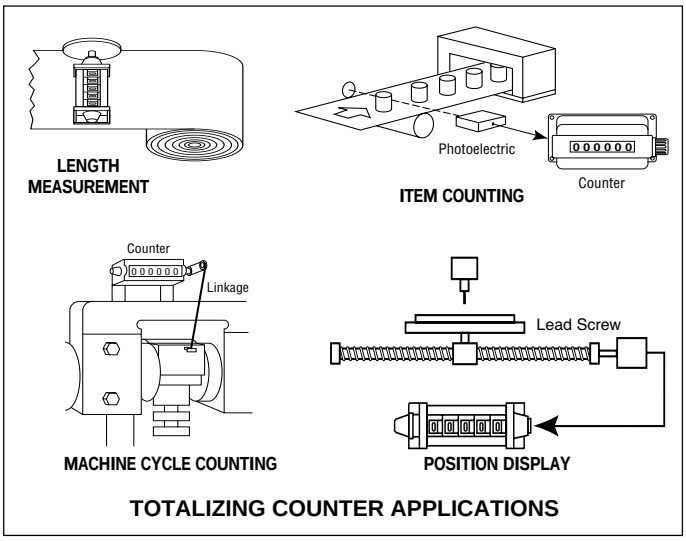
TOTALIZING COUNTERS

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.

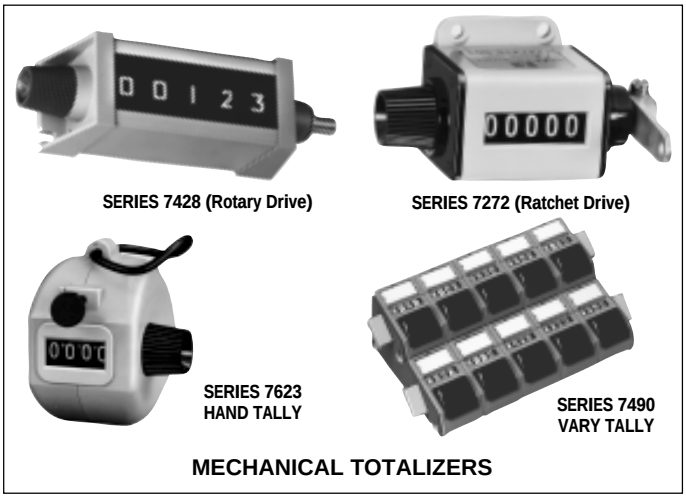


TOTALIZING COUNTER APPLICATIONS

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.

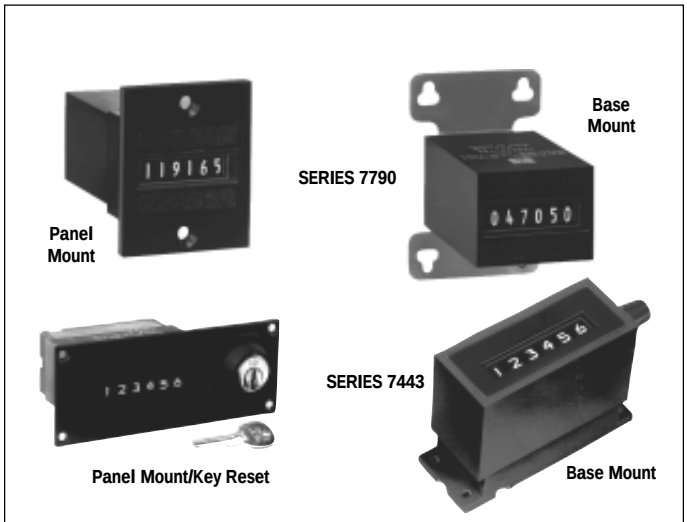


MECHANICAL TOTALIZERS

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.



ELECTRIC TOTALIZERS

SPECIFYING A TOTALIZER

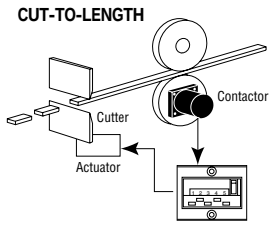
Considerations when selecting a totalizing counter for your application are:

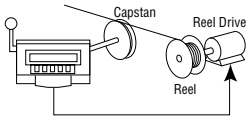
- **Technology –** Mechanical, Electrical (also see our electronic totalizers in Section 1).
- **Input –** What is to be counted and from where will the counter's input be obtained?
- **Count Speed –** Speed ratings vary. Check Specifications.
- **Number of Digits and Figure Size –** Based on Maximum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





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.

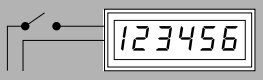
Mechanical & Electric Counters

Electric Totalizing Counters

Advantages:

- rugged
- compact
- economical

VEEDER-ROOT brand

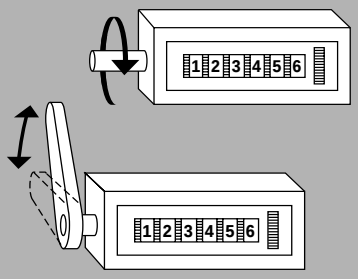


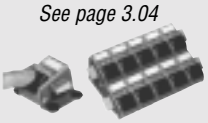
Mechanical Totalizing Counters

Advantages:

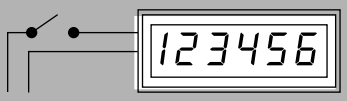
- no wiring
- rugged
- versatile

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

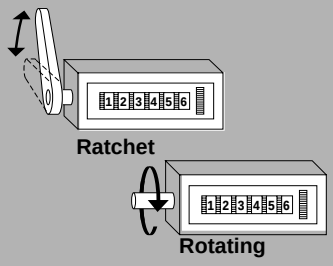
Series 7441
See page 3.25

- AC or DC models
- Easy, pushbutton presets

Series 7283
See page 3.24

- Quick lever reset
- Accepts 2 measuring wheels

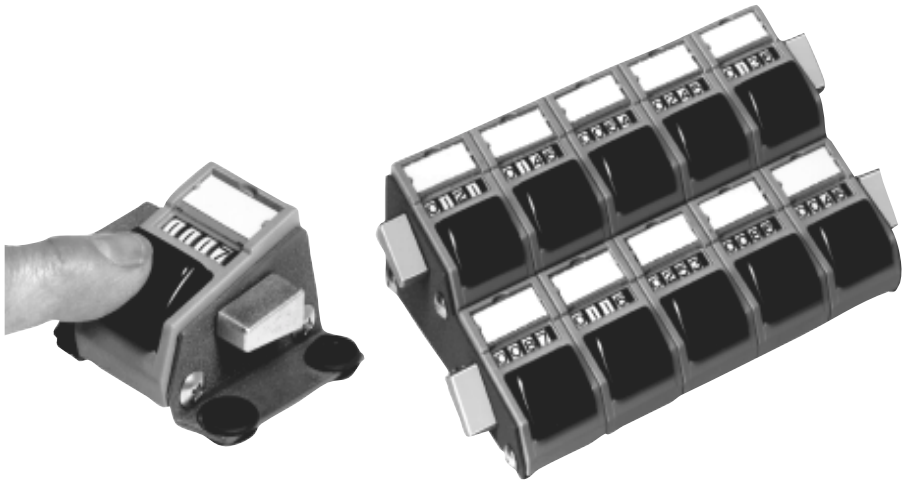
Mechanical Predetermining Counters



Series 1239
See page 3.23

- Up counting predetermining
- Accepts measuring wheels

1490 Vary Tally®



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

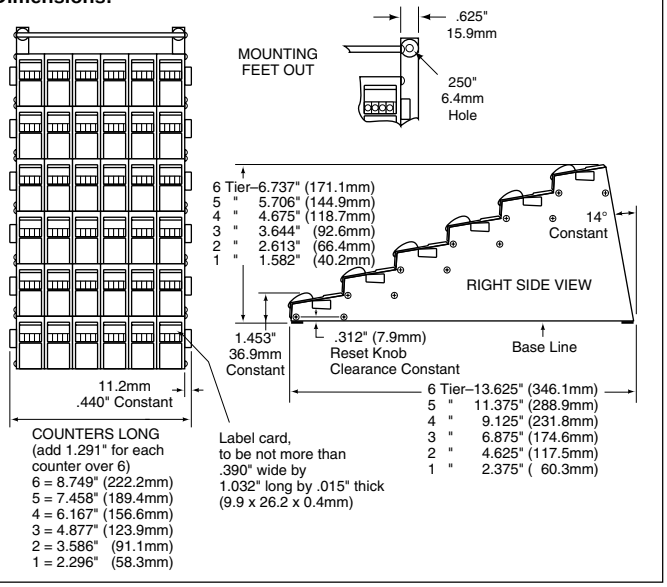
Lubrication: Not required

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

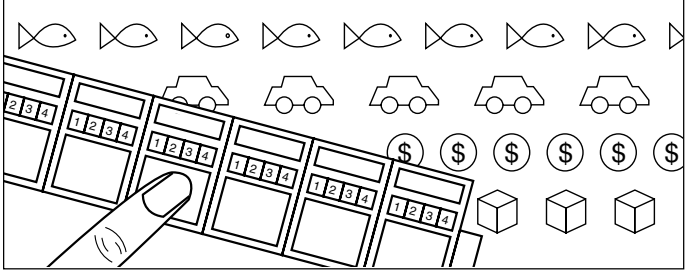
Options: Combined assemblies to 114 counters; mounting feet in or out

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:



Typical Applications:



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

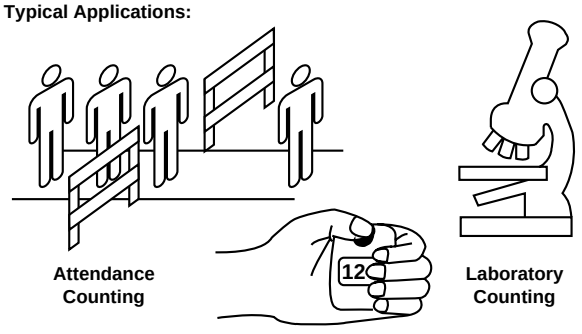
Mounting: Hand-held; or detachable mounting base

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)

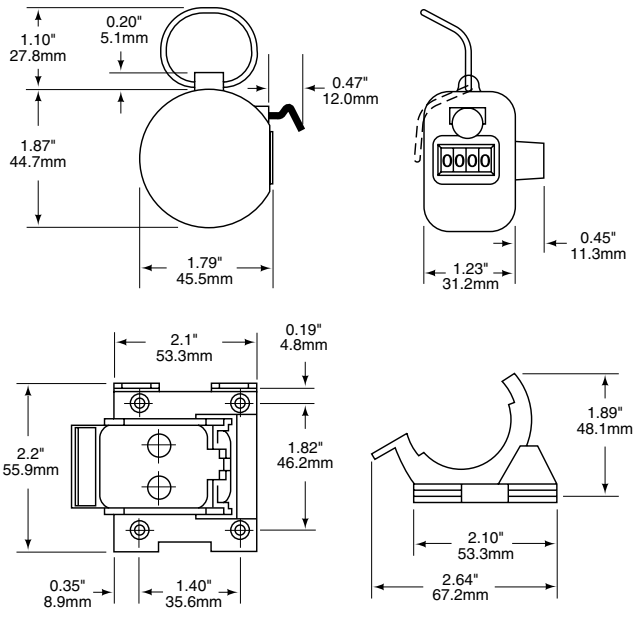
Model No.	Description
0762304-001	Hand Tally
0300301-547	Mounting Base

Typical Applications:



Ideal for any hand-actuated counting application.

Dimensions:



7458-7461 Small Square Case

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

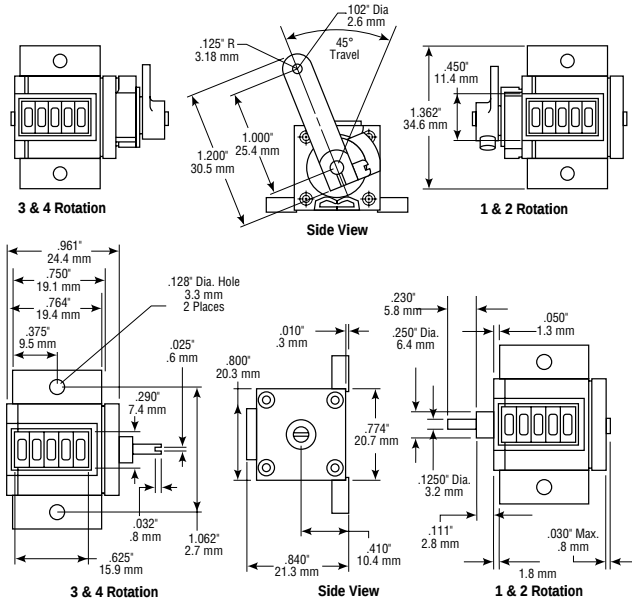
Torque (oz.-in.): Direct Drive: 0.25; Revolution Drive: 0.5; Ratchet Drive: 6.0; Rotary Ratchet Drive: 1.0; Geared Drive: 0.5

Number of Figures: 5

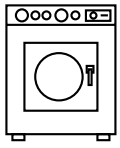
Size of Figures: 0.170" (4.3 mm) high by 0.087" (2.2 mm) wide
Color of Figures: White on black
Lubrication: Not required
Ambient Temperature: -40° to +160°F (-40° to +57°C)
Construction: Case, pinions, and wheels: acetal resin; Drive shaft and washer: stainless steel
Net Weight: 0.49 oz. for 5 figure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

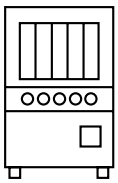
Model No.	Description	Rotation
0745815-001	Direct drive, 5 figures, flange case	1
0746015-001	Ratchet drive, 5 figures, flange case	
0746115-001	Rotary ratchet drive, 5 figures, flange case	
0745915-001	Revolution drive, 5 figures, flange case	
0745825-001	Direct drive, 5 figures, flange case	2
0746025-001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

Dimensions:



Typical Applications:


Coin-operated Laundry


Vending Machine

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

7268 High Speed

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

For rotary reset, high-speed totalizer, see Series 1133, 1134
For quick lever-reset high speed totalizer, see Series 7298

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

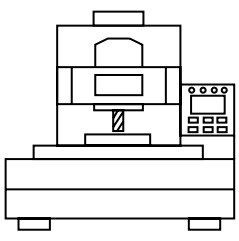
Lubrication: Not required

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)

Typical Applications:



Machine Tool

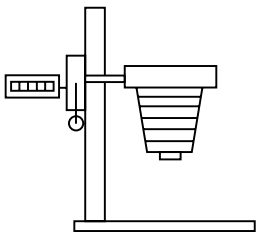
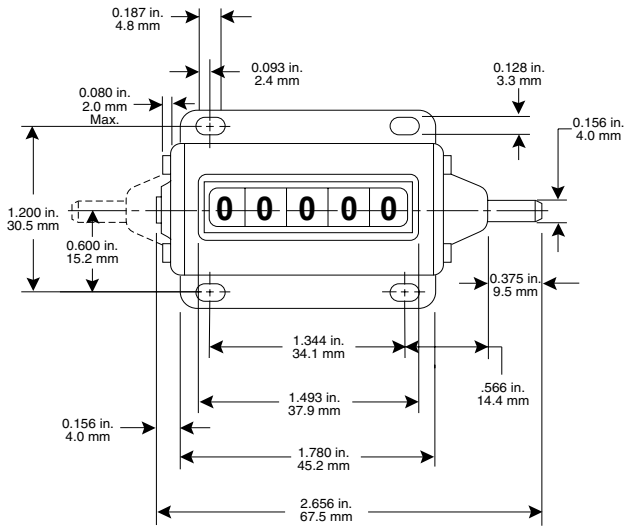


Photo Enlarger

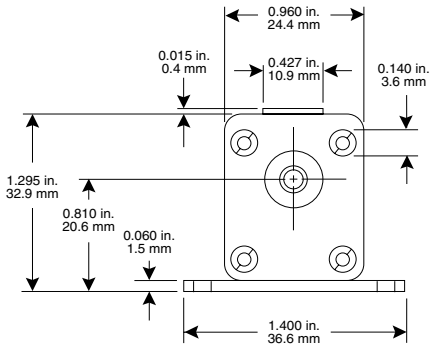
Model No.	Description	Rotation
0726815-001	5 figure, nonreset	1
0726825-001	5 figure, nonreset	2
0726835-001	5 figure, nonreset	3
0726845-001	5 figure, nonreset	4

Dimensions:

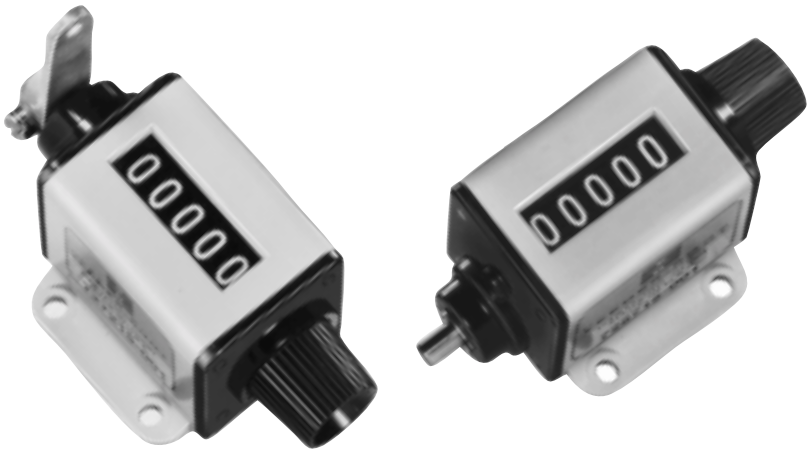
Front View



Side View



7272/7287 Small Reset



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

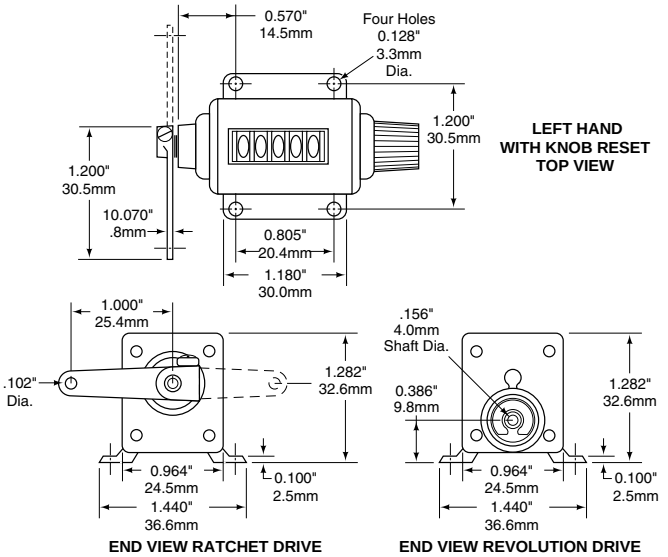
Mounting: Base

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)

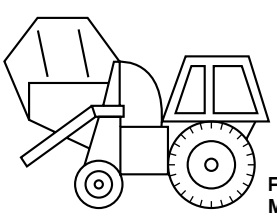
Model No.	Description	Rotation
0727215-001	Ratchet drive, 5 figure, knob reset	
0727215-012	Ratchet drive, 5 figure, lock-and-key reset	
0727215-002	Ratchet thumb lever drive, 5 figure, knob reset	1
0727215-004	Ratchet drive, 5 figure, nonreset	
0728715-001	Revolution drive, 5 figure, knob reset	
0727225-001	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:

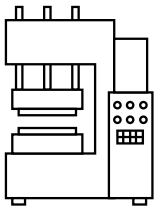


NOTE: Right hand drive models are mirror image.

Typical Applications:



Farm Machinery



Punch Press

1259-1262 Resettable

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

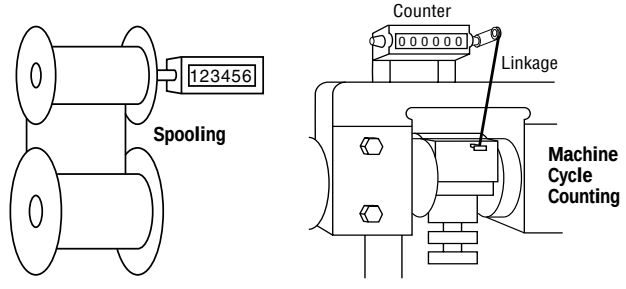
Mounting: Base

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

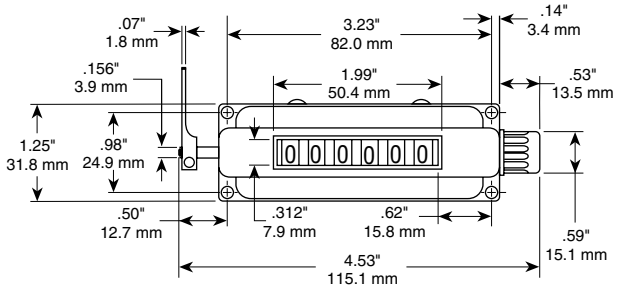
Net Weight: 9 oz. (255 g.)

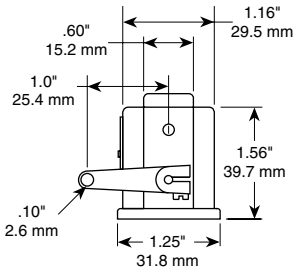
Model No.	Description	Rotation
0125916-005	Ratchet drive	1
0125926-010 **0126226-010**	Ratchet drive Revolution Drive	2
0125936-015 **0126136-015**	Ratchet drive Direct drive	3
0125946-020 **0126246-020**	Ratchet drive Revolution drive	4

Typical Applications:



Dimensions:





Ratchet Drive Shown

7030 Pneumatic Counter

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.

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)

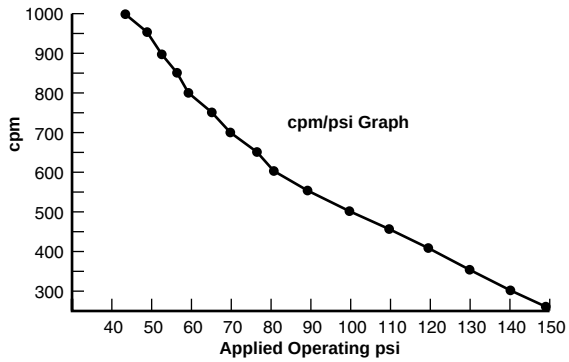
Construction: Case: Zamak; Wheels and Pinions: Acetal resin; Connection Fitting: Brass

Net Weight: 1 lb. (0.454 kg)

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

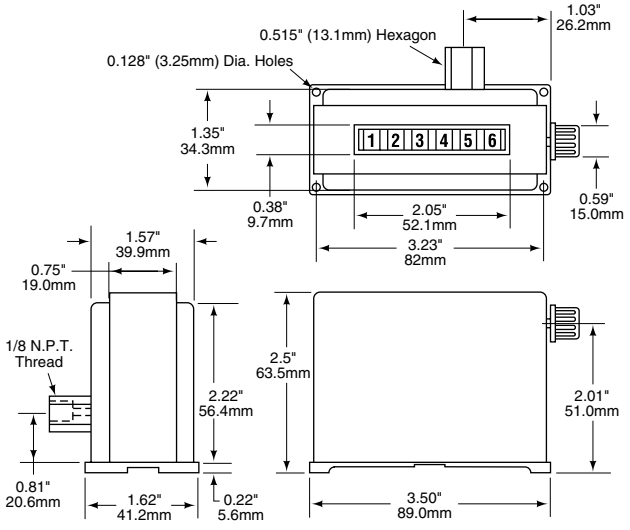
For Mechanical General Purpose Totalizer, see Series 1259, 1251
For Electric General Purpose Totalizer, see Series 1205, 7443

Speed vs. Pressure



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%.

Dimensions:



7428, 7430 Medium Sized

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

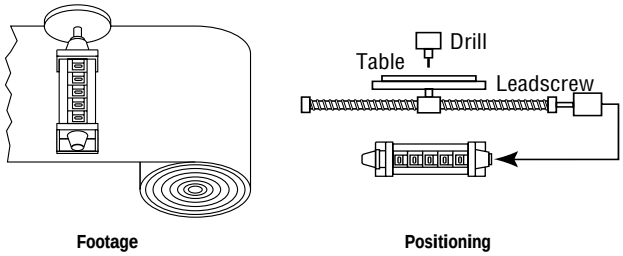
Lubrication: Not required

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

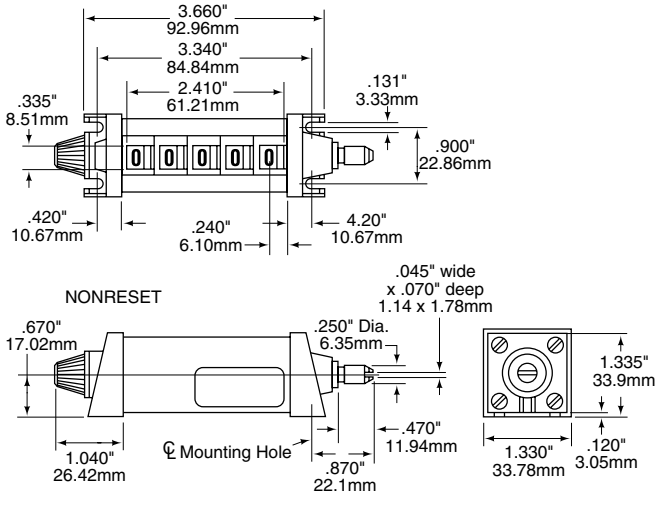
Net Weight: 6 oz. (170 g)

Typical Applications:



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

Dimensions:



1133, 1134 High Speed

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

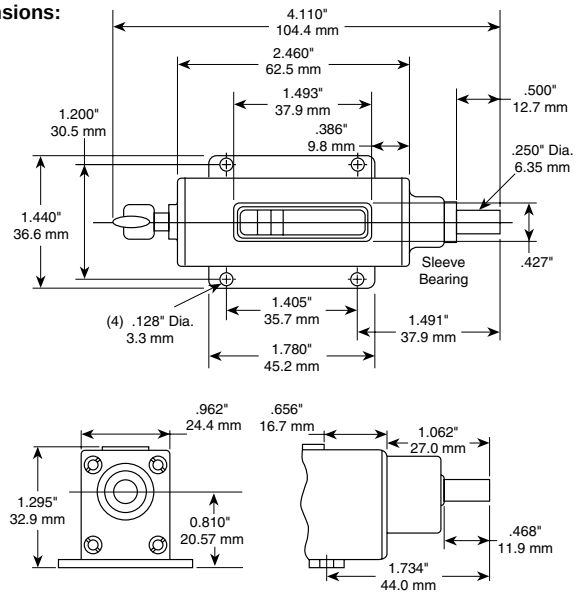
Mounting: Base

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

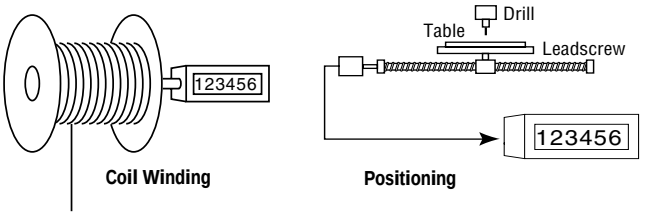
Net Weight: 7 oz. (198.6 g.)

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

Dimensions:



Typical Applications:



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

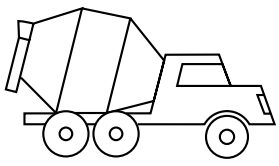
For double shaft extension, see Series 7298, 1953, 7434
For large figure ratchet drive, see Series 1129

SPECIFICATIONS

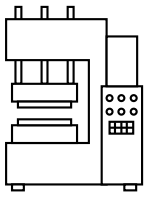
Speed: Ratchet: 500 cpm; Geared: 1500 rpm or 5000 cpm whichever is limiting
Number of Figures: 6
Drive: Ratchet Drive: Series 1667 adds one count for each drive shaft actuation, arc of 26° to 45° for rotations 1 and 3, arc of 42° to 67° for rotations 2 and 4, maximum travel limited internal lever return 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
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

Typical Applications:

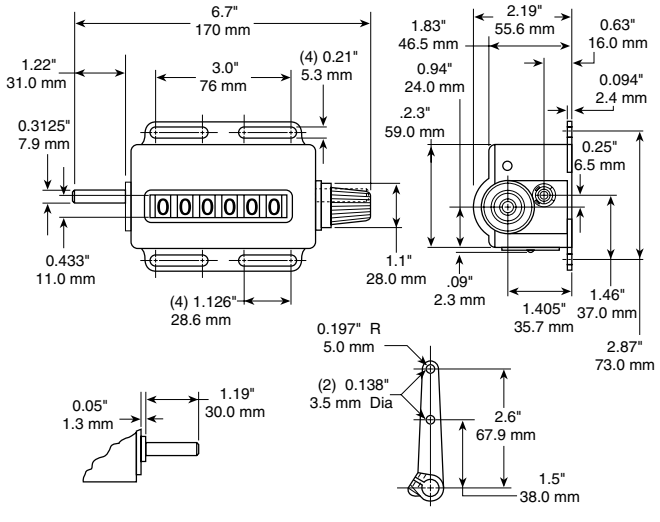


Cement Truck



Punch Press

Dimensions:



7298 High Speed

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

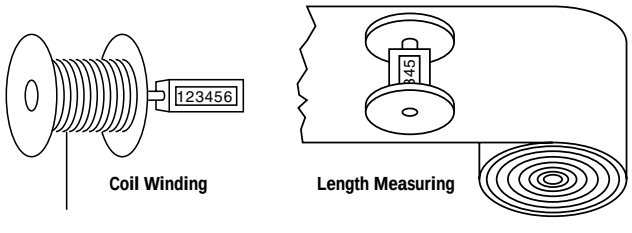
Mounting: Base

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

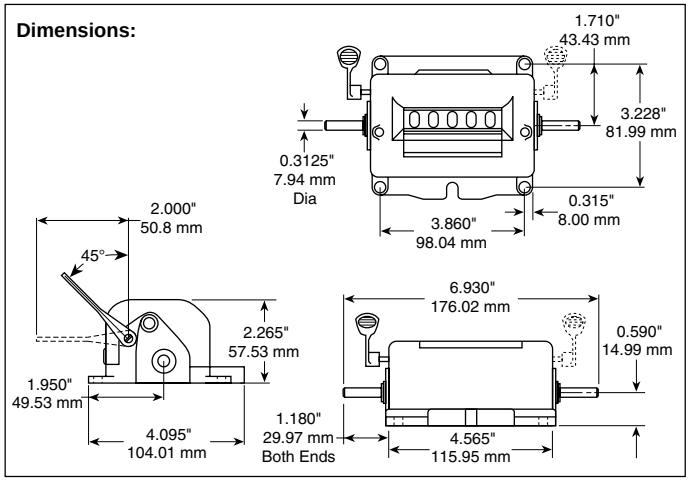
Net Weight: 2 lb.(907 g.)

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

Typical Application:



Dimensions:



1129 Large Figure

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

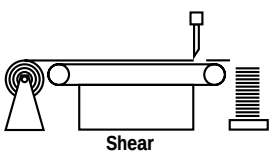
Mounting: Base

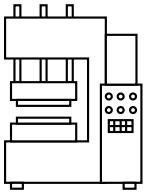
Construction: End caps: Glass-filled nylon; Case: Steel; Shafts: Chrome-plated steel; Pinions: Nylon; Wheels: Aluminum and steel

Net Weight: 4 lbs. (1.8 kg)

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

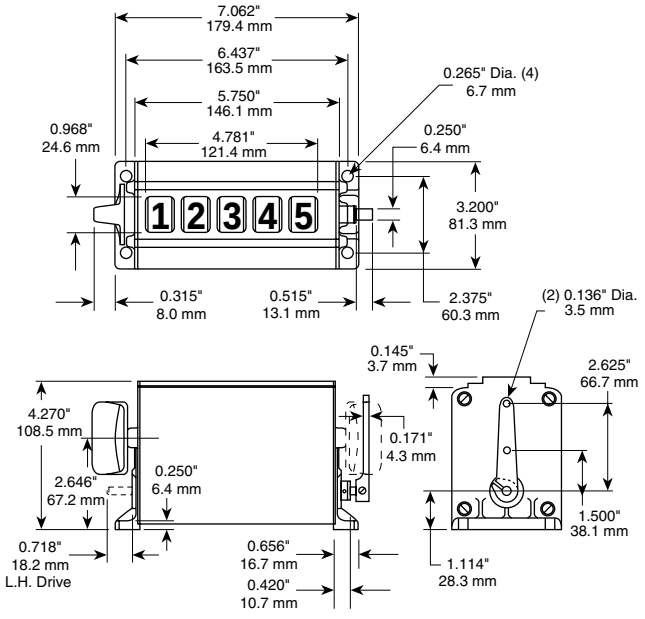
Typical Applications:





Ideal for use on heavy industrial equipment.

Dimensions:



1953 Visicounter®

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.

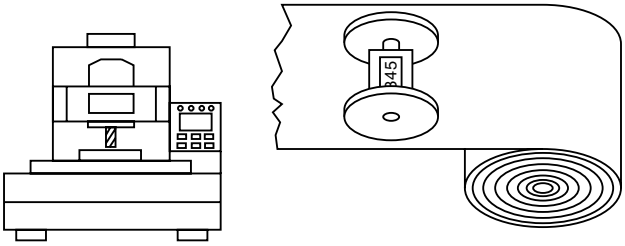
For measuring wheels, see page 3.18

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)
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)

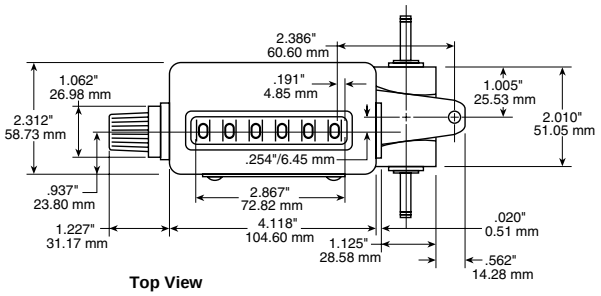
Model No.	Description	Rotation
0195316-051	Knob reset, 6 figure, 1:1 ratio	
0195316-052	Knob reset, 6 figure, 3:1 ratio	
0195316-053	Knob reset, 6 figure, 0.375:1 ratio	
0195326-045	Knob reset, 6 figure, 1:1 ratio	
0195326-046	Knob reset, 6 figure, 3:1 ratio	
0195326-047	Knob reset, 6 figure, 0.375:1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

Typical Applications:

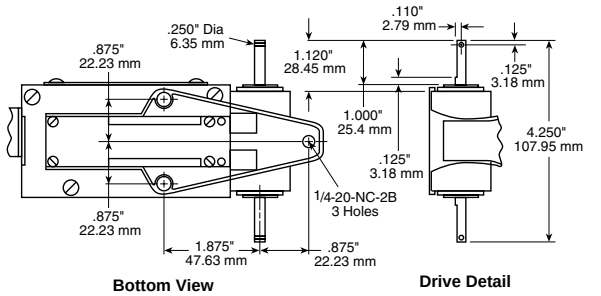


Ideal for measuring roll or sheet goods, position indicating on machine tools, etc.

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.

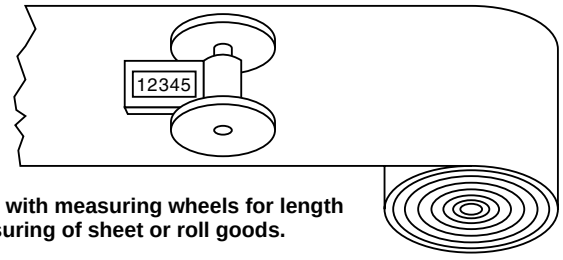
Other features and configurations are available on special order, such as: shaft variations, special wheel colors and markings, and reset options.

For measuring wheels, see page 3.18

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
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)

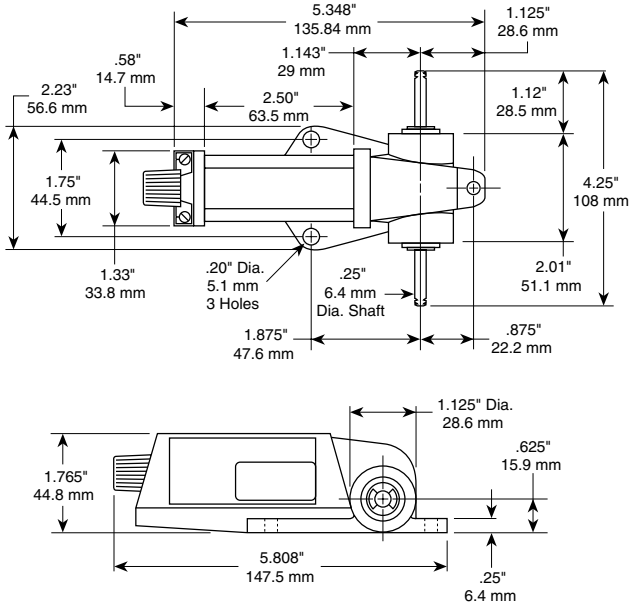
Typical Applications:



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

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	
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	
0743425-014	Geared drive, base mount, 5 figures, knob reset, 0.375:1 ratio	

Dimensions:



Measuring Wheels

Rubber Grooved Knurled Smooth

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

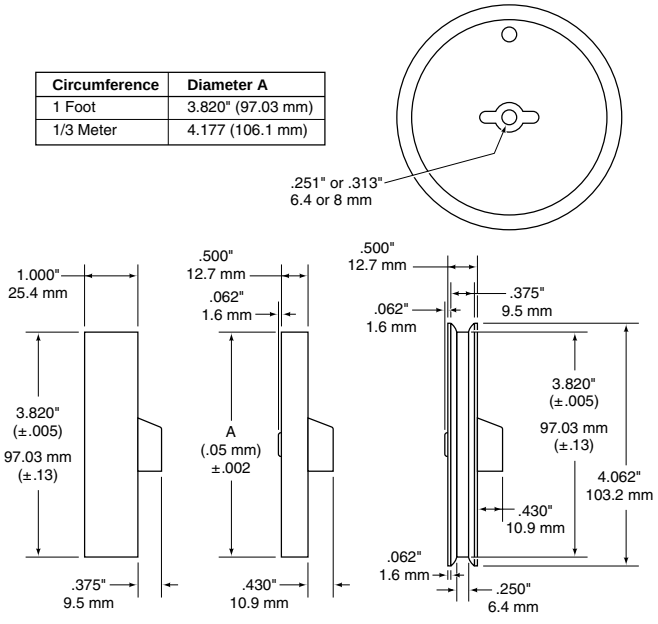
When used with counters with 1:1 or 1:10 drive ratios, these wheels will produce highly accurate resolutions of 1 foot or 1/10 foot. With geared drive counters, resolution of yards, or 1/8 yard is possible. 1/3 meter wheels are typically used with 3:1 drive ratio counters, for resolution of meters.

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

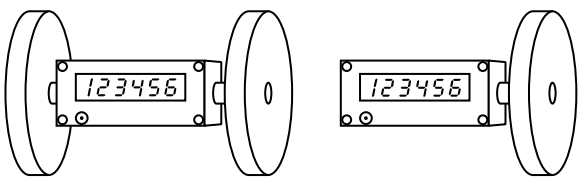
Model No.	Description
	1 Foot Circumference
0015537-070	Rubber, 1/2" wide, .251" center bore
0015537-530	Rubber, 1" wide, .251" center bore
0317680-001	Rubber, 1/2" wide, .313" center bore
0317678-001	Rubber, 1" wide, .313" center bore
0015537-095	Smooth, 1/2" wide, .251" center bore
0015537-525	Smooth, 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)

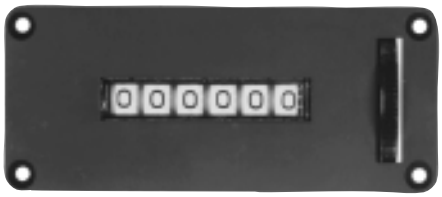


Typical Applications:



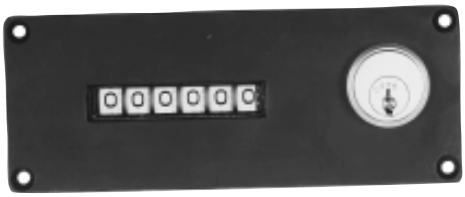
Double Shaft Counter **Single Shaft Counter**

1205 Series



Panel Mount, Rotary Thumbwheel Reset

Base Mount,
Knob Reset



Panel Mount, Lock and Key Reset

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

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

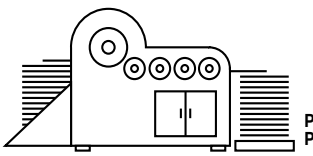
The Series 1205 is tough: Wide temperature variations don't upset its thermo-stable wheels and pinions. Severe voltage transients will not damage its direct AC coil, so external surge protection is not required. Duty cycles that result in continuous coil energization won't degrade its life or performance.

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

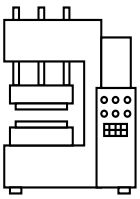
SPECIFICATIONS

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)

Typical Applications:



Printing Press

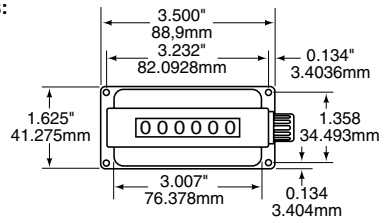


Punch Press

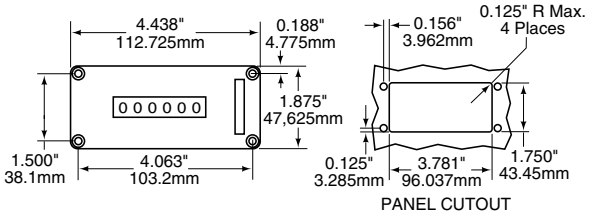
Ideal for punch presses, printing equipment, shears, and other heavy industrial machinery.

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

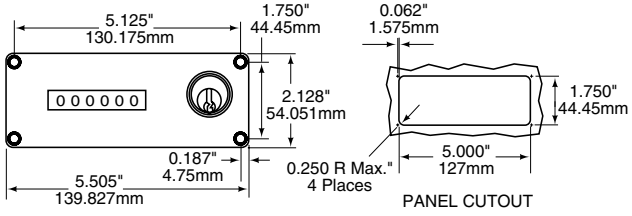
Dimensions:



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



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



7443 Series

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

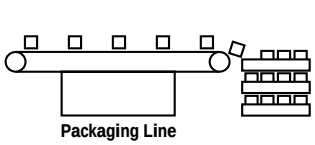
Series 7443 is a good choice for new applications requiring an industrial duty counter, or for updating existing installations. Applications with poorly conditioned AC power lines are no problem. Rectifiers, which frequently fail due to power surges and transients, are not used. Instead, a precision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

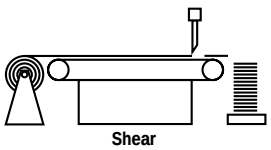
For even greater durability, see Series 1205.
For LCD or LED display, see Series 7997 and 7995.

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:



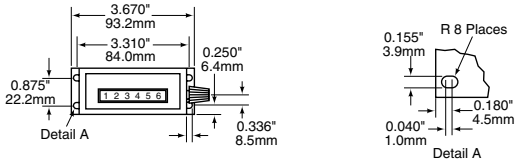


Ideal for punch presses, riveters, shears, packaging equipment, and many other factory-floor jobs.

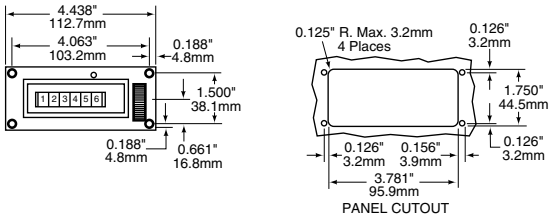
Model No.	Description
0744386-011	Base mount, knob reset, 115 VAC, UL/CSA
0744396-017	Base mount, knob reset, 12 VDC, UL
0744396-016	Base mount, knob reset, 24 VDC, UL
0744396-012	Base mount, knob reset, 230 VAC, UL
0744386-211	Panel mount, rotary thumbwheel reset, 115 VAC, UL/CSA
0744396-243	Panel mount,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

Dimensions:

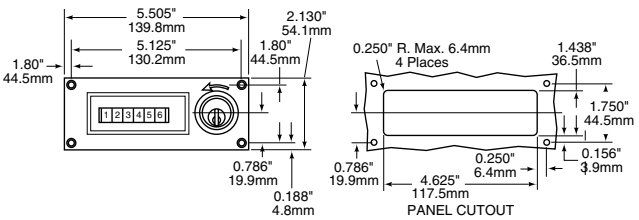
Base Mount, Knob Reset
Depth: 2.570"/65.2mm



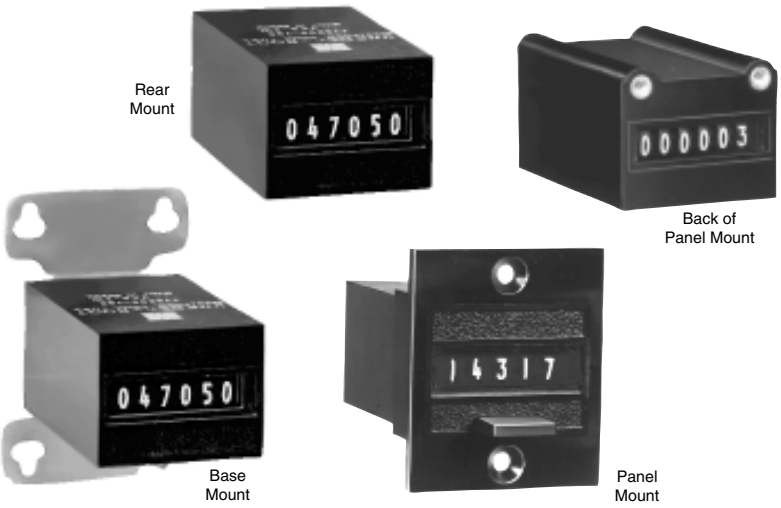
Panel Mount, Rotary Reset
Depth: 2.530"/64.3mm



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



7790/7791 Series



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

RECOGNIZED 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.

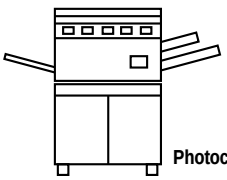
- Compact size
- Four standard mounting styles
- Five and six figure indication standard–high contrast white on black
- Capable of speeds up to 600 counts/minute
- Count coil can be continously energized
- Long service life
- Standard models for a broad range of AC and DC voltages
- UL recognized; CSA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

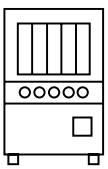
For harsh environments see Series 1205 or 7443
For liquid crystal display (LCD), see Series 7999

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:

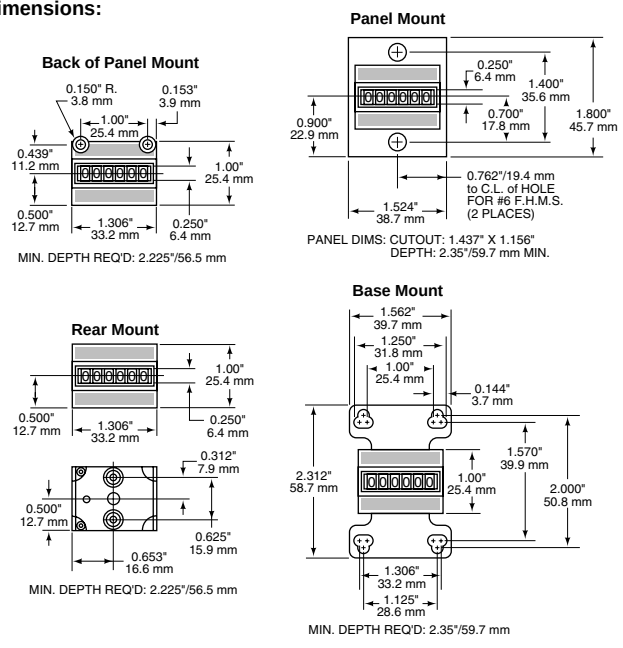

Photocopier


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	96Ω
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	96Ω
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:



7437/7438 Series

RoHS

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

Specific Models

RECOGNIZED 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.

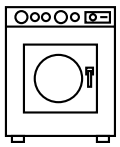
- Broad range of standard AC and DC models
- Base mount and panel mount styles
- High contrast white-on-black figures
- UL recognized; CSA certified
- Tamper resistant construction
- Capable of speeds to 600 counts/minute
- Nonreset and convenient bar-reset models
- Thermo-stable materials used for long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

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

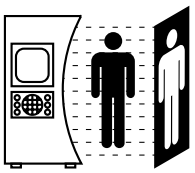
SPECIFICATIONS

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



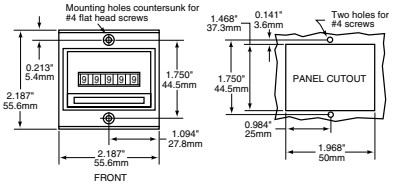
X-ray Machine

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

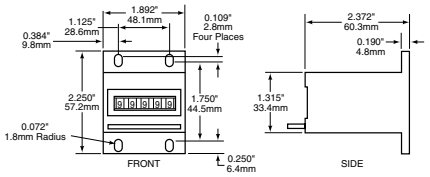
Model No.	Description
0743785-001	Base mount, 5 figures, 115 VAC, nonreset, UL/CSA
0743785-002	Base mount, 5 figures, 230 VAC, nonreset, UL/CSA
0743785-003	Base mount, 5 figures, 24 VAC, nonreset, UL/CSA
0743785-004	Base mount, 5 figures, 115 VDC, nonreset, UL/CSA
0743785-006	Base mount, 5 figures, 24 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:

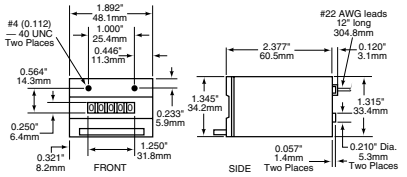
Panel Mount
Depth: 2.377"/60.4mm



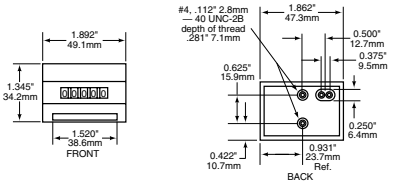
Base Mount
Depth: 2.372"/60.3mm



Back of Panel Mount
Depth: 2.377"/60.5mm



Rear Mount
Depth: 2.377"/60.4mm



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: 15A at 125, 250 or 480 VAC; 1/8HP at 125 VAC; 1/4HP at 250 VAC; 1/2A at 125 VDC; 1/4A at 250 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

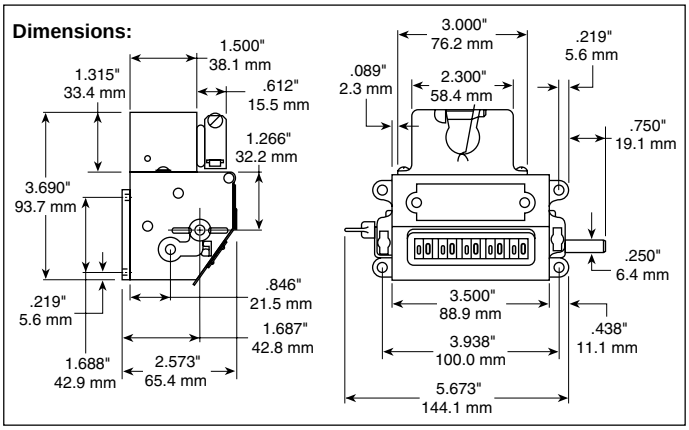
Mounting: Base mount with switch at back

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

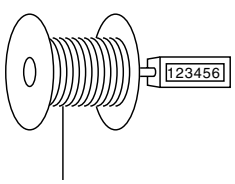
Net Weight: 2 lb., 9 oz. (1.16 kg)

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

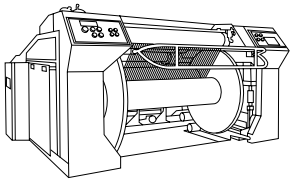
Dimensions:



Typical Applications:



Coil Winding



Textile Machinery

7283 High Speed

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.

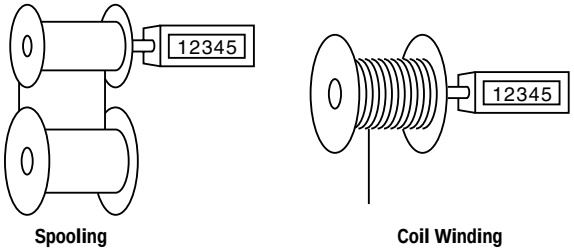
For count up predetermining, see Series 1239
For accessory measuring wheels, see page 3.18

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

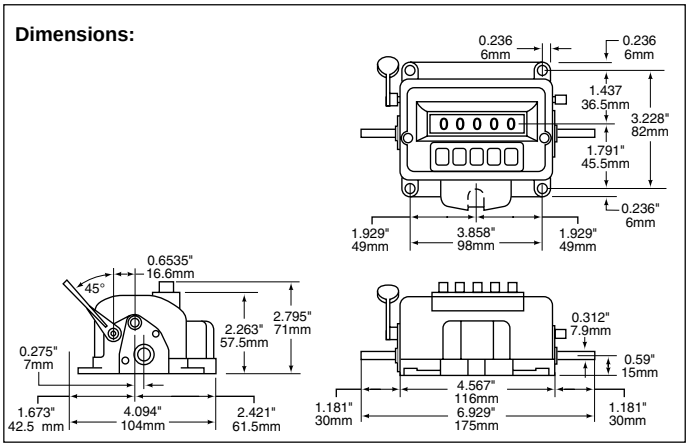
Model No.	Description	Rotation
0728315-001 **0728315-501**	Geared drive, 5 figures, sleeve bearing Geared drive, 5 figures, ball bearing	1
0728325-001 **0728325-501**	Geared drive, 5 figures, sleeve bearing Geared drive, 5 figures, ball bearing	2
0728315-001 **0728315-501**	Geared drive, 5 figures, sleeve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

Typical Applications:



Spooling — Coil Winding

Dimensions:



7441 Electric Preset

Convenient pushbutton preset entry . . . in a space-saving package

Specific Models

RECOGNIZED 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)

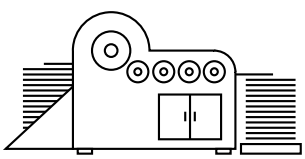
Maximum on Time: With a 50% duty cycle, maximum permissible ON time is 5 minutes

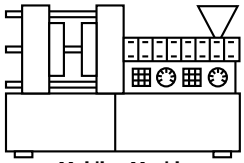
Count Pulse Timing: 20 milliseconds minimum on- or off-time for DC operation, 25 milliseconds minimum on-time for AC operation

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

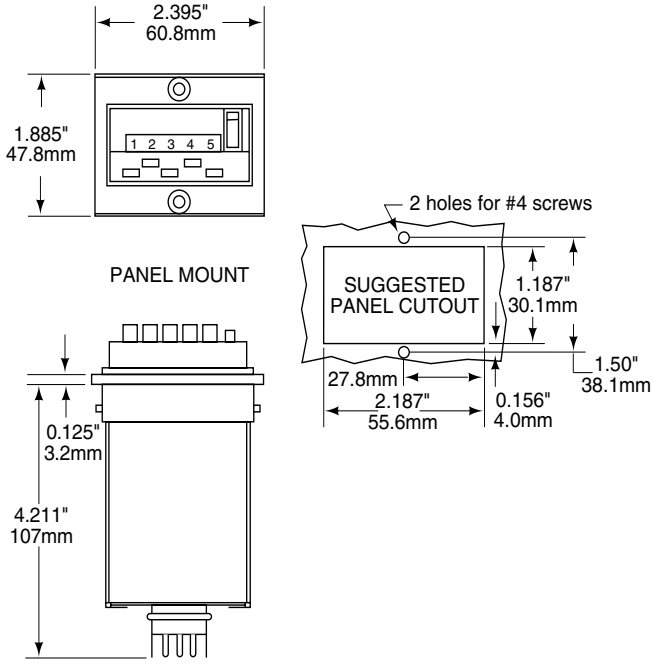
Preset: Manual pushbutton for each digit; reset button must be fully depressed and latched to permit setting

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:



HZ170 CYCL-FLEX®

Electromechanical counter housed in standard CYCL-FLEX® case

RECOGNIZED CERTIFIED

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

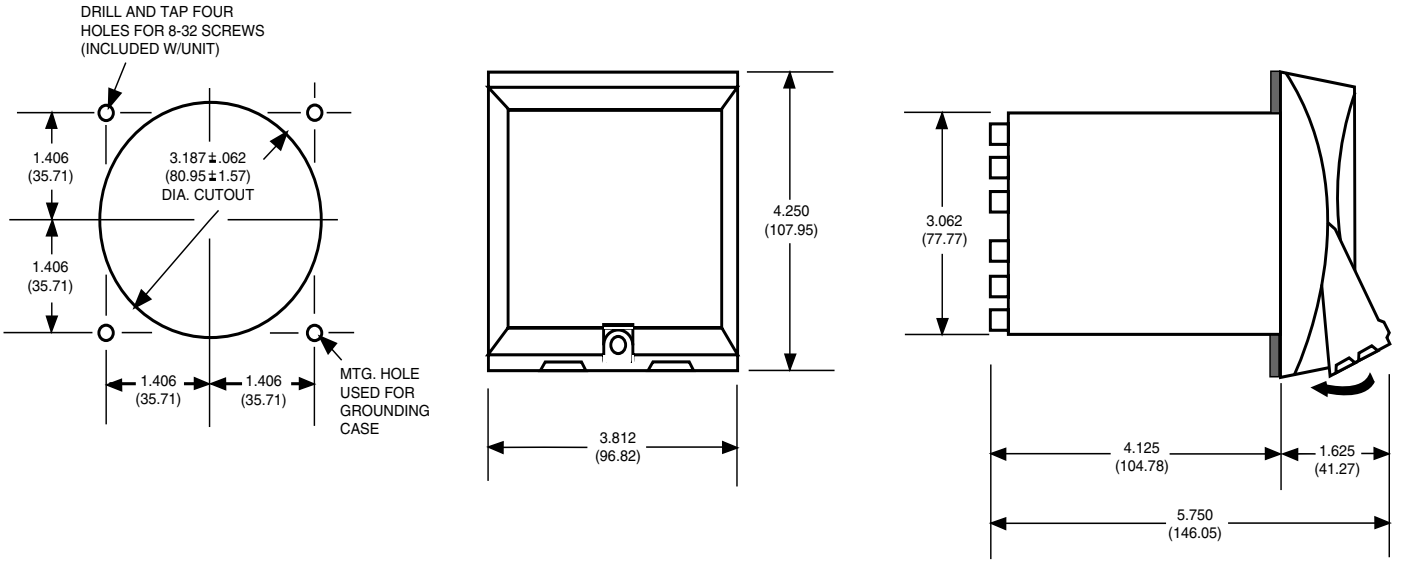
ENCLOSURES

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

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.

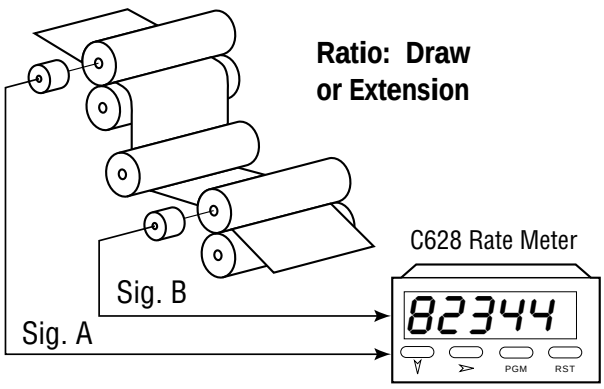
Draw indicators and controllers report on the relationship between two rates. Two sensors, A and B, are used to measure the rates Ra and Rb. Difference, Ra – Rb, is a draw function that is used when one section of a process is slower or faster than another; a single draw indicator is more desirable than 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.

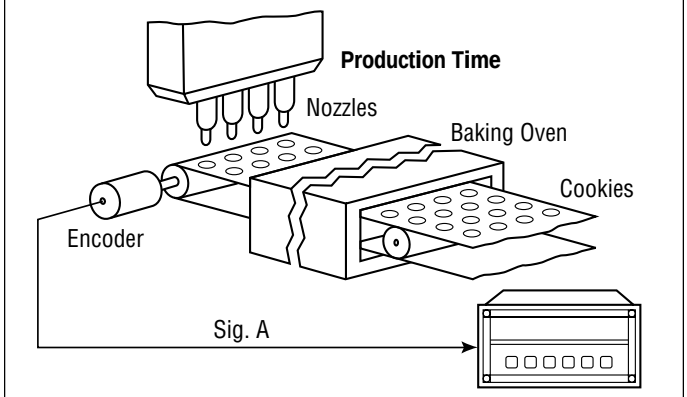
Some rate metering products can measure process time. This differs from a rate or ratio in that a measurment is made of how long a process takes, rather than how fast it is going. For example they may be used on conveyor lines to indicate the time a product spends in a galvanizing tank or baking oven.

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.





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 warnin 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

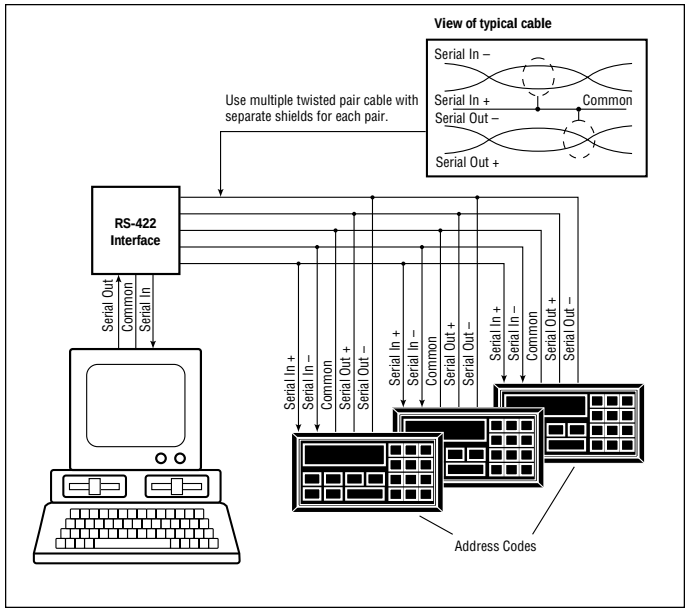
C628 AWESOME Rate Meter

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:

Rate Indicators & Controllers

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.

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.	**Page: 4.04** ★	**Page: 4.05 - 4.07** ★	**Page: 4.08** ★	**Page: 4.09**
				
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.	■ **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**	■ **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**	■ **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**	■ **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. Additional specialized products that perform rate operations can be found in the Multifunction Products Section

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**
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
6 - NPN transisitor	None	Front Panel (Selectable Enable), Remote
Indiv. mult. 0.0001 to 99999, channels A and B	1 or 60 PPR input (selectable by model #)	Multiplier 0.001 to 9999
30 kHz	10 kHz	10 kHz
Sourcing	Sinking, Magnetic	Sinking, Contact closure
Time Interval (1/Tau)	Time Inteval (1/Tau)	
12 VDC	12 VDC	No
NEMA 4	NEMA 4	NEMA 4
RS-422/485	No	No

C628 AWESOME Rate Meter

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 RECOGNIZED

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.

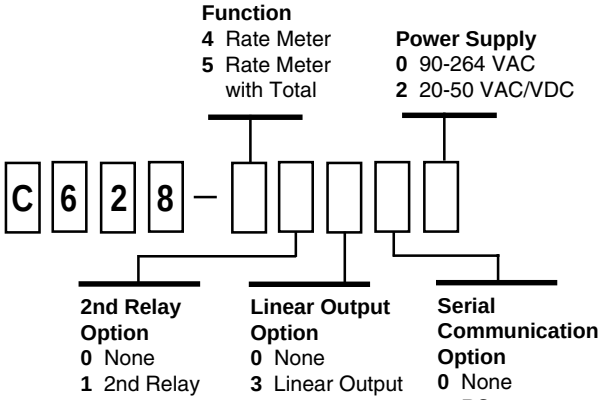
Operating Temp.: 0° to 55° Celsius, 32° to 131° Fahrenheit

Storage Temp.: -20° to 80° Celsius, -4° to 176° Fahrenheit

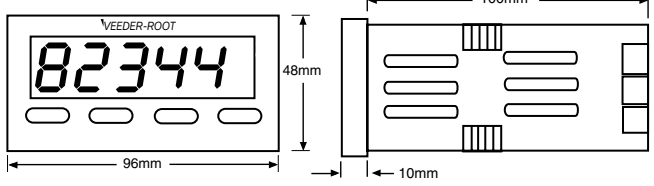
Relative Humidity: 20% to 95% non-condensing

Approvals: CE, UL Recognized, File No.: E185087

Ordering Information:



Dimensions:



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

A103 Tachometer

CE

"Plug-and-play", compact tachometer… large display with backlighting

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 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 convenience – 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

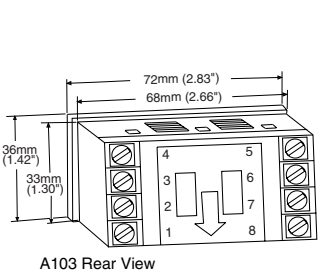
Model No.	Description
A103-003	A103 Tachometer

The following option modules attach to the rear of the A103 Tachometers:

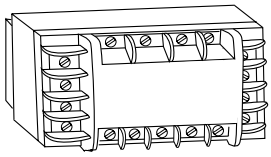
Model No.	AC Power Supply	Low Voltage Input	High Voltage Input
A103-A12	X		
A103-A17		X	
A103-A19	X	X	
A103-A10			X
A103-A14	X		X

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

Dimensions:



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")

A103 Programmable Rate Meter

CE

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**

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

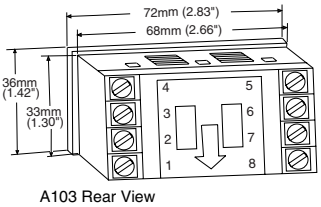
Model No.	Description
A103-004	A103 Programmable Rate Meter

The following option modules attach to the rear of the A103:

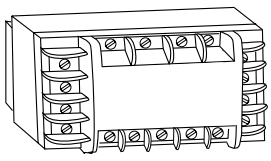
Model No.	AC Power Supply	Low Voltage Input	High Voltage Input
A103-A12	X		
A103-A17		X	
A103-A19	X	X	
A103-A10			X
A103-A14	X		X

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

Dimensions:



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")

A103 Rate Meter & Totalizer

Scaled measurement of rate or speed – plus totals… large display with backlighting

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 total count. 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

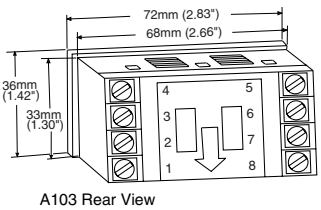
Model No.	Description
A103-005	A103 Rate Meter & Totalizer
A103-009	A103 Rate Meter & Totalizer w/Pulse Output

The following option modules attach to the rear of the A103 :

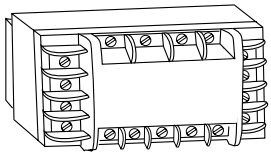
Model No.	AC Power Supply	Low Voltage Input	High Voltage Input
A103-A12	X		
A103-A17		X	
A103-A19	X	X	
A103-A10			X
A103-A14	X		X

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

Dimensions:



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")

C342 Tachometer

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**

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.

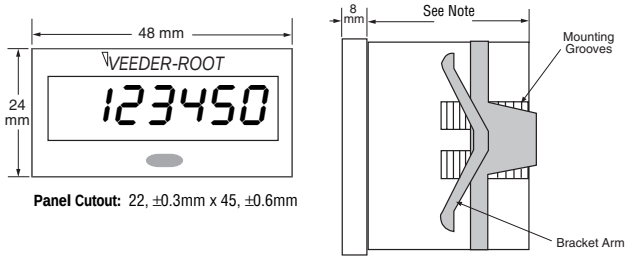
Easy field programing allows interface to PNP or NPN count signals.

- 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:



Panel Cutout: 22, ±0.3mm x 45, ±0.6mm

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, RoHS

MAX® jr Tach 1 & Tach 2

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.

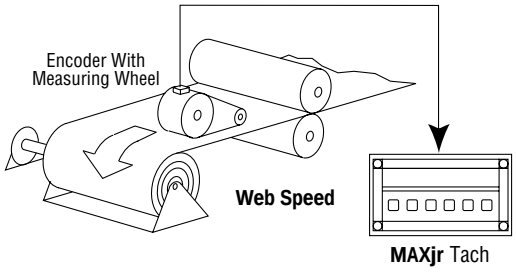
Accessory Power: + 12 VDC ± 25% @ 0 to 125 mA

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

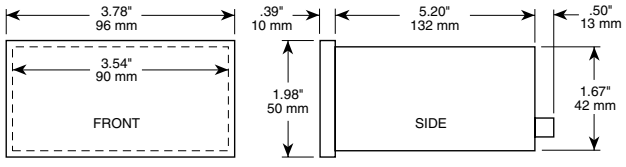
For RPM display without alarms, see SimTach D
For voltage or current loop inputs, see PM64S

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:



Dimensions:



MAX® Tach 1 Programmable

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.

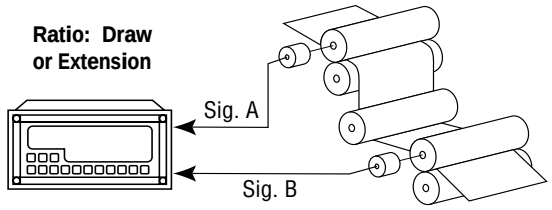
Power Requirements: 95 to 130, or 190 to 260 VAC, 50/60 Hz, 6 VA; 9 to 15 VDC @ 0.3 A max.

Accessory Power: + 12 VDC ± 5% @ 0 to 175 mA

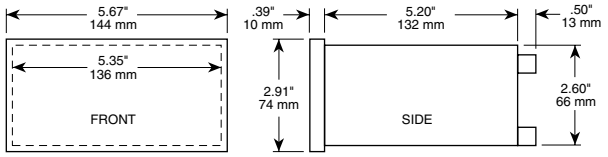
Operating Temperature: 32° to +122°F (0° to +50°C)

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:



Dimensions:



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

SimTach D

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.

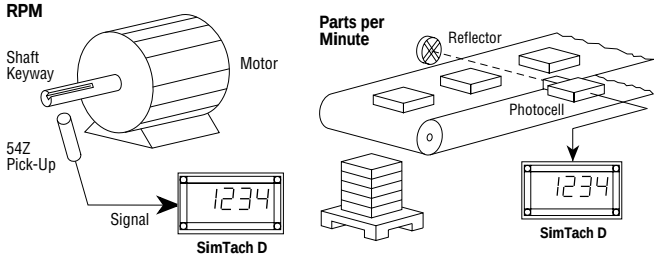
Accessory Power: +12 VDC ± 25% @ 0 to 125 mA

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

For voltage inputs, see SimTach A
For other PPR inputs, see MAXjr Tach 1

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

Typical Applications:



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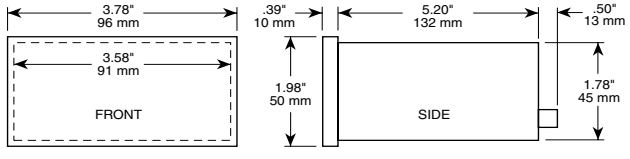


Panel Dims: Cutout: 1.78" x 3.58". Thickness: 1/16" to 1/14". Depth: 5.68" min.

Series 7990

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.

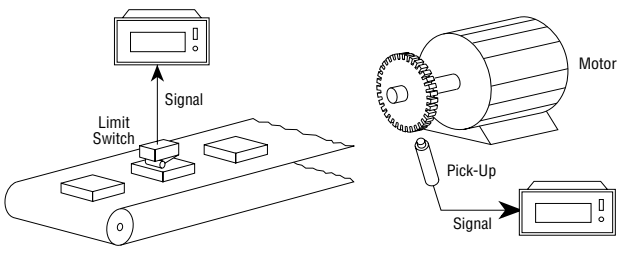
Operating Temperature: +32° to +167 °F (0° to +75°C)

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:



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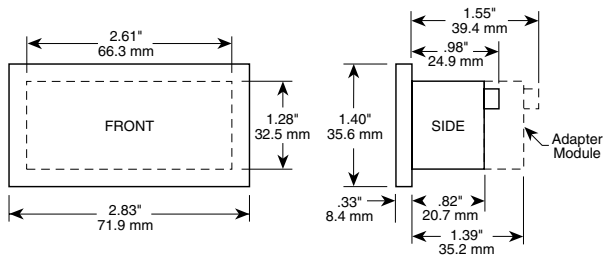

Notes

DANAHER SPECIALTY PRODUCTS 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
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or +1.910.862.2511
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veeder-root.custserv@dancon.com

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or +1.847.662.2666
eagle-signal.techsupport@dancon.com
veeder-root.techsupport@dancon.com

Websites
www.eagle-signal.com
www.veeder-rootcounters.com

Veeder-Root
Dynapar
Eagle Signal

Notes

DANAHER SPECIALTY PRODUCTS 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 +1.910.862.2511
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veeder-root.custserv@dancon.com

Technical Support
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or +1.910.862.2511
eagle-signal.techsupport@dancon.com
veeder-root.techsupport@dancon.com

Websites
www.eagle-signal.com
www.veeder-rootcounters.com

Veeder-Root
Dynapar
Eagle Signal

Notes

DANAHER SPECIALTY PRODUCTS 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
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or +1.910.862.2511
eagle-signal.custserv@dancon.com
veeder-root.custserv@dancon.com

Technical Support
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or +1.847.662.2666
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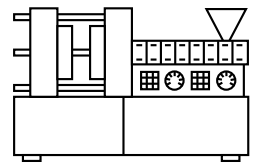
veeder-root.techsupport@dancon.com

Websites
www.eagle-signal.com
www.veeder-rootcounters.com

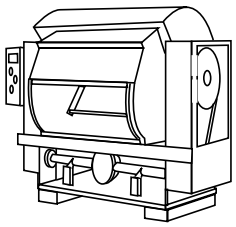
Veeder-Root
Dynapar
Eagle Signal

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.

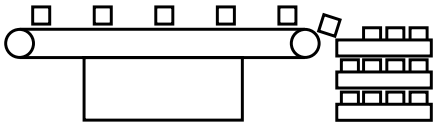
Eagle Signal brand industrial timers have a 70 year history of providing accuracy and reliability in harsh industrial environments.



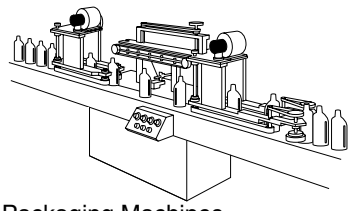
Plastic Working Equipment



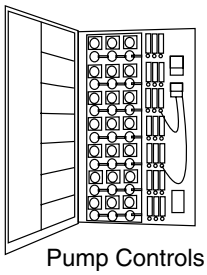
Food Processing Machinery



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.

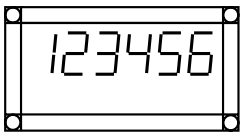
B506

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 AC, 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?

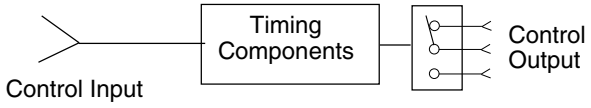
Operator Restraints - Lighting, gloves, low skill level

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

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.

Eagle Signal brand	Series HP5E	Series HQ4E	Series HQ9E	Series B866
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: 5.06** ★  ■ **16 standard time ranges from 5 seconds to 60 hours** ■ **Knob adjustable time settings and LED progress indicator** ■ **Pilot light indicates when timer is active** ■ **15 terminal ABS (UL rated 94V-0) molded housing has high impact resistance and will not support combustion** ■ **Optional reverse action mode will not reset on power failure**	**Page: 5.08** ★  ■ **Accurate, economical, enclosed percentage timer** ■ **Power supply accepts 120/240 VAC or 24 VDC** ■ **Rugged front panel with simple dial setting** ■ **Direct replacement for obsolete Series HQ4**	**Page: 5.10** ★  ■ **Knob adjustable percent settings and LED progress indicator** ■ **Power supply accepts 120/240 VAC, 50/60Hz** ■ **Adjustable timing as a percentage of an overall cycle** ■ **Direct replacement for Series HQ9**	**Page: 5.12** ★  ■ **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**
Dimensions	97mm x 108mm	89mm x 89mm	97mm x 108mm	48mm x 48mm
Display Type	Dial for time set. LEDs for Progress Indication	Dial for percent setting, marks for Progress Indication	Dial for percent setting. LEDs for Progress Indication	Dial for time set
Number of Digits	NA	NA	NA	NA
Power Supply	120/240 VAC, 50/60Hz	120/240 VAC, 50/60Hz 24 VDC	120/240 VAC, 50/60Hz	24 - 240 VAC or 24 VDC
Time Ranges	16 Ranges: 5 Sec - 16 Hrs	11 Ranges: 15 Sec - 120 Mins	Available in 10 Ranges: 15 Sec - 20 Hrs	1, 10 Seconds; 1, 10 Minutes; 1, 10 Hours
Operation Modes	Stand. and Rev. Start, Instant and delayed Contacts	Percent ON adjustable within total cycle	Percent ON adjustable within total cycle	On-Delay, Off-Delay, Interval, Repeat Cycle
Control Inputs	Start/Stop, Reset	Start/Stop	Start/Stop	Start/Stop - Reset
Repeat Accuracy			Setting: ±1%	Setting: ±5% Repeat: ±0.5%
Control Outputs	DPDT - 5 to 10 Amps	SPST - 5 to 10 Amps	SPDT - 5 to 10 Amps	DPDT - 5 Amps
Front Panel Rating				IP54

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 the back of this catalog.. Additional specialized products that perform timing operations can be found in the Multifunction Products Section.

Series BRE	Series B856	Series B506	Series B90D	Series C628
Page: 5.14 	Page: 5.16 	Page: 5.18 	Page: 5.20 	Page: 5.21 
■ Simple dial set timer with 11 time ranges and surface mounting ■ Models for 120VAC or 240VAC operation ■ Standard and Reverse Start operating modes available ■ 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	■ 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
2.5" x 4.25"	48mm x 48mm	48mm x 48mm	22.5mm x 93mm	48mm x 96mm
Dial for time set	Dual line LCD	Dual line LED	LCD & Annunciators	LED, Programmable Red or Green color
NA	4	4	3	5 (0.71" high)
120 or 240 VAC	24 - 240 VAC or 24 VDC	90 - 240 VAC or 24 V AC/DC	Two Internal LithiumCells	90-240 VAC, 20-50 VAC/ DC 50/60 Hz, 4 Watts
11 ranges cover .05 seconds to 10 hours	Hrs; Min; Sec; Hrs:Min; Min:Sec	Selectable for Hrs, Min, Sec; Selecable Decimal PT.	8 Time Ranges from 0.2 Sec. to 999 Hrs	Sec., Min., Hrs., Min.& Sec., or Hrs. & Min.
Standard, reverse and momentaty Start	On-Delay, Off-Delay, Interval, Repeat Cycle	On Delay, Off Delay, Interval, Repeat, Delay/Interval	On Delay, Off Delay, Interval, Rep. Cycle, On-Delay Interval	Single alarm at timed interval
Start/Stop - Reset	Start/Stop - Reset	Start/Stop - Reset	Start/Stop	Start/Stop - Reset
Setting: 3% of full scale Repeat: ±1/4% of full scale	Repeat: ±0.03%	Repeat: ±0.01%	Repeat: ±0.3% of Setting	Repeat: ±0.1%
To 10 Amps	DPDT - 5 Amps	5 Amp Relay & NPN Transistor	SPDT - 8 Amps	2 Amp Relay & NPN Transistor
N/A	NEMA 4/IP65	NEMA 4/IP65	IP20	NEMA 4X/IP65

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.

Eagle Signal brand	Series A103	Series EHM	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: 5.53, 5.54** ★  ■ **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**	**Page: 5.50** ★  ■ **Electronic Hour Meter. Attractive 5mm 6-digit LCD display** ■ **High reliability non-volatile memory** ■ **Wide voltage range**	**Page: 5.52** ★  ■ **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**	**Page: 5.55**  ■ **Ultra-compact low cost elapsed time indicator** ■ **Internally powered** ■ **Selectable front panel reset**
Dimensions	36mm x 72mm	Rect. 1.2" X 2", Round: 2.4" dia.	24mm x 48mm	24mm x 48mm
Display Type	Backlit LCD (Backlight requires external 12 VDC)	LCD	7.0mm high LCD or 7.6mm LED	LCD
Number of Digits	7 (0.47" high)	6 (5mm high)	LCD: 8, LED: 6	7 (0.3" high)
Power Supply	3 Volt replaceable lithium battery	9-85VDC @ 4mA max.	Internal lithium battery or 12-24 VDC external	Internal lithium battery
Time Ranges	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	Sec, Min-Sec, Hr-Min, or Hrs-1/100 (by model #)
Operation Modes	On Delay, Interval	Hour Meter	Hour Meter	Elapsed Time
Control Inputs	Start, Reset - Sinking, Contact closure	Start	Start/Reset - Reset	Contact Closure or Open Collector
Repeat Accuracy	0.2%	±2 sec over temperature	–	±20 ppm @ 20°C
Control Outputs	0.1 Amp SSR (A103-008)	–	Optional on LED display models	—
Front Panel Rating	NEMA 4X	IP65	IP65	NEMA 4 / IP65

Notes

DANAHER SPECIALTY PRODUCTS 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 +1.800.390.6405
or +1.910.862.2511
eagle-signal.custserv@dancon.com
veeder-root.custserv@dancon.com

Technical Support
call Toll Free +1.800.390.6405
or +1.910.862.2511
eagle-signal.techsupport@dancon.com
veeder-root.techsupport@dancon.com

Websites
www.eagle-signal.com
www.veeder-rootcounters.com

Veeder-Root
Dynapar
Eagle Signal

HP5E CYCL-FLEX® Reset Timer

Modern, high quality timer housed in industry standard patented plug-in housing

File No. E61735

The Eagle Signal brand Series HP5E CYCL- FLEX timer is a modern, microprocessor based reset timer housed in the standard CYCL- FLEX plug-in enclosure. Timing progress is indicated by a LED array that displays remaining time interval. Its 5.20 inches circumference calibrated dial is easy-to-read with well defined resolution increments on all ranges. The 15 terminal ABS (U. L. rated 94V- 0) molded housing has high impact resistance and will not support combustion.

- 16 standard time ranges from 5 seconds to 60 hours
- Knob adjustable time ranges and LED progress indicator
- Pilot light indicates when timer is active
- Optional reverse action mode will not reset on power failure
- 15 terminal ABS (UL rated 94V-0) molded housing has high impact resistance and will not support combustion

SPECIFICATIONS

Time Ranges

Sym.	Dial	Minimum Setting	Dial Divisions	Repeat Accuracy
17	5 Sec.	1/5 Sec.	1/5 Sec.	±.05 Sec.
15	10 Sec.	1/5 Sec.	1/5 Sec.	±.05 Sec.
14	15 Sec.	1/2 Sec.	1/2 Sec.	±.08 Sec.
0	30 Sec.	1 Sec.	1 Sec.	±1.5 Sec.
1	60 Sec.	1 Sec.	1 Sec.	±3 Sec.
2	150 Sec.	5 Sec.	5 Sec.	±7.5 Sec.
3	5 Min.	12 Sec.	12 Sec.	±15 Sec.
4	10 Min.	12 Sec	12 Sec.	±2 Sec.
18	15 Min.	1 Min.	1 Min.	±4.5 Sec.
5	30 Min.	1 Min.	1 Min.	±9 Sec.
6	60 Min.	1 Min.	1 Min.	±18 Sec.
7	150 Min.	5 Min.	5 Min.	±45 Sec.
8	5 Hr.	12 Min.	12 Min.	±1.5 Min.
9	10 Hr.	12 Min.	12 Min.	±3 Min.
10	30 Hr.	1 Hr.	1Hr.	±9 Min.
11	60 Hr.	1 Hr.	1 Hr.	±18 Min.

Reset Time: 500 mS at maximum setting
Voltage/ Frequency:
120 V (+10 -15%) 50/60 Hz
240 V (+10 -15%) 50/60 Hz
Power Consumption: 1.5 watts
Contact Rating:
10 Amps Resistive / Inductive @ 120vAC 1/6 HP @ 120VAC
5 Amps Resistive / Inductive @ 240VAC 1/2 HP @ 240VAC
Electrical Contact Lifetime: Average, contingent on load characteristics. Inrush current should not exceed 10 amps.
At full load: 250,000 cycles
At 1 amp load: 5 million cycles

Power On Response:
28 ms average pull-in
17 ms average drop-out
Operationg Temerature: -10 to +140 F (-23 to +60 C)
Approximate weight: 1.7 lbs.
Agency Approvals: FM; UL/CUL Recognition E61735

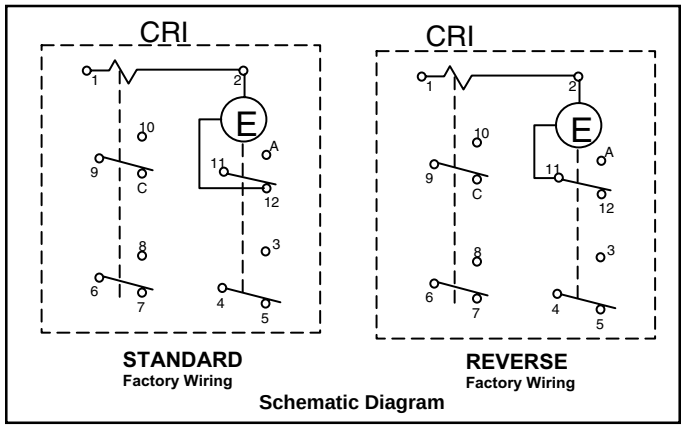
OPERATION (reference Schmatic Diagram)

Standard: Instantaneous contacts 9-10-C and 6-7-8 operates directly with power applied to 1, 11(E) and 2. Different operating sequences are possible 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.

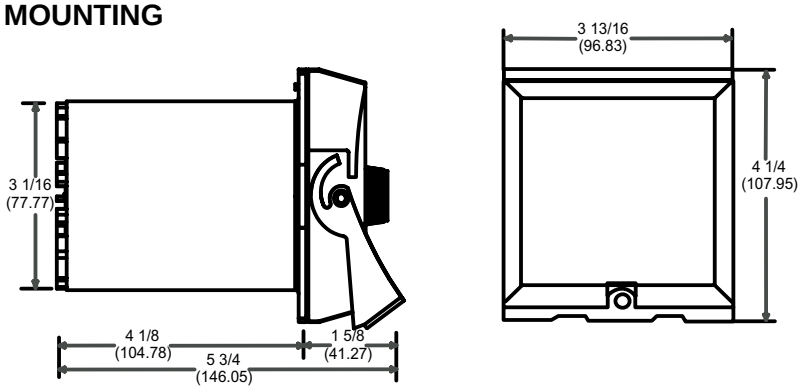
Reverse Start: Instantaneous contacts 9-10-C and 6-7-8 operates directly with power applied to 1, 11(E) and 2. Different operating sequences are possible depending on the control circuit configuration.

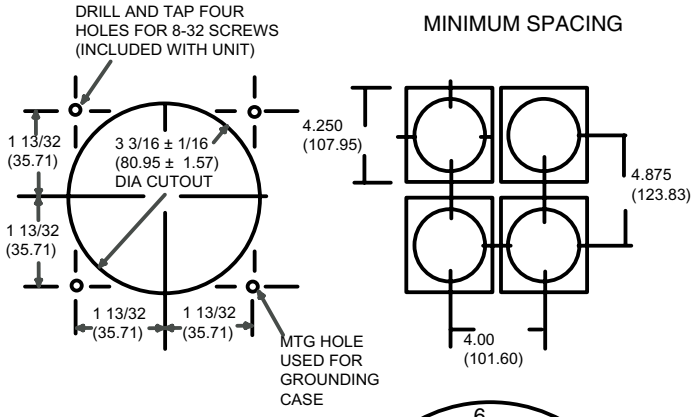
Delayed contacts 4- 3 and 11- A close and contacts 4- 5 and 11- 12 open when timer reaches a timed out position. Contacts 4- 5 and 11- 12 close and contacts 4- 3 and 11- A open when timer is reset.



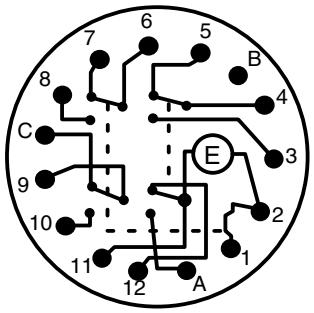
Schematic Diagram

MOUNTING





TERMINALS AND WIRING DIAGRAM ON REAR OF TIMER CASE



ENCLOSURES

Model No.	NEMA Class	Description
HN308	1	Surface Mtg. with terminal block
HN364	1	Surface Mtg. without terminal block

ACCESSORIES

Model No.	Description
H-5331	Mounting Brackets (2 required per timer)
HP50-31	One Hole Mounting Ring
HP50-131	CYCL-FLEX Water-Sealed Housing
HP50-133	Surface Mounting Adapter to use in place of brackets
HP50-295E	Dial Lock

ORDERING INFORMATION

HP5E **15** **A6** **01**

TIME RANGE

Symbol	Description	Symbol	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

Symbol	Description
A6	120V, 50/60 Hz
B6	240V, 50/60 Hz

FEATURES

Symbol	Description
01	Reverse
07	Dial Lock

HQ4E® Percentage Timer

Economical, accurate percentage timer for adjustable on time of a fixed cycle... ideal for irrigation control, chemical injection,

File No. E61735

The HQ4E 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. The HQ4E series 48 percentage timer 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 relays are enclosed for environmental protection.Electrical connections are made to captive screw terminals on the rear of the unit.

OPERATION

Percentage settings are made with a knob and a dial on the front of the unit. Settings may be made or changed with the timer operating. At 100 percent setting, terminals 2 and 3 are closed continuously. At zero percent setting, terminals 2 and 3 are open continuously.

SPECIFICATIONS

Time Ranges:

SYM	DIAL RANGE	SYM	DIAL RANGE
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:
24 VDC (+10, -20%)
120 VAC (+10, -15%) 50/60 Hz
240 VAC (+10, -15%) 50/60 Hz

Contact Rating:

INPUT	CONTACT RATING
24VDC	10A RESISTIVE, INDUCTIVE @120VAC,1/2HP@120/240VAC
120VAC	10A RESISTIVE, INDUCTIVE @120VAC,1/6HP@120VAC
240VAC	5A RESISTIVE, INDUCTIVE @240VAC,1/2HP@240VAC

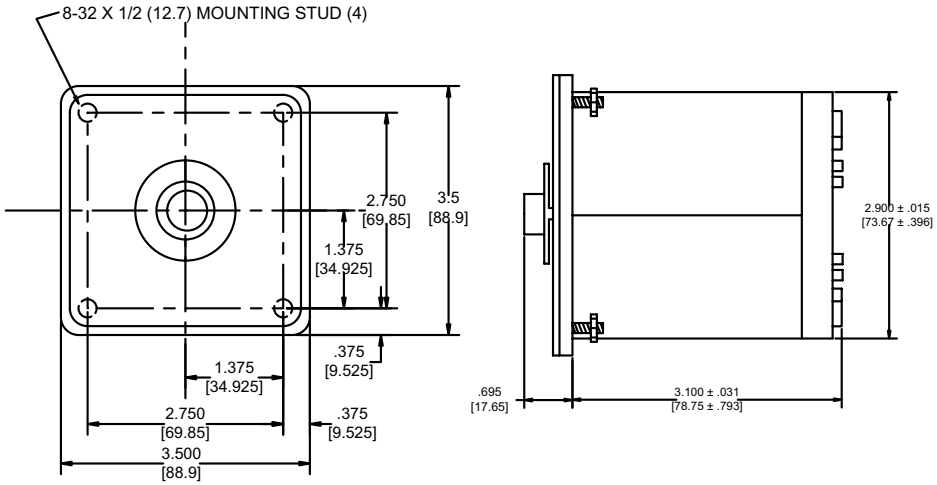
Setability: ±1% of total time cycle

Temperature Range: -10° to 140°F (-23° to +60°C)

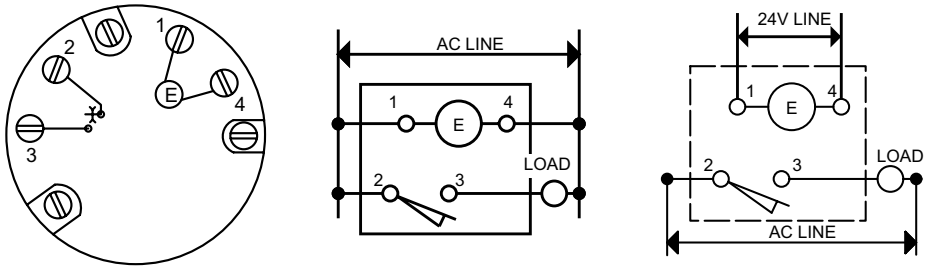
Power Consumption: 1.2 Watts

Agency Approvals: UL/CUL Recognition E61735

MOUNTING



WIRING DIAGRAMS



ORDERING INFORMATION

HQ4E **01** **S48** **A6**

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.		

SERIES

VOLTAGE & FREQUENCY

Sym.	Description
A6	120V, 50/60 Hz
B6	240V, 50/60 Hz
Z1	24 VDC

HQ9E® Percentage Timer

Adjustable timing as a percentage of overall cycle... ideal for heat control, machine lubrication, etc.

File No. E61735

The HQ9E Percentage Timer for use where Repetitive "ON" time of a fixed cycle is to be varied.

The HQ9E offers accurate efficient control for many industrial applications. A few of these are Motor Control, Electric Heaters Ovens Program Temperature Controls, Chemical Feeding Lubrication Systems.

Standard features include a pilot light that is steady on when relay is energized and blinks when relay is de-energized. (During on portion of cycle)

The HQ9E Percentage Timer is compatible with the Cycl-Flex Series featuring the unique plug-in mounting

OPERATION

A Mirco-controller unit switches a relay contact for a percent (per dial setting) of the total time cycle. Setting 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. The load contacts transfers as the cycle progresses pass the setting pointer as indicated by the LED array. The HQ9E continues to operate as a repeat cycle timer as long as power is supplied to E terminals. "On" time is adjustable from 5% to 100% of the total time range. Load connection are made as required to form-C contacts 3,4 & 5. (see wiring diagram)

SPECIFICATIONS

Time Ranges:

SYM	DIAL RANGE	SYM	DIAL RANGE
01	15 Sec.	08	15 Min.
02	30 Sec.	09	30 Min.
03	60 Sec.	10	1 Hr.
04	120 Sec.	11	2 Hrs
06	5 Min.	14	20 Hrs..

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

Contact Rating:
10 Amps Resistive, Inductive @ 120VAC; 1/6 HP @ 120VAC
5 Amps Resistive, Inductive @ 240VAC; 1/2 HP @ 240VAC

Setability: ±1%

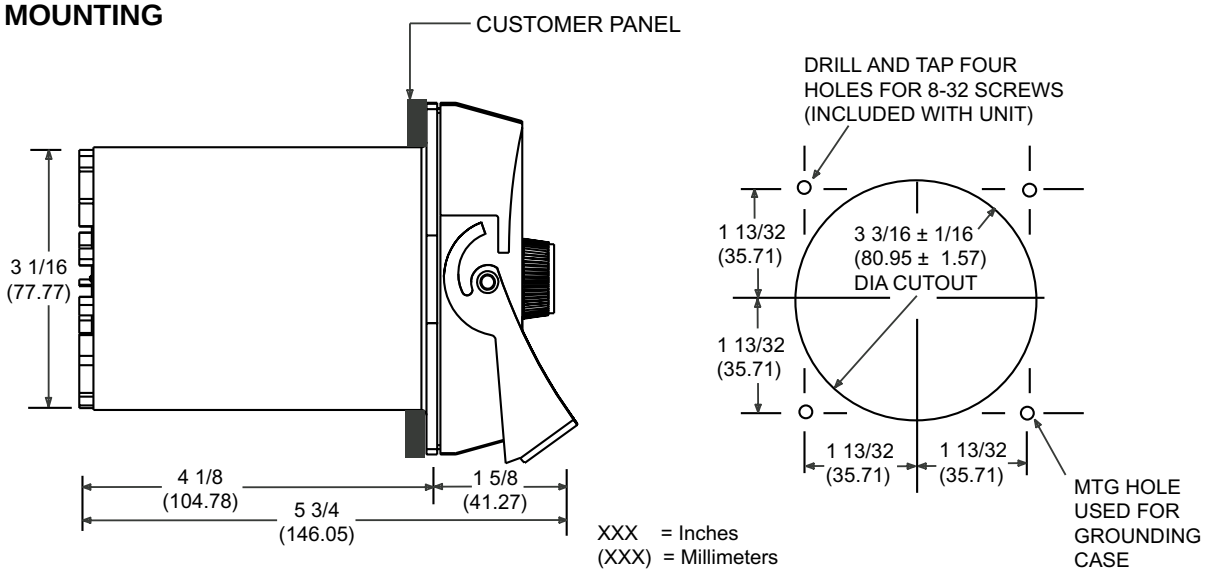
Temperature Range: -10° to 140°F (-23° to +60°C)

Power Consumption: 1.2 Watts

Agency Approvals: UL/CUL Recognition E61735

NOTE: Because of precise adjustment and calibration procedures, it is recommended that all repair or part replacement be done at the factory.

MOUNTING



WIRING

Standard CW Dial References the operation of the load when connected to terminal number 3 "ON Time" adjustment 5% to 100%

ORDERING INFORMATION

Consult Customer Service for availability of other time ranges, voltages, and frequencies.

HQ9E **06** **A6** **07**

Symbol	Time Range	Symbol	Time Range
01	15 Sec.	08	15 Min.
02	30 Sec.	09	30 Min.
03	60 Sec.	10	1 Hr..
04	120 Sec.	11	2 Hr.
06	5 Min.	14	20 Hr.

VOLTAGE & FREQUENCY

Symbol	Description
A6	120V, 50/60 Hz
B6	240V, 50/60 Hz

FEATURES

Sym.	Description
07	Dial Lock

B866 Multi-Function Timer

Simple dial set timer …Multiple time ranges and versatile functions

File No.: E96337

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: ± 5%

Repeat Accuracy: ± 0.5%

Electrical Service Life: 100,000 cycles at full load

Mechanical Service Life: 10 million cycles at min. load

Environmental:

Front Panel Rating: IP54

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

Storage Temperature: -40° to 90° C (-40° to 194° F)

Humidity: 35% to 85% RH non-condensing

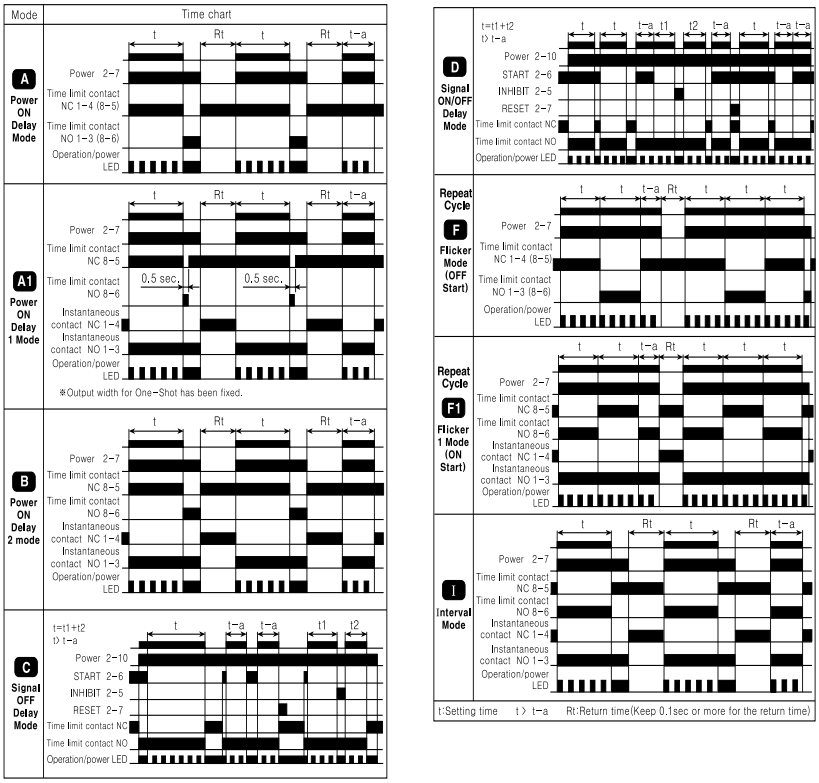
Weight: 100 grams (3.5 ounces)

Approvals:

B866-100, -500: UL, CUL recognized, CE compliant
B866-511: UL, CUL recognized

OPERATING MODES

Timing Modes



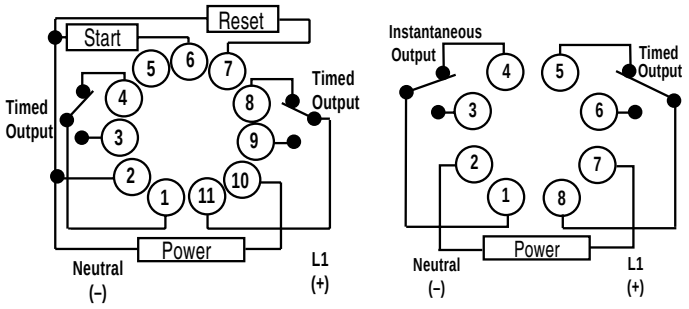
※ Time setting should be 100ms minimum if using Output Modes F or F1. Shorter time settings may be inaccurate due to relay contact reaction time.

Modes Available for Model

Model	-500	-100	-511
Timing Mode			
A	X	X	X
A[1]	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
F[1]	X	X	X
I	X	X	X

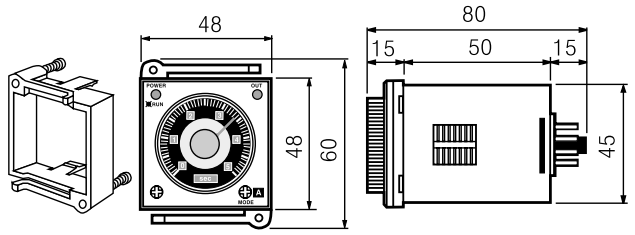
X= Available on Model
N/A= Not Available on Model

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

BRE Reset Timer

Electronic low profile surface mount reset timer... features 11 time ranges

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.

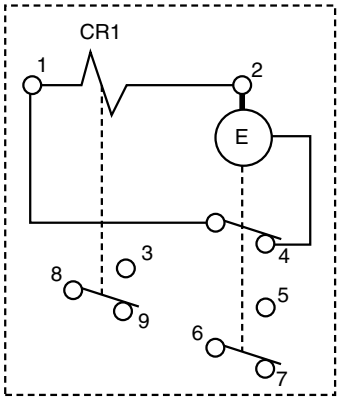
The case of the BR series timer is injection molded Lexan®. This material is recognized by Underwriters Laboratories for use as the sole support of current carrying components. Lexan is self-extinguishing, has a high impact strength, and high dimensional stability.

OPERATION

The NEW BRE series reset timers are micro processor 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.

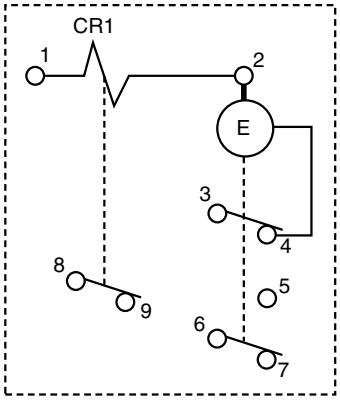
Standard Start

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

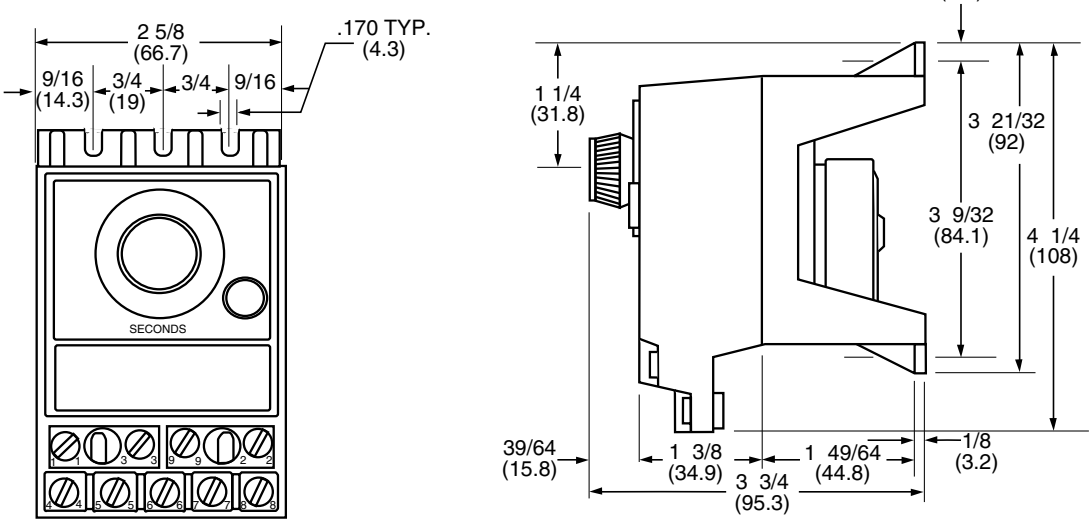
Minimum Setting: 2% of full scale

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

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

FEATURES

Sym.	Description
Blank	Standard Timer
01	Reverse Start

B856 Multi-Function Timer

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

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: ± 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)

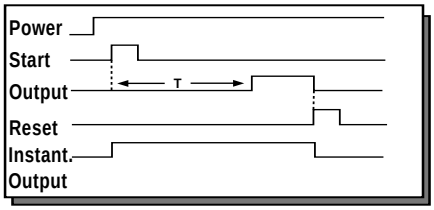
Approvals:

B856-500 & -501: UL and CUL recognized, CE marked
B856-511: UL and CUL recognized

OPERATING MODES

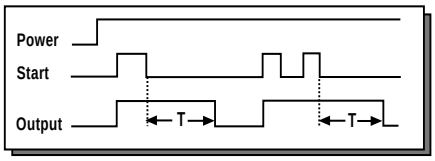
On-Delay

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.*



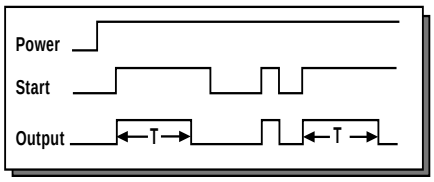
Off-Delay

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.



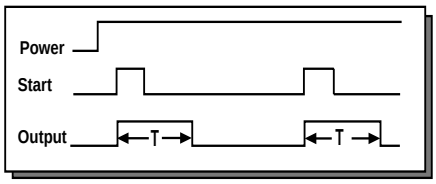
Interval 1

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.



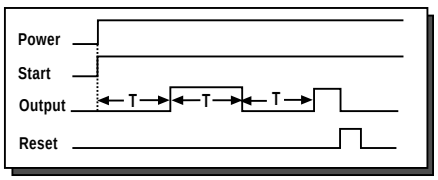
Interval 2

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.



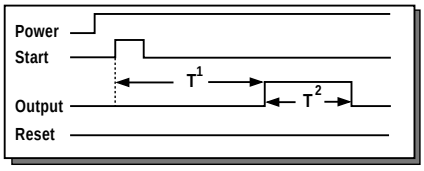
Repeat Cycle

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

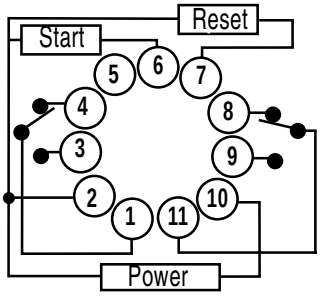
The delay cycle begins upon application of the start signal. The output will activate at the completion of the preset time (T1). Upon activation of the output, the Interval cycle will begin. The output will be deactivated at the end of the Interval time (T2). T1 is the primary preset value. T2 is settable 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.

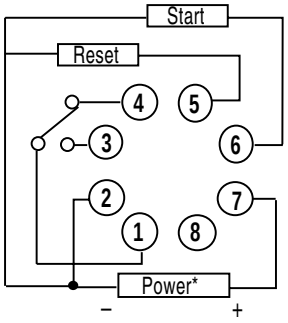
Connections

B856-500 & -511



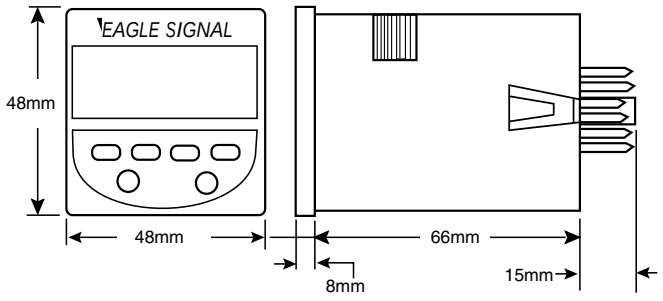
For the -511 version, Pins 1, 3, 4 are the instantaneous contacts

B856-501



* 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 Facing Terminals	PBT-03172
B856-501:	
8 Pin Socket	60SR2P06
8 Pin Socket - Outward Facing Terminals	PBT-03155

B506 1/16 DIN LED Timers

A compact 1/16 DIN size timer… combines the visibility of LED display with advanced functionality

File No.: E96337

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

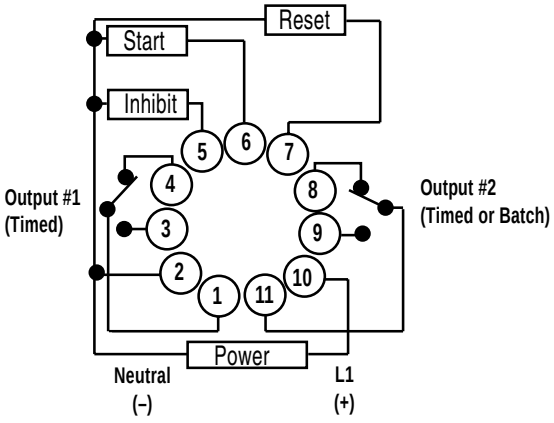
Outputs: Relay (B506-200X) - 2 SPDT (5 amp) - 15 ms max latency; Transistor (B506-205X) - NPN Open Collector - 30 VDC, 30 mA max. opto isolated

Power Consumption: <10 VA max @ 240 VAC, 200 mA @ 24 VDC

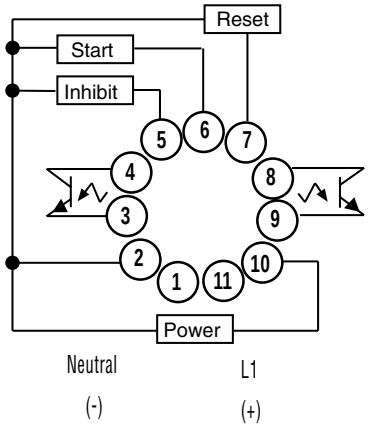
Resolution: Settable for XXXX or X.XXX for hrs., mins., and secs. ranges

WIRING REFERENCE

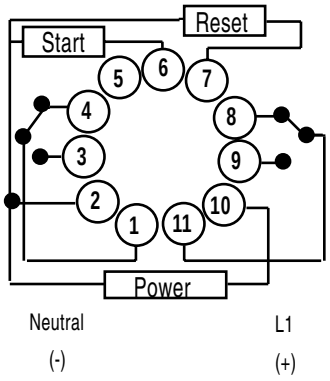
B506-2001/2, B506-7001/2



B506-2051/2, B506-7051/2



B506-5001/2



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

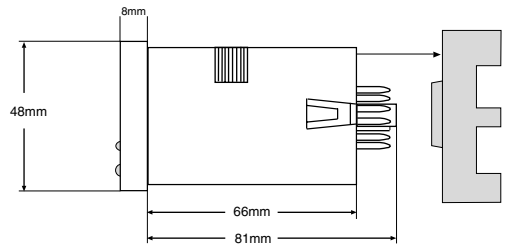
High Performance Model

- 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:



B90D DIN Rail Mount Timer

Space Saving 22.5 mm wide multifunction timer with digital setting

E195335

RECOGNIZED RECOGNIZED

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

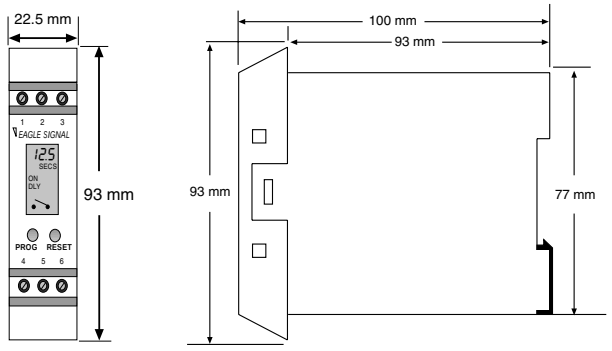
Operation:
Power Source: Two non-replaceable 3V lithium batteries, 10 years expected life
Time Ranges: 0.2 to 99.9, 1 to 999 secs. 0.01 to 9.99, 0.1 to 99.9, 1 to 999 min. 0.01 to 9.99, 0.1 to 99.9, 1 to 999 hrs.
Operating Modes: On-Delay, Off-Delay, Interval, Symmetrical Repeat Cycle (On or Off start), 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:



C628 AWESOME Elapsed Timers

Large, blazing bright, color-changing display… cumulative or single timing operation

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

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 ≤ 2.0 VDC, Logic High ≥ 3.0, 30V max.
Impedance: 10 KΩ to common - Sourcing; 4.7 KΩ to +Voltage - Sinking

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 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.

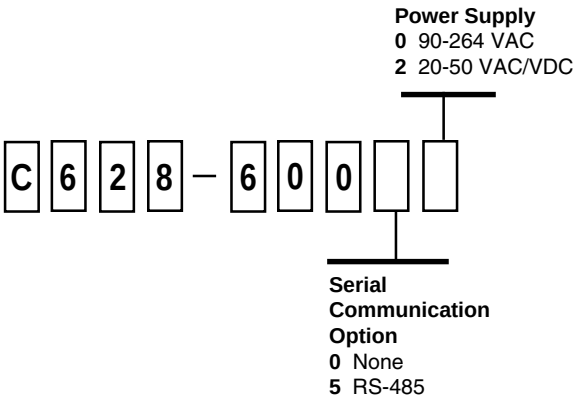
Operating Temp.: 0° to 55° Celsius, 32° to 131° Fahrenheit

Storage Temp.: -20° to 80° Celsius, -4° to 176° Fahrenheit

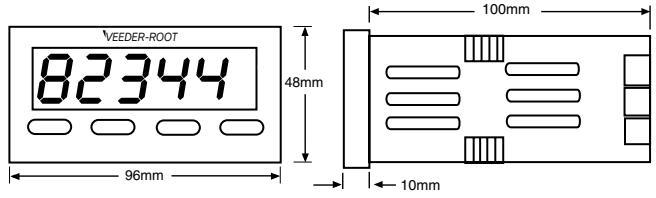
Relative Humidity: 20% to 95% non-condensing

Approvals: CE, UL, CUL

Ordering Information:



Dimensions:



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

SX210 Microprocessor Digital Timer

Economical, electronic, single setpoint reset timer... with 8 time ranges and 8 operating modes

RECOGNIZED CERTIFIED

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

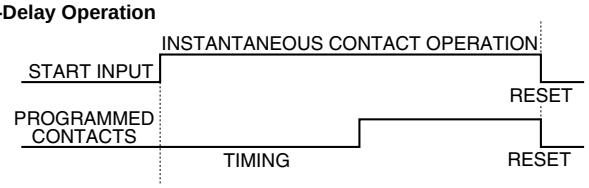
Static Discharge: Unit function is unaffected by a constant 3600 volt peak, 60 Hz discharge applied to the grounded front plate at a relative humidity of less than 25%

Transient Protection: Immune to 2500 volts peak transients up to 50 microseconds in duration

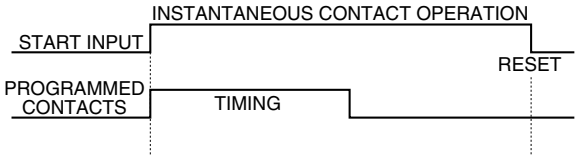
Approvals: UL Recognition E96337
CSA Certification LR26861

OUTPUT OPERATING MODES

ON-Delay Operation



Interval Operation



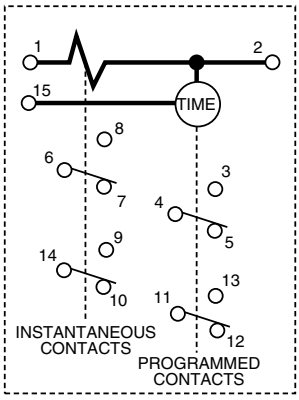
ON-Delay Operation with Time Totalization

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.

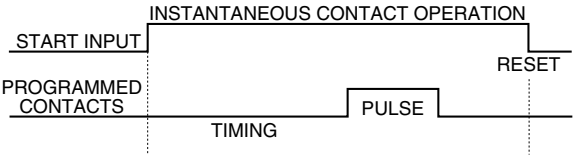
Interval Operation with Time Totalization

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.

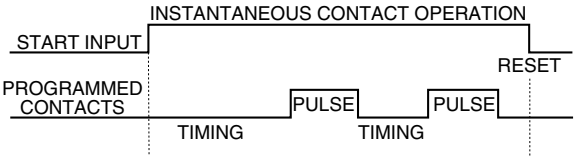
WIRING



Single-Pulse Operation



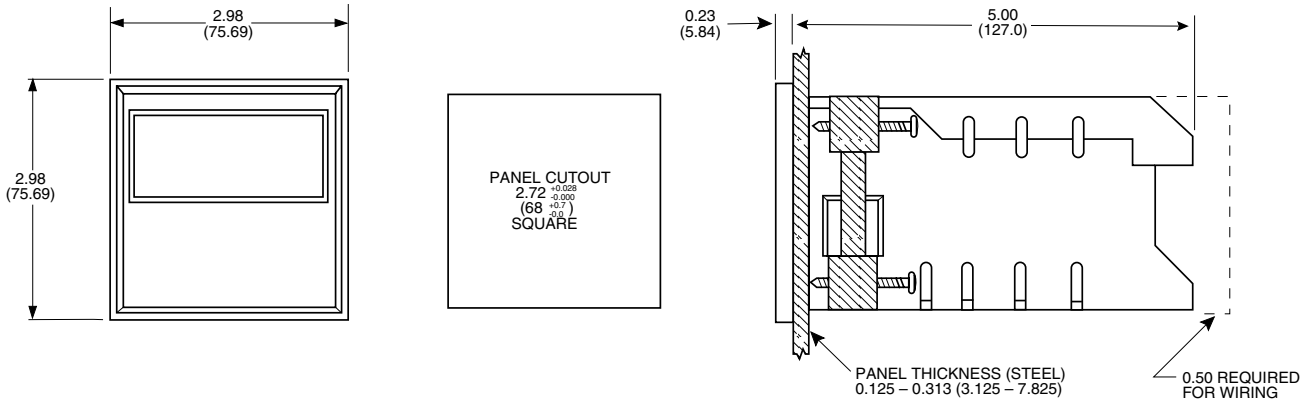
Pulse and Repeat Operation



5 ELECTRONIC TIMERS

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.



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

SX160 Dual Setpoint Repeat Cycle

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

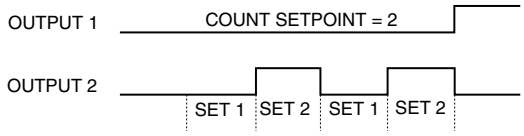
Static Discharge: Unit function is unaffected by a constant 3600 volt peak, 60 Hz discharge applied to the grounded front plate at a relative humidity of less than 25%

Transient Protection: Immune to 2500 volts peak transients up to 50 microseconds in duration

OUTPUT OPERATING MODES

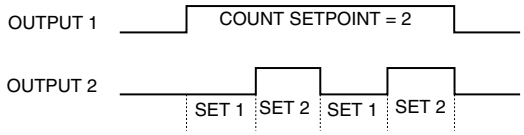
ON-Delay Counter Output Operation

Output 2 performs the repeat cycle timing operation. Output 1 energizes at the end of the programmed number of repeat operations.



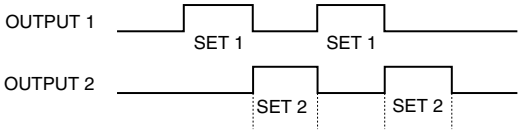
Interval Counter Output Operation

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.

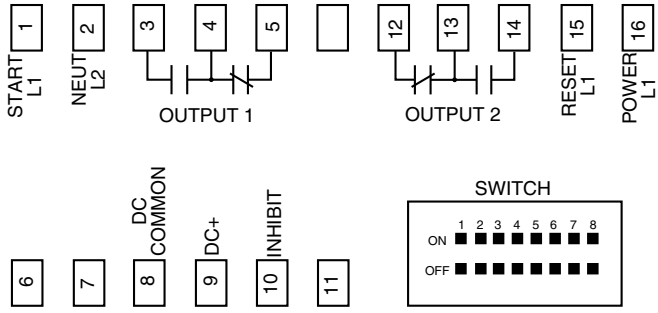


Repeating Sequence Intervals

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.



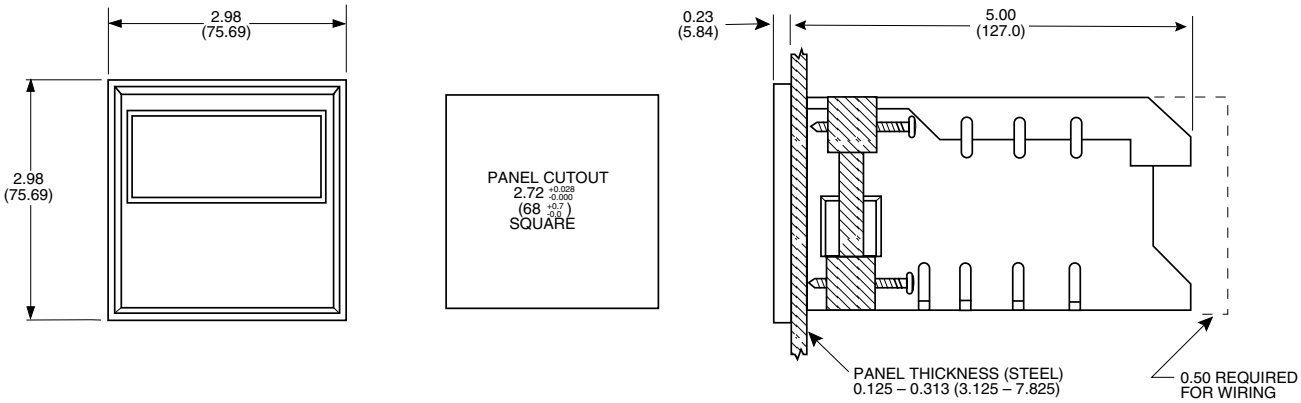
TERMINAL ASSIGNMENTS



Terminals 6, 7, and 11 are not used on the SX160 timer.

MOUNTING

The SX160 timer uses two removable mounting clips with adjustable screws to mount the enclosure in a panel as shown below.



ORDERING INFORMATION

SX1 **60** **A6**

OUTPUT TYPE

Sym.	Description
60	Relay Output

VOLTAGE & FREQUENCY

Sym.	Description
A6	120 VAC, 50/60 Hz

SX110 Three Setpoint Repeat Cycle

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

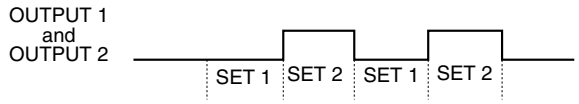
Static Discharge: Unit function is unaffected by a constant 3600 volt peak, 60 Hz discharge applied to the grounded front plate at a relative humidity of less than 25%

Transient Protection: Immune to 2500 volts peak transients up to 50 microseconds in duration

OUTPUT OPERATING MODES

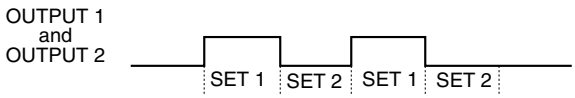
DPDT - OFF Time First

Both outputs are energized together. The OFF time defined by Setpoint 1 (SEt1) occurs first.



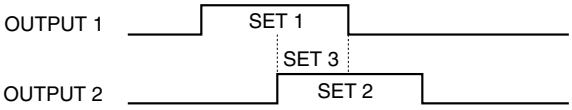
DPDT - ON Time First

Both outputs are energized together. The ON time defined by Setpoint 1 (SEt1) occurs first.



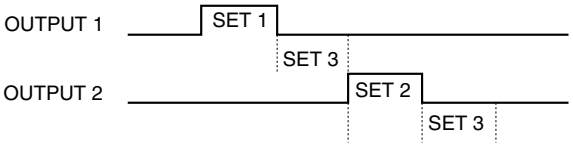
Overlapping Intervals

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.

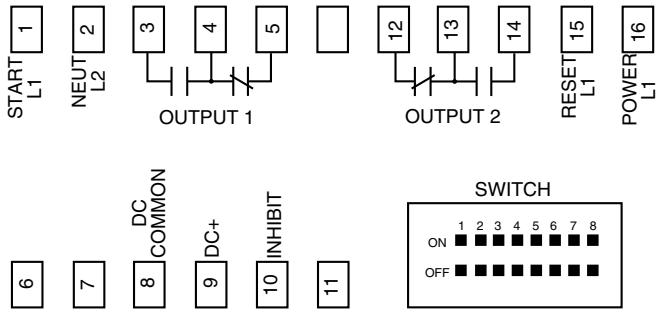


Non-Overlapping Intervals

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.



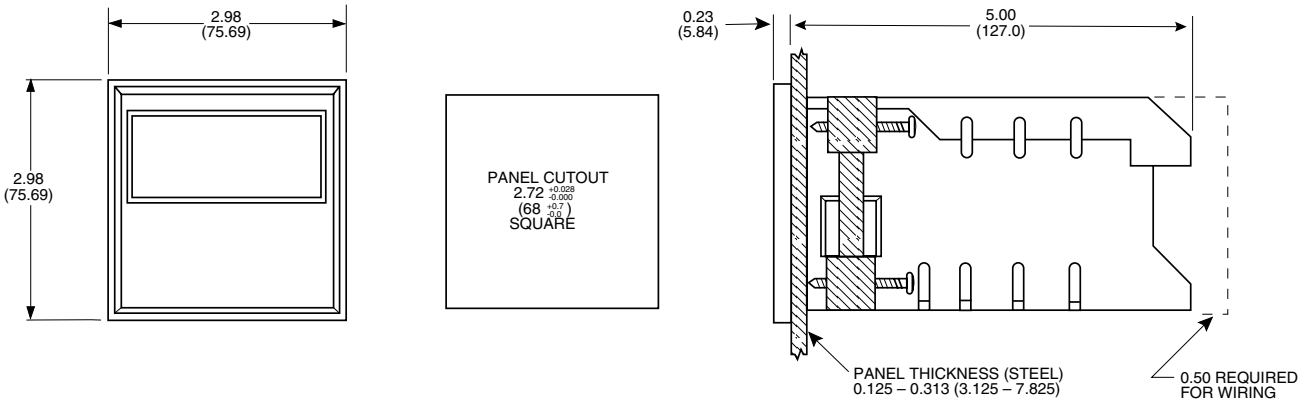
TERMINAL ASSIGNMENTS



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.



ORDERING INFORMATION

SX1 **10** **A6**

OUTPUT TYPE

Sym.	Description
10	Relay Output

VOLTAGE & FREQUENCY

Sym.	Description
A6	120 VAC, 50/60 Hz

SX410/430 Dual Setpoint Timer

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

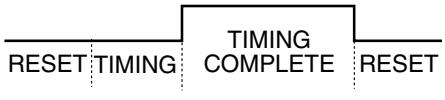
Vibration: Unit function is unaffected by 2.5G sinusoidal vibration magnitude in both directions of the perpendicular mounting axes imposed from 10 to 100 Hz

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%

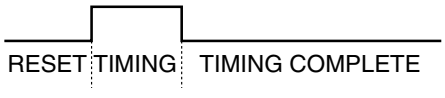
Transient Protection: Immune to 2500 volts peak transients up to 50 microseconds in duration

OUTPUT 1 OPERATING MODES

ON-Delay
Output 1 is energized at the end of the timing cycle.



Interval
Output 1 is energized during the timing cycle.



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.

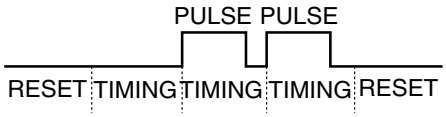
OUTPUT 1 OPERATING MODES CONT.

ONTimed Pulse Output

Output 1 is energized for a programmable pulse time up to 99.99 seconds at the end of the timing cycle.

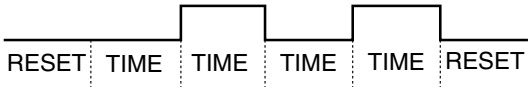
Timed Pulse and Repeat

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.



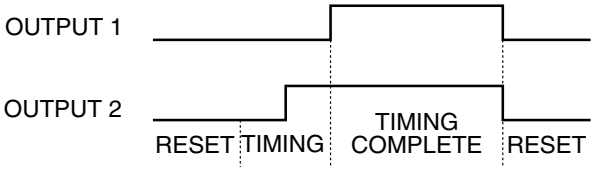
Repeat Cycle, ON or OFF Time Cycle First

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.

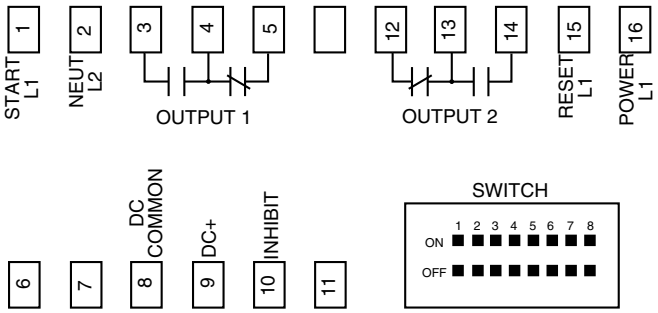


OUTPUT 2 OPERATING MODES

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.

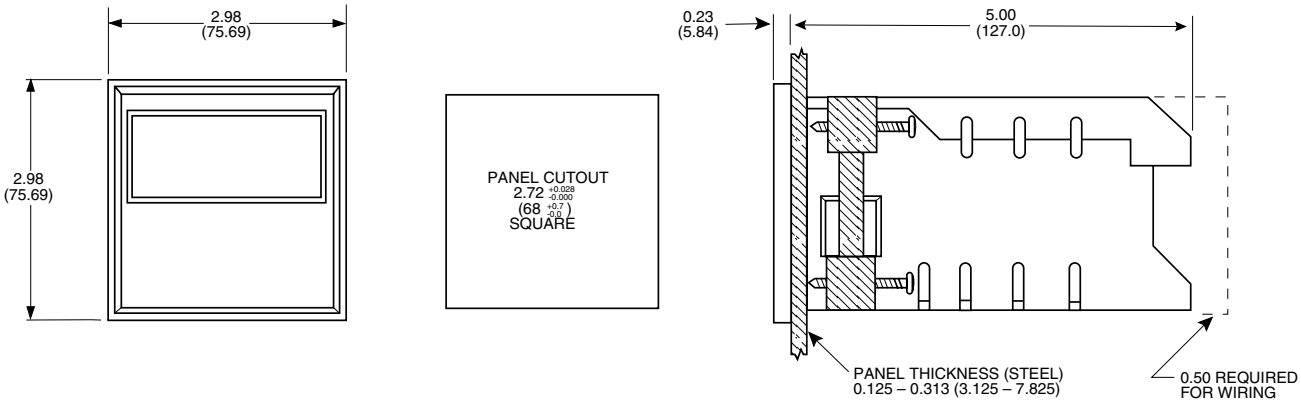


TERMINAL ASSIGNMENTS



MOUNTING

The SX400 timer uses two removable mounting clips with adjustable screws to mount the enclosure in a panel as shown below.



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

SX460 Dual Output Interval with Inhibit

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

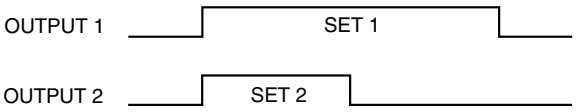
Vibration: Unit function is unaffected by 2.5 G sinusoidal vibration magnitude in both directions of the perpendicular mounting axes imposed from 10 to 100 Hz

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%

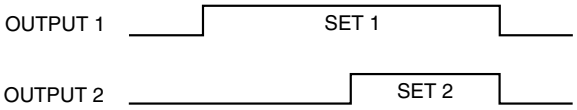
Transient Protection: Immune to 2500 volts peak transients up to 50 microseconds in duration

OUTPUT OPERATING MODES

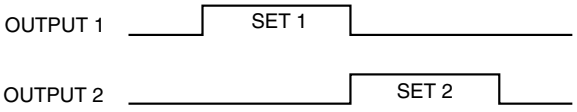
Simultaneous Intervals, Beginning Together
Both outputs are energized together. They have separately programmable timing intervals.



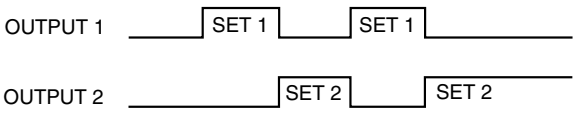
Simultaneous Intervals, Ending Together
Output 1 is energized first. The setpoint for Output 2 determines how long before the end of the Output 1 interval that Output 2 is energized.



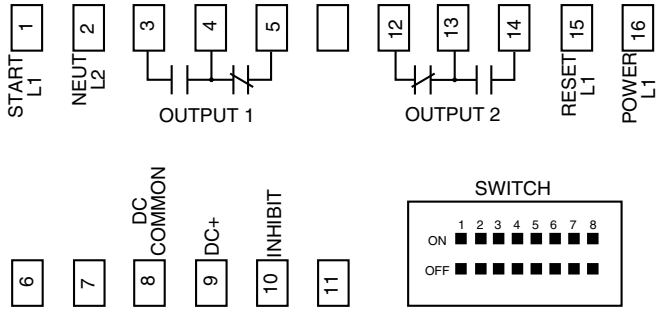
Sequential Intervals
The timing interval for Output 1 is followed by the timing interval for Output 2.



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.

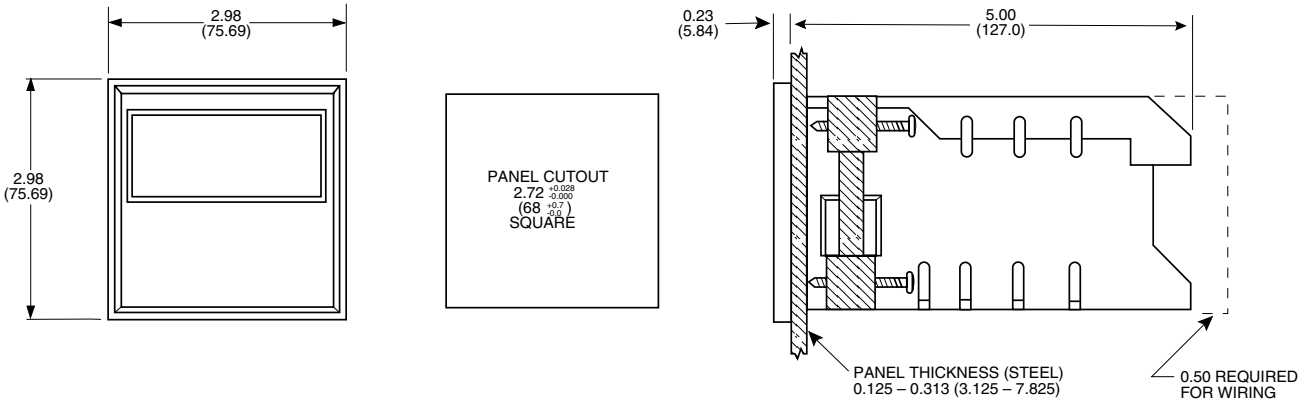


TERMINAL ASSIGNMENTS



MOUNTING

The SX460 timer uses two removable mounting clips with adjustable screws to mount the enclosure in a panel as shown below.



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

CX200 Microprocessor Timer/Counter

Microprocessor based solid state timer/ counter... housed in CYCL-FLEX® case

RECOGNIZED CERTIFIED

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 annunicators 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
- Non-volatile memory data retention

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)

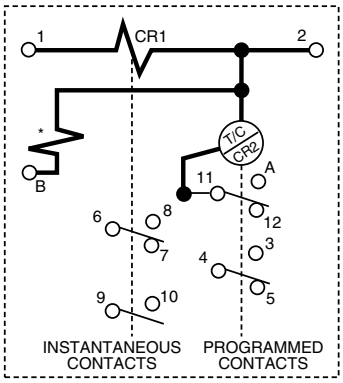
Output Rating: Relay: 10 amp (resistive), 120 VAC
Mechanical Life: 20 million operations
Electrical Life: contingent upon controlled load
Solid State: 1 amp, 0-264 VAC, VDC

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

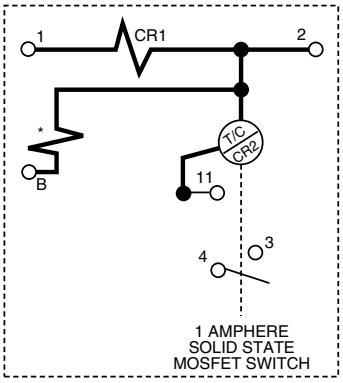
Static Discharge: Unit function is unaffected by a constant 3600 volt peak, 60 Hz discharge applied to the grounded front plate at a relative humidity of less than 25%

Agency Approvals: UL Recognition E96337
CSA Certification LR26861

CX200 TERMINAL ASSIGNMENTS

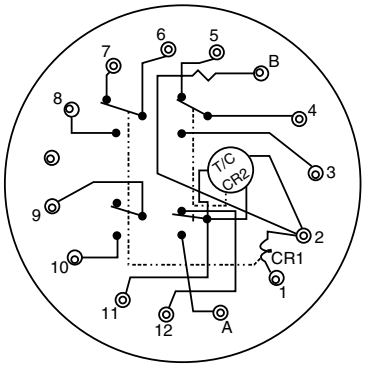


*COUNT INPUT/TIME INHIBIT

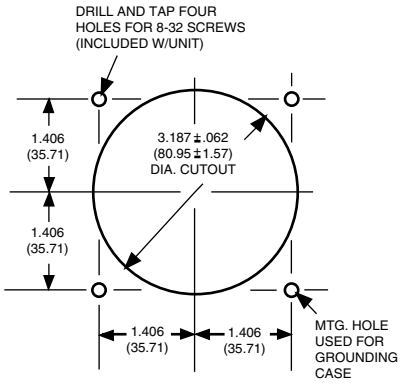


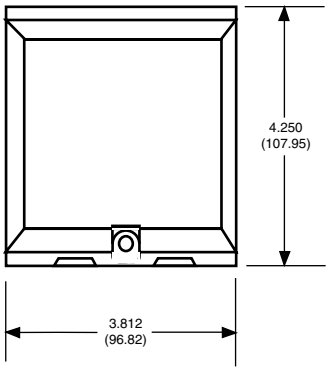
*COUNT INPUT/TIME INHIBIT

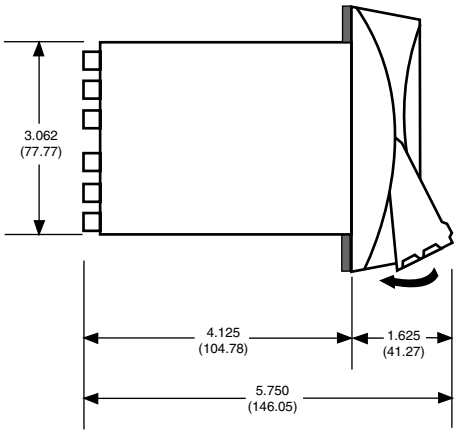
TERMINALS AND WIRING DIAGRAM ON REAR OF TIMER CASE



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
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

CX300 Microprocessor Timer/Counter

Microprocessor based timer/counter housed in the industrial standard CYCL-FLEX® case

RECOGNIZED CERTIFIED

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)
- Non-volatile memory data retention

SPECIFICATIONS

Time/Count Ranges:

Sym.	Maximum Range	Minimum Setting	Count Rate
1	19999 Cts.	1 Ct.	4000/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

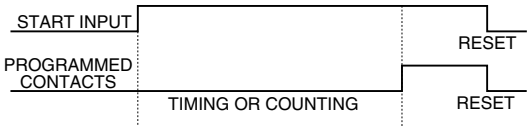
Static Discharge: Unit function is unaffected by a constant 3600 volt peak, 60 Hz discharge applied to the grounded front plate at a relative humidity of less than 25%

Approvals: UL Recognition E96337
CSA Certification LR26861

OUTPUT OPERATING MODES

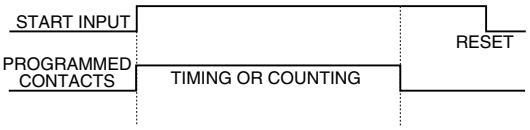
ON-Delay Operation

The contacts are energized at the end of the timing/counting cycle and remain energized until the unit is reset.



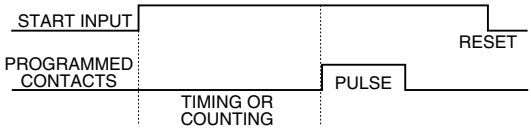
Interval Operation

The contacts are energized during the timing/counting cycle and then shut off at the end of the cycle.



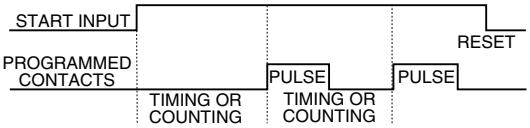
Pulse Output Operation

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..

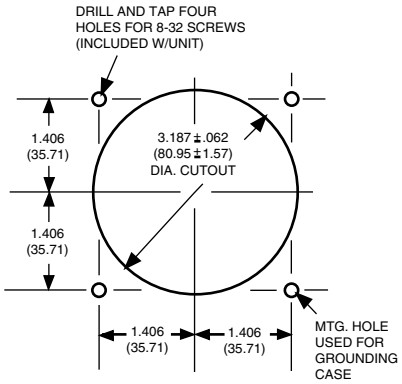


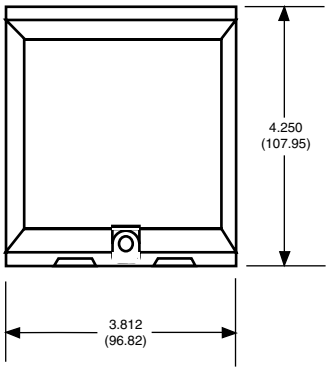
Pulse and Repeat Operation

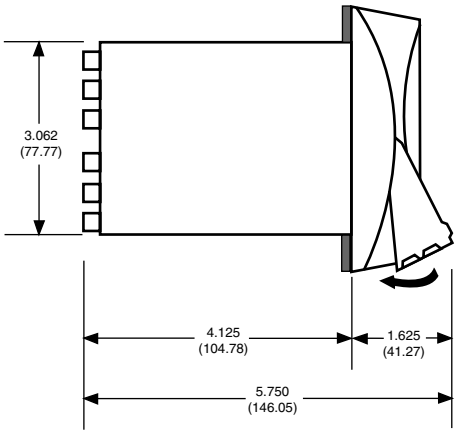
The contacts are energized at the end of the timing/counting cycle for a pulse which is user programmable. At the same time that the cycle is completed and the pulse output begins, the timing/counting cycle resets and begins again. This repeat operation continues as long as the start circuit is energized.



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
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

CX400 Dual Setpoint Timer/Counter

Dual setpoint, microprocessor based timer/counter... packaged in CYCL-FLEX® case

RECOGNIZED CERTIFIED

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)
- Non-volatile memory data retention

SPECIFICATIONS

Time/Count Ranges:

Sym.	Maximum Range	Minimum Setting	Count Rate
1	19999 Cts.	1 Ct.	4000/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)

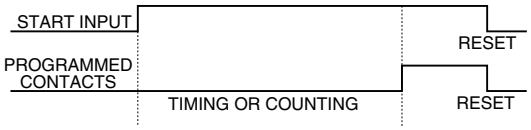
Output Rating:
Relay Contacts:
Instantaneous: 10 amp (resistive), 120 VAC
Delayed: 5 amp (resistive) @ 120 VAC, 60 Hz
Early Trip: 5 amp (resistive) @ 120 VAC, 60 Hz
Mechanical Life: in excess of 20 million operations
Electrical Life: contingent upon contact load
Solid State: 1 amp, 0-264 VAC, VDC

Approvals: UL Recognition E96337
CSA Certification LR26861

OUTPUT OPERATING MODES

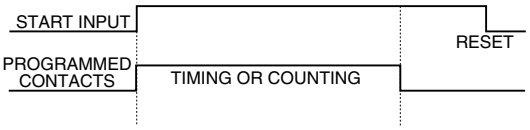
ON-Delay Operation

The contacts are energized at the end of the timing/counting cycle and remain energized until the unit is reset.



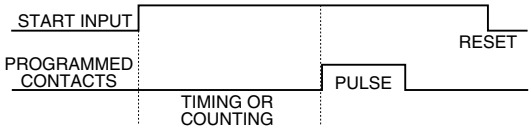
Interval Operation

The contacts are energized during the timing/counting cycle and then shut off at the end of the cycle.



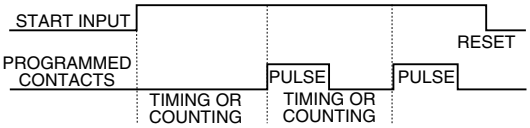
Pulse Output Operation

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..

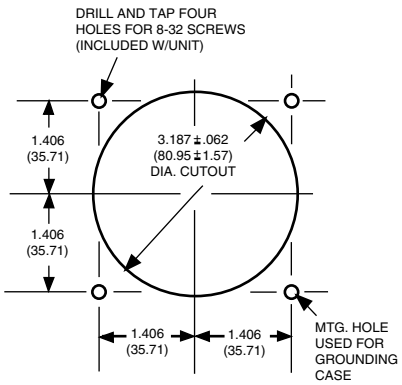


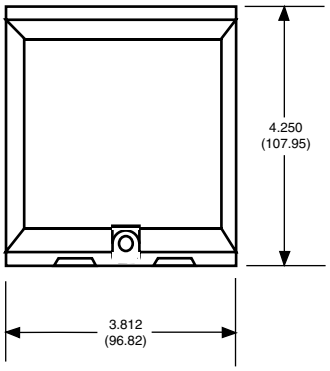
Pulse and Repeat Operation

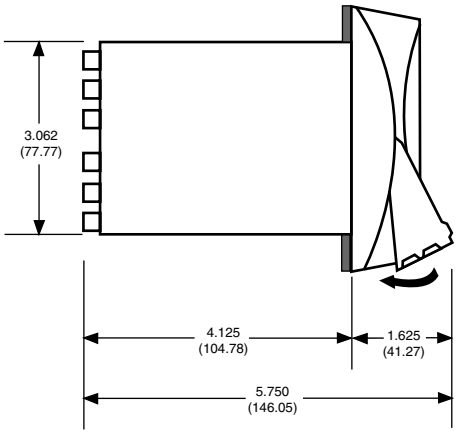
The contacts are energized at the end of the timing/counting cycle for a pulse which is user programmable. At the same time that the cycle is completed and the pulse output begins, the timing/counting cycle resets and begins again. This repeat operation continues as long as the start circuit is energized.



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
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

COUNTINPUT / 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

CX100 Repeat Cycle Timer

Continuously runs cycles with independently settable on/off ratio

RECOGNIZED CERTIFIED

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 programmed 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
- Non-volatile memory data retention

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

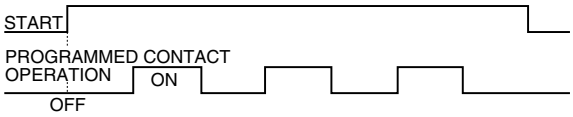
Vibration: Unit function is unaffected by 2.5G sinusoidal vibration magnitude in both directions of the perpendicular mounting axes imposed from 10 to 100 Hz

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%

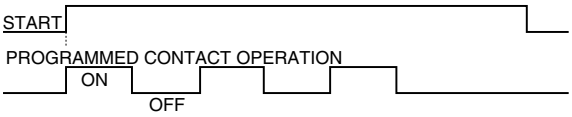
Approvals: UL Recognition E96337
CSA Certification LR26861

OUTPUT OPERATING MODES

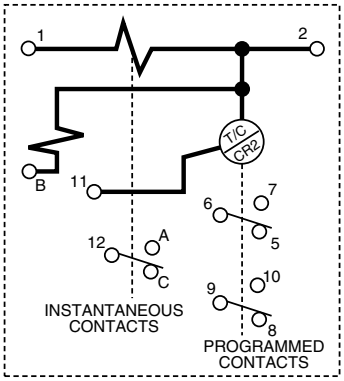
OFF Time First/Repeat Cycle Operation



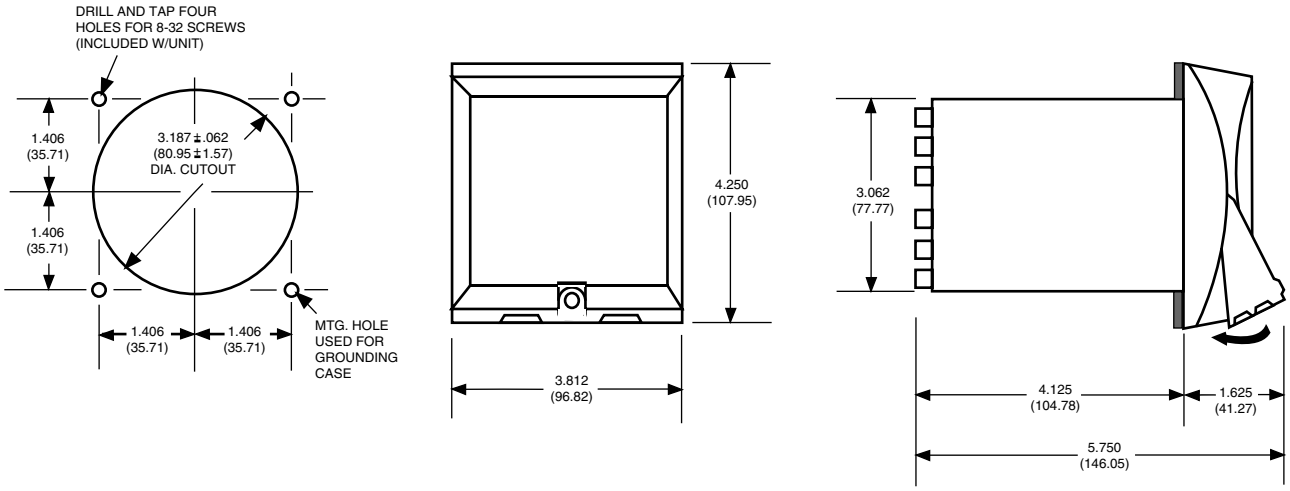
ON Time First/Repeat Cycle Operation



CX100 TERMINAL ASSIGNMENTS



MOUNTING



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
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

DG100 MINIFLEX® Solid State Timer

Family of compact timers... 1/8 DIN housing mounts in standard relay socket

RECOGNIZED CERTIFIED FM APPROVED

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

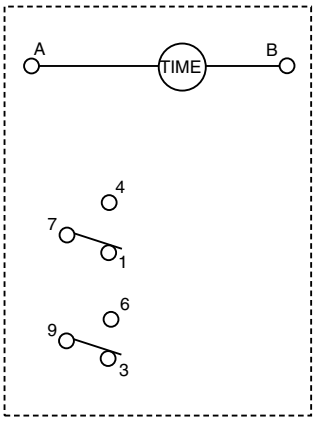
ON-Delay

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.

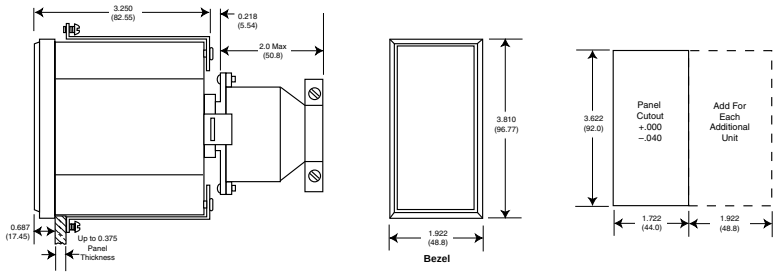
DG100 TERMINAL ASSIGNMENTS



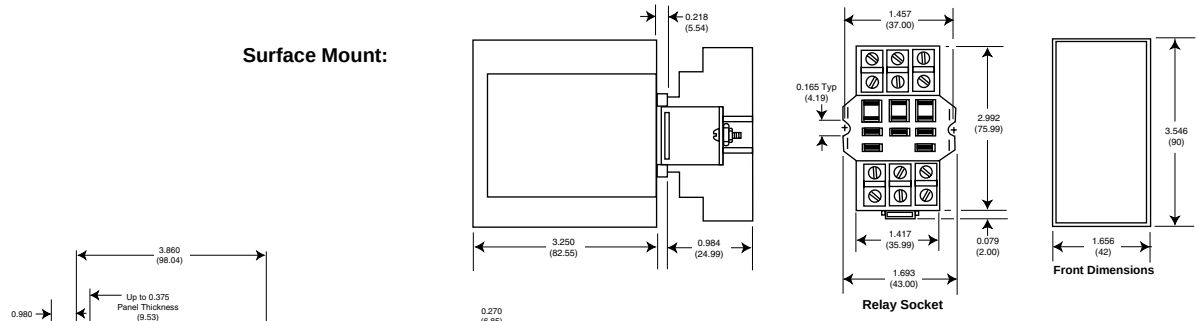
5 ELECTRONIC TIMERS

MOUNTING

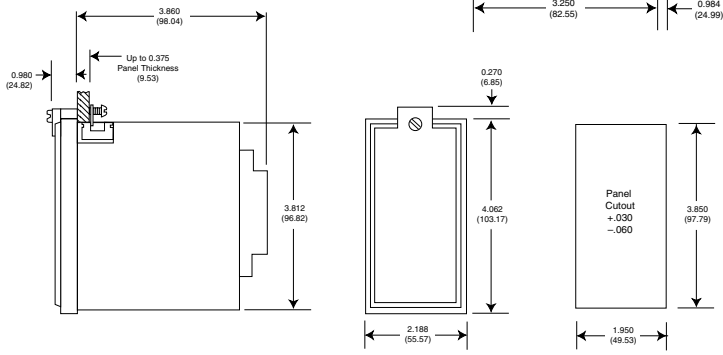
Panel Mount:



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

DG200 MINIFLEX® Digital Set Reset Timer

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

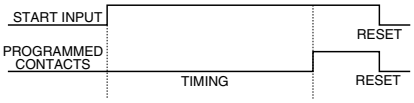
Vibration: Unit function is unaffected by 2.5G sinusoidal vibration magnitude in both directions of the perpendicular mounting axes imposed from 20 to 100 Hz

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%

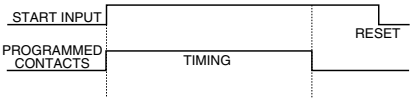
Transient Protection: Immune to 2500 volts peak transients up to 50 microseconds in duration

OUTPUT OPERATING MODES

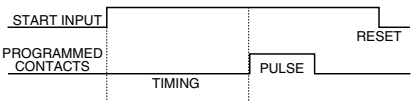
ON-Delay Operation
The output contacts are energized at the end of the timing cycle and remain energized until the unit is reset.



Interval Operation
The output contacts are energized during the timing cycle and deenergized at the end of the cycle.



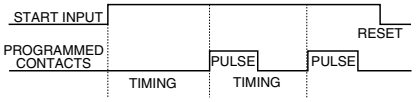
Timed Pulse Output Operation
The output contacts are energized at the end of the timing cycle for a 100 millisecond pulse output.



OUTPUT OPERATING MODES CONT.

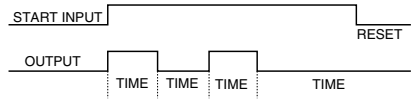
Timed Pulse and Repeat Operation

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.



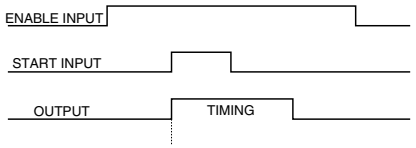
Repeat Cycle - ON First

The output contacts are energized for repeating ON and OFF periods. The ON and OFF time periods are the same length.



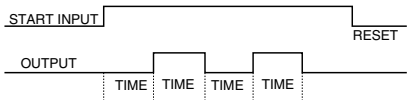
Single-Shot (DG203 Only)

When power is applied to start input, the output contacts energize and the time delay period starts. The output contacts deenergize at time out.



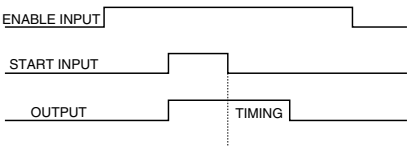
Repeat Cycle - OFF First

The output contacts are energized for repeating OFF and ON periods. The OFF and ON time periods are the same length.



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.

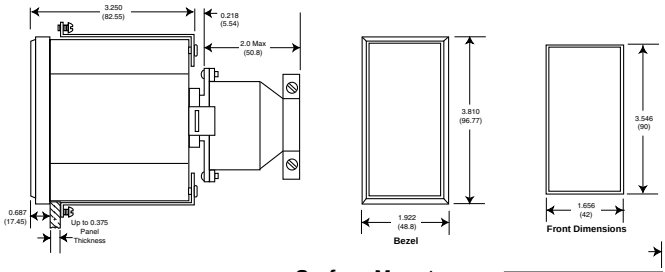


ACCESSORIES

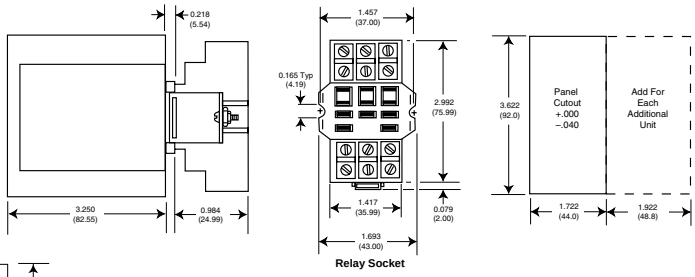
Model No.	Description
DZ100-51	Bezel Kit - for panel mounting. Includes (1) Bezel, (1) gasket, (2) brackets, and hardware
DZ100-54	Plug-in Housing
DZ100-56	Latch and Release Kit - Used with 60SR3B05 Socket
60SR3B05	Surface/Track Mount Square Base Socket

MOUNTING

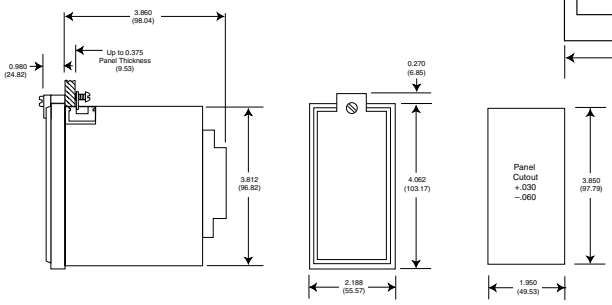
Panel Mount:



Surface Mount:



Plug-In Mount:



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

DA100 MINIFLEX® On/Off Repeat Cycle

Continuous repeat cycle timing in a compact 1/8 DIN case... fast, easy analog dial setpoint adjustment

RECOGNIZED CERTIFIED FM APPROVED

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

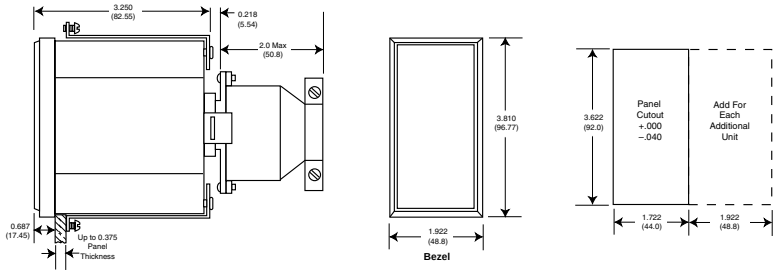
Transient Voltage Immunity: Unaffected by 50 microseconds, 600 V peak transients superimposed on the line input

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

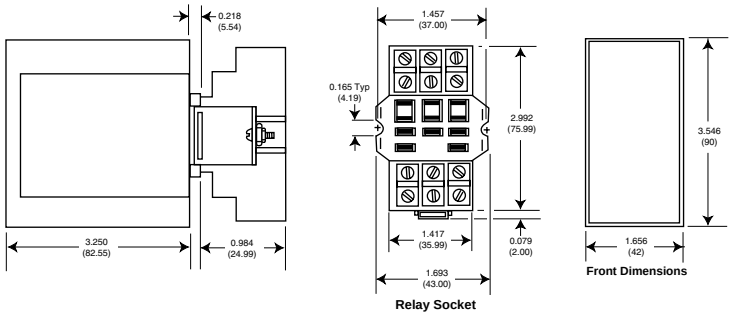
Approvals: UL Recognition E96337
CSA Certification L26861
FM Approved J10C8A4.AF

MOUNTING

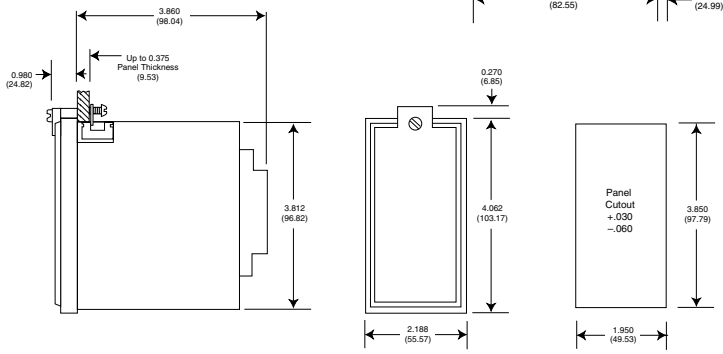
Panel Mount:



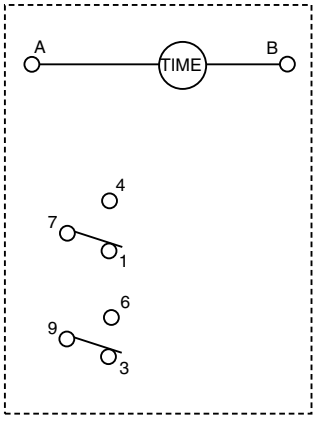
Surface Mount:



Plug-In Mount:



DA100 TERMINAL ASSIGNMENTS



ACCESSORIES

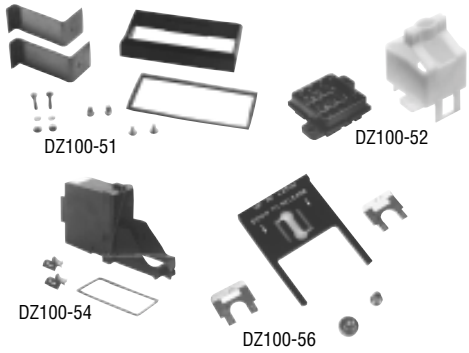
DZ100-51 Bezel Kit for panel mounting. Kit includes bezel,bezel gasket, brackets and mounting hardware.

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



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)

DA200 MINIFLEX® Digital Repeat Cycle

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

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

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

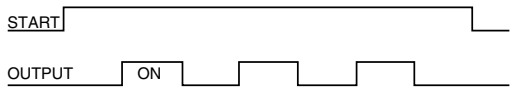
Vibration: Unit function is unaffected by 2.5G sinusoidal vibration magnitude in both directions of the perpendicular mounting axes imposed from 20 to 100 Hz

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%

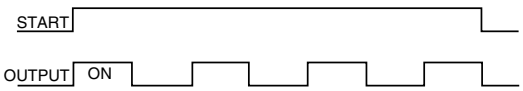
Transient Protection: Immune to 2500 volts peak transients up to 50 microseconds in duration

OUTPUT OPERATING MODES

Repeat Cycle Operation - OFF Time First

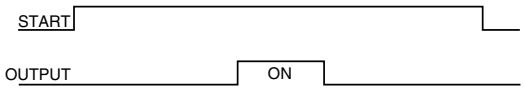


Repeat Cycle Operation - ON Time First

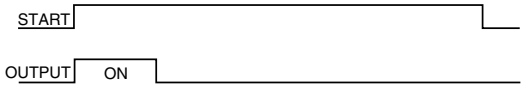


OUTPUT OPERATING MODES CONT.

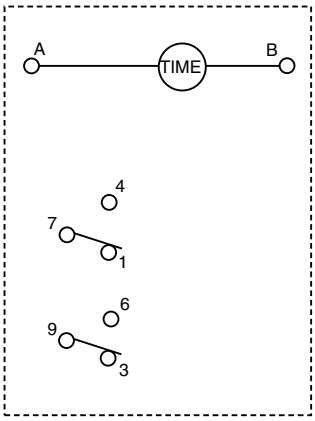
Single-Cycle Operation - OFF Time First



Single-Cycle Operation - ON Time First

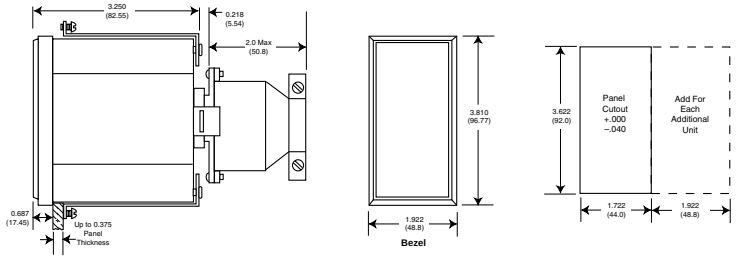


DA200 TERMINAL ASSIGNMENTS

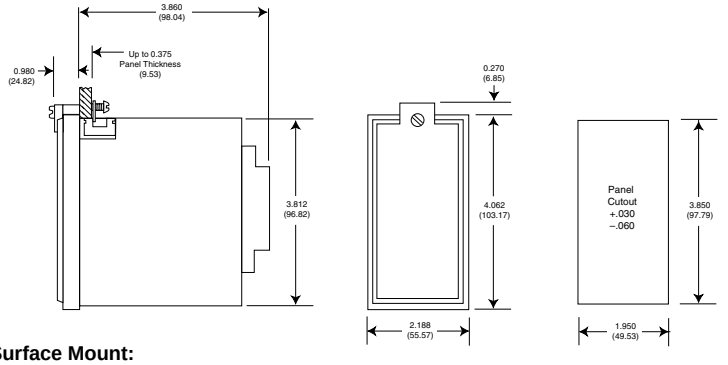


MOUNTING

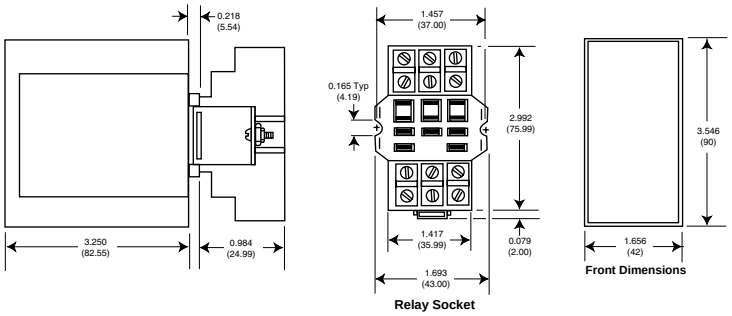
Panel Mount:



Plug-In Mount:



Surface Mount:



ACCESSORIES

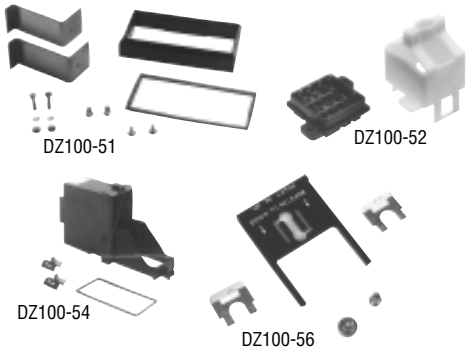
DZ100-51 Bezel Kit for panel mounting. Kit includes bezel,bezel gasket, brackets and mounting hardware.

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



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

CD300 Solid State

Solid state reset timer... housed in standard CYCL-FLEX® case

RECOGNIZED CERTIFIED

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

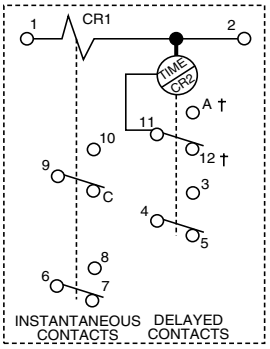
Power Interruption:
Line voltage interruptions of 16 ms or less will not reset unit

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

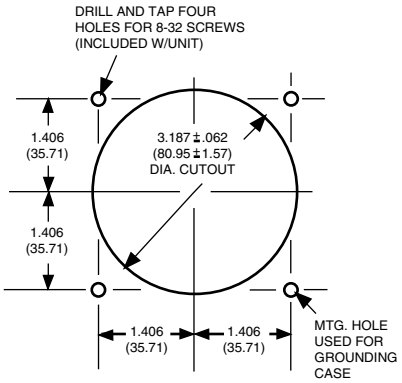
Approvals: UL Recognition E96337
CSA Certification LR26861

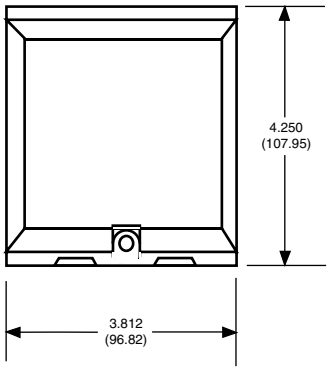
CD300 TERMINAL ASSIGNMENTS

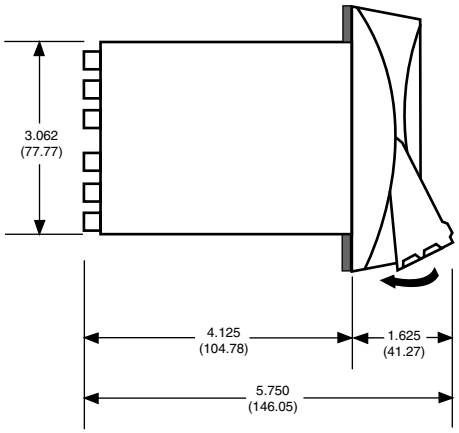


† Terminals A and 12 are useable ONLY on 120 Volt

MOUNTING







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

Series EHM Electronic Hour Meter

- ***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.

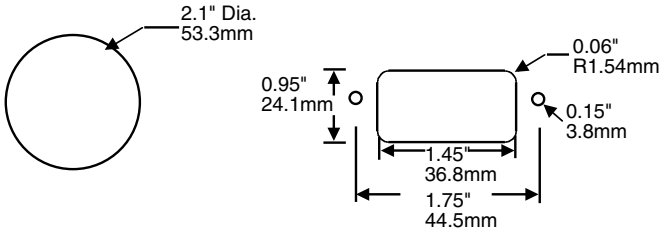
There are three versions of the hourmeter with identical functionality:
- Round Meter – 2.4" panel bezel
- Rectangular Meter – 2.09" x 1.23" panel bezel
- PCB Mount Meter.

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

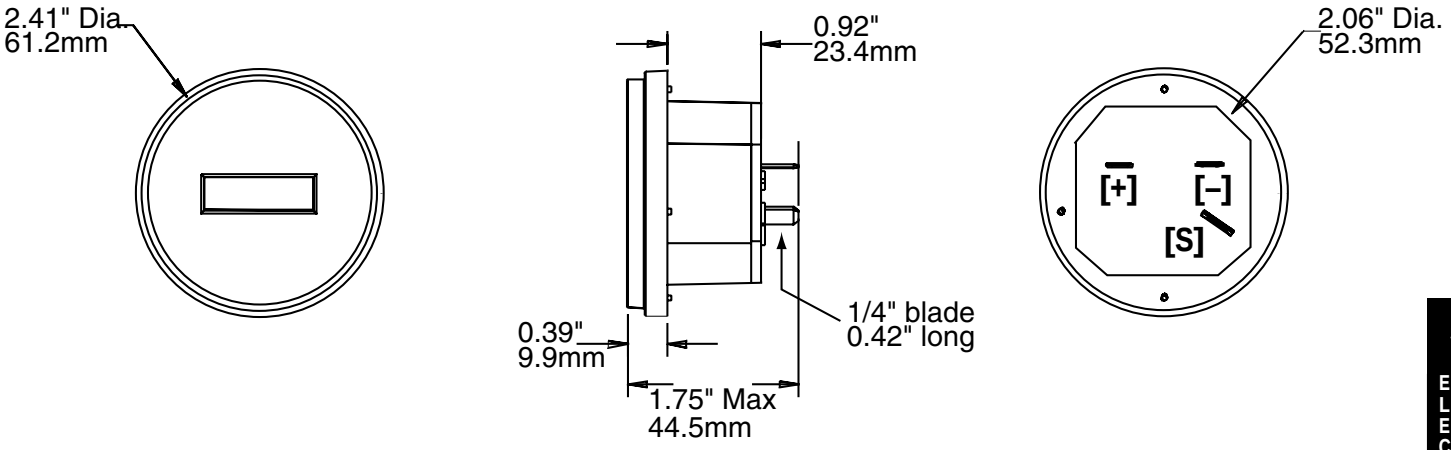


CONNECTIONS

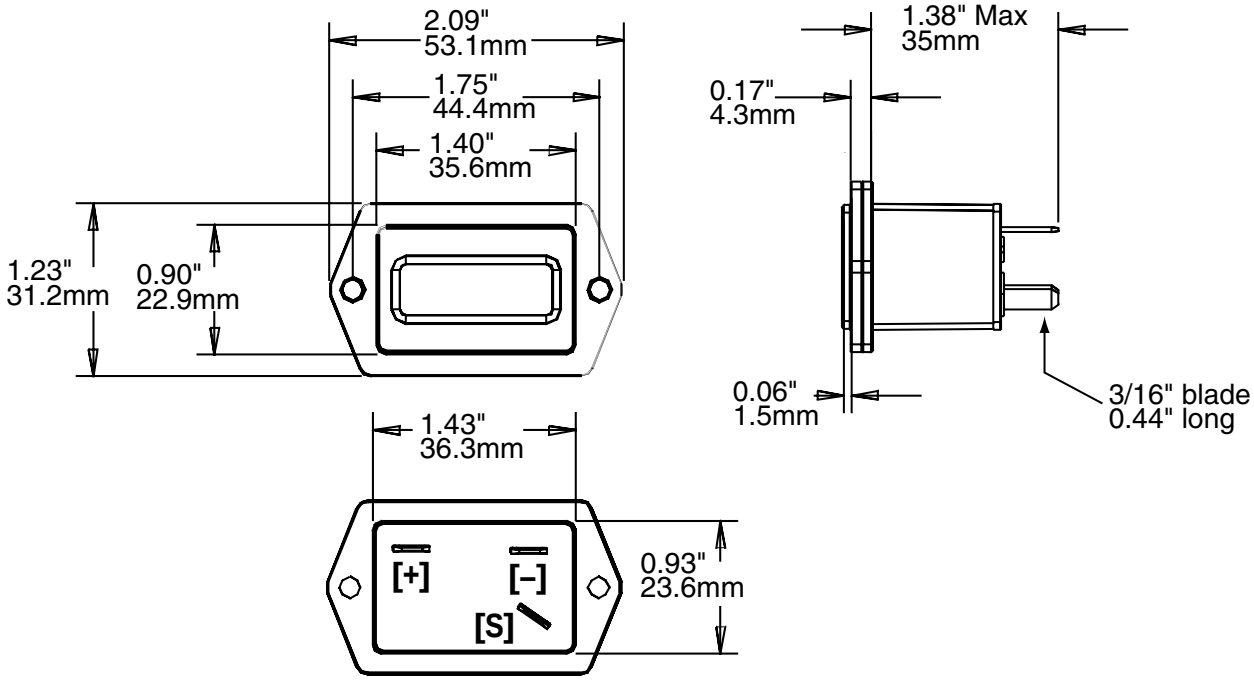
Terminal	Description
+V	+ (9-85 VDC)
-V	- (GND)
S	Start Input + (9-85VDC) Note: For two wire operation, connect +9-85VDC to "S" and - (GND) to "-V"

DIMENSIONS

CODE A: 1 - ROUND



CODE A: 2 - RECTANGULAR



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 **2** Rectangular Hour Meter	**0**	**0**	**0** No Logo **1** V-R Pad Print	**1** Blade Terminals	**2** 9-85VDC

Example: EHM-100112 Round Veeder-Root hour meter with blade terminals 9-85VDC

C342 Time Totalizer

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

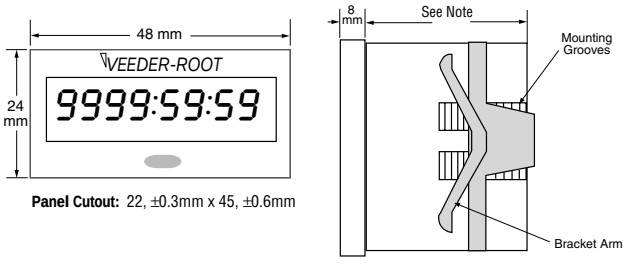
Front Panel Rating: IEC IP65

Approvals: CE, ROHS

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

A103 Preset Timers

Compact, cost effective control by elapsed time... large display with backlighting

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**

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

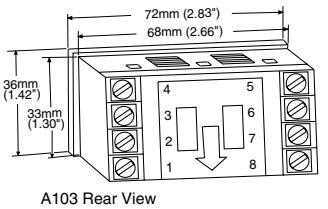
Option modules accessories provide a convenient integrated solution to applications that require AC or high-voltage DC signals, a mechanical relay output, and/or a voltage source for use with external sensors or the A103's display backlight feature. Specifications for each option module feature follow, 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

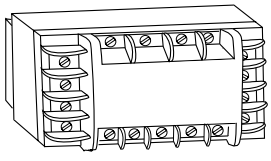
Model No.	Description			
A103-008	A103 Preset Timer			
	The following option modules attach to the rear of the A103:			
Model No.	**AC Power Supply**	**Low Voltage Input**	**High Voltage Input**	**Relay Output**
A103-A12	X			
A103-A17		X		
A103-A19	X	X		
A103-A10			X	
A103-A14	X		X	
A103-A11				X
A103-A13			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:



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")

A103 Timers

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**

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 convenience – 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

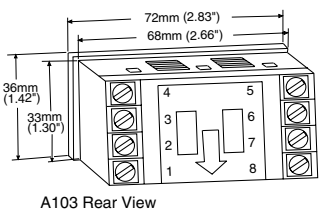
Model No.	Description
A103-006	A103 Elapsed Time Indicator

The following option modules attach to the rear of A103 timers:

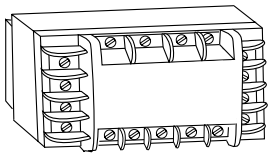
Model No.	AC Power Supply	Low Voltage Input	High Voltage Input
A103-A12	X		
A103-A17		X	
A103-A19	X	X	
A103-A10			X
A103-A14	X		X

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

Dimensions:



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")

7999 Mite Elapsed Timers

A family of low cost, high performance LCD indicators and accessories

E135458
Specific Models

RECOGNIZED CERTIFIED

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

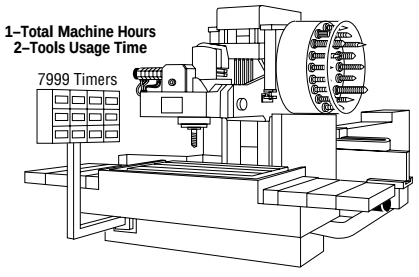
ACCESSORIES

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

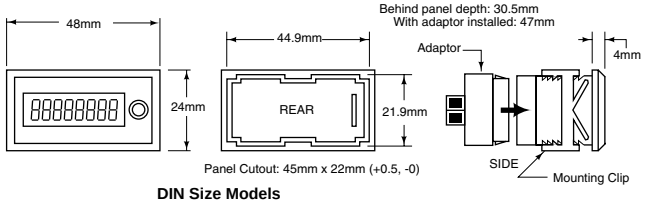
Screw Terminal Adaptor: Provides the convenience of screw terminal connection of input signal and remote reset. Part Number 108937-0001

For 12mm Display, see Series A103
For Electrical Hour Meters, see Series 7795

Typical Applications:



Dimensions:



DIN Size Models

Series 7990

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

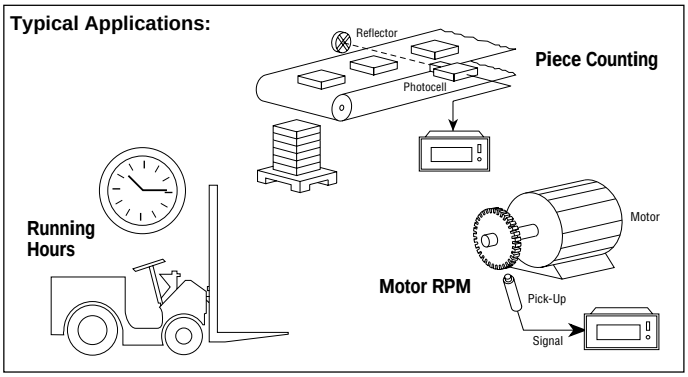
Power Source: Internal lithium battery; eight-year typical life

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

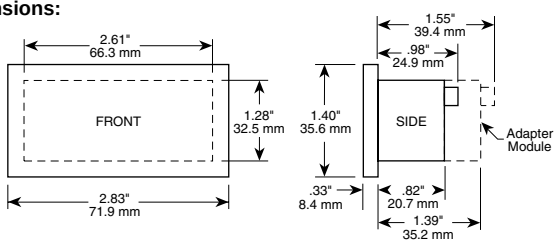
Elapsed Time Indicator: Eight-digit capacity; programmable ranging for resolution of hours, minutes, (decimal placement for whole units, tenths, or hundredths); or seconds

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.

MicroMITE 799988-602/612

Compact LCD timer 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.

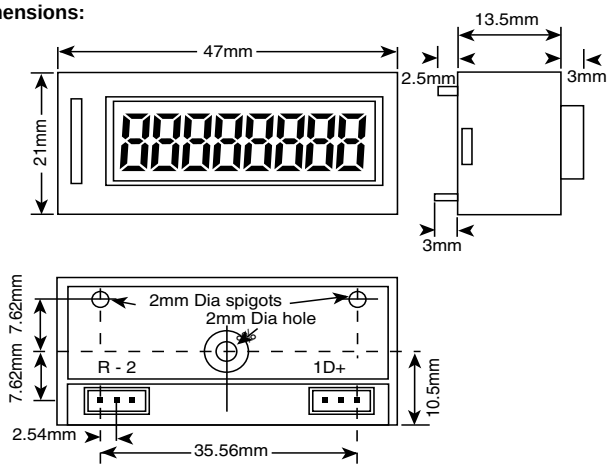
Its bidirectional counting inputs, accepts count pulses on one input while a second input commands the counting direction.

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
- 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:



Model Number	Description
0799988-612	Timer, with reset button
0799988-602	Timer, without reset button

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

See Section 1 for matching MicroMITE count totalizers. Models 0 799988-402/412

DX100 Time/Count Totalizer

Solid state time/count totalizer... housed in a 1/8 DIN case

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

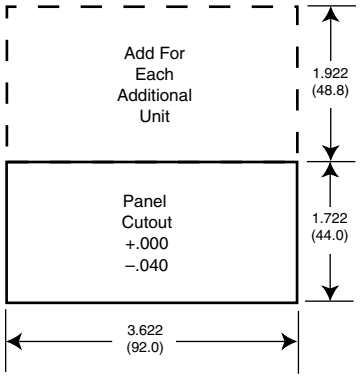
Vibration: Unit function is unaffected by 2.5G sinusoidal vibration magnitude in both directions of three perpendicular mounting axes imposed from 20 to 900 Hz

Agency Approvals: UL Recognition E96337

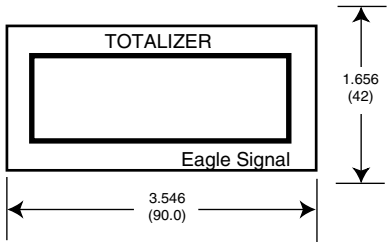
Replacement Battery: PBB9

MOUNTING

Panel Mount:



Surface Mount:



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 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)

Electronic Timer Accessories

ABV03141P001
FLEXIBLE DUST COVER KIT

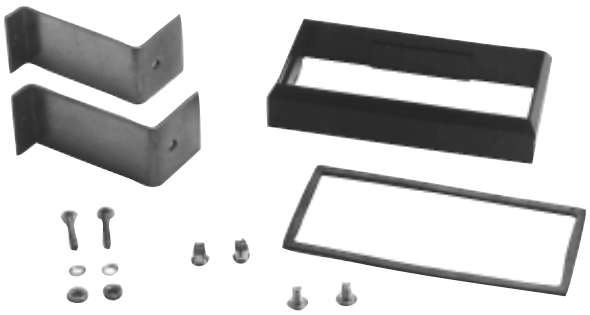
Provides dust and liquid protection for LZ and LX series products. Allows changing thumbwheel and pushbutton settings.

CG900-6
REMOTE POTENTIOMETER KIT

Allows time seeting to be made from a remote location on the CG9 series time delay relay.

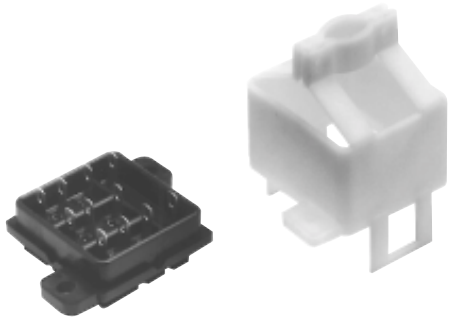
DZ100-51
BEZEL KIT

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.

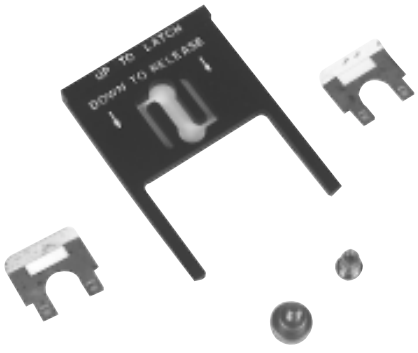


DZ100-54
PLUG-IN HOUSING

Plug-in housing for 1/8 DIN products DA, DG, DX, and DZ.

DZ100-56
LATCH AND RELEASE KIT

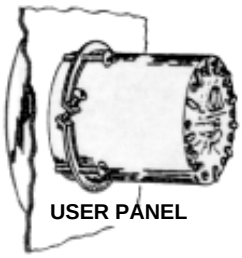
Contains clips to latch 1/8 DIN DA, DG, DX, and DZ series products to socket. Release device mounts directly to unit. Requires 1 kit/unit.



HP50-31
MOUNTING RING

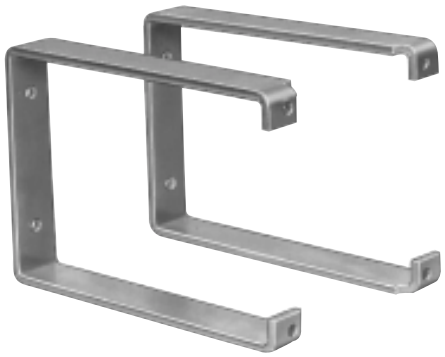
Eliminates drilling and tapping the four mounting holes for panel mounting all CYCL-FLEX® products.

APPLIED TO TIMER PLUG-IN CASE



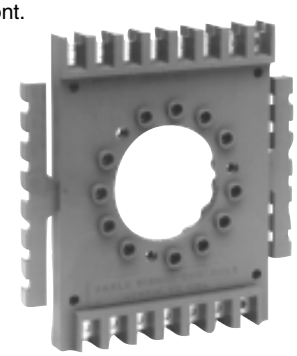
H-5331
MOUNTING BRACKETS

Allows surface mounting of all CYCL-FLEX® and BR4 products.



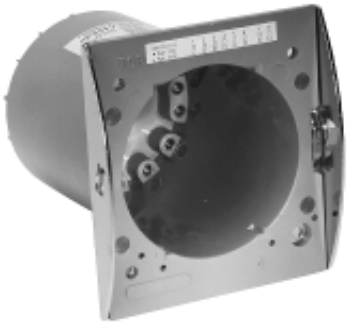
HP50-133
SURFACE MOUNT ADAPTER

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 water tight seal for CX series timers/ counters.



Notes

DANAHER SPECIALTY PRODUCTS 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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veeder-root.techsupport@dancon.com

Websites
www.eagle-signal.com
www.veeder-rootcounters.com

Veeder-Root
Dynapar
Eagle Signal

Notes

DANAHER SPECIALTY PRODUCTS 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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www.eagle-signal.com
www.veeder-rootcounters.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.

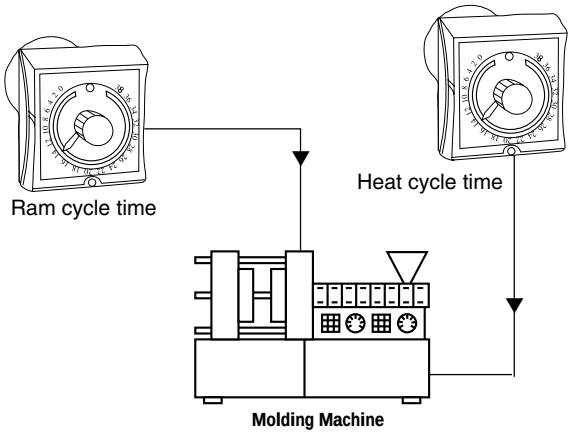
Operate in Harsh Power Environments - Electric timers are virtually immune to EMI, brownouts and blackouts, and withstand many power surges.

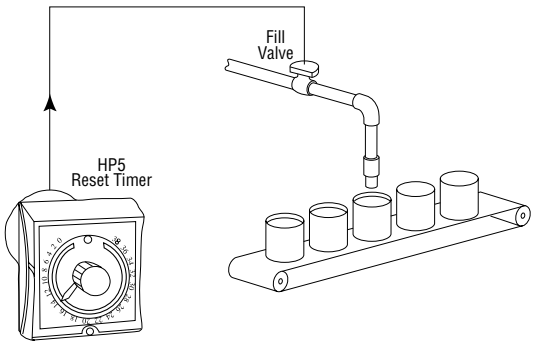
Heavy Duty Construction - Years of operation continue to prove the long maintenance free life in dirty, dusty, damp, hot and cold environments.

Simple Programming - No switch programming required. Timer works the way you expect it to work.

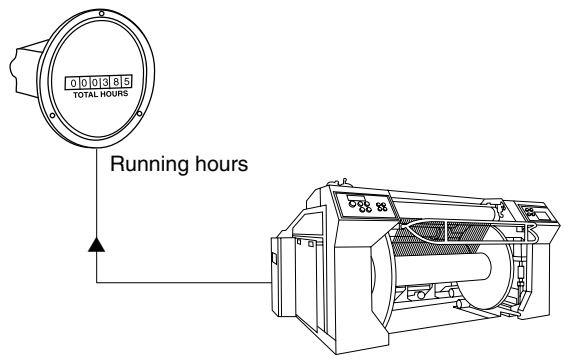
Long Service Life - Highly reliable. Exact or similar replacements available for an extensive installed base.

HP5 CYCL-FLEX® Reset Timer





Filling System



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.

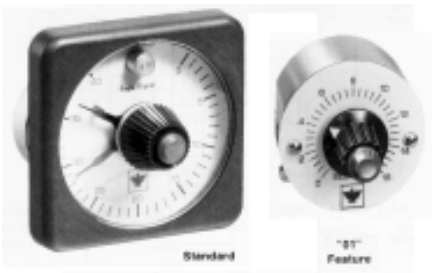
Reset Timers time through a preset cycle and is then automatically or manually reset until it is restarted by an outside source. Most commonly, an electrically started timer is used in industrial applications where automatic control of process time is required.

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.



Model 191 Reset Timers

HQ9 Percentage Timer

TF Hand Set 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?

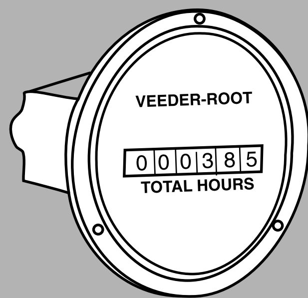
Mounting: Various mounts are available: panel, surface, socket.

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?

ELAPSED TIME INDICATORS



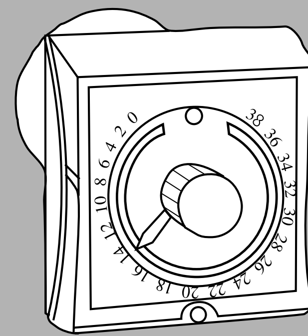
Function:

Totalizes time for the duration that power is applied.

RESET TIMERS

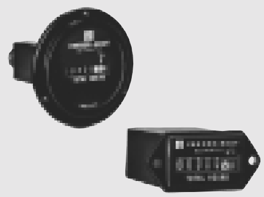
Function:

Upon command, times preset cycle length and stops. Awaits command to start next cycle



VEEDER-ROOT brand

7795
See page 6.04
- AC and DC models
- Round or rectangular mount



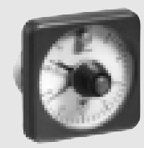
EAGLE SIGNAL brand

HP5 CYCL-FLEX®
See page 6.08
- [illegible]
- [illegible]

Also see Series HP5E in Section 5 for Solid-State Model

EAGLE SIGNAL brand

Model 191
See page 6.10
- [illegible]
- Panel mount

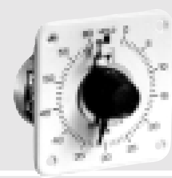


EAGLE SIGNAL brand

HK
See page 6.06
- [illegible]
- Reset and nonreset models

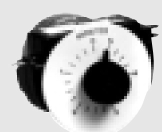
EAGLE SIGNAL brand

AB
See page 6.14
- [illegible]
- Panel mount



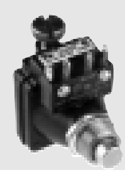
EAGLE SIGNAL brand

TF
See page 6.12
- [illegible]
- Economical



EAGLE SIGNAL brand

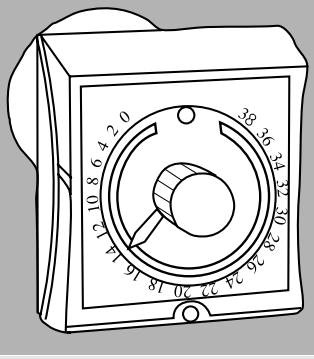
Model 90
See page 6.14
- Compact
- [illegible]



REPEAT CYCLE TIMERS

Function:

Continuously cycles power to a load in an ON/Off pattern. Ability to set cycle times vary by model type.



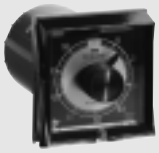
EAGLE SIGNAL brand

HG1 FLEXOPULSE®
See page 6.16

EAGLE SIGNAL brand

HQ9
See page 6.18

Also see Series HQ9E in Section 5 for Solid-State Model



EAGLE SIGNAL brand

TM TIME MODULE®
See page 6.20

EAGLE SIGNAL brand

HP7 REPEAT CYCLE TIMER
See page 6.22

7795 Hourmeters

Rugged and reliable hour meters in rectangular or round case, for AC or DC operation

Specific Models

RECOGNIZED 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

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

SPECIFICATIONS

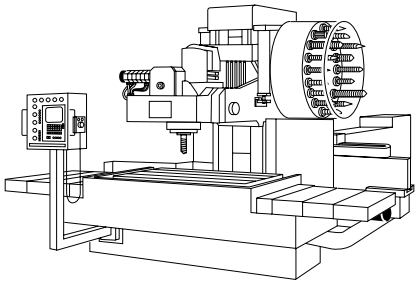
Panel Mounting:
Round Case: 2.00" diameter cutout
Rectangular Case: 0.95" x 1.45" cutout

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)

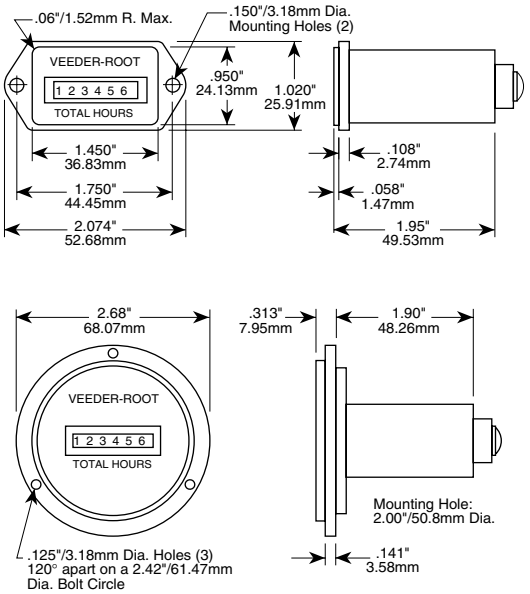
AC Hour Meters:
Input: 120 VAC (range ± 10%), 60 Hz
Accuracy: 0.02%
Capacity: Up to 99999.9 hours, automatic recycle at zero
Operating Temperature: –65° to +154 °F (–54° to +68°C)

Weight: 3 oz.

Typical Applications:



Dimensions:



Notes

DANAHER SPECIALTY PRODUCTS 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 +1.800.390.6405
or +1.910.862.2511
eagle-signal.custserv@dancon.com
veeder-root.custserv@dancon.com

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eagle-signal.techsupport@dancon.com
veeder-root.techsupport@dancon.com

Websites
www.eagle-signal.com
www.veeder-rootcounters.com

Veeder-Root
Dynapar
Eagle Signal

HK Time Totalizer

Totalizes running time of electrically operated equipment... synchronous motor driven models for display of hours, minutes, or seconds

RoHS

RECOGNIZED

CERTIFIED

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

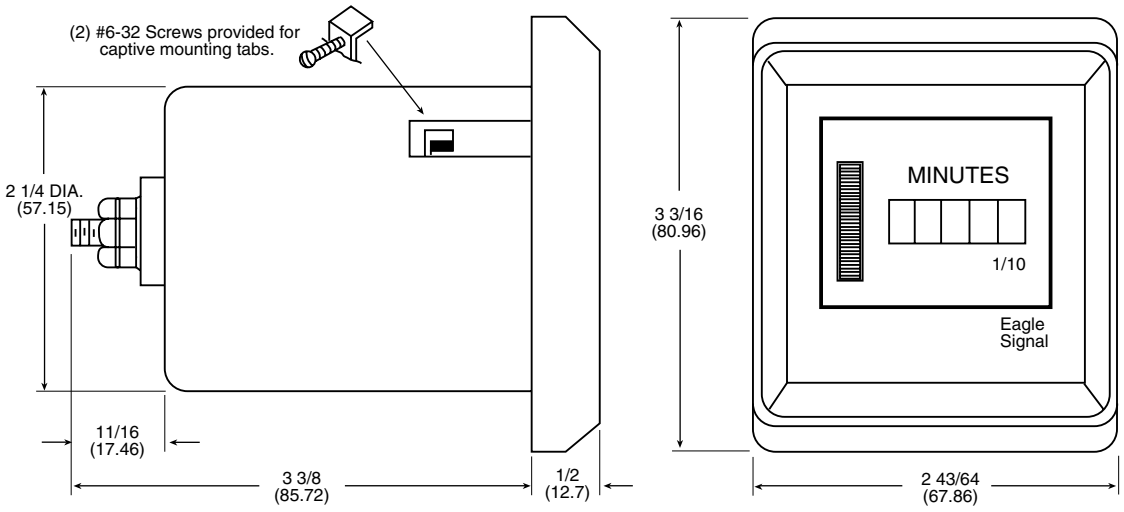
Burden: 3W max.

Temperature Range: 0° to 140°F (-17° to +60°C)

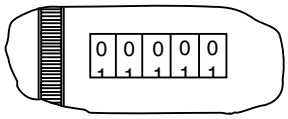
Agency Approvals: UL Recognition E59290
CSA Certification LR27967
RoHS

MOUNTING

Requires 2 3/8 diameter panel cutout for mounting. 1/2 maximum mounting panel thickness.



CAUTION: When resetting the HK5 unit, adjust odometer to position 00000 at top of window, as shown.



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

HP5 CYCL-FLEX® Reset Timer

Also see Series HP5E in Section 5 for Solid-State Model

The high quality timer that has become an industry standard... knob setpoint, cycle progress pointer, pilot light, and patented plug-in housing

RoHS · RECOGNIZED · CERTIFIED · FM APPROVED

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%), 60 Hz
240V (+10, -15%), 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
RoHS

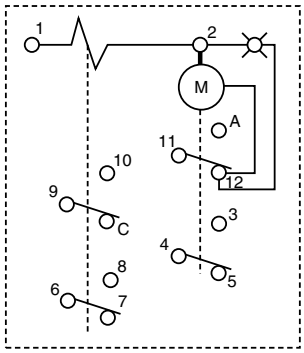
OPERATION

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



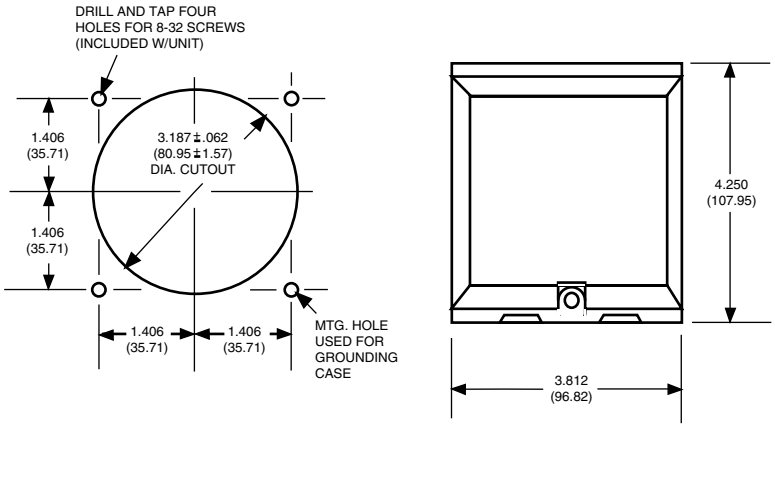
ENCLOSURES

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

MOUNTING



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

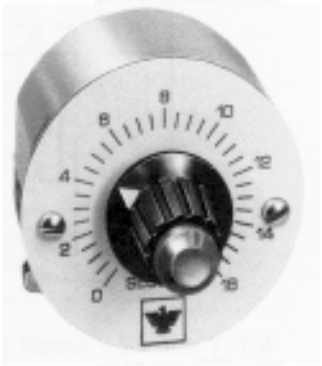
Sym.	Description
A6	120V, 60 Hz
B6	240V, 60 Hz

FEATURES

Sym.	Description
01	Reverse Clutch Arrangement
07	Dial Lock
19	Revision for Mtg. to HN383 Explosion Proof
22	Cabinet. Add when purchased without cabinet. DOES NOT have pilot light. Water Resistant Window & Housing
92*	Enclosed in HN383 Explosion Proof Cabinet

*Laboratory Testing: UL Recognition E61735
CSA Certification LR45132-1

Model 191 Reset Timer



Just set the dial and push the button to initiate an accurate time delay or interval cycle

RECOGNIZED CERTIFIED

. . . Provides an accurate, adjustable time delay or timed interval for control of a load circuit . . . Push Button to start.

OPERATION

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 set point. Timer is now ready for another timing operation.

The standard timer has cycle progress and a 3-5/8" square bezel with window. The "01" feature does not include cycle progress indicator or bezel and window assembly.

SPECIFICATIONS

Dial Ranges

SYMBOL	TIME RANGE	DIAL DIVISIONS
02	16 second	1/2 second
04	80 second	2 second
05	160 second	5 second
06	8 minute	15 second
07	16 minute	30 second
08	40 minute	1 minute
09	80 minute	2 minute
11	8 hour	15 minute
12	16 hour	30 minute

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

Contact Rating (Resistive)
10 Amperes 120/240 V

Repeat Accuracy
1½% of full scale

Setting Accuracy
1½% of full scale

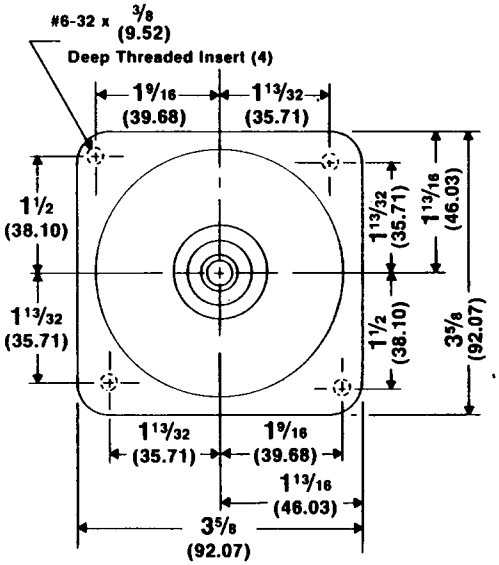
Termination
Motor - Loose Leads, 20 Ga., 6" long stripped 5/8"
Switch - .188x.250x.020 Quick Connect Tabs

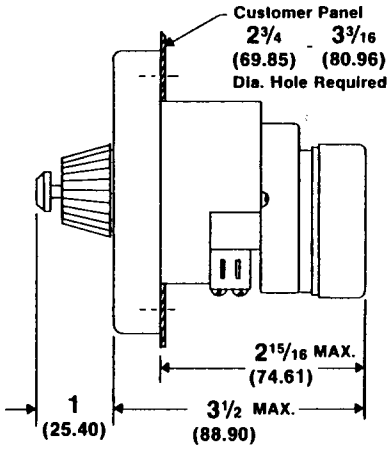
Burden
120VAC/3Watts
240VAC/3Watts

Laboratory Testing
U.L. Recognition E-61735
C.S.A. Certification LR-27967

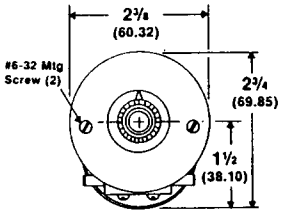
MOUNTING DIMENSIONS

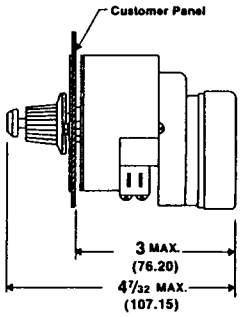
Standard Timer

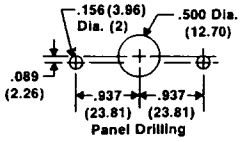




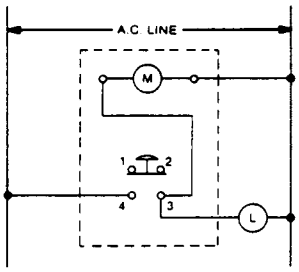
"01" Feature Timer







WIRING DIAGRAM



By placing a jumper between terminals 1 and 4 of switch, a form "C" SPDT switch is obtained. When manually depressed, push-button switch is mechanically latched in the "4-3" closed position. At time out, latch is released and "4-3" opens.

XXX = inches.
(XXX) = millimeters.

ENCLOSURES

PART NUMBER	DESCRIPTION
HN308	Surface Mtg. with terminal block
HN364	Surface Mtg. without terminal block
HN370	Dual unit cabinet less unit cases and toggle switch, with 9 terminal block.

ORDERING INFORMATION

191 04 A6 01

TIME RANGE

SYMBOL	DESCRIPTION
02	16 Second
04	80 Second
05	160 Second
06	8 Minute
07	16 Minute
08	40 Minute
09	80 Minute
11	8 Hour
12	16 Hour

FEATURES

SYMBOL	DESCRIPTION
01	Timer with exposed dial - no cycle progress pointer. Two tapped hole mounting.

VOLTAGE/FREQUENCY

SYMBOL	DESCRIPTION
A5	120V 50Hz
A6	120V 60Hz
B5	240V 50Hz
B6	240V 60Hz

TF Hand SetTimer

A low cost, manually set interval timer... just turn knob to set and start

RoHS ® RECOGNIZED CERTIFIED

The TF Series Timer is a low cost, manually set, synchronous motor driven timer, adjustable to a selected time 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" diameter hole with a 3/8 x 32 nut. The TF has a completely moulded housing containing the reduction gears, motor mounting clips, and contact members. Terminations of contact members are 1/4" quick connect. Motor leads are separate and are 6" long.

OPERATION

To operate, turn knob counter clockwise to desired time interval. Internal contacts will transfer and remain transferred until pointer returns to zero and timer times out. At this point, contacts return to original position.

SPECIFICATIONS

Time Ranges

SYMBOL	TIME RANGE
1	1 Min
2	5 Min
3	11 Min
4	30 Min
5	60 Min
7	11 Hr

Minimum Setting - 5% of Time Scale

Voltage/Frequency
115V (+10%, -15%) 60 Hz
230V (+10%, -15%) 60 Hz

Burden
2.2 Watts

Output Rating
10 Amp 1/6 HP, 250 VAC

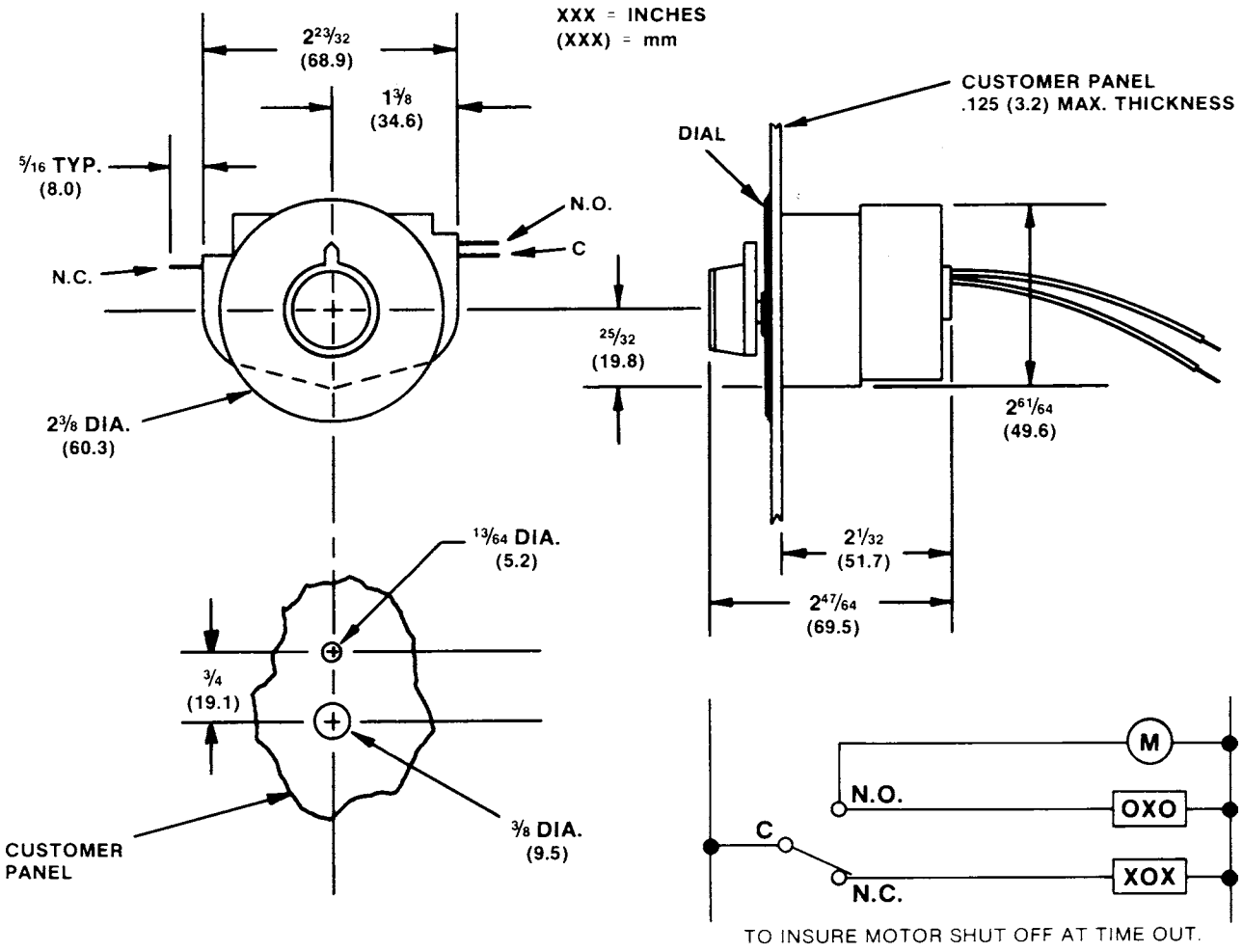
Contact Arrangement
SPDT — Form "C"

Life — Mechanical and Electrical
10,000 Cycles

Operating Temperature
0°F to +140°F (-17°C to +60°C)

Laboratory Testing
U.L. Recognition E61735

MOUNTING DIMENSIONS



ORDERING INFORMATION

TF 2 3 A6

TIME RANGE

SYMBOL	60 Hz	50 Hz
1	60 Sec	72 Sec
2	5 Min	6 Min
3	11 Min	13 Min
4	30 Min	30 Min
5	60 Min	70 Min
7	11 Hrs	13 Hrs

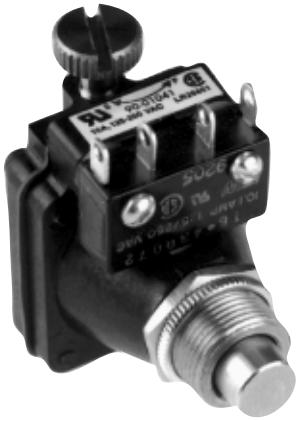
SWITCH ARRANGEMENT

SYMBOL	DESCRIPTION
3	Form "C" SPDT

VOLTAGE & FREQUENCY

SYMBOL	DESCRIPTION
A6	115V 50/60 Hz
B6	230V 50/60 Hz

MODEL 90
MINIATURE PNEUMATIC TIMER



Small, pneumatic operated timer... opens or closes circuit after time delay

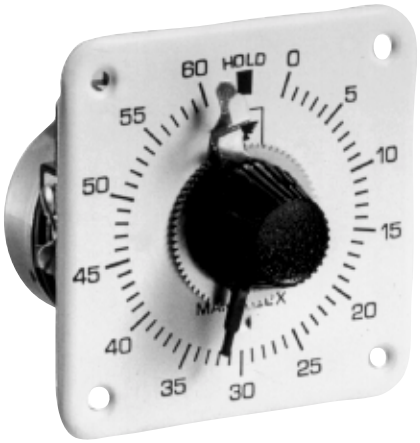
Standard Model: 90-01041

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.

AB4 MANUFLEX®
HAND SET



Very easy to use... to start a cycle just turn the pointer knob to the desired time

AB4 3 A6 04

- 3 — TIME RANGE
- A6 — VOLTAGE & FREQUENCY
- 04 — FEATURES

For Complete Information, Request Bulletin No. 174

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.

Notes

DANAHER SPECIALTY PRODUCTS 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:

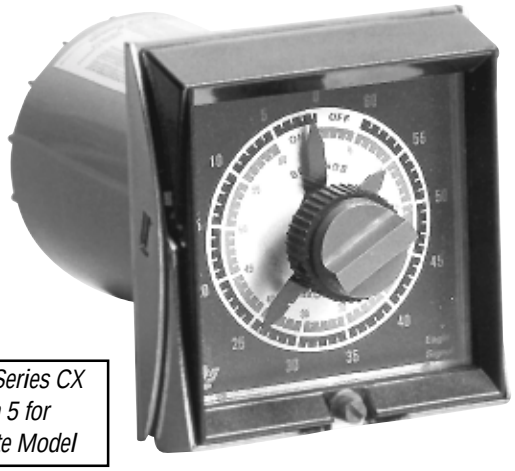
Customer Service
call Toll Free +1.800.390.6405
or +1.910.862.2511
eagle-signal.custserv@dancon.com
veeder-root.custserv@dancon.com

Technical Support
call Toll Free +1.800.390.6405
or +1.910.862.2511
eagle-signal.techsupport@dancon.com
veeder-root.techsupport@dancon.com

Websites
www.eagle-signal.com
www.veeder-rootcounters.com

Veeder-Root
Dynapar
Eagle Signal

HG1 FLEXOPULSE® Repeat Cycle Timer



Also see Series CX in Section 5 for Solid-State Model

Repeat cycle timer features separate dial scales for ON and OFF time

RoHS RECOGNIZED CERTIFIED

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
RoHS

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

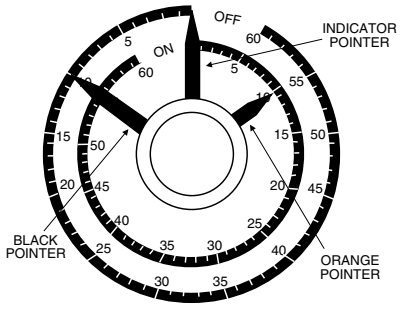


Figure 1

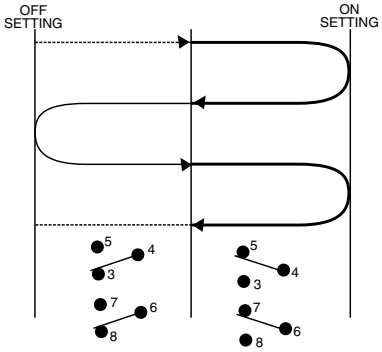


Figure 2

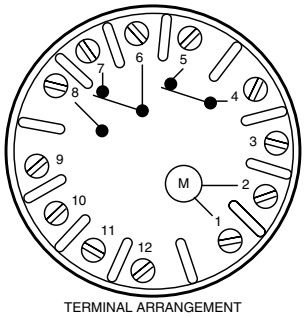
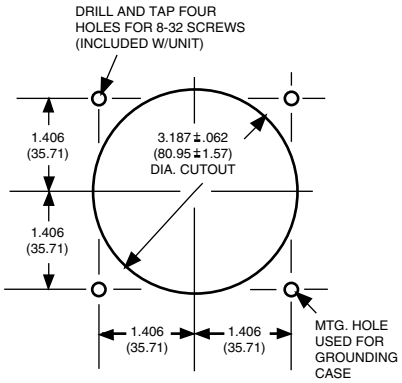
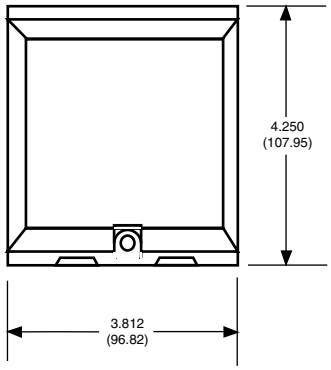
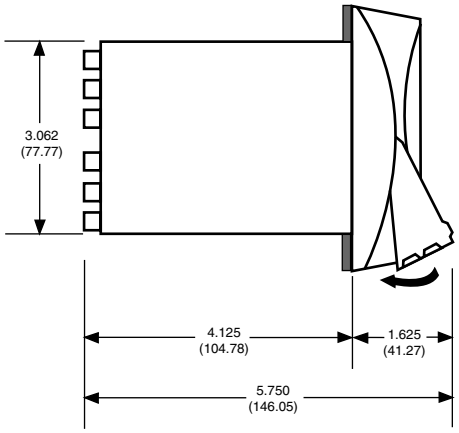


Figure 3 CONTACTS SHOWN IN "ON" POSITION

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
HP50-133	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

HQ9 Percentage Timer

Also see Series HQ9E in Section 5 for Solid-State Model

Adjustable timing as a percentage of overall cycle... ideal for heat control, machine lubrication, etc.

RECOGNIZED CERTIFIED

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.

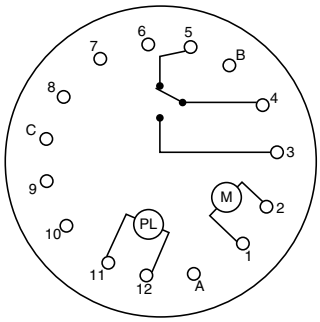
Temperature Range: -10° to 140°F (-23° to +60°C)

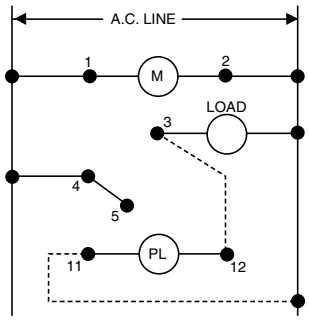
Agency Approvals: UL Recognition E61735
CSA Certification LR26861

NOTE: Because of precise adjustment and calibration procedures, it is recommended that all repair or part replacement be done at the factory.

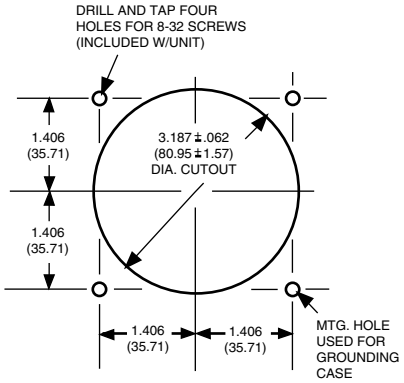
WIRING

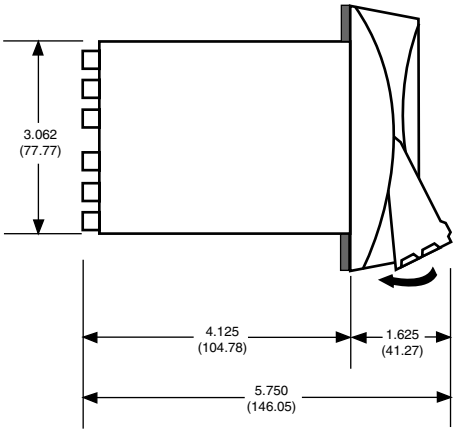
Standard CW dial references the operation of the load when connected to terminal number 3. ON Time adjustable 5% to 100%.





MOUNTING





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

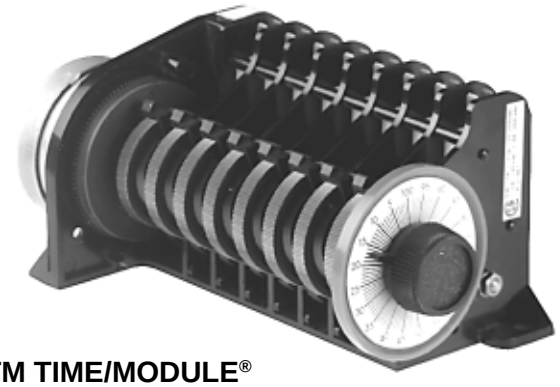
Sym.	Description
A5	120V, 50 Hz
A6	120V, 60 Hz
B5	240V, 50 Hz
B6	240V, 60 Hz

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

TM Time Module



TM TIME/MODULE®
REPEAT CYCLE TIMER

Extremely flexible cam timer... modular construction allows custom configuration to solve almost any repeating time control problem

RoHS ® RECOGNIZED CERTIFIED

OPERATION

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.

The TIME/MODULE® utilizes a unique latch switching mechanism rather than the conventional variable radius cam and follower found on most cam timers.

There are 120 serrations on the outer perimeter of the cam wheel which will accommodate a maximum of 24 tabs. A latch actuator maintains the module SPDT switch in one of its positions until a cam tab engages an actuator and triggers the switch to the opposite position. This method allows multiple switch closures on the same cam and eliminates the need for additional circuits or expensive multiple cut cams.

The TIME/MODULE® is constructed of precision molded plastic parts, using the latest injection molding techniques to provide a durable and reliable low cost cam timer. The motor and switch plates are injection molded polycarbonate to provide high impact and dielectric strength. Cams and gears are made of M°S² filled nylon to provide lifetime lubrication for all moving parts. Cam segments, cam tabs and actuators are molded of acetal for durability. All switch terminals are .187 quick disconnect type for easy connections.

SPECIFICATIONS

SYMBOL	RANGE	SYMBOL	RANGE
01	6 Sec	15	30 Min
02	10 Sec	16	30 Min
03	15 Sec	17	100 Min
04	30 Sec	18	120 Min
05	60 Sec	19	150 Min
06	90 Sec	20	3 Hr
07	120 Sec	21	5 Hr
08	150 Sec	22	6 Hr
09	3 Min	23	10 Hr
10	5 Min	24	20 Hr
11	6 Min	25	30 Hr
12	10 Min	26	60 Hr
13	15 Min	27	24 Hr
14	20 Min	67	8 Hr

Number of Circuits
One through ten standard.

Repeat Accuracy
Cam speed is synchronous to power supply.

Cam Programming Accuracy
LATCH OR 50-50 CAMS
Closure time on same cam ± ½% of time cycle.
Closure time between two different cams ± ½% of time cycle.
ALL OTHER CAMS
Closure time on same cam ± ¾% of time cycle.
Closure time between two different cams ± 1% of time cycle.

Minimum Settings (average values)
Latch switching — 3½% of time cycle.
Cam follower with two cam tabs — 2½% of time cycle.
Cam follower (molded, cut, or 50-50 type) — 2% of time cycle.

Contact Rating
10 Amp, 1/3 Hp, 120/240 VAC
1/2 Amp, @120 VDC; 1/4 Amp @240 VDC

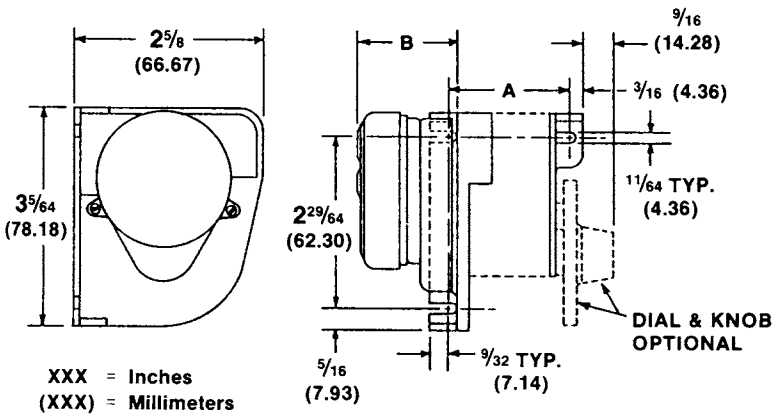
Temperature Range
0° to 140°F (-18° to 60°C)

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

Input Burden (average values)
Standard motor — 3 Watts @ rated voltage.

Laboratory Testing
U.L. Recognition E-61735
C.S.A. Certification LR-27967

MOUNTING DIMENSIONS



	NUMBER OF CIRCUITS				
No. of Switches	**1**	**2**	**3**	**4**	**5**
Dimension "A"	1-9/32 (32.53)	1-25/32 (43.23)	2-9/32 (57.93)	2-25/32 (70.63)	3-9/32 (83.33)
No. of Switches	**6**	**7**	**8**	**9**	**10**
Dimension "A"	3-25/32 (96.03)	4-9/32 (108.73)	4-25/32 (121.43)	5-9/32 (134.13)	5-25/32 (146.83)
Dimension "B" Motor Depth	Time Symbols 01 - 05 Maximum - 1-1/2 (38.10) Time Symbols 06 - 25 Maximum - 1-5/8 (41.53)				

TIME RANGE CHART

SYM.	CW Motor Speed	TIME CYCLE Direct Drive Motor Module	TIME CYCLE 10:1 Drive Motor Module	CAM Shaft Rotation
01	10 RPM	6 Sec		CW
02	60 RPM		10 Sec	CCW
03	40 RPM		15 Sec	CCW
04	20 RPM		30 Sec	CCW
05	10 RPM		60 Sec	CCW
06	2/3 RPM	90 Sec		CW
07	1/2 RPM	120 Sec		CW
08	4 RPM		150 Sec	CCW
09	1/3 RPM	3 Min		CW
10	2 RPM		5 Min	CCW
11	1/6 RPM	6 Min		CW
12	1/10 RPM	10 Min		CW
13	1/15 RPM	15 Min		CW
14	1/2 RPM		20 Min	CCW
15	1/30 RPM	30 Min		CW
16	1/60 RPM	60 Min		CW
17	1/10 RPM		100 Min	CCW
18	1/2 RPH	120 Min		CW
19	1/15 RPM		150 Min	CCW
20	1/3 RPH	3 Hr		CW
21	1/30 RPM		5 Hr	CCW
22	1/6 RPH	6 Hr		CW
23	1/60 RPM		10 Hr	CCW
24	1/2 RPH		20 Hr	CCW
25	1/3 RPH		30 Hr	CCW
26	1/6 RPH		60 Hr	CCW
27	1/2.4 RPH		24 Hr	CCW
67	1/8 RPH		8 Hr	CW

For parts list, request Bulletin 345-E

ORDERING INFORMATION

TM 6 A6 05 01

NUMBER OF CIRCUITS

1 - 10

VOLTAGE & FREQUENCY

SYMBOL	VOLTAGE & HZ
A5	120V 50 Hz
A6	120V 60 Hz
B5	240V 50 Hz
B6	240V 60 Hz

TIME RANGE

From Chart on Front Page Of This Bulletin

FEATURES

SYMBOL	DESCRIPTION
Blank	Standard Timer with one way clutch. One rise and one drop tab per cam without dial and knob
01	With dial (100%) and knob.
02*	Two adjustable 180° cam segments per switch.
11*	Cam Follower Actuator and two tabs.

* Applies to all circuits.

HP7 Repeat Cycle Timer

Electromechanical repeat cycle timer housed in standard CYCL-FLEX® case... Knob setpoint, cycle progress pointer, pilot light, and patented plug-in housing

RoHS ® RECOGNIZED CERTIFIED

The HP7 series timer is a high quality, synchronous motor driven repeat cycle timer housed in the standard CYCL-FLEX® plug-in housing.

- 7 standard time ranges from 60 seconds to 10 hours
- Knob/Pointer adjustable time ranges - another pointer shows cycle progress
- Highly visible, calibrated dials (7.85 inch circumference)
- Output switch transfer at end of timing cycle
- 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

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.

Repeatability: (constant voltage and temperature): ±2%

Setability: Within ±2% of maximum range

Reset Time: 1 second ±20%

Cycle Progress: Indicated by red pointer

Voltage/Frequency: 120V (+10, -15%), 60 Hz

Burden: Motor: 2.5 VA, 120 VAC
Clutch: 10.5 VA, 120 VAC

Output Pulse: 1% (nominal) of dial range

Output Rating: 10 amps, 120 VAC 50/60Hz

Power Interuption: Unit will not reset on power interuption or failure

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 20 to 900 Hz

Approximate Weight: 2 lb. 14 oz.

Agency Approvals: UL Recognition E61735
CSA Certification LR26861
RoHS

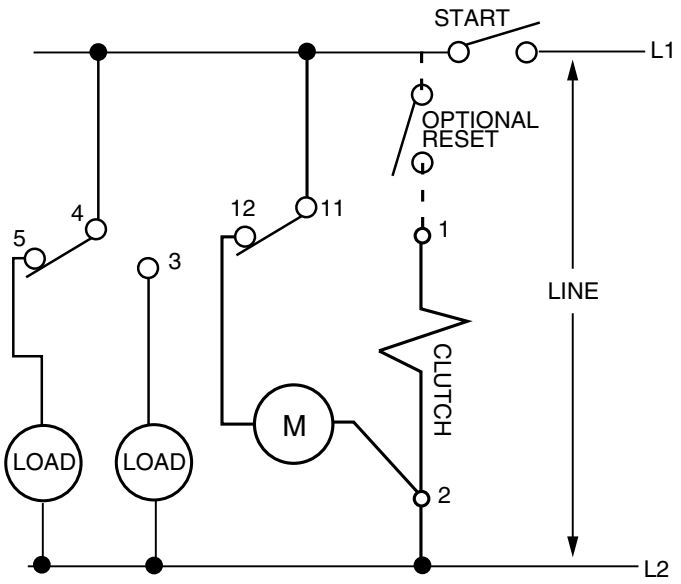
REFERENCE EAGLE SIGNAL BULLETIN NUMBER 325

SPECIFICATIONS

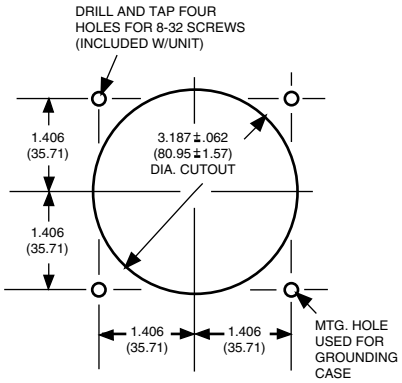
Time Ranges:

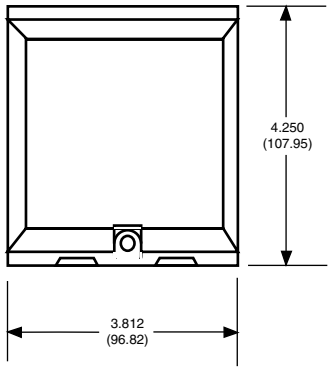
Sym.	Dial	Minimum Setting	Output Pulse Duration
1	60 Sec.	2 Sec.	.3 to .9 Sec.
3	5 Min.	9 Sec.	1.5 to 4.5 Sec.
4	10 Min.	20 Sec.	3 to 9 Sec.
5	30 Min.	1 Min.	9 to 27 Sec.
6	60 Min.	2 Min.	.18 to .54 Sec.
7	150 Min.	4.5 Min.	45 to 135 Sec.
9	10 Hrs.	20 Min.	3 to 9 Min.

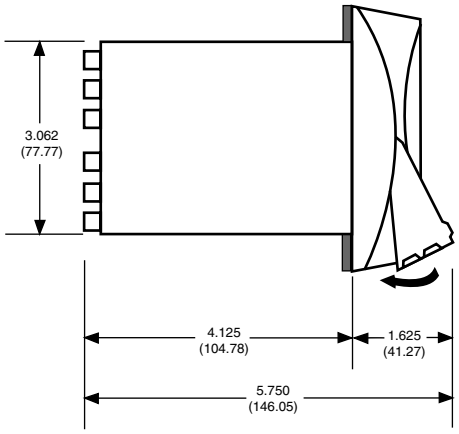
SCHMATIC DIAGRAM



MOUNTING







ORDERING INFORMATION

HP7 5 A6 07

TIME RANGE

Sym.	Description
1	0-60 Sec.
3	0-5 Min.
4	0-10 Min.
5	0-30 Min.
6	0-60 Min.
7	0-150 Min.
9	0-10 Hr.

VOLTAGE & FREQUENCY

Sym.	Description
A6	120V, 60 Hz

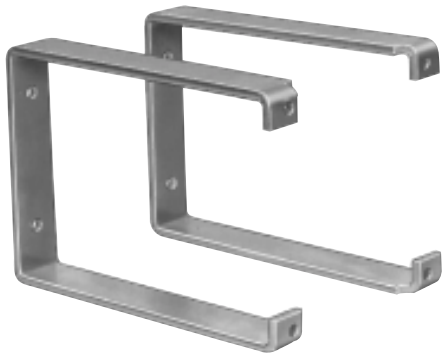
FEATURES

Sym.	Description
(Blank)	Standard
07	Dial Lock

*Laboratory Testing: UL Recognition E61735
CSA Certification LR45132-1

H-5331
MOUNTING BRACKETS

Allows surface mounting of all CYCL-FLEX® and BR4 products.

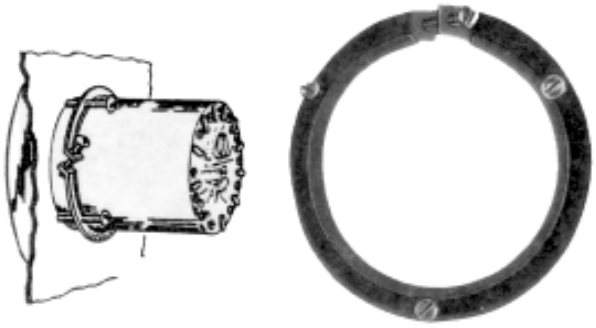


HA10-69
FLUSH MOUNT BEZEL ASSEMBLY

Allows flush mounting of HA or HZ4 series counter.

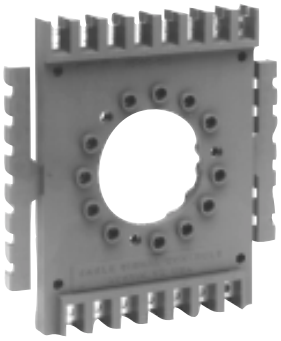
HP50-31
MOUNTING RING

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.

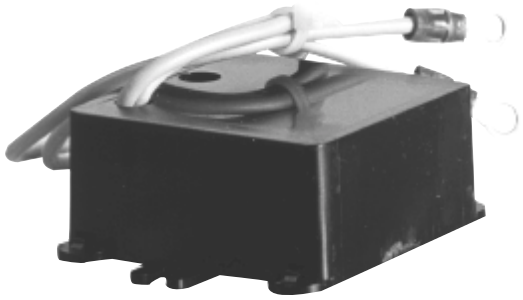
HP50-295
DIAL LOCK ASSEMBLY

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.

HP50103 Recycle Module



Converts a single-cycle reset timer to a repeat cycle timer

RECOGNIZED

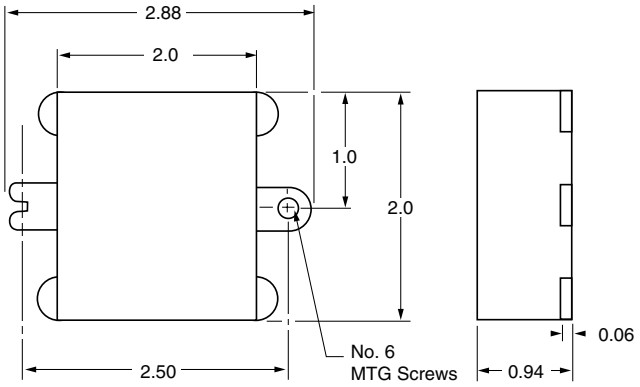
The HP50103 Recycle Module is an accessory designed to automatically reset reset timers and counters.

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:



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

Notes

DANAHER SPECIALTY PRODUCTS 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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Websites
www.eagle-signal.com
www.veeder-rootcounters.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

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.

The following is a summary of our multifunction instrument features:

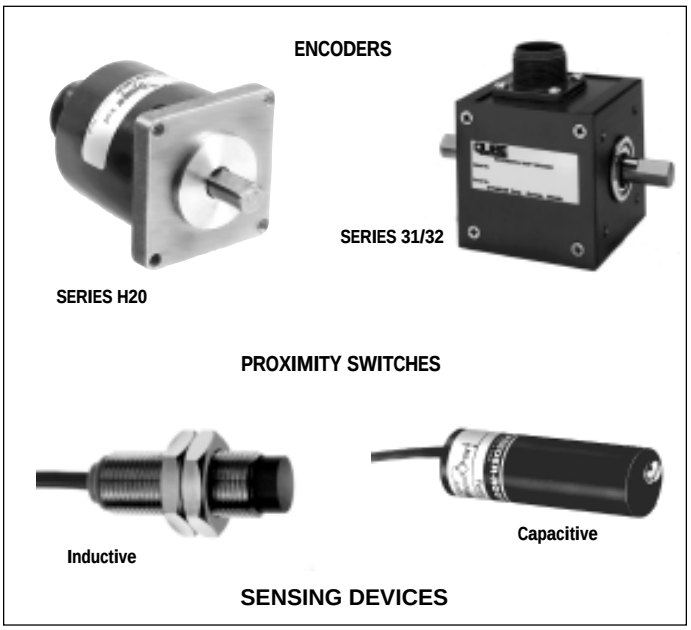
SFC 40 Batch Controller

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 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



Multi-Function Products

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.	**Page: 7.03**	**Page: 7.04**	**Page: 7.05**
			
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.	■ **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**	■ **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**	■ **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

SFC40 Flow Controller

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.

For additional production monitoring features, see Series 7935 production data control

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

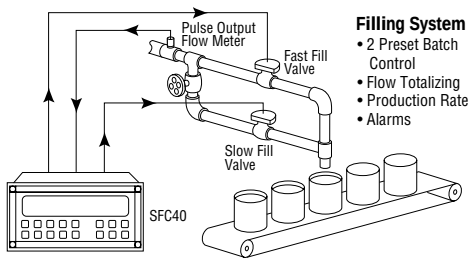
Serial Communications: RS-485/422

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

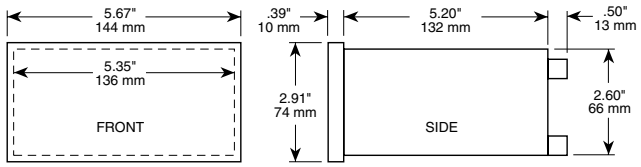
Diagnostics: User initiated tests of inputs, outputs, keyboard

Model No.	Description
SFC400S00	**SFC40** without relays; 115 or 240 VAC, selectable
SFC401S00	**SFC40** with relays; 115 or 240 VAC, selectable

Typical Applications:



Dimensions:



Panel Dims: Cutout: 2.68" x 5.43". Thickness: 1/16" to 1/14". Depth: 5.68" min.

Sheet length and ream control . . . for web processing applications

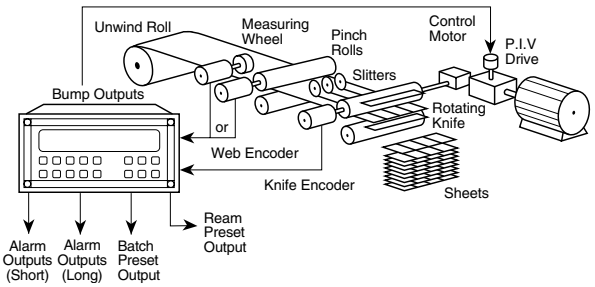
The **MAX S.L.R.C.** monitors the radial position of rotary cutters, and the linear delivery of web transport, calculates the resultant sheet length, and produces alarm outputs if length is out of tolerance from high/low limits. In addition, web length throughput is totalized, sheet production is counted, 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

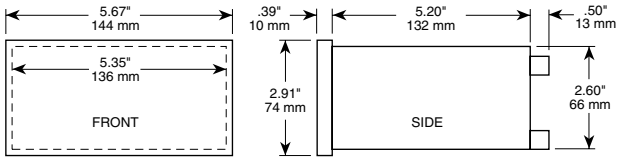
Outputs: Type: 6 solid state, 100 mA sink, 28 VDC max. programmable operation

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.

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

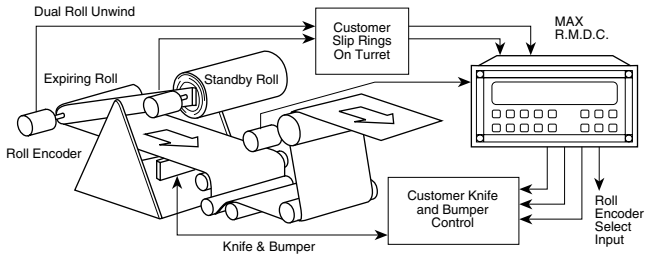
Outputs: 3 solid state, 100 mA sink, 28 VDC max.

Serial Communications: RS-422/485 differential, ASCII

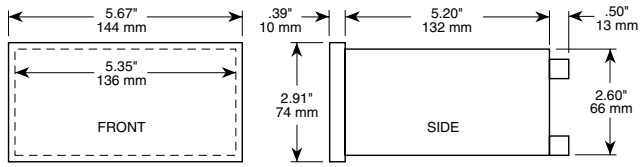
Operating Temperature: 32° to 122°F (0° to 50°C)

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.

Notes

DANAHER SPECIALTY PRODUCTS 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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Veeder-Root
Dynapar
Eagle Signal

Notes

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veeder-root.techsupport@dancon.com

Websites
www.eagle-signal.com
www.veeder-rootcounters.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 f exibility 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.

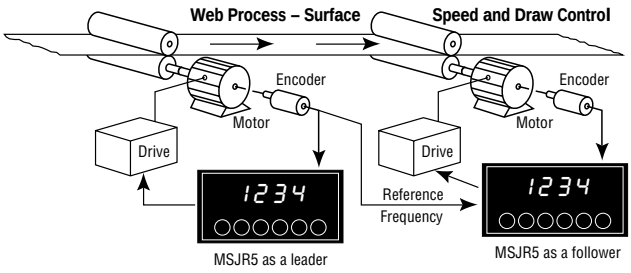
Speed follower controls are used to make one part of a system track another. Conveyor applications might require the takeaway line to go slightly faster than the feed line. Mixing applications often use speed followers to maintain a balance of materials even though the production rate of the system may vary.

SPECIFYING A MOTION CONTROLLER

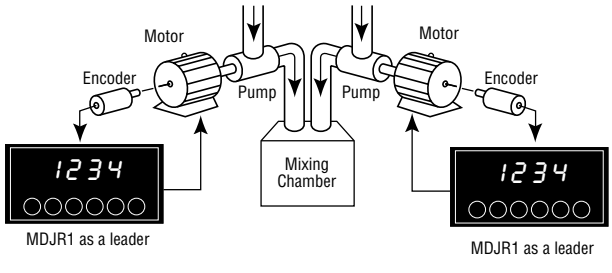
In choosing a master speed control, the primary consideration is given to the accuracy needed. This is usually a price/ performance issue, with higher accuracy control costing more. Accuracies can range from 0.1% to 0.01%. Better performance will also enter into the feedback device selection, the drive/ 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.

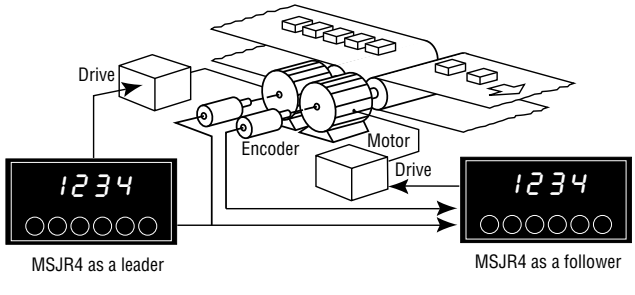
Web Speed & Draw Control



Precise Pump Control



Precise Conveyor Speed Control



SELECTOR GUIDE — 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	

MSJR4 Motion Controller

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%

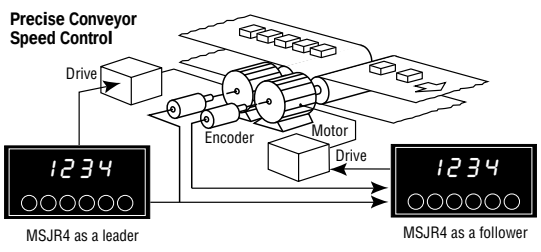
Loop Time: 16 milliseconds

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

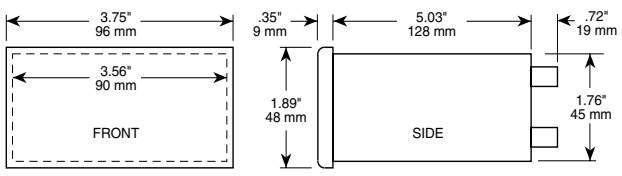
For trim input capability, see MSJR5
For integrated DC drive, see MDJR1

Model No.	Description
MSJR4U00	Digital Speed Controller

Typical Applications:



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.

MSJR5 Motion Controller

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%

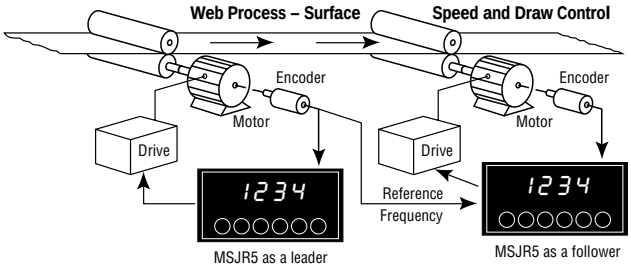
Loop Time: 16 milliseconds

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

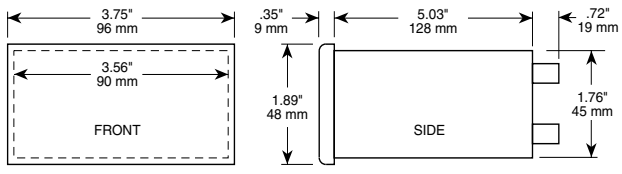
For no trim input capability, see MSJR4
For integrated DC drive, see MDJR1

Model No.	Description
MSJR5U00	Digital Speed Controller with Analog Trim Input

Typical Applications:



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.

MDJR1 Motion Controller

The most economical and compact fractional horsepower 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

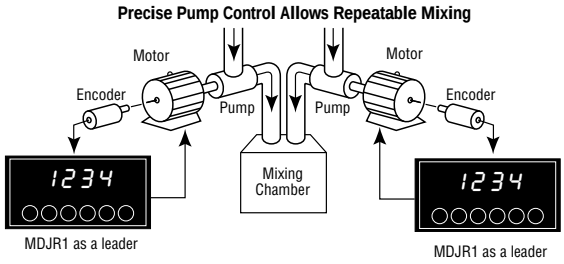
Regulation: Leader (speed): 0.05%; Follower (ratio): 0.05% with zero long term drift; Process Time: 0.05%

Loop Time: 16 milliseconds

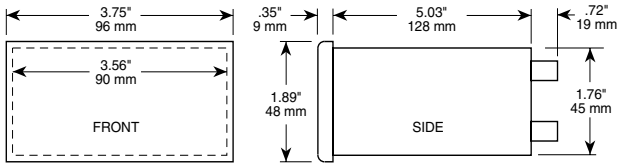
Operating Temperature: 32° to 122°F (0° to 50°C)

Model No.	Description
MDJR1U00	**MDjr1** 1/8 DIN Digital DC Drive

Typical Applications:



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.

MDJR2 Motion Controller

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

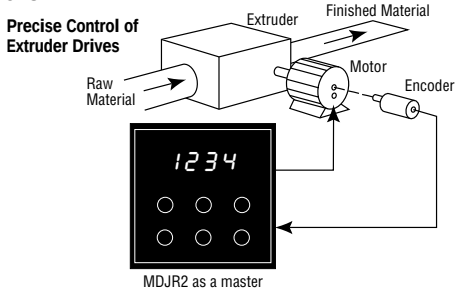
Regulation: Leader (speed): 0.05%; Follower (ratio): 0.05% with zero long term drift; Process Time: 0.05%

Loop Time: 16 milliseconds

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

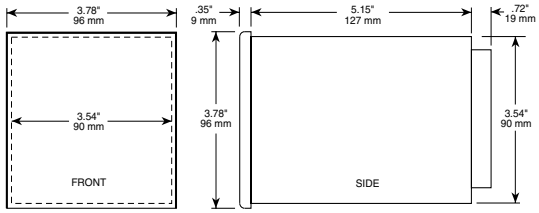
Model No.	Description
MDJR2U00	1/4 DIN Digital DC Drive

Typical Applications:



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.

Notes

DANAHER SPECIALTY PRODUCTS 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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Notes

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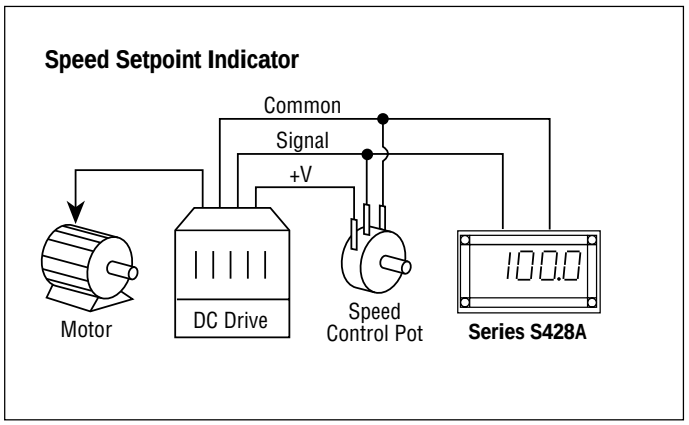
www.eagle-signal.com
www.veeder-rootcounters.com

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.

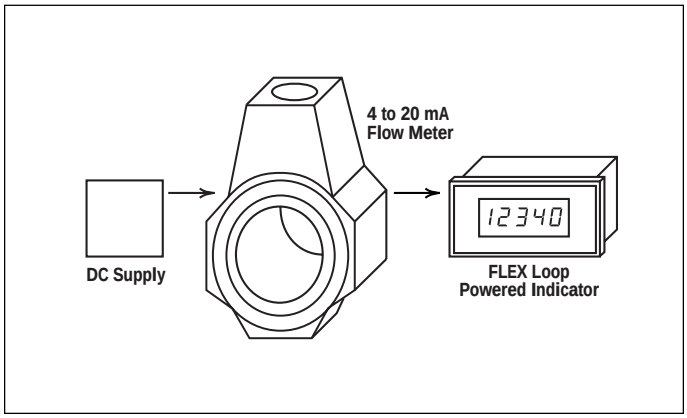
DIGITAL PANEL METER FUNCTIONS

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.



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.

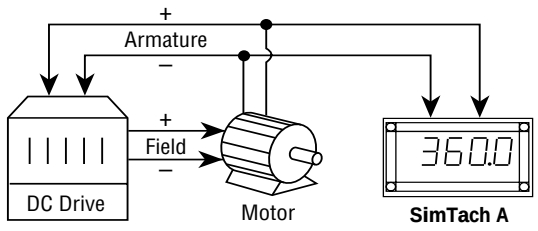
Finally, other convenience features should be considered. Setup and calibration methods can be potentiometer adjustments or switch settings. Accessory power may be needed to power sensing devices.

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



Process Indicators

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: 9.04** ★	**Page: 9.05** ★	**Page: 9.06** ★	**Page: 9.07** ★
				
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

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 A	FLEX LPI	FLEX DCV	FLEX DCI
Page: 9.08 ★	**Page: 9.09**	**Page: 9.10**	**Page: 9.11**	**Page: 9.12**
				
■ **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**	■ **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**	■ **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**
48mm x 96mm	50mm x 96mm	36mm x 72mm	36mm x 72mm	36mm x 72mm
Red or Green LED	LED	LCD	LCD	LCD
4 (0.56" high)	4 1/2 (0.56" high)	3 1/2 (0.5" high)	3 1/2 (0.5" high)	3 1/2 (0.5" high)
90- 264 VAC	115, 230 VAC	Loop powered	5 VDC	5 VDC
Thermocouple, RTD, DC mA, DC V	0 to 20, 200, 600 VDC	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
Auto for TC & RTD, front panel for DC mA & DC V	Span adjust or digital (BCD) calibrator	Offset and Span adjustment	Offset and Span adjustment	Offset and Span adjustment
0.05%	0.1%	0.1%	0.1%	0.1%
Up to 3 Alarm Relays; 20 - 28 VDC Accessory Power	None	None	None	None
RS-485 (Modbus or Open ASCII)	None	None	None	None
NEMA 4X/IP65	NEMA 4	NEMA 4	NEMA 4	Nema 4

S628 AWESOME DC Process

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:

Linear Output Option
0 None
3 Linear Output

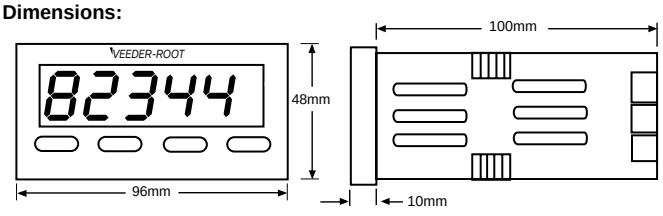
Power Supply
0 90-264 VAC
2 20-50 VAC/VDC

S 6 2 8 – 2 _ _ _ _

2nd Relay Option
0 None
1 2nd Relay

Serial Communication Option
0 None
5 RS-485
6 Digital Input

Dimensions:



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

S628 AWESOME Temp. Indicator

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

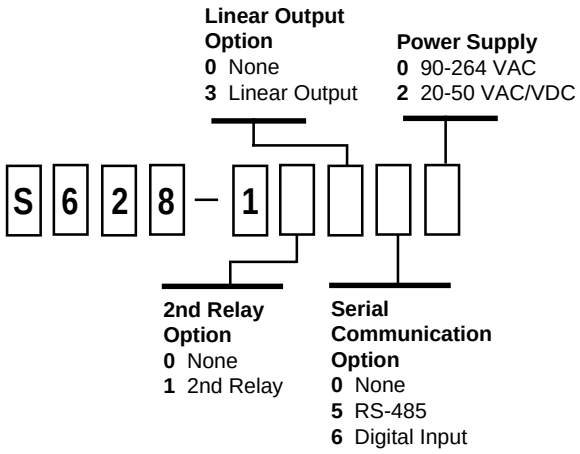
Outputs: Solid State: NPN open collector, 30 VDC max., 100 mA max.
Relay: SPDT, 5A resistive@ 110 VAC
Latency: 75 µ seconds, plus 8 ms for relay pull-in

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.

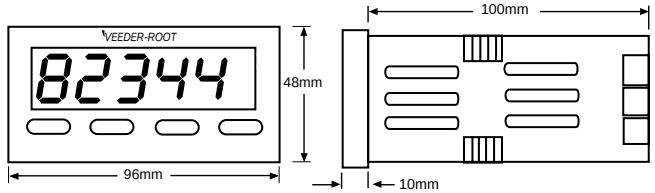
Communication: RS-485; Serial asynchronous, UART to UART;
Open ASCII: One start bit, even parity seven data bits, one stop bit;
Baud Rate selectable from 9600, 4800, 2400, or 1200
Maximum Zones: 99

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:



Dimensions:



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

S628 AWESOME DC Volts/Amps

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

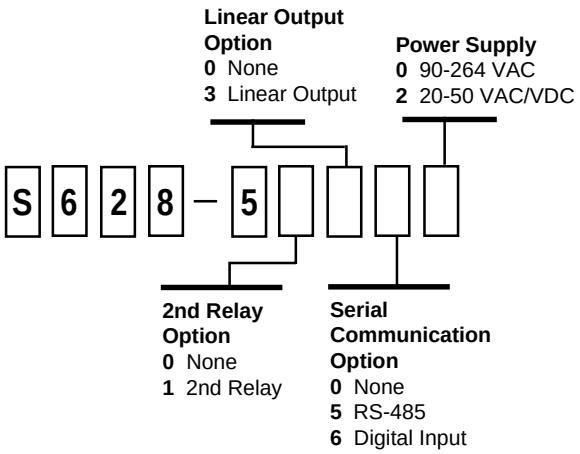
Outputs: Solid State: NPN open collector, 30 VDC max., 100 mA max.
Relay: SPDT, 5A resistive@ 110 VAC
Latency: 75 µ seconds, plus 8 ms for relay pull-in

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.

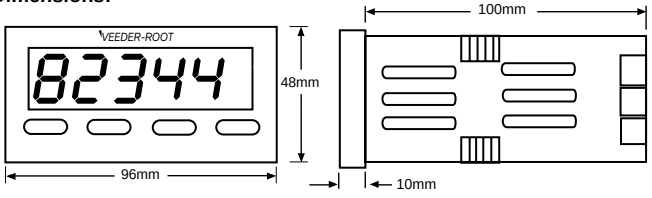
Communication: RS-485; Serial asynchronous, UART to UART;
Open ASCII: One start bit, even parity seven data bits, one stop bit;
Baud Rate selectable from 9600, 4800, 2400, or 1200
Maximum Zones: 99

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:



Dimensions:



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

S628 AWESOME AC Volts/Amps

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
0 None
3 Linear Output

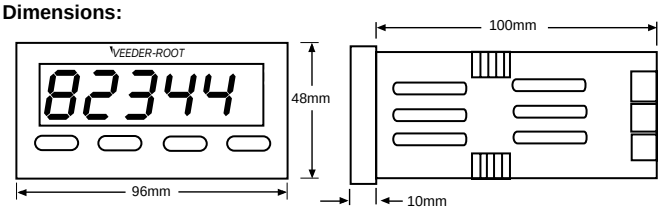
Power Supply
0 90-264 VAC
2 20-50 VAC/VDC

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:



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

S428a Process Indicator with Alarm

Volts, Current, Thermocouple, or RTD Process Measurements with Intelligent Features… available with red, green or color changing LED display

File No.: 67237

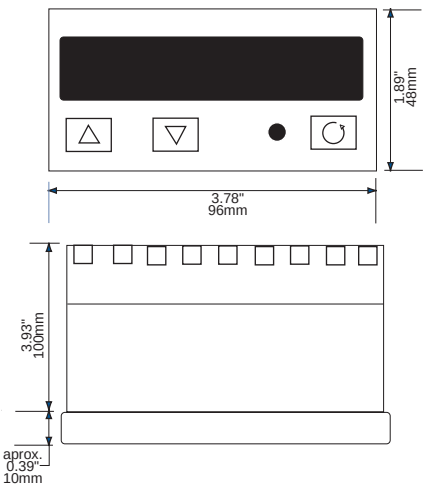
RECOGNIZED RECOGNIZED

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**

Dimensions:



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

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)

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.

For digital (pulsed) inputs, see SimTach D
For readout with alarm capability , use a MAXjr Tach 1 with a PM64S Analog to Frequency Converter

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)

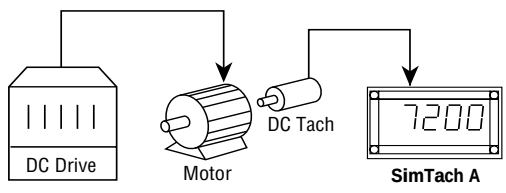
Power Requirements: 95 to 130, or 190 to 260 VAC, 50/60 Hz, 6 VA

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

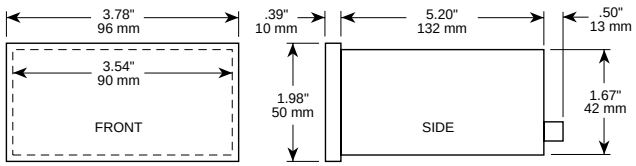
Model No.	Description
STA00	115 VAC, DC Volts Panel Meter
STAE0	230 VAC, DC Volts Panel Meter
STAS0	115 or 230 VAC, DC Volts Panel Meter
STA01	115 VAC, DC Volts Panel Meter with Digital Calibration
STAE1	230 VAC, DC Volts Panel Meter with Digital Calibration
STAS1	115 or 230 VAC, DC Volts Panel Meter with Digital Calibration

Typical Applications:

Actual Speed Indicator Using DC Tach Feedback



Dimensions:



FLEX LPI

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

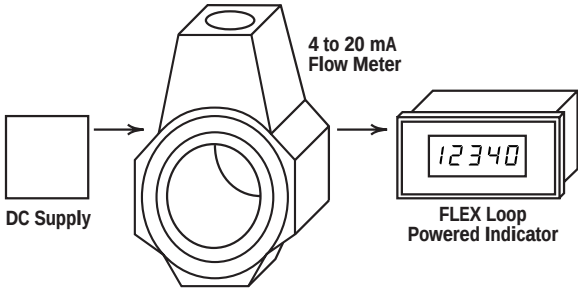
Span Stability: ±0.005% of span per ° C, typical; ±0.015% maximum

Materials: Diecast bezel, high impact plastic lens and insert; Front surface meets NEMA-4 requirements when panel mounted with gasket provided

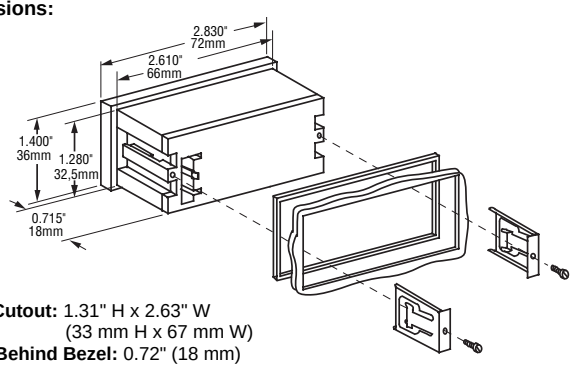
Weight: 5.5 oz. (156 g)

Model No.	Description
FLPI00	**FLEX** LPI digital panel meter

Typical Applications:



Dimensions:



Panel Cutout: 1.31" H x 2.63" W
(33 mm H x 67 mm W)
Depth Behind Bezel: 0.72" (18 mm)

FLEX DCV

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

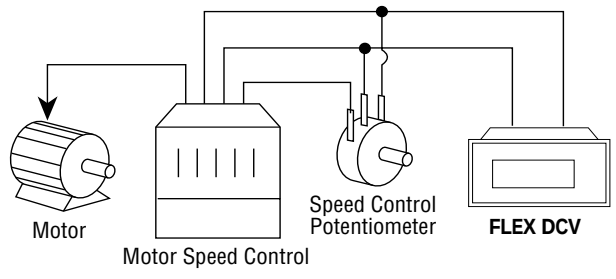
Zero Temperature Coefficient: ±0.03% of span/°C with offset adjustment enabled

Materials: Diecast bezel, high impact plastic lens and insert; front surface meets NEMA-4 requirements when panel mounted with gasket provided

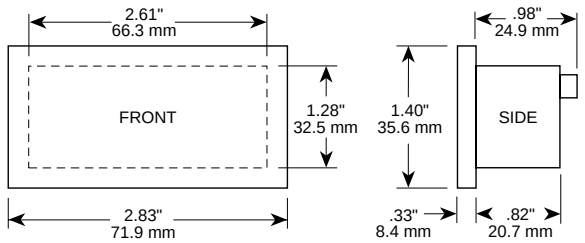
Weight: 5.5 oz. (156 g)

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:



Dimensions:



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

FLEX DCI

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

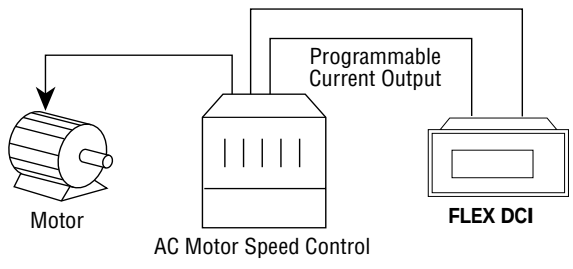
Zero Temperature Coefficient: ±0.005% of span/°C with offset adjustment enabled

Materials: Diecast bezel, high impact plastic lens and insert; front surface meets NEMA-4 requirements when panel mounted with gasket provided

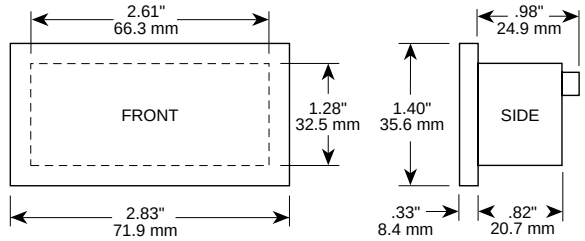
Weight: 5.5 oz. (156 g)

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:



Dimensions:



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

Notes

DANAHER SPECIALTY PRODUCTS 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 +1.800.390.6405
or +1.910.862.2511
eagle-signal.custserv@dancon.com
veeder-root.custserv@dancon.com

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eagle-signal.techsupport@dancon.com
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Websites
www.eagle-signal.com
www.veeder-rootcounters.com

Veeder-Root
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Eagle Signal

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www.veeder-rootcounters.com

Veeder-Root
Dynapar
Eagle Signal

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eagle-signal.techsupport@dancon.com
veeder-root.techsupport@dancon.com

Websites
www.eagle-signal.com
www.veeder-rootcounters.com

Veeder-Root
Dynapar
Eagle Signal

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

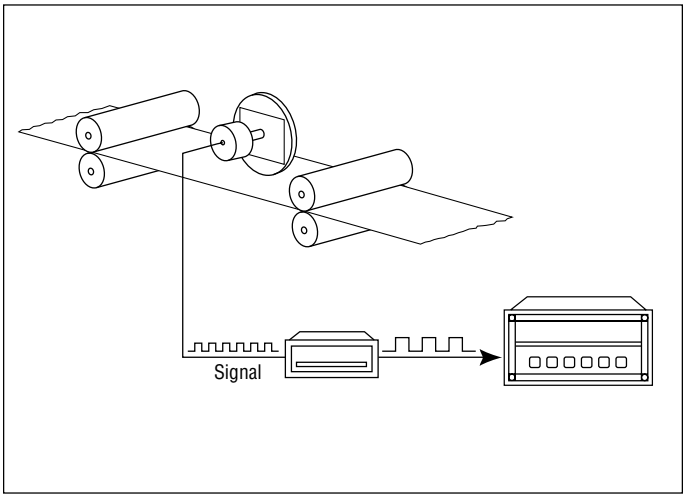
Our indicators and controllers provide a carefully selected group of features to satisfy most application needs, yet keep the products cost effective and easy to apply. Digital accessories offer you the added functionality you need only when you need it, making product selection easy while keeping system 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.

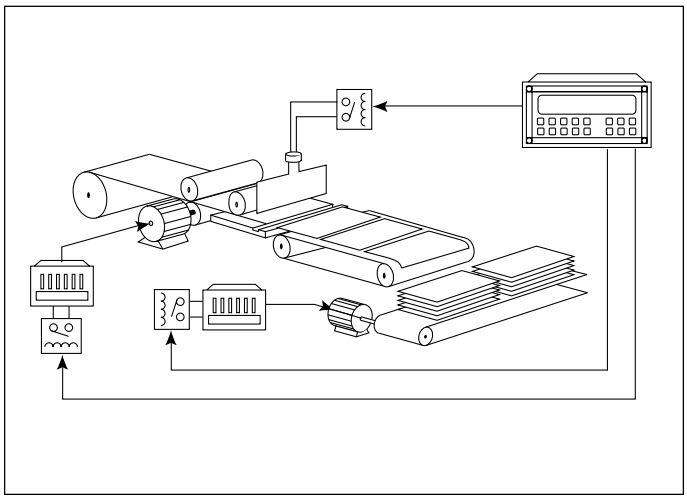
INPUT MODULES

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.)



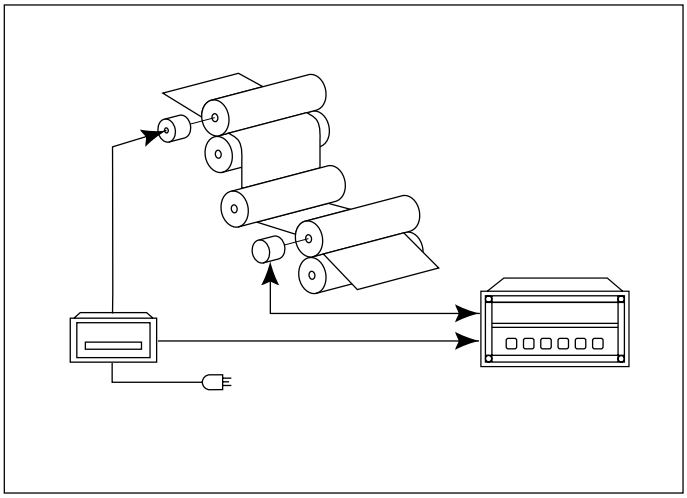
OUTPUT MODULES

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.



POWER SUPPLIES

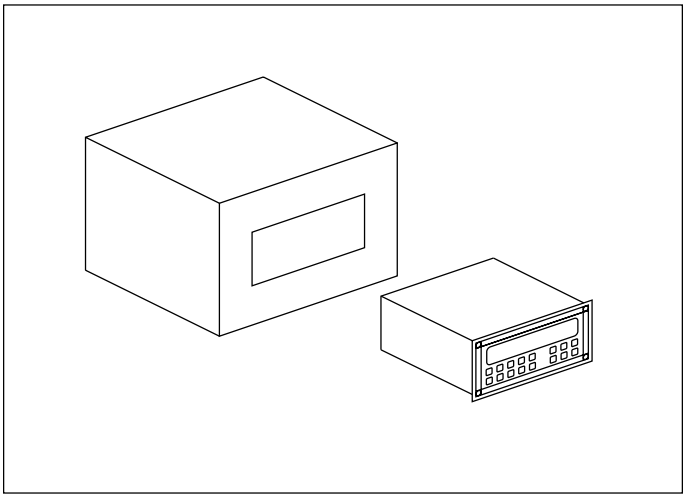
A source of power is needed for encoders, sensors, relays and other peripheral devices. When an indicator or controller's built-in supply is insufficient for an application's needs, an external supply can be added. We offer supplies with 12 or 15 volt outputs for compatibility with Dynapar and Veeder-Root products.



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.

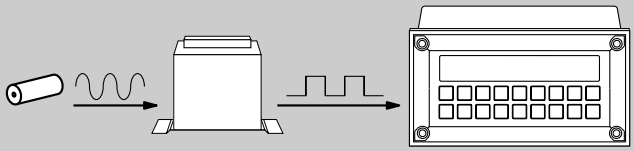
INPUT MODULES:

- **Improve Signal Quality**
- **Extend Operating Range**
- **Perform Conversion**

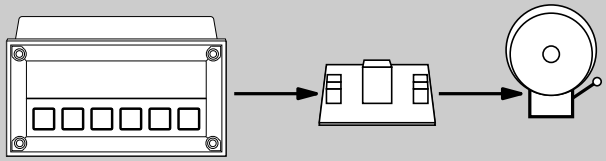
OUTPUT MODULES:

- **Switch High Power Loads**
- **Povide Electrical Isolation**

INPUT CONVERSION



OUTPUT BUFFER



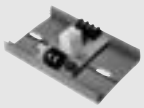
DYNAPAR brand

PM21S Differential Line Receiver and Supply
See page 10.05

- Differential Inputs
- Built-in Encoder Power Supply

DYNAPAR brand

PM31 Relay Module
See page 10.08



- 7.5 Amp SPDT Relay
- Contact Supression/Protection

DYNAPAR brand

PM28S Dual Universal Input Amplifier
See page 10.04

- Universal Inputs (configurable)
- Optically Isolated Outputs

DYNAPAR brand

High Frequency Dividers
See page 13.06 & 13.07

- HFD10 – 2 Channels, ÷10
- HFDQ4– Quadrature plus Index ÷4

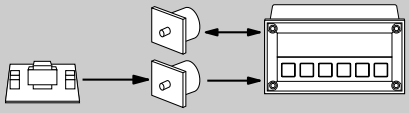
POWER SUPPLIES:

- Provide Power for Accessories
- Allow Use of Additional Sensors

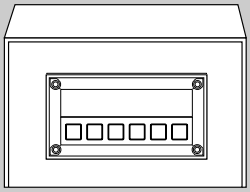
ENCLOSURES:

- Mount Relays and Power Supplies
- Mount Indicators, Controllers and Accessories

ENCODER POWER



PANEL MOUNTING



DYNAPAR brand

PM41S Power Supply Module

See page 10.09

■ +12 VDC, 200 mA Output

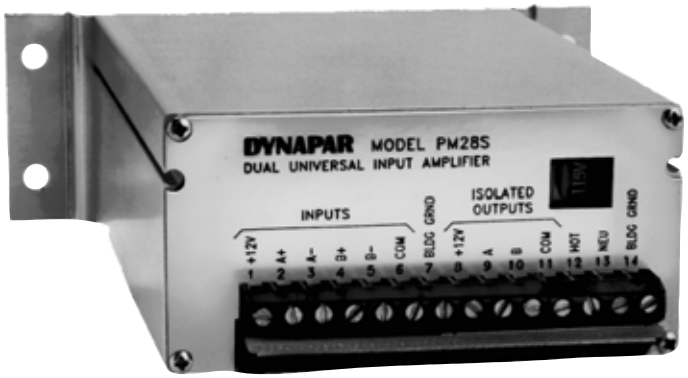
VEEDER-ROOT brand

16000700234 SNAPTRACK™

See page 10.10

■ Snap-In Convenience
■ Mounts PM41S Power Supply & PM31 Relay

PM28S Input Amplifier



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

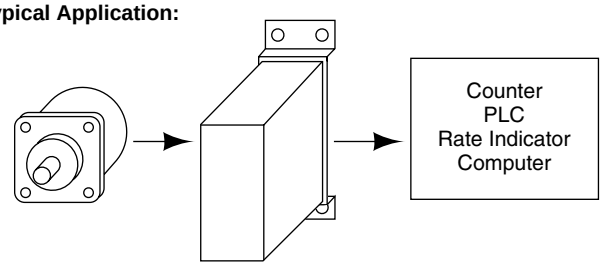
Environmental:

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

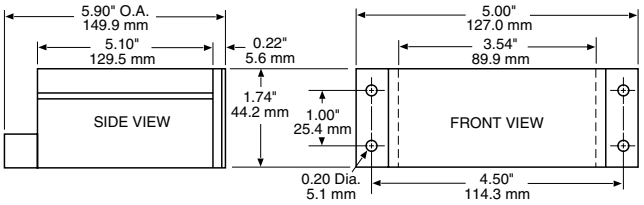
PM28S replaces PM21, PM25 and 101UA

Model No.	Description
PM28S00	Dual Universal Input Amplifier

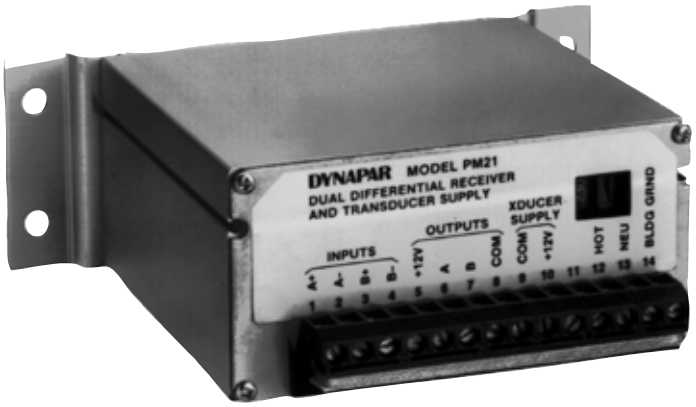
Typical Application:



Dimensions:



PM21S Line Receiver & Supply



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.

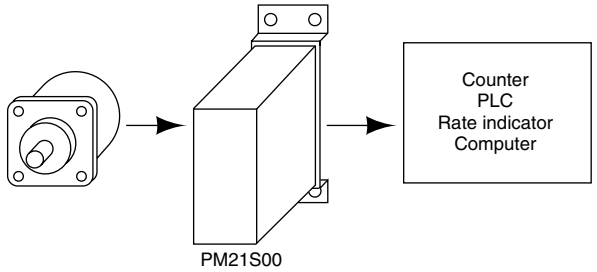
- Two independent channels
- Differential inputs
- High capacity transducer supply
- Internal line termination
- Hysteresis on inputs
- Noise filtering
- Short circuit protected outputs
- Selectable 115/230 VAC Operation

SPECIFICATIONS

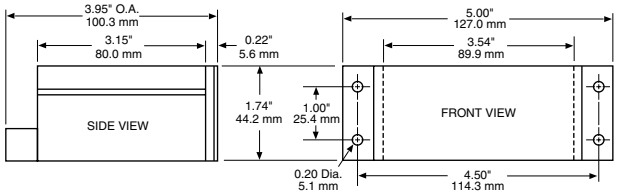
Input Power:
Ext. Receiver Supply: +12 VDC @ 25 mA max.
Int. Transducer Supply: 115/230 VAC; ±10%, 50/660 Hz, 6 VA
Transducer Output Power: +12 VDC ±5% @ 225 mA
Differential Inputs:
Voltage Range: ±15 VDC max.
Input Sensitivity: 200 mV
Input Hysteresis: 50 mV
Input Impedance: approx. 5 kΩ
Input Frequency: 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

Typical Applications:



Dimensions:



The PM21 may be mounted either horizontally or vertically, as required, using standard #10 hardware.

HFD-10 High Frequency Divider

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

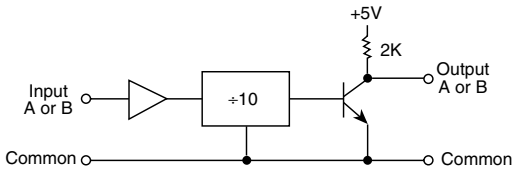
Output:
Output High: 1.9 V min. @ 0.6 mA source, 5 V max.
Output Low: 0.45 V max. @ 10 mA sink

Supply Voltage: +12 VDC (+10%, -25%) @ 60 mA max.

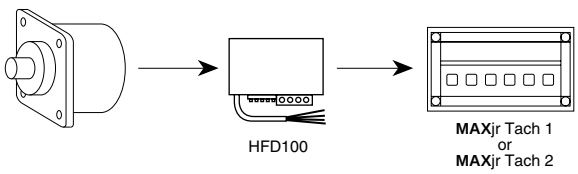
Environmental
Storage Temp.: -18 to 85°C
Operating Temp.: 0 to 55°C
Humidity: 90% and non-condensing

Model No.	Description
HFD100	High Frequency Divider

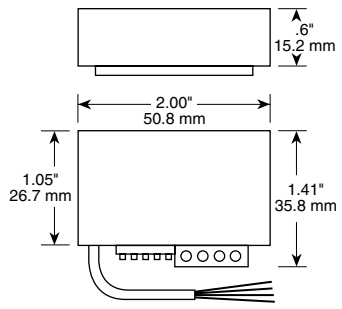
Functional Diagram:



Typical Applications:



Dimensions/Installation:



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.

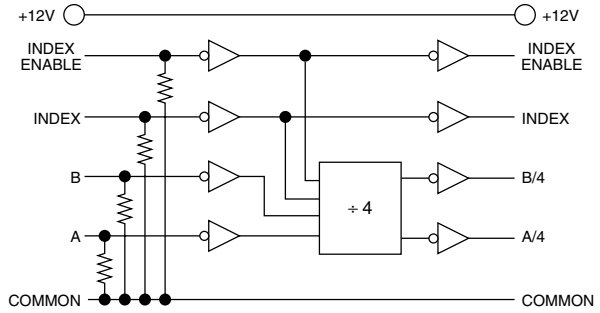
HFDQ-4 High Frequency Divider

High Frequency Quadrature Divider

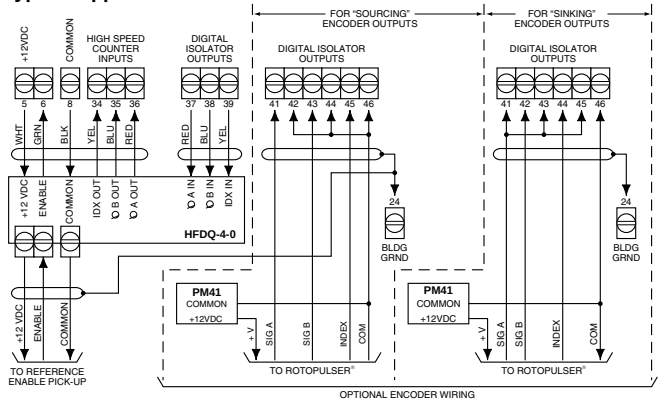
The model HFDQ-4 is a quadrature high frequency interface module which divides the input rate by four. The HFDQ-4 interfaces with the **MAX** Motion 1 to allow quadrature encoder inputs up to 50KHz.

- 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.

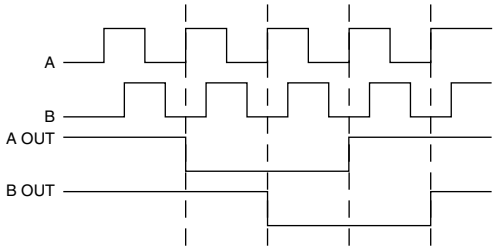
SPECIFICATIONS

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:



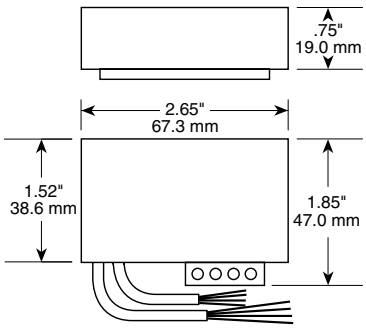
Supply Voltage: +12 VDC (+10%, -25%) @ 60 mA max.

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

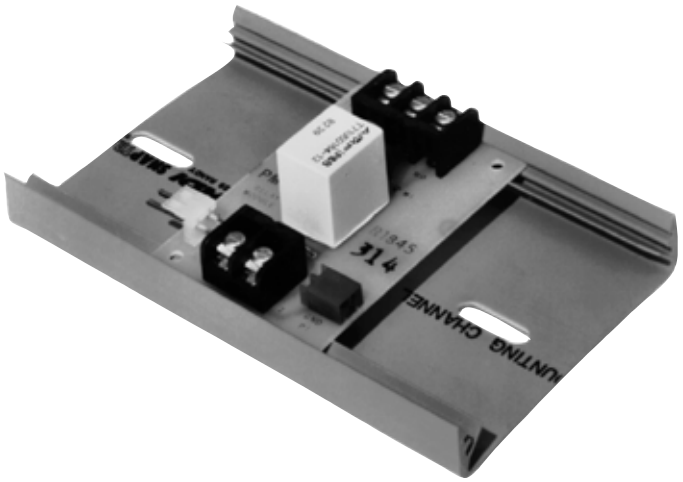
Dimensions/Installation:



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.

PM31 Relay Module



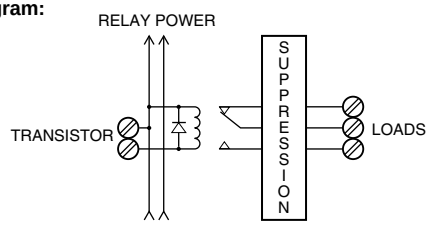
General purpose form C relay module

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

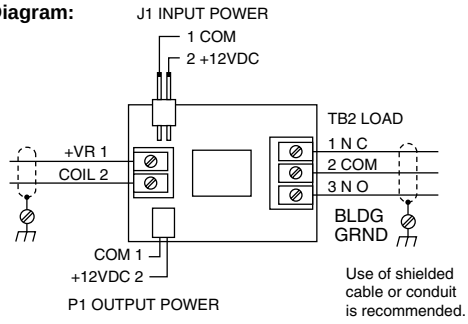
SNAPTRACK™ mounting chassis are available from DYNAPAR in 12" lengths. (Refer to SNAPTRACK™ product information in this section of the product catalog.) They may be trimmed by the customer for his particular need.

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.

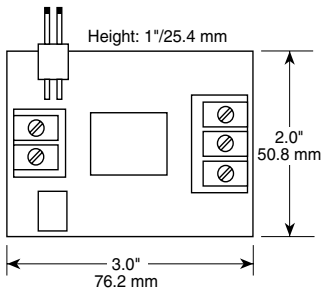
Model No.	Description
PM3100	Relay Module
16000700234	SNAPTRACK™ 12" long

Wiring Diagram:

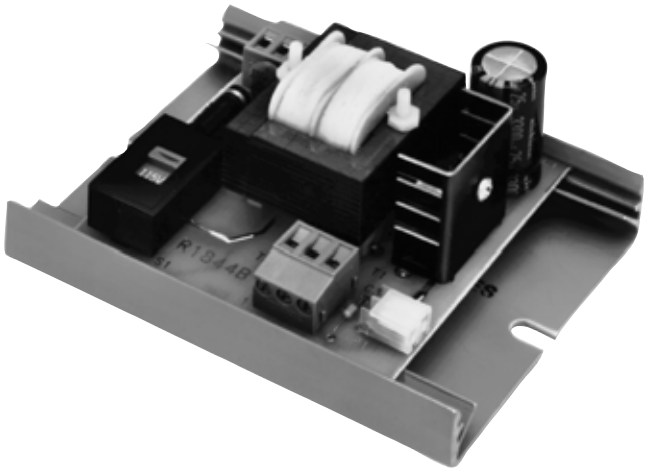


Package Dimensions/Specifications:

Interconnect: Terminal strips for coil and contact connections, .045" pin and socket connectors for 12 V bussing for coil power.



PM41S Power Supply Module



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.

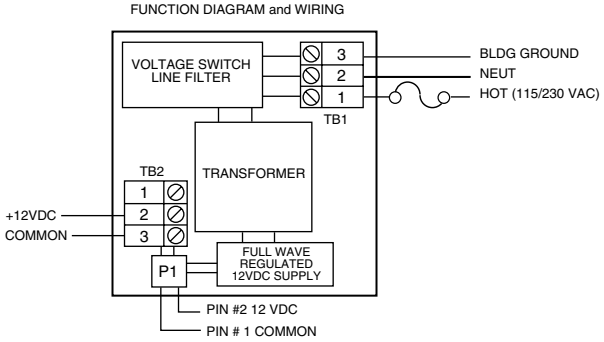
Mount the PM41S module by inserting one edge of the board into the guide, then press down on the board until it snaps into place.

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

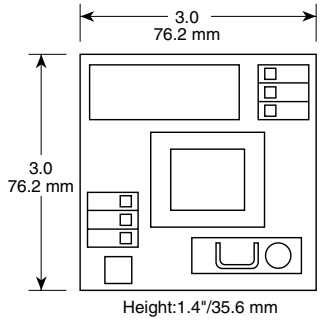
Refer to SNAPTRACK™ product information in this section of the catalog.

Functional Diagram and Wiring:



Bussed power to other SNAPTRACK modules (PM31) is provided by P1. Electrical connection is made by sliding the modules together.

Dimensions:



16000700234 SNAPTRACK™

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.

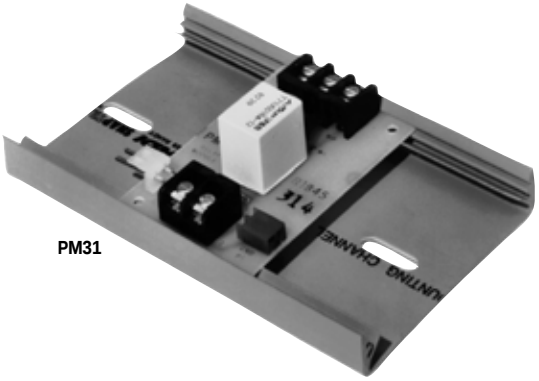
INSTALLATION

Install the SNAPTRACK™ by using rivets or screws thru the slots provided, or with double faced tape as the application permits.

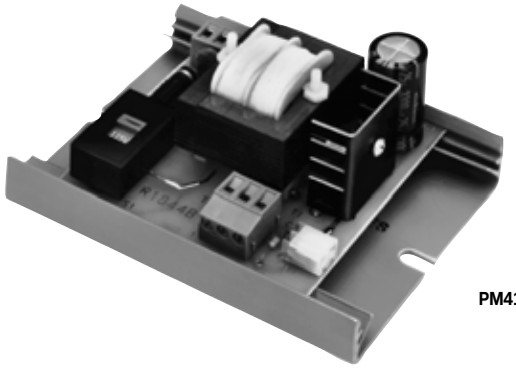
Mount the PM41S module by inserting one edge of the board into the guide then press down on the board until it snaps into place.

PM31 RELAY MODULES can be mounted in the same SNAPTRACK™. The P1 connector system will power the PM31 Relay Module.

Typical Applications:



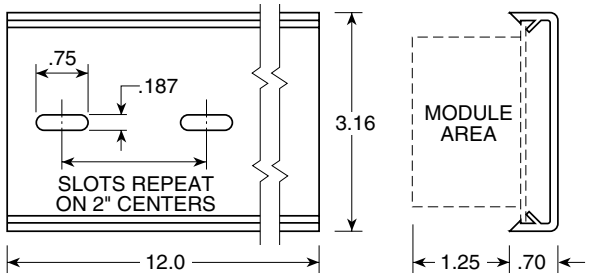
PM31



PM41S

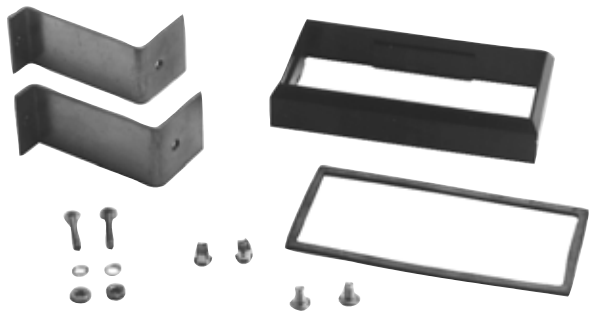
Model No.	Description
16000700234	SNAPTRACK™ 12" long

Dimensions:



DZ100-51
BEZEL KIT

Panel mount hardware for 1/8 DIN DA, DG, DX, and DZ series products.

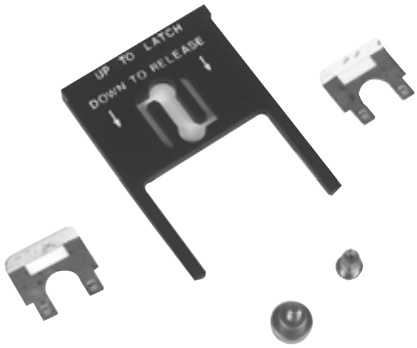


ABV03141P001
FLEXIBLE DUST COVER KIT

Provides dust and liquid protection for LZ and LX series products. Allows changing thumbwheel and push-button settings.

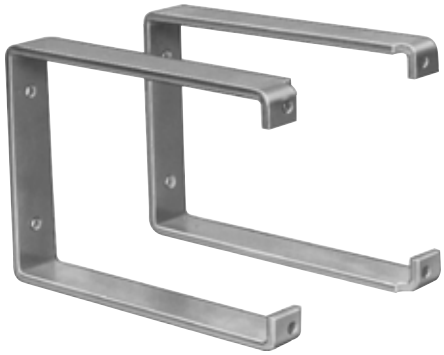
DZ100-56
LATCH AND RELEASE KIT

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.



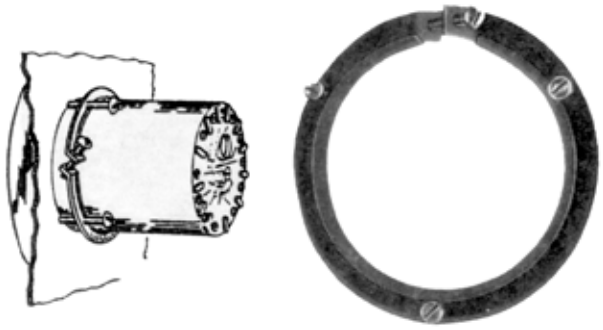
H-5331
MOUNTING BRACKETS

Allows surface mounting of all CYCL-FLEX® and BR4 products.



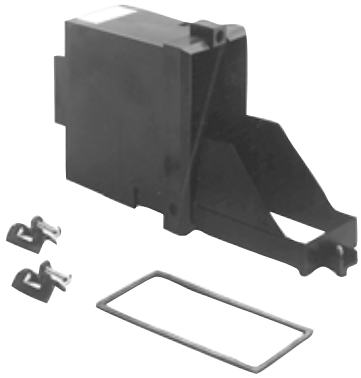
HP50-31
MOUNTING RING

Eliminates drilling and tapping the four mounting holes for panel mounting all CYCL-FLEX® products.



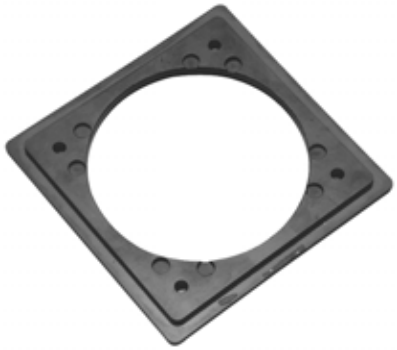
DZ100-54
PLUG-IN HOUSING

Plug-in housing for 1/8 DIN products DA, DG, DX, and DZ.



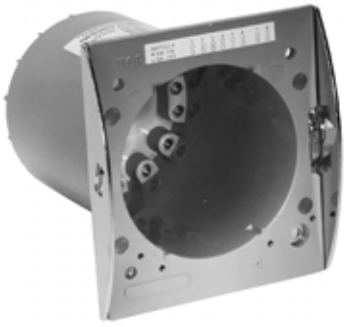
PDM 534
ADAPTER PLATE

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.

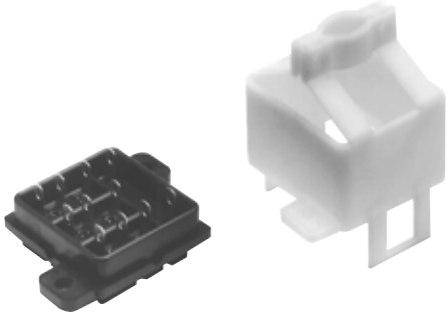


FFR11059P001
FLEXIBLE DUST COVER

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.



Notes

DANAHER SPECIALTY PRODUCTS 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 +1.800.390.6405
or +1.910.862.2511
eagle-signal.custserv@dancon.com
veeder-root.custserv@dancon.com

Technical Support
call Toll Free +1.800.390.6405
or +1.910.862.2511
eagle-signal.techsupport@dancon.com
veeder-root.techsupport@dancon.com

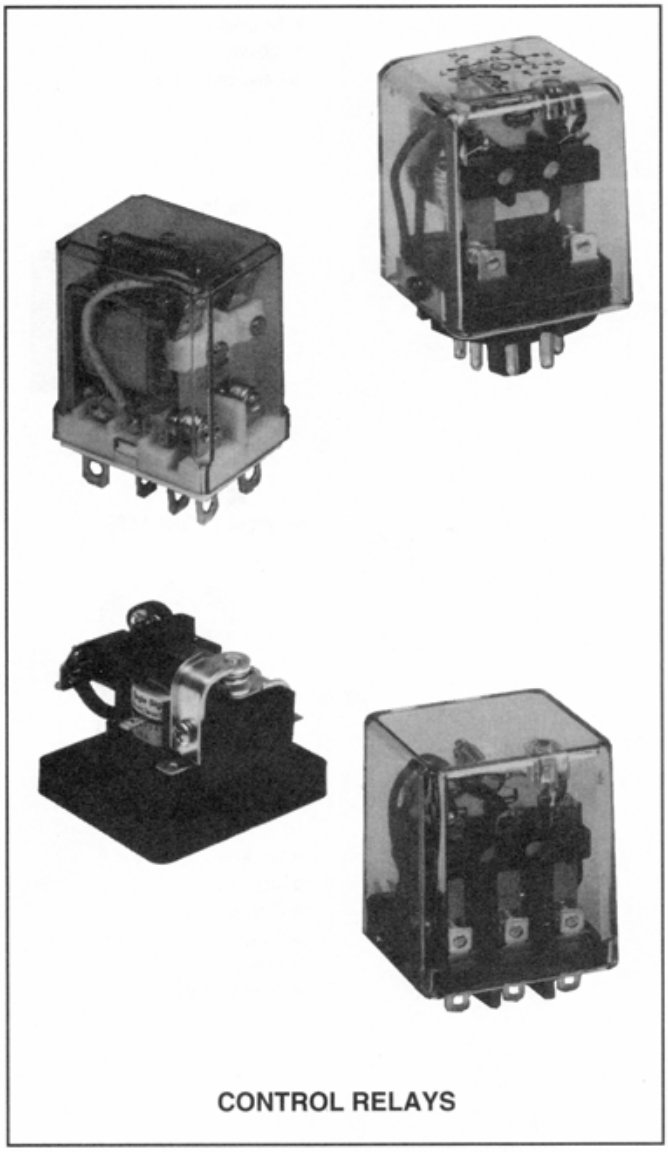
Websites
www.eagle-signal.com
www.veeder-rootcounters.com

Veeder-Root
Dynapar
Eagle Signal

Our Eagle Signal brand provides a wide selection of industrial control relays and time delay 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.

STANDARD CONFIGURATIONS

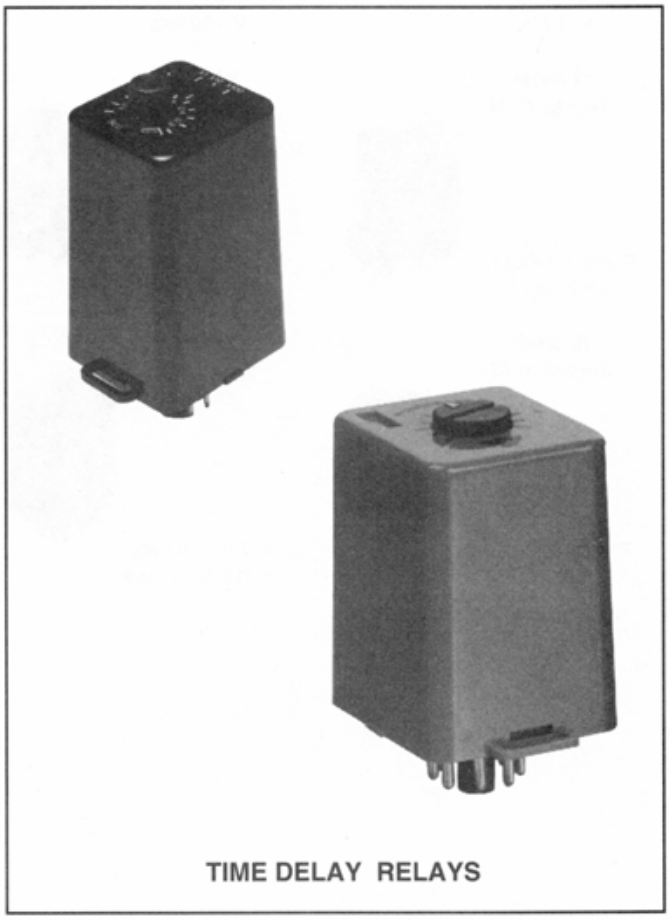
Relays are available in either low profile or conventional round and square base "cube" styles. Both control relays and time delay relays are available for all popular AC and DC operating voltages.



CONTROL RELAYS

INDUSTRIAL CONTROL RELAYS

Eagle Signal brand industrial control relays are available with contact ratings ranging from low power to 30 Amps. Most popular units offer a choice of contact material to suit your needs – some specialized for low level signal inputs such as on PLCs, while others are well suited for switching current to small motors. For extended storage life, gold plating can be applied to contacts to inhibit oxidation.



TIME DELAY RELAYS

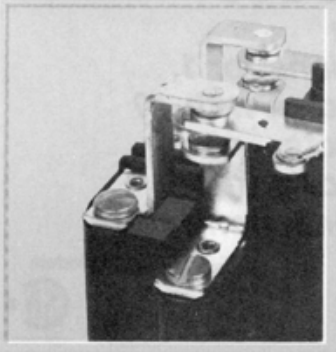
TIME DELAY RELAYS

When your application requires time control, consider an economical solution with our time delay relays. Select an On-Delay, Interval, Pulse, Delay-on-Release, or Repeat Cycle relays.

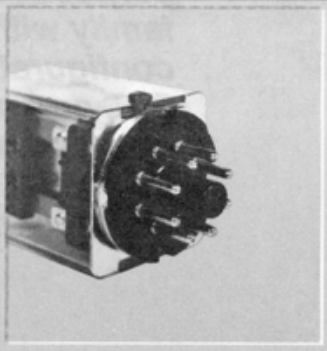
EAGLE SIGNAL brand LOW PROFILE	*EAGLE SIGNAL* brand GENERAL PURPOSE	*EAGLE SIGNAL* brand POWER and LATCHING	*EAGLE SIGNAL* brand TIME DELAY
16 Series *See page 11.04*  ■ Plug-in ■ 10 Amp	**22 Series** *See page 11.10*  ■ Round base plug-in ■ 5/10 Amp	**27 Series** *See page 11.14*  ■ Mechanical latch ■ 1 or 2 pole	**70 Series** *See page 11.18*  ■ **Multi-Range** ■ On delay ■ Interval ■ Delay on release
17 Series *See page 11.06*  ■ Solder or Plug-in ■ 3 Amp	**30 Series** *See page 11.16*  ■ Open or enclosed ■ Square base		
18 Series *See page 11.08*  ■ Magnetic latching ■ 10 Amp	**23 Series** *See page 11.12*  ■ Current sensitive ■ 120 mw per pole		**CG Series** *See page 11.28*  ■ On delay ■ 0.5 seconds to 30 hours
			80 Series *See pages 11.20 to 11.26*  ■ **Fixed-Range** ■ On delay ■ Interval ■ Delay on release ■ Pulse ■ Repeat cycle ■ Counter (1-99)
	For our complete line of relay sockets and accessories *See page 11.30*		

11 RELAYS and ACCESSORIES

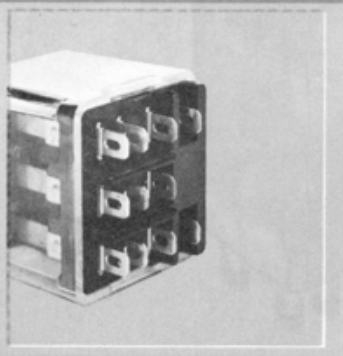
TERMINAL CONFIGURATIONS



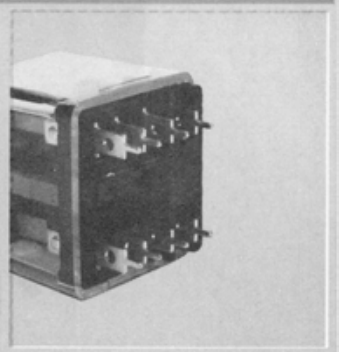
Screw



Plug-in

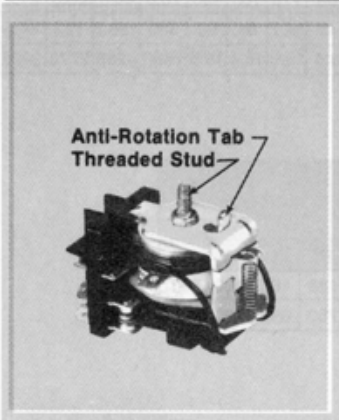


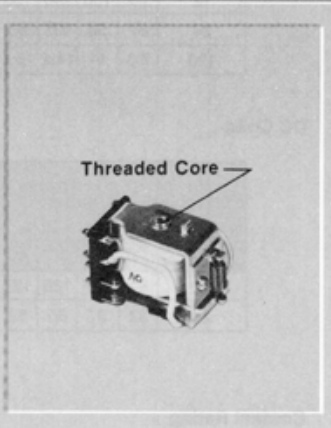
Universal, for Quick Connect/Solder/Plug-in

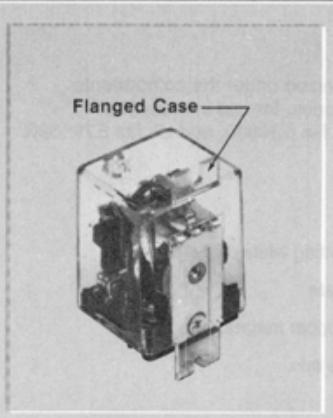


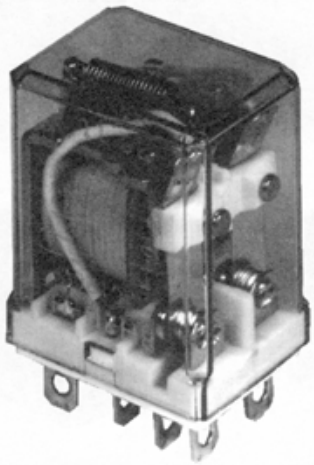
Printed Circuit

RELAY FEATURES









Low profile, general purpose AC & DC family with configurations for 1, 2, 3, or 4 poles with 10 amp contacts... plug-in, solder, or printed circuit connections

Selected Models

RECOGNIZED CERTIFIED

- Polycarbonate, molded clear dust cover has low moisture absorption and high impact strength
- Movable blade and panel assemblies utilize molded thermosetting white diallyl-phtalate for low moisture absorption, excellent dielectric strength, high arc tracking resistance, and broad temperature range
- Polyurethane insulated magnet wire for excellent insulation at high temperatures
- Low profile where mounting space is at a premium
- 10 amp rated contacts
- CSA certified file 35144
- All standard configurations recognized under the components program of Underwriters Laboratories, for use in industrial applications - UL file E73557, UL file E39906, and UL file E79139R

SPECIFICATIONS

Insulating Material: Molded thermosetting white diallyl-phtalate

Dust Cover: Molded clear polycarbonate

Coil Winding: Polyurethane coated copper magnet wire

Insulation Resistance: 100 megohms min.

Dielectric Strength:
2000 VAC between current carrying members and frame
2000 VAC between contacts and coil
1500 VAC between contact sets
1000 VAC between open contacts

Temperature Range: -22˚ to 158˚F (-30˚ to +70˚C)

Life Expectancy Mechanical: 50 million operations

Electrical: 500,000 operations
10 amp, 120 VAC resistive, 2 pole
200,000 operations
10 amp, 120 VAC resistive
1-3-4 pole

Pull-In/Drop-Out: 1C and 2C: 20 ms max.
3C and 4C: 25 ms max.

Pull-In Voltage: 80% of nominal at 68˚F (20˚C)

Shock: 1C and 2C: 20G; 3C and 4C: 10G

Duty Cycle: Continuous

COIL SPECIFICATIONS

AC Coils

Rated Voltage	60 Hz Average Current MA.				50 Hz Average Current MA.				Coil Ohms			
	1C	2C	3C	4C	1C	2C	3C	4C	1C	2C	3C	4C
12	75	100	140	165	86	118	165	196	76.8	40.5	25.3	21.2
24	37	50	70	83	42	59.7	81	98	300	156.7	103	84.5
120	7.5	11	14.2	16.5	8.6	12.9	16.4	19.5	7680	4280	2770	2220

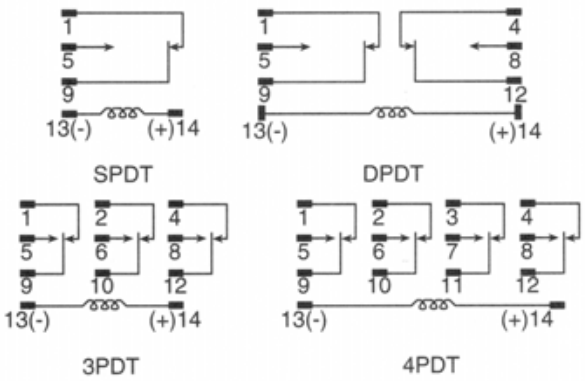
DC Coils

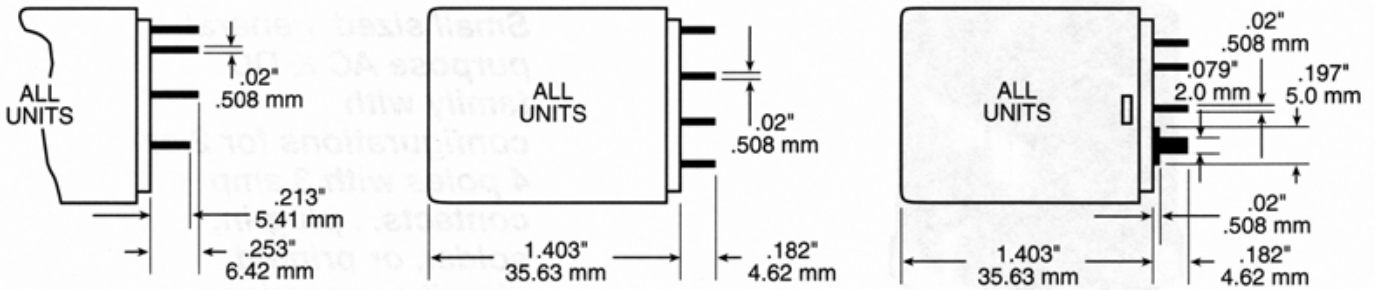
Rated Voltage	Average Current MA.				Coil Ohms			
	1C	2C	3C	4C	1C	2C	3C	4C
12	64	75	120	125	188	160	100	96
24	32	37	60	62	750	650	400	380

Contact Rating

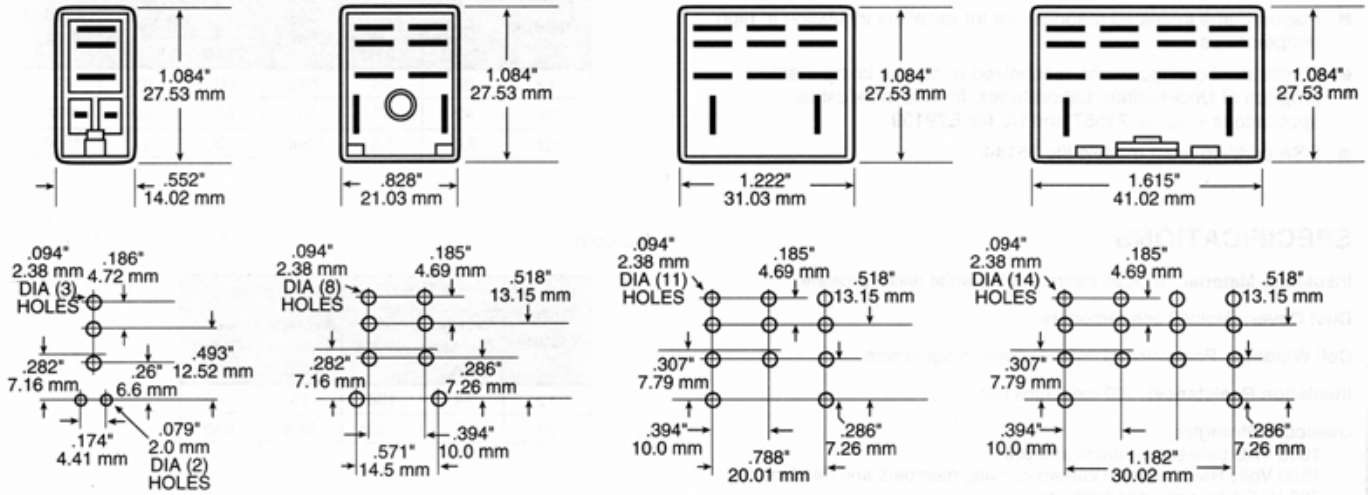
Materials	Rating
Silver Cadmium Oxide (AgCdO)	10 amp, 125 VA, 125 VAC, 240 VA, 250 VAC 1/6 HP, 120 VAC

CONTACTS





Sockets	Retainers	Sockets	Retainers	Sockets	Retainers	Sockets	Retainers
60SH1B05	60SY2S02F1	60SH2B05 60SH2B62	60SY4S02F1 60SY4S51F1 60RH-01	60SH3B05	60SH3B05F1	60SH4B05	60SH4B02F1



ORDERING INFORMATION

16Q 2C A 120 00

RELAY TYPE

Sym.	Description
16Q	General Purpose Solder/.187 Plug-In Type Terminals

CONTACT FORMS

Sym.	Description
1C	SPDT
2C	DPDT
3C	3PDT
4C	4PDT

COIL VOLTAGE TYPE

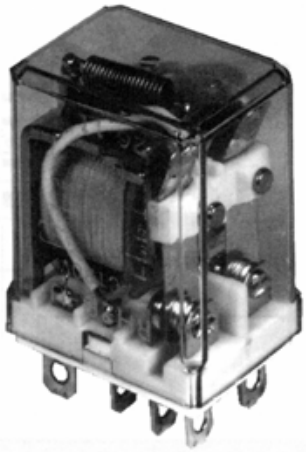
Sym.	Description
A	Alternating Current
D	Direct Current

RATED VOLTAGES

Sym.	Description
012	12V (AC or DC)
024	24V (AC or DC)
120	120 VAC

FEATURES

Sym.	Description
00 (or Blank)	Standard Relay
02	Indicating Light (Special order 2 & 4 pole only)



Small sized, general purpose AC & DC family with configurations for 2 or 4 poles with 3 amp contacts... plug-in, solder, or printed circuit connections

Selected Models

RECOGNIZED

- Polycarbonate molded, clear dust cover has low moisture absorption and high impact strength
- Movable blade and panel assemblies utilize molded phenolic thermoset plastic with low moisture absorption, excellent dielectric strength, high arc tracking resistance, and broad temperature range
- Polyurethane insulated magnet wire for excellent insulation at high temperatures
- All standard configurations recognized under the components program of Underwriters Laboratories, for use in industrial applications - UL file 73557 and UL file E79139
- CSA certified most models file 35144

SPECIFICATIONS

Insulating Material: Molded thermosetting white diallyl-phtalate

Dust Cover: Molded polycarbonate

Coil Winding: Polyurethane coated copper magnet wire

Insulation Resistance: 100 megohms min.

Dielectric Strength:
1000 VAC between contacts and coil
1500 Volts RMS between current carrying members and dead metal
700 VAC between open contacts
1000 VAC between contact sets

Temperature Range: -22˚ to 158˚F (-30˚ to +70˚C)

Life Expectancy Mechanical: 50 million operations

Electrical: 200,000 operations, 3 amp
120 Volt, AC resistive

Pull-In/Drop-Out: 20 ms max.

Pull-In Voltage: (Must operate) 80% max. of nominal rated voltage at 68˚F (20˚C)

Shock: DPDT: 10G; 4PDT: 20G

Duty Cycle: Continuous

COIL SPECIFICATIONS

AC Coils

Rated Voltage	2 Pole			2 Pole		
	Average Current MA.		Coil Ohms	Average Current MA.		Coil Ohms
	50 Hz	60 Hz		50 Hz	60 Hz	
12	86	75	76.8	115	100	41
24	42	37	300	60	50	157
120	8.6	7.5	7680	13	11	4280

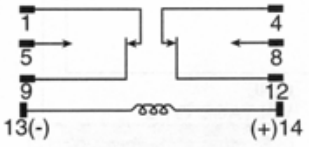
DC Coils

Rated Volume	2 Pole		2 Pole	
	Average Current MA.	Coil Ohms	Average Current MA.	Coil Ohms
12	64	188	75	160
24	32	750	36.9	650

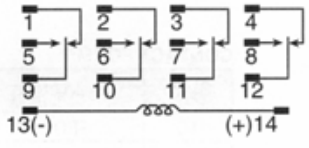
Contact Rating

Materials	Rating
Fine Silver, Gold Flashed	3.0 amp, 120 VAC, 24 VDC 0.2 amp, 100 VDC

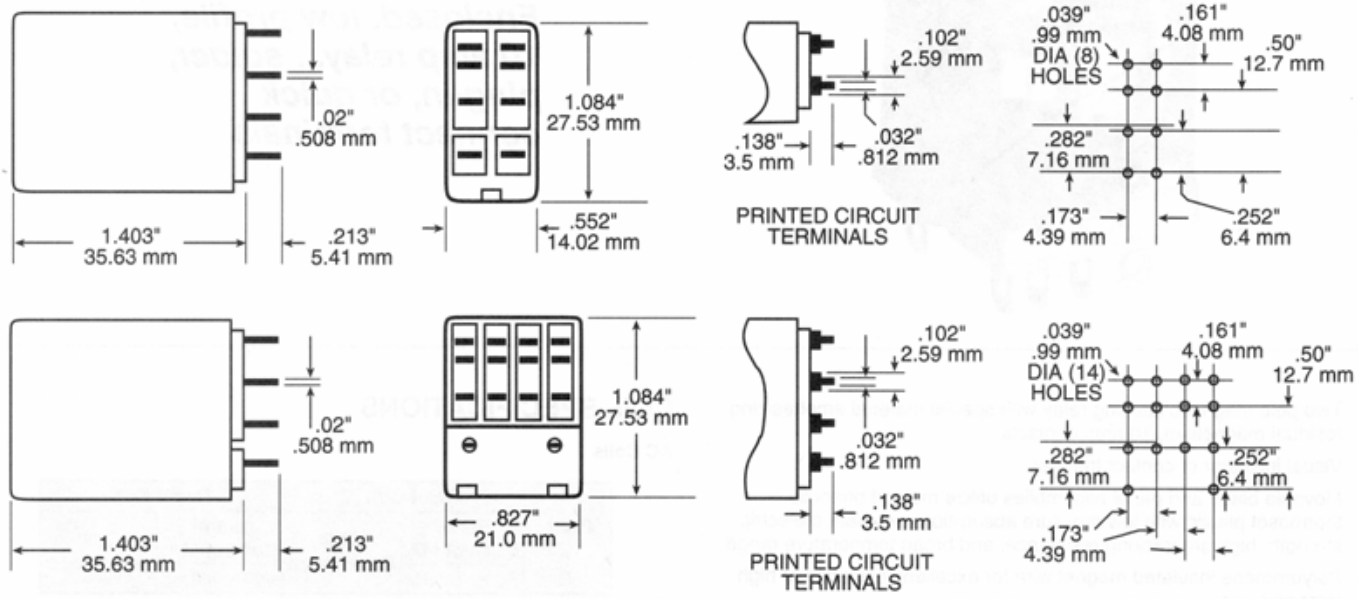
CONTACTS



DPDT



4PDT



Sockets (DPDT)	Retainers	Sockets (4PDT)	Retainers
60SY2S05	60SY2S02F1	60SY4S05	60SY4S02F1
60SY2S61	60SY4S51F1	60SY4S61	60SY4S51F1
			60RH-01

ORDERING INFORMATION

17P 2C A 120 00

RELAY TYPE

Sym.	Description
17P	General Purpose Solder/.103 Plug-In Type Terminals

CONTACT FORMS

Sym.	Description
2C	DPDT
4C	4PDT

COIL VOLTAGE TYPE

Sym.	Description
A	Alternating Current
D	Direct Current

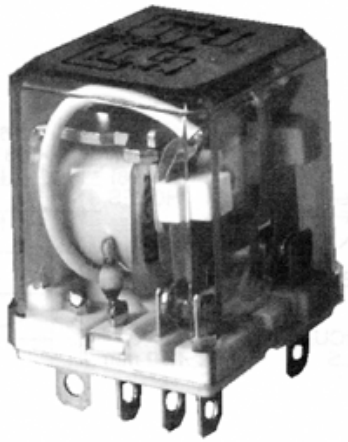
RATED VOLTAGES

Sym.	Description
012	12V (AC or DC)
024	24V (AC or DC)
110	110 VDC (On special order)
120	120 VAC

FEATURES

Sym.	Description
00 (or Blank)	Standard Relay
02	Indicating Light (Special order 4 pole only)

Series 18, Magnetic Latch



Enclosed, low profile, 10 amp relay... solder, plug-in, or quick connect terminals

- Two pole magnetic latching relay with special material emphasizing residual magnetism, 10 amp contacts
- Visual indicator of contact transfer
- Movable blade and panel assemblies utilize molded phenolic thermoset plastic with low moisture absorption, excellent dielectric strength, high arc tracking resistance, and broad temperature range
- Polyurethane insulated magnet wire for excellent insulation at high temperatures

SPECIFICATIONS

Insulating Material: Molded thermosetting white diallyl-phtalate

Dust Cover: Molded clear polycarbonate

Coil Winding: Polyurethane coated copper magnet wire

Insulation Resistance: 100 megohms min.

Dielectric Strength:
2000 VAC between contacts and coil
2000 Volts RMS between current carrying members and dead metal
1000 VAC between open contacts
1500 VAC between contact sets

Temperature Range: -22˚ to 158˚F (-30˚ to +70˚C)

Life Expectancy Mechanical: 10 million operations

Electrical: 200,000 operations, 10 amp/110 VAC resistive

Set Time: 30 ms max. (AC) 20 ms max. (DC)

Reset Time: 30 ms max. (AC) 20 ms max. (DC)

Shock: 10G

Vibration: 0 to 6G (55 Hz max.)

Weight: Approximately 1.8 oz. (50 Gr.)

Duty Cycle: Continuous

COIL SPECIFICATIONS

AC Coils

Coils	Set Coil			Reset Coil		
	Rated Current MA.		Coil Resistance	Rated Current MA.		Coil Resistance
	50 Hz	60 Hz		50 Hz	60 Hz	
12	103	100	41.6	34.2	34	30.2
24	51.2	50	182	17.1	17	105
120	10.3	10	4670	4.2	4.2	2680

DC Coils

Coils	Set Coil		Reset Coil	
	Rated Current MA.	Coil Resistance	Rated Current MA.	Coil Resistance
12	167	72	75	160
24	83	288	37.5	640

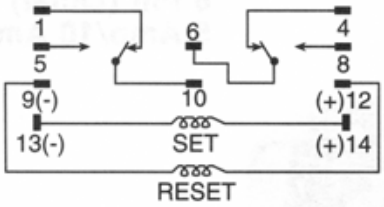
Contact Rating

Materials	Rating
Resistive	10 amp, 110 VAC, 30 VDC, 7.5 amp, 220 VAC
Inductive	7.5 amp, 110 VAC, 30 VDC, 5 amp, 220 VAC

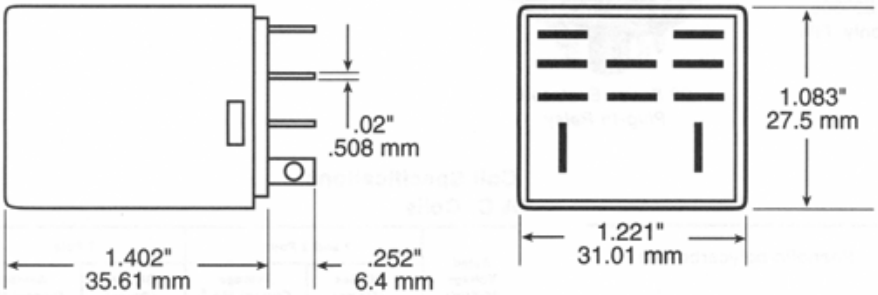
Contact Material
Silver Cadmium Oxide (AgCdO)

NOTE:
- Strong magnetic fields in close proximity to relay coil may cause erratic operation
- Airborne metal dust can have a detrimental effect on operation
- Maintain 250˚ (6 mm) separation between relays

CONTACTS



DIMENSIONS



Sockets (DPDT)	Retainers
60SH3B05	60SH3B05F1

ORDERING INFORMATION

18Q 2C A 120

RELAY TYPE

Sym.	Description
18Q	Magnetic Latch Solder/.187 Plug-In/Quick Connect Type Terminals

CONTACT FORMS

Sym.	Description
2C	DPDT

COIL VOLTAGE TYPE

Sym.	Description
A	Alternating Current
D	Direct Current

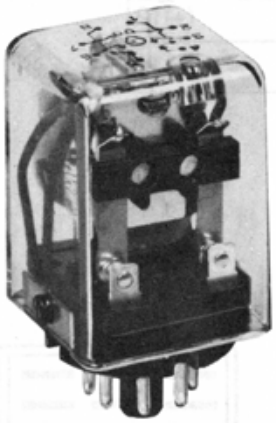
RATED VOLTAGES

Sym.	Description
012	12V (AC or DC)
024	24V (AC or DC)
120	120 VAC only

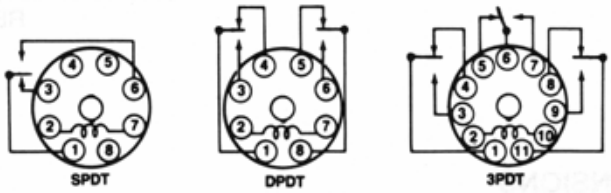
General Purpose
Enclosed Plug-In
8 Pin (Octal) or 11 Pin Base
5 Amp/10 Amp

General Information

- Polycarbonate dust cover has low moisture absorption and high impact strength.
- Integral indicator light available.
- Polyurethane insulated magnet wire improves heat dissipation.
- Low level, gold diffused silver contacts optional.
- All standard configurations are recognized under the Component Program of U.L. Inc., File E39906. CSA certified by request only. File LR26861.



22 Series Enclosed Plug-In Relay



Specifications

Insulating Material:	Phenolic/polycarbonate
Dust Cover:	Clear polycarbonate
Coil Bobbin Material:	Nylon
Coil Winding:	Polyurethane insulated magnet wire
Insulation Resistance:	100 Megohms minimum
Dielectric Strength:	500 Volts R.M.S. 60 Hz between open contacts. 1500 volts R.M.S. 60 Hz between all elements.
Temperature Range:	
D.C.:	-55° to +85°C (-67° to +185°F)
A.C.:	-55° to +72°C (-67° to +161°F)
Life Expectancy:	
Mechanical:	In excess of 20 million operations
Electrical:	100,000 minimum at full rated load
Pull-In Speed:	12 milliseconds typical (including bounce)
Drop-out Speed	10 milliseconds typical (including bounce)
Duty Cycle:	Continuous
Weight:	Approximately 3 oz. (85 Gr.) all models

Coil Specifications

A.C. Coils

Rated Voltage 50/60Hz	1 and 2 Pole		3 Pole		Must Operate Volts Max.
	DC Res. (Ohms) ± 10%	Average Current MA.* (60Hz)	DC Res (Ohms) ± 10%	Average Current MA.* (60Hz)	
6	5	367	4.2	500	4.8
12	27	183	16.5	250	9.6
24	90	91.7	66	125	19
120	2250	18.3	1680	25	96
240	9100	9.2	6640	12.5	192

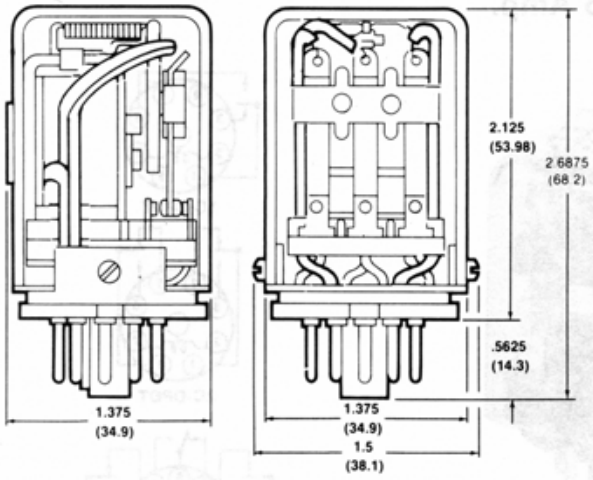
D.C. Coils

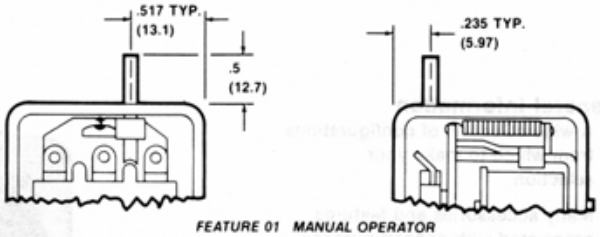
Rated Voltage 50/60Hz	1 and 2 Pole		3 Pole		Must Operate Volts Max.
	DC Res. (Ohms) ± 10%	Average Current MA.* (60Hz)	DC Res (Ohms) ± 10%	Average Current MA.* (60Hz)	
6	30	200	24	250	4.5
12	120	100	96	125	9
24	480	50	380	62.5	18
48	1920	25	1530	31.3	36
110	10100	10.9	8050	13.6	82

* Average current values do not include indicating light current draw (Feature 02).

Contact Rating

Materials	Rating
Fine Silver Gold Flashed (Ag)	5 Amp, 28 VDC (resistive) 5 Amp, 250 VAC, 125 VA, 120 VAC 1/10 HP, 125 VAC, 240 VA, 240 VAC 1/4 HP, 250 VAC
Silver Cadmium Oxide (AgCdO)	10 Amp, 28 VDC (resistive) 10 Amp, 250 VAC, 125 VA, 120 VAC 1/4 HP, 125 VAC, 240 VA, 250 VAC 1/3 HP, 250 VAC
Fine Silver Gold Diffused (AuAg)	Low level applications (Specify Feature 07)





FEATURE 01 MANUAL OPERATOR

	Sockets	Retainers
1C 2C	60SR2P05 60SR2P06 60SR2P51	60SR3B02F1 60SR3B02F1 60SR2P51F1
3C	60SR3P05 60SR3P06 60SR3P51	60SR3B02F1 60SR3B02F1 60SR2P51F1

22 Series Ordering Information

22P 1C A 120 02

Relay Type

22P General Purpose, enclosed, plug-in
Heat treated fine silver,
gold flashed 5 amp contacts.
22Q General Purpose, enclosed, plug-in
silver cadmium oxide 10 Amp contacts

Contact Forms

1C - SPDT
2C - DPDT
3C - 3PDT

Coil Voltage Type

A - Alternating Current
D - Direct Current

Rated Voltages

006 - 6 Volts (AC or DC)
012 - 12 Volts (AC or DC)
024 - 24 Volts (AC or DC)
048 - 48 Volts D.C.
110 - 110 Volts D.C.
120 - 120 Volts A.C.
240 - 240 Volts A.C.

Features

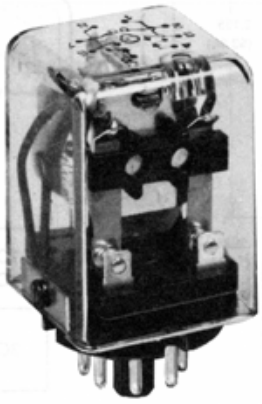
(More than one feature may be specified.)

BLANK - Standard relay
01 - Manual (push-to-test) operator
02 - Indicating light (except 48 volt)

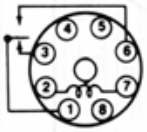
Current Sensitive Enclosed, Plug-In 5 Amp.

General Information

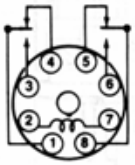
- A wide selection of configurations from which to make your selection.
- Many accessories and features associated with general purpose relays are available with this selection of current sensitive relays.
- Polyurethane insulated magnet wire improves heat dissipation.
- Low level gold diffused silver contacts optional.



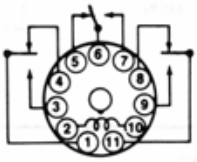
23 Series Enclosed
120 Milliwatts per Pole Pull-In



1C-SPDT



2C-DPDT



3C-3PDT

Specifications

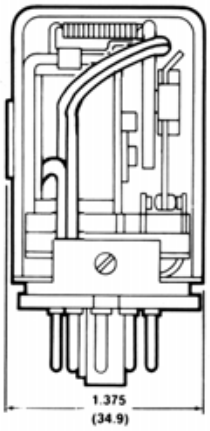
Insulating Material:	Phenolic/polycarbonate
Dust Cover:	Clear polycarbonate
Coil Bobbin Material:	Nylon
Coil Winding:	Polyurethane insulated magnet wire
Insulation Resistance:	100 Megohms minimum
Dielectric Strength:	500 Volts R.M.S.; 60 Hz between open contacts 1500 Volts R.M.S.; 60 Hz between all elements
Temperature Range:	
D.C.:	-67° to +185°F (-55° to +85°C)
A.C.:	-67° to +161°F (-55° to +72°C)
Life Expectancy:	
Mechanical:	In excess of 20 million operations
Electrical:	100,000 minimum at full rated load.
Pull-In Speed:	12 milliseconds typical (including bounce).
Drop Out Speed:	10 milliseconds typical (including bounce)
Duty Cycle:	Continuous
Weight:	3.1 oz. (88 Gr.)

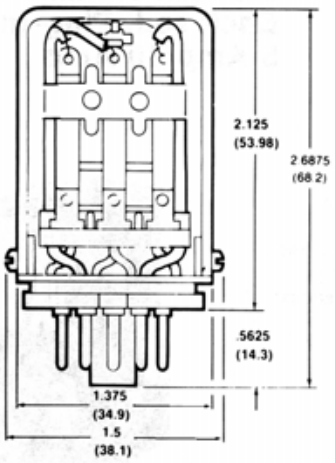
Coil Specifications

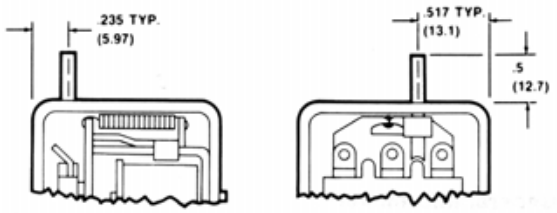
Coil Resistance Symbol	Coil Resistance (Ohms) ± 5%	1C - SPST Pull-in (MA DC)		2C - DPDT Pull-in (MA DC)		3C - 3PDT Pull-in (MA DC)	
		MIN	MAX	MIN	MAX	MIN	MAX
010	1000	11.0	12.8	15.5	18.2	19.0	22.2
025	2500	6.9	8.4	9.8	11.5	12.0	14.1
050	5000	4.9	5.7	6.9	8.1	8.5	9.9
100	10000	3.5	4.1	4.9	5.7	6.0	7.0

Contact Rating

Materials	Rating
Fine Silver Gold Flashed (Ag)	5 Amp, 28 VDC (resistive ONLY) 5 Amp, 250 VAC, 125 VA, 120/240 VAC 1/10 HP, 125 VAC 1/4 HP, 250 VAC
Fine Silver Gold Diffused (AuAg)	Low level applications (Specify Feature 07)







FEATURE 01 MANUAL OPERATOR

	Sockets	Retainers
1C 2C	60SR2P05 60SR2P06 60SR2P51	60SR3B02F1 60SR3B02F1 60SR2P51F1
3C	60SR3P05 60SR3P06 60SR3P51	60SR3B02F1 60SR3B02F1 60SR2P51F1

23 Series
Ordering Information

23 P 3C D 025 01

Relay Type
D.C. Current Sensitive
Enclosed, Plug-In
120 Milliwatts/Pole Pull-In

Contact Materials
P - Heat treated fine silver, gold flashed 5 Amp

Terminals
Plug-In

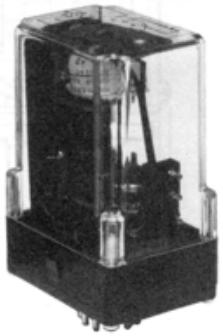
Contact Forms
1C - SPDT
2C - DPDT
3C - 3PDT

Coil Voltage Type
D - Direct Current

Coil Resistance
010 - 1.0 K Ohm
025 - 2.5 K Ohm
050 - 5.0 K Ohm
100 - 10.0 K Ohm

Features
(More than one feature may be specified)
BLANK - Standard relay
01 - Manual Operator

Mechanical Latch Enclosed, Plug-In 5 Amp/10 Amp



27 Series, Enclosed Plug-In

General Information

- Polyurethane insulated magnet wire improves heat dissipation.
- Low level, gold diffused silver contacts optional.
- Acetal latch members, both series, have excellent dimension stability, low moisture absorption and near infinite wear.
- Series 27P and 27Q relays only include polycarbonate dust cover with low moisture absorption and high impact strength. They are mounted on a phenolic base for dimensional and physical stability.
- One and two pole relays are recognized under the Components Program of U.L. Inc., File E39906. 27P, one and two pole are CSA certified by request only. File LR26861.

Specifications

Insulating Material:	Phenolic/polycarbonate
Dust Cover:	Clear Polycarbonate
Coil Bobbin Material:	Nylon
Coil Winding:	Polyurethane insulated magnet wire
Insulation Resistance:	100 Megohms minimum
Dielectric Strength:	500 Volts R.M.S. 60 Hz between open contacts. 1500 volts R.M.S. 60 Hz between all elements.
Temperature Range: 27P and 27Q:	
D.C.:	-55° to +70°C (-67° to +158°F)
A.C.:	-55° to +60°C (-67° to +140°F)
Life Expectancy: Mechanical:	In excess of 20 million operations
Electrical:	100,000 minimum at full rated load
Duty Cycle:	Continuous (one coil energized only)
Weight:	6.7 oz. (190 Gr.)

Coil Specifications

A.C. Coils

Rated Voltage 50/60 Hz	DC Resistance (Ohms) ±10%	Average Current (MA) (60 Hz)	Must Operate Volts Max.
12	13	333	9.6
24	58	167	19
120	1220	33	96
240	5000	17	192

D.C. Coils

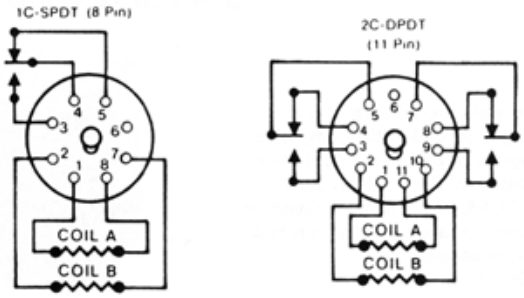
Rated Voltage	DC Resistance (Ohms) ±5%	Average Current (MA)	Must Operate Volts Max.
12	72	200	9
24	288	100	18
110	5880	22	82

Contact Rating

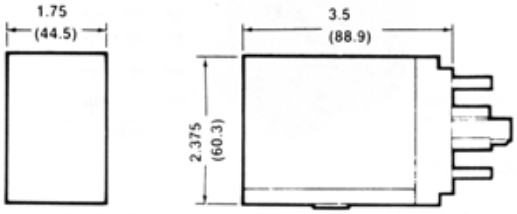
Materials	Rating*
Fine Silver Gold Flashed (Ag)	5 Amp, 28 VDC (resistive) 5 Amp, 250 VAC, (resistive) 1/10 HP, 125 VAC 1/4 HP, 250 VAC
Silver Cadmium Oxide (AgCdO)	10 Amp, 28 VDC (resistive) 10 Amp, 250 VAC (resistive) 1/4 HP*, 125 VAC 1/3 HP*, 250 VAC
Fine Silver Gold Diffused (AuAg)	Low level applications (Specify Feature 07)

* Total controlled load not to exceed 20 amps when used in industrial applications.

27 P & Q Series (Shown with Coil "A" Energized, Coil "B" De-energized)



Series 27 Plug-In



	Sockets	Retainers
1C	60SR2P05 60SR2P06 60SR2P51	Z-100071 60SFA201 Clip N/A
2C	60SR3P05 60SR3P06 60SR3P51	Z-100071 60SFA201 Clip N/A

27 P-Q Series
Ordering Information

27P 2C A 120

Relay Type

27P - Mechanical Latch, Enclosed, Plug-in, heat treated fine silver gold flashed **5 Amp** contacts.

27Q - Mechanical Latch, Enclosed, Plug-in, silver cadmium oxide **10 Amp** contacts.

Contact Forms

1C - SPDT
2C - DPDT

Coil Voltage Type

A - Alternating Current (50/60 Hz)
D - Direct Current

Rated Voltage

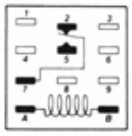
012 - 12 Volts (AC or DC)
024 - 24 Volts (AC or DC)
110 - 110 Volts DC
120 - 120 Volts AC
240 - 240 Volts AC

General Purpose Square Base 5 Amp/10 Amp

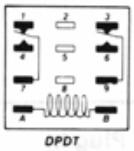
General Information

- Inexpensive plug-in design also provides universal arrangement for solder and quick connect terminations. (See ordering information for printed circuit terminals.)
- Polycarbonate dust cover has low moisture absorption and high impact strength.
- Open type, without dust cover, available.
- Polyurethane insulated magnet wire improves heat dissipation.
- Low level, gold diffused silver contacts optional.
- All standard configurations are recognized under the Component Program of U.L. Inc., File E39906. Inclusive of Features 01, 02, 03, 04, 05, 06, 07, 09 and 14. Standard configurations are CSA certified by request only. File LR26861.

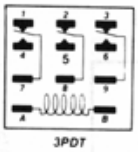
30 Series Square Base Relay



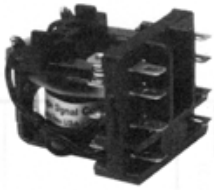
SPDT



DPDT



3PDT



Open type Feature 06

Specifications

Insulating Material:	Polycarbonate/polyphenylene sulfide
Dust Cover:	Molded clear polycarbonate
Coil Bobbin Material:	Nylon
Coil Winding:	Polyurethane insulated magnet wire
Insulation Resistance:	100 Megohms minimum
Dielectric Strength:	500 Volts R.M.S. 60 Hz between open contacts. 1500 volts R.M.S. 60 Hz between all elements.
Temperature Range:	
D.C.:	-55° to +85°C (-67° to +185°F)
A.C.:	-55° to +72°C (-67° to +161°F)
Life Expectancy:	
Mechanical:	In excess of 20 million operations
Electrical:	100,000 minimum at full rated load
Pull-In Speed:	12 milliseconds typical (including bounce)
Drop-out Speed	10 milliseconds typical (including bounce)
Duty Cycle:	Continuous
Weight:	Approximately 3 oz. (85 Gr.)

Coil Specifications

A.C. Coils

Rated Voltage 50/60Hz	1 and 2 Pole		3 Pole		Must Operate Volts Max.
	DC Res. (Ohms) ±10%	Average* Current MA. (60Hz)	DC Res (Ohms) ±10%	Average* Current MA. (60Hz)	
12	27	183	16.5	250	9.6
24	90	91.7	66	125	19
120	2250	18.3	1680	25	96
240	9100	9.2	6640	12.5	192

D.C. Coils

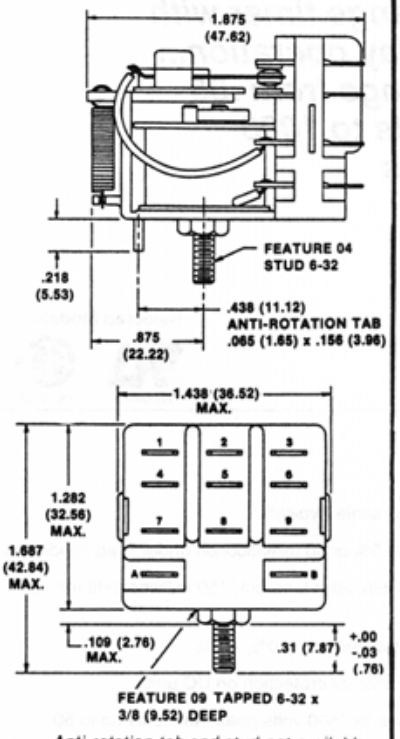
Rated Voltage	1 and 2 Pole		3 Pole		Must Operate Volts Max.
	DC Res. ±5%	Average* Current MA.	DC Res ±5%	Average* Current MA.	
12	120	100	96	125	9
24	480	50	380	62.5	18
48	1920	25	1530	31.3	36
110	10100	10.9	8050	13.6	82

*Average current values do not include indicating light current draw (Feature 02).

Contact Rating

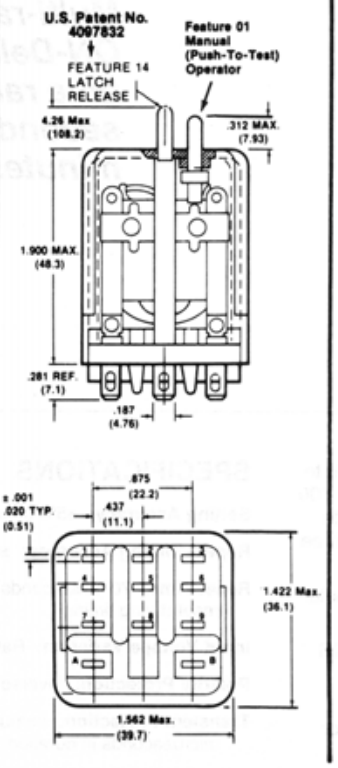
Materials	Rating
Fine Silver Gold Flashed (Ag)	5 Amp, 28 VDC (resistive) 5 Amp, 250 VAC, 125 VA, 125 VAC 1/10 HP, 125 VAC, 240 VA, 250 VAC 1/4 HP, 250 VAC
Silver Cadmium Oxide (AgCdO)	10 Amp, 28 VDC (resistive) 10 Amp, 250 VAC, 125 VA, 120 VAC 1/4 HP, 125 VAC, 240 VA, 250 VAC 1/3 HP, 250 VAC
Fine Silver Gold Diffused (AuAg)	Low level applications (Specify Feature 07)

OPEN CONSTRUCTION (FEATURE 06)

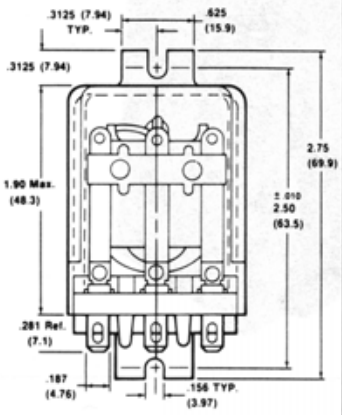


Anti-rotation tab and stud not available on relays with PC terminals.

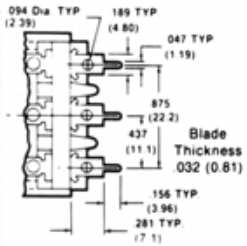
ENCLOSED



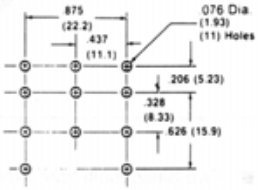
FLANGED CASE (FEATURE 05)



PRINTED CIRCUIT



Suggested P.C. Board Layout



Sockets	Retainers
60SR3B05	60SR3B02F1 or 1600-4131 Clip
60SR3B51	
4270-0681	
2014-0020 Mtg. bracket for Open Type	

30 Series Ordering Information

30 E 3C A 120 01

Relay Type
General Purpose Square Base

Contact Materials	Terminals
D Heat treated, fine silver gold flashed **5 amp**	Plug-in Universal for Solder, .187 Quick Connect
E Silver cadmium oxide, **10 amp**	
H Silver cadmium oxide, **10 amp**	Printed Circuit Special Quote Only

For low level applications, refer to special Feature 07.

Contact Forms
1C - SPDT (Not available with Feature 14)
2C - DPDT
3C - 3PDT (Not available with Feature 14)

Coil Voltage Type
A - Alternating Current
D - Direct Current

Features
(More than one feature may be specified.)
BLANK - Standard relay
01 - Manual (push-to-test) operator
02 - Indicating light (except 48 volt)
04 - Threaded Stud
05 - Flanged case mounting
†06 - Open construction
09 - Tapped core

Rated Voltages
012 - 12 Volts (AC or DC)
024 - 24 Volts (AC or DC)
048 - 48 Volts D.C.
110 - 110 Volts D.C.
120 - 120 Volts A.C.
240 - 240 Volts A.C.

† Relay may be mounted using 2014-0020 Mounting Kit.

Series 70, Multi-Range "ON" Delay

Multi-range timer with ON-Delay operation... time range from .05 seconds to 1000 minutes

Selected Models

RECOGNIZED CERTIFIED

- Two basic multi-time range units provide timing from .05 seconds to 1000 minutes: Seconds timer provides 1 second, 10 second, or 100 second time range; Minutes timer provides 10 minute, 100 minute, or 1000 minute time range - time ranges selected by means of three position slide switch
- Pin for pin compatible with Eagle Signal brand's proven and popular 80 series family of time delay relays
- High density, surface mount electronic subassemblies with CMOS logic circuits provide high noise immunity and low power consumption
- Available in five voltages - outputs are one 10 amp DPDT relay or one 8 amp 3PDT relay
- LED indication for timing and output status
- Fixed time range available for OEM applications
- Unit is housed in space saving, polycarbonate case with high impact strength
- Gold diffused low-level contacts optional
- Optional flange mounting
- Standard 2 pole versions recognized under the components program of Underwriters Laboratories, Inc. - file E39906, CSA certified by request only - file LR26861

SPECIFICATIONS

Setting Accuracy: ±5% of full scale (typical)

Repeat Timing Accuracy: ±0.5% or 50 milliseconds under fixed conditions

Reset Time: 70 milliseconds min. after time-out, 150 milliseconds min. if reset during timing

Input Voltage Variation: Rated voltage +10%, -15%

Polarity Protection: Inverse polarity protection on DC units

Transient Protection: Immune to 2500 volts peak transients up to 50 microseconds in duration

Dielectric Strength:
500 volts R.M.S.
60 Hz between open contacts
1500 volts R.M.S.
60 Hz between all elements

Operating Temperature Range: 0˚ to 131˚F (-18˚ to 55˚C) 2 pole versions
0˚ to 122˚F (-18˚ to 50˚C) 3 pole versions

Storage Temperature Range: -40˚ to 185˚F (-40˚ to 85˚C)

Life Expectancy Mechanical: In excess of 10 million operations

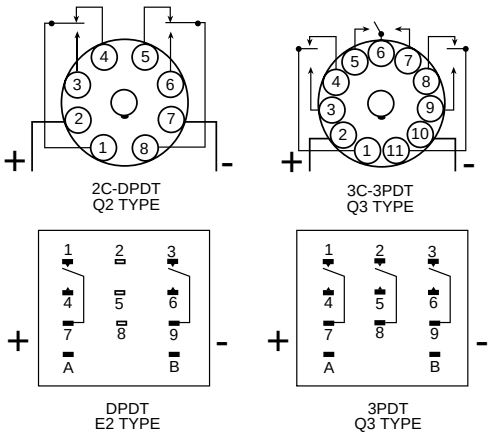
Electrical: 100,000 min. at full rated resistive load

Duty Cycle: Continuous

OUTPUT RATING

Materials	Poles	Rating
Silver Cadmium Oxide (AgCdO)	2 Poles	10 amp, 28 VDC (resistive)
		10 amp, 250 VAC
		1/4 HP, 250 VA, 125 VAC
		1/3 HP, 240 VA, 250 VAC
	3 Poles	7 amp, 28 VDC (resistive)
		7 amp, 250 VAC (resistive)

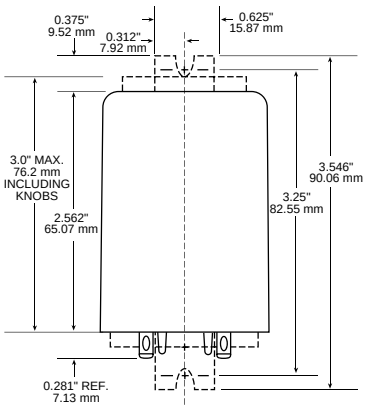
CONTACTS



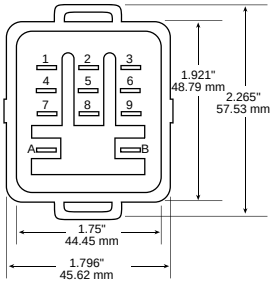
	Sockets	Retainers
Type Q2	60SR2P05	N/A
8 Pin	60SR2P06	60SFA201 Clip
Octal	60SR2P51	N/A
Type Q3	60SR3P05	N/A
11 Pin	60SR3P06	60SFA201 Clip
Round	60SR3P51	N/A
Type E	60SR3B05	60 SFA201 Clip
Square	60SR3B51	N/A
Base	4270-0681	N/A

DIMENSIONS

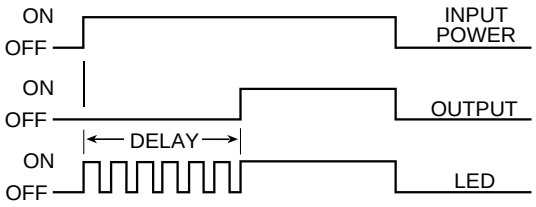
Flanged Case



E Type, Square Base



LOGIC FUNCTION



ON DELAY: Time delay starts upon application of power. Relay energizes after delay. De-energizing input terminals resets timer.

ORDERING INFORMATION

70 E 2 A6 01

RELAY TYPE

Sym.	Description
	Time Delay Relay

CONTACT MATERIALS

Sym.	Description
E	Silver Cadmium Oxide, Universal Plug-In .187 Solder, Quick Connect , Square Base
Q	Silver Cadmium Oxide, Plug-In, 8 Pin or 11 Pin Round

CONTACT FORM

Sym.	Description
2	DPDT
3	3PDT

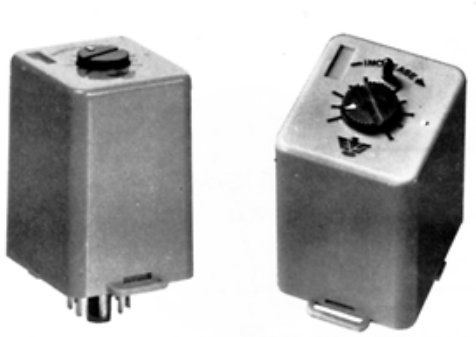
VOLTAGE & FREQUENCY

Sym.	Description
X1	12 VDC
Z1	24 VDC
Z6	24V 60 Hz
A6	120V 60 Hz

TIME RANGE

Sym.	Description
01	Seconds (1 Sec., 10 Sec., 100 Sec. Selectable Ranges)
02	Minutes (10 Min., 100 Min., 1000 Min. Selectable Ranges)
99	Fixed

Series 80, Time Delay, "ON" Delay



Standard

With Features 01* and 14*
Latching Relay
Press to Test
Latch Release

Economical model for ON-Delay operation

Selected Models

RECOGNIZED CERTIFIED

- Inexpensive and compact fixed or adjustable time delay
- Models feature plug-in octal base or square base design; plug-in square base also features universal blade type terminals for solder or quick connect terminals; printed circuit terminals are available on square base units (see ordering information)
- Polycarbonate dust cover has low moisture absorption and high impact strength
- All standard configurations recognized under the components program of Underwriters Laboratories, Inc. - file E39906, CSA certified by request only - file LR26861
- Delay time is obtained by using a CMOS integrated circuit, an internal potentiometer controlled oscillator, a programmable binary counter, and output controlled logic
- Available in five voltages and DPDT 10 ampere output contacts
- Gold diffused low-level contacts optional
- Available in 15 standard time ranges from .1 second to 4.5 hours
- Optional flange mounting
- Push to test, simulating timed out condition, optional
- Optional lock in/manual reset; retains contacts in timed out condition after time out; reset button must be depressed and power removed to reset timer
- Indicator light - on when power is applied to timer (standard on this series)

SPECIFICATIONS

Repeat Timing Accuracy: ±1.5% under fixed conditions

Fixed Time Accuracy: ±5% at rated voltage and room temperature (99 time range)

Reset Time: 75 milliseconds after time-out
150 milliseconds if reset during timing

Drop-Out Speed: 30 milliseconds typical (including bounce)

Input Voltage Variation: Rated voltage +10%, -15%

Polarity Protection: Inverse polarity protection on DC units

Transient Protection: Immune to 600 volts peak transients up to 50 microseconds in duration

Insulation Resistance: 100 megohms min.

Dielectric Strength:
500 volts R.M.S.
60 Hz between open contacts
1500 volts R.M.S.
60 Hz between all elements

Operating Temperature Range: 14˚ to 104˚F (-10˚ to 40˚C)

Storage Temperature Range: -4˚ to 185˚F (-20˚ to 85˚C)

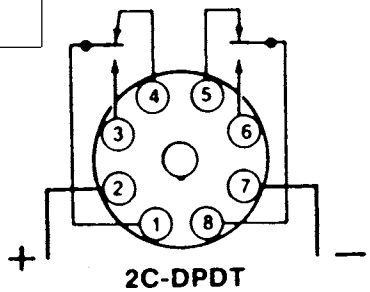
Life Expectancy Mechanical: In excess of 10 million operations

Electrical: 100,000 min. at full rated resistive load

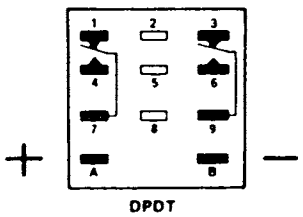
Duty Cycle: Continuous

OUTPUT RATING

Materials	Rating
Silver	10 amp, 28 VDC (resistive)
Cadmium	10 amp, 250 VAC
Oxide	1/4 HP, 250 VA, 125 VAC
(AgCdO)	1/3 HP, 240 VA, 250 VAC

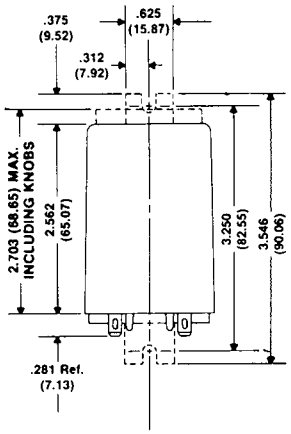


2C-DPDT

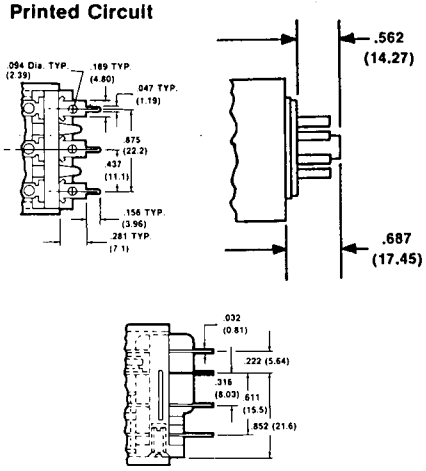


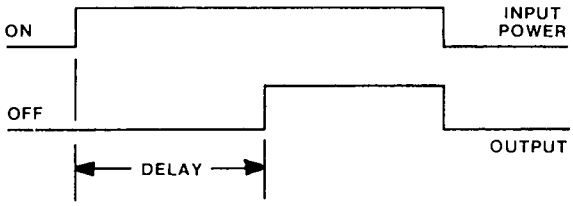
DPDT

Flanged Case

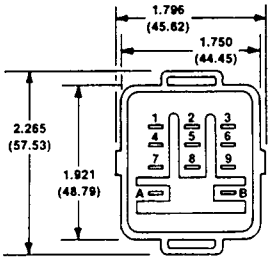


Printed Circuit

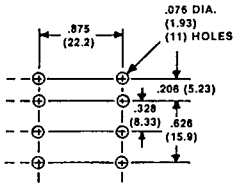




ON DELAY: Time delay starts upon application of power. Relay energizes after delay. De-energizing input terminals resets timer.



Suggested PC Board Layout



	Sockets	Retainers
Type Q	60SR2P05	N/A
1C and	60SR2P06	60SFA201 Clip
2C	60SR2P51	N/A
Type E	60SR3B05	60SFA201 Clip
Square	60SR3B51	N/A
Base	4270-0681	N/A

ORDERING INFORMATION

80 E 2 A6 01 07

RELAY TYPE

Sym.	Description
	Time Delay Relay

CONTACT MATERIALS

Sym.	Description
E	Silver Cadmium Oxide, 10 amp, Universal Plug-In .187 Solder, Quick Connect
H	Silver Cadmium Oxide, 10 amp, Printed Circuit Special Order Only
Q	Silver Cadmium Oxide, 10 amp, Plug-In

CONTACT FORM

Sym.	Description
2	DPDT
3	3PDT

VOLTAGE & FREQUENCY

Sym.	Description
Z6	24V 60 Hz
A6	120V 60 Hz
B6	240V 60 Hz

TIME RANGE

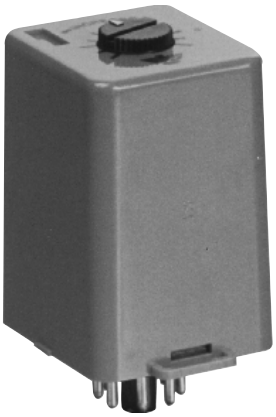
Sym.	Description	Sym.	Description
00	Unprogrammed	09	25.6 - 256 Sec.
01	.1 - 1 Sec.	10	.85 - 8.5 Min.
02	.2 - 2 Sec.	11	1.7 - 17 Min.
03	.4 - 4 Sec.	12	3.4 - 34 Min.
04	.8 - 8 Sec.	13	6.8 - 68 Min.
05	1.6 - 16 Sec.	14	13.6 - 136 Min.
06	3.2 - 32 Sec.	15	.45 - 4.5 Hr.
07	6.4 - 64 Sec.	99	Fixed Timing
08	12.8 - 128 Sec.		(Specify Time)

FEATURES
(More than one may be specified)

Sym.	Description
01*	Manual (Push to Test) Operator
05	Flanged Case Mounting "E" Series ONLY

* Patent No. 4, 378, 543

Series 81, Time Delay, "ON" Release

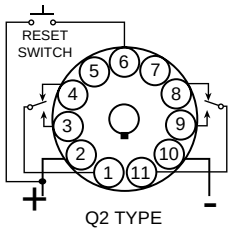


Economical model for Delay ON release operation

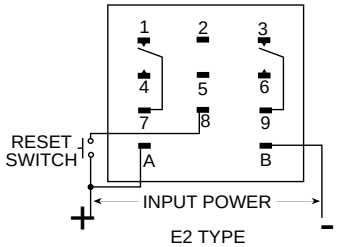
Selected Models

RECOGNIZED CERTIFIED

- Inexpensive and compact fixed or adjustable time delay
- Models feature 11 pin plug-in base or square base design; plug-in square base also features universal blade type terminals for solder or quick connect terminals; printed circuit terminals are available on square base units (see ordering information)
- Polycarbonate dust cover has low moisture absorption and high impact strength
- Delay time is obtained by using a CMOS integrated circuit, an internal potentiometer controlled oscillator, a programmable binary counter, and output controlled logic
- Available in five voltages and DPDT 10 ampere output contacts
- Gold diffused low-level contacts optional
- Available in 15 standard time ranges from .1 second to 4.5 hours
- Optional flange mounting
- Push to test, simulating timed out condition, optional
- All standard configurations recognized under the components program of Underwriters Laboratories, Inc. - file E39906, CSA certified by request only - file LR26861



Q2 TYPE



E2 TYPE

SPECIFICATIONS

Repeat Timing Accuracy: ±1.5% under fixed conditions

Fixed Time Accuracy: ±5% at rated voltage and room temperature (99 time range)

Reset Time: 16 milliseconds min.

Drop-Out Speed: 30 milliseconds typical (including bounce)

Minimum Setting: 10% of full range

Input Voltage Variation: Rated voltage +10%, -15%

Polarity Protection: Inverse polarity protection on DC units

Transient Protection: Immune to 600 volts peak transients up to 50 microseconds in duration

Insulation Resistance: 100 megohms min.

Dielectric Strength:
500 volts R.M.S.
60 Hz between open contacts
1500 volts R.M.S.
60 Hz between all elements

Operating Temperature Range: 14˚ to 104˚F (-10˚ to 40˚C)

Storage Temperature Range: -4˚ to 185˚F (-20˚ to 85˚C)

Life Expectancy Mechanical: In excess of 10 million operations

Electrical: 100,000 min. at full rated resistive load

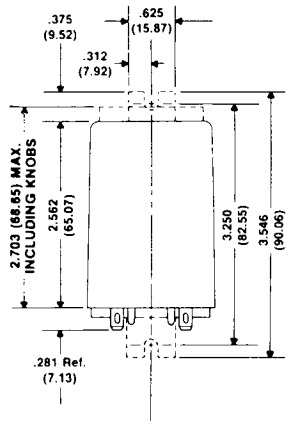
Duty Cycle: Continuous

Weight: Approximately 4 oz. (113 Gr.) all models

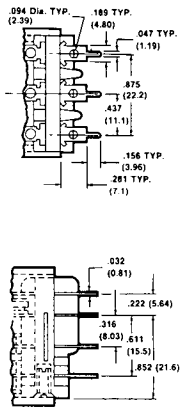
OUTPUT RATING

Materials	Rating
Silver	10 amp, 28 VDC (resistive)
Cadmium	10 amp, 250 VAC
Oxide	1/4 HP, 250 VA, 125 VAC
(AgCdO)	1/3 HP, 240 VA, 250 VAC

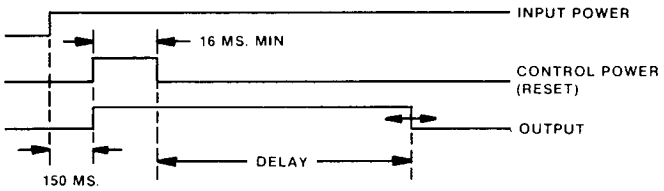
Flanged Case



Printed Circuit

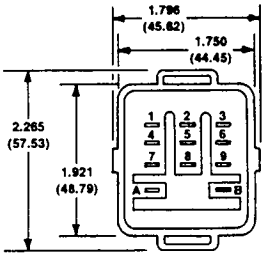


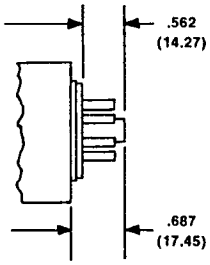
Logic Function Diagram



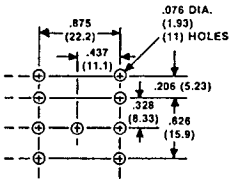
Power applied to input terminals at all times ("A" and "B" square base) (2 and 10, 11 pin plug-in).

Application of control power to terminal 8 of square base or terminal 6 of 11 pin plug-in resets the timing circuit and energizes the relay. Removal of control power starts timing. Relay de-energizes after time delay.





Suggested PC Board Layout



	Sockets	Retainers
Type Q	60SR3P05	N/A
	60SR3P06	60SFA201 Clip
	60SR3P51	N/A
Type E	60SR3B05	60SFA201 Clip
	60SR3B51	N/A
	4270-0681	N/A

ORDERING INFORMATION

81 E 2 A6 01

RELAY TYPE

Sym.	Description
81	Time Delay Relay

CONTACT MATERIALS

Sym.	Description
E	Silver Cadmium Oxide, 10 amp, Universal Plug-In, .187 Solder, Quick Connect
H	Silver Cadmium Oxide, 10 amp, Printed Circuit, Special Order Only
Q	Silver Camium Oxide, 10 amp, Plug-In, 11 Pin (Round)

CONTACT FORM

Sym.	Description
2	DPDT

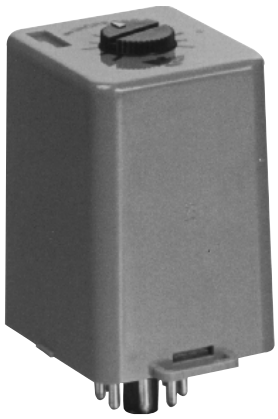
VOLTAGE & FREQUENCY

Sym.	Description
Z6	24V 60 Hz
A6	120V 60 Hz
B6	240V 60 Hz

TIME RANGE

Sym.	Description	Sym.	Description
00	Unprogrammed	09	25.6 - 256 Sec.
01	.1 - 1 Sec.	10	.85 - 8.5 Min.
02	.2 - 2 Sec.	11	1.7 - 17 Min.
03	.4 - 4 Sec.	12	3.4 - 34 Min.
04	.8 - 8 Sec.	13	6.8 - 68 Min.
05	1.6 - 16 Sec.	14	13.6 - 136 Min.
06	3.2 - 32 Sec.	15	.45 - 4.5 Hr.
07	6.4 - 64 Sec.	99	Fixed Timing
08	12.8 - 128 Sec.		(Specify Time)

Series 84, Time Delay Interval 1-Shot

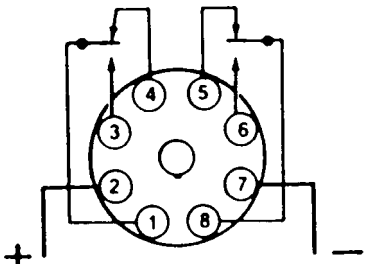


Economical model for Single-Shot Interval operation

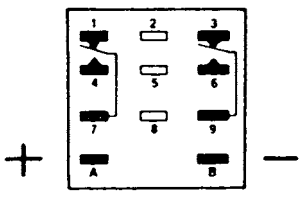
Selected Models

RECOGNIZED CERTIFIED

- Inexpensive and compact fixed or adjustable time delay
- Models feature plug-in octal base or square base design; plug-in square base also features universal blade type terminals for solder or quick connect terminals; printed circuit terminals are available on square base units (see ordering information)
- Polycarbonate dust cover has low moisture absorption and high impact strength
- Delay time is obtained by using a CMOS integrated circuit, an internal potentiometer controlled oscillator, a programmable binary counter, and output controlled logic
- Available in five voltages and DPDT 10 ampere output contacts
- Gold diffused low-level contacts optional
- Available in 15 standard time ranges from .1 second to 4.5 hours
- Optional flange mounting
- Push to test, simulating power on condition, optional
- Indicator light - on when power is applied to timer (standard on this series)
- All standard configurations recognized under the components program of Underwriters Laboratories, Inc. - file E39906, CSA certified by request only - file LR26861



2C-DPDT



DPDT

SPECIFICATIONS

Repeat Timing Accuracy: ±1.5% under fixed conditions

Fixed Time Accuracy: ±5% at rated voltage and room temperature (99 time range)

Reset Time: 100 milliseconds min.

Drop-Out Speed: 30 milliseconds typical (including bounce)

Input Voltage Variation: Rated voltage +10%, -15%

Polarity Protection: Inverse polarity protection on DC units

Transient Protection: Immune to 600 volts peak transients up to 50 microseconds in duration

Insulation Resistance: 100 megohms min.

Dielectric Strength:
500 volts R.M.S.
60 Hz between open contacts
1500 volts R.M.S.
60 Hz between all elements

Operating Temperature Range: 14˚ to 104˚F (-10˚ to 40˚C)

Storage Temperature Range: -4˚ to 185˚F (-20˚ to 85˚C)

Life Expectancy Mechanical: In excess of 10 million operations

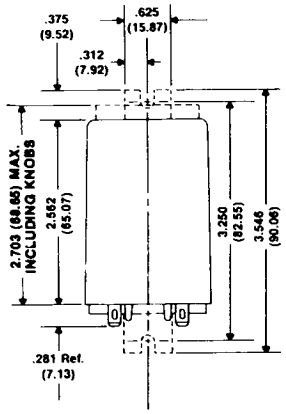
Electrical: 100,000 min. at full rated load

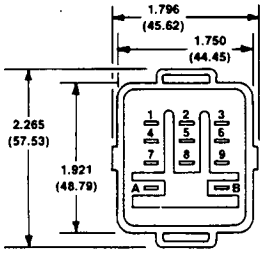
Duty Cycle: Continuous

OUTPUT RATING

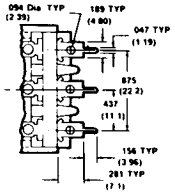
Materials	Rating
Silver	10 amp, 28 VDC (resistive)
Cadmium	10 amp, 250 VAC
Oxide	1/4 HP, 250 VA, 125 VAC
(AgCdO)	1/3 HP, 240 VA, 250 VAC

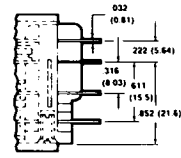
Flanged Case

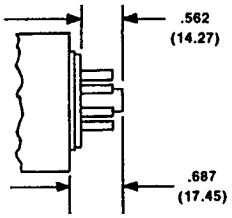




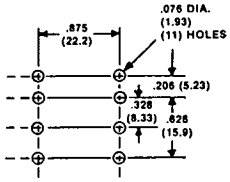
Printed Circuit







Suggested PC Board Layout



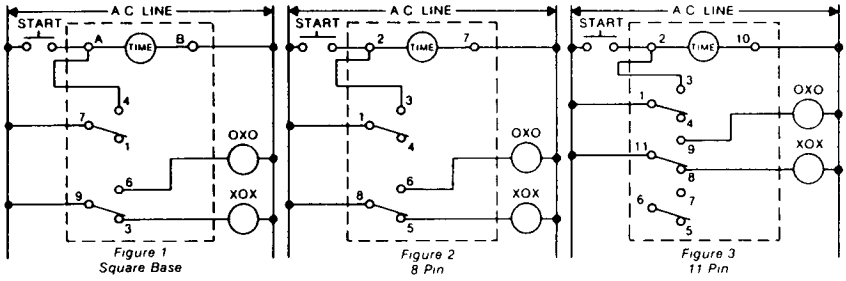
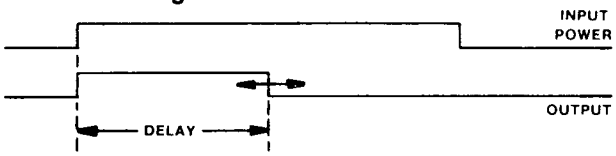


Figure 1 Square Base *Figure 2 8 Pin* *Figure 3 11 Pin*

ONE SHOT — Momentary or Maintained start switch. Close switch to start timing. Resets automatically using momentary start. Resets upon opening maintained switch. Relay contacts provide interval sequence (OXO, XOX). Contacts 4-7 (E and H Series) must be wired as shown for one shot control (Figure 1). For Q Series wire contacts 3-1 as shown in Figures 2 and 3.

Logic Function Diagram



Interval: Upon application of power, timing begins and output relay is energized. Output relay de-energizes at time-out. Removal of input power resets timer.

	Sockets	Retainers
Type Q	60SR2P05	N/A
2C	60SR2P06	60SFA201 Clip
	60SR2P51	N/A
Type E	60SR3B05	60SFA201 Clip
Square	60SR3B51	N/A
Base	4270-0681	N/A

ORDERING INFORMATION

84 E 2 A6 04

RELAY TYPE

Sym.	Description
	Time Delay Relay

CONTACT MATERIALS

Sym.	Description
E	Silver Cadmium Oxide, 10 amp, Universal Plug-In, .187 Solder, Quick Connect
H	Silver Cadmium Oxide, 10 amp, Printed Circuit, Special Order Only
Q	Silver Camium Oxide, 10 amp, Plug-In, 8 Pin (Octal)

CONTACT FORM

Sym.	Description
2	DPDT

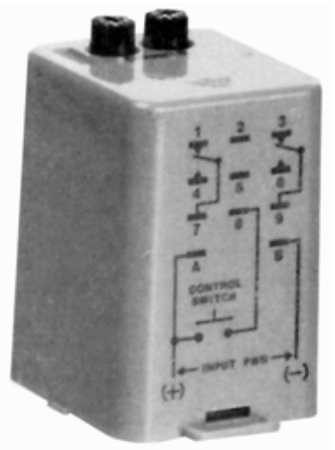
VOLTAGE & FREQUENCY

Sym.	Description
Z6	24V 60 Hz
A6	120V 60 Hz
B6	240V 60 Hz

TIME RANGE

Sym.	Description	Sym.	Description
00	Unprogrammed	09	25.6 - 256 Sec.
01	.1 - 1 Sec.	10	.85 - 8.5 Min.
02	.2 - 2 Sec.	11	1.7 - 17 Min.
03	.4 - 4 Sec.	12	3.4 - 34 Min.
04	.8 - 8 Sec.	13	6.8 - 68 Min.
05	1.6 - 16 Sec.	14	13.6 - 136 Min.
06	3.2 - 32 Sec.	15	.45 - 4.5 Hr.
07	6.4 - 64 Sec.	99	Fixed Timing
08	12.8 - 128 Sec.		(Specify Time)

Series 87, Low Profile Counter

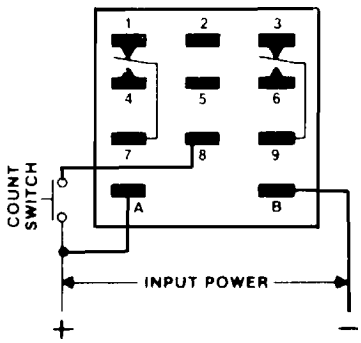


Economical model...
1 to 99 count

Selected Models

RECOGNIZED CERTIFIED

- Inexpensive and compact low profile counter
- Models feature plug-in square base design with universal blade type terminals for solder or quick connect terminals; printed circuit terminals are available (see ordering information)
- Polycarbonate dust cover has low moisture absorption and high impact strength
- Uses CMOS integrated circuits for counting functions; counter outputs occurs when preset count total is reached
- Standard units available in five voltages and DPDT load contacts
- Factory assembled option modes are count registration on the leading edge of the count pulse or the lagging edge of the count pulse; N.O. load contacts can be closed while counting or closed at the end of the count period
- 87 sets to the selected count range when power is applied to terminals A and B; operating voltage pulses are applied to the count input terminal, and each pulse is registered as a count as determined by the factory assembled modes; when registered counts equal the setpoint, the output relay changes state; output relay remains in this state until power is removed and counter resets
- Available in 5 voltages and DPDT 10 ampere output contacts
- Gold diffused low-level contacts optional
- Optional flange mounting
- All standard configurations recognized under the components program of Underwriters Laboratories, Inc. - file E39906, CSA certified by request only - file LR26861



SPECIFICATIONS

Repeat Accuracy: 100%

Count Speed: 400 per minute max.

Maximum Pulse: 75 ms ON and OFF

Reset Time: 120 milliseconds (count and supply line de-energized)

Count Accuracy: 100%

Power on Response Time: 110 milliseconds min.

Output Response Time: 90 milliseconds typical (last pulse to output change)

Input Voltage Variation: Rated voltage +10%, -15%

Polarity Protection: Inverse polarity protection on DC units

Transient Protection: Immune to 600 volts peak transients up to 50 microseconds in duration

Insulation Resistance: 100 megohms min.

Dielectric Strength:
500 volts R.M.S.
60 Hz between open contacts
1500 volts R.M.S.
60 Hz between all elements

Operating Temperature Range: 14˚ to 104˚F (-10˚ to 40˚C)

Storage Temperature Range: -4˚ to 185˚F (-20˚ to 85˚C)

Life Expectancy Mechanical: In excess of 10 million operations

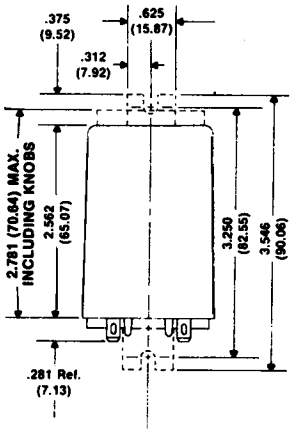
Electrical: 100,000 min. at full rated load

Duty Cycle: Continuous

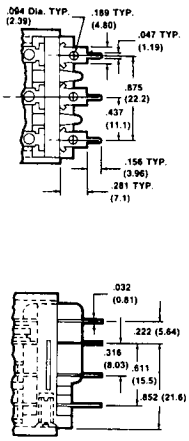
OUTPUT RATING

Materials	Rating
Silver	10 amp, 28 VDC (resistive)
Cadmium	10 amp, 250 VAC
Oxide	1/4 HP, 250 VA, 125 VAC
(AgCdO)	1/3 HP, 240 VA, 250 VAC

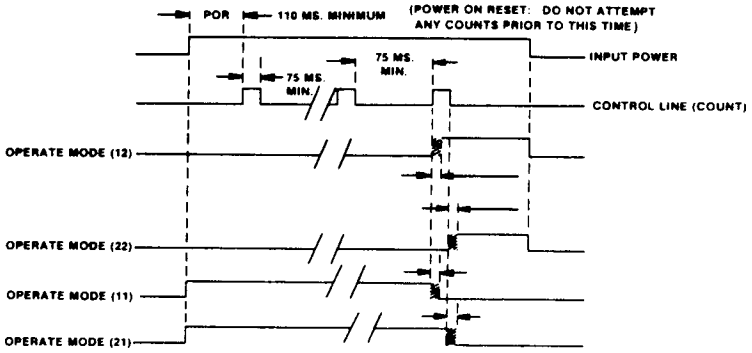
Flanged Case

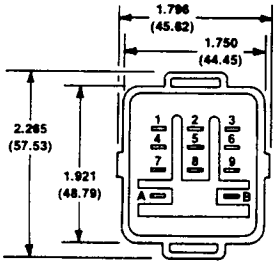


Printed Circuit

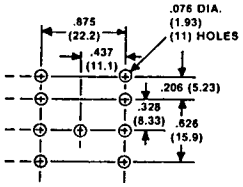


Logic Function Diagram





Suggested PC Board Layout



(12)	Relay will energize within 90 ms of power being applied for last count. Output = OOX, Input = Power On
(22)	Relay will energize within 90 ms of power being removed for last count. Output = OOX, Input = Power On
(11)	Relay will de-energize within 90 ms of power being applied for last count. Output = OXO, Input = Power On
(21)	Relay will de-energize within 90 ms of power being removed for last count. Output = OXO, Input = Power Off

Sockets	Retainers
60SR3B05	60SFA201 Clip
60SR3B51	N/A
4270-0681	N/A

ORDERING INFORMATION

87 E 2 A6 11

RELAY TYPE

Sym.	Description
	Counter

CONTACT MATERIALS

Sym.	Description
E	Silver Cadmium Oxide, 10 amp, Universal Plug-In, .187 Solder, Quick Connect
H	Silver Cadmium Oxide, 10 amp, Printed Circuit, Special Order Only

CONTACT FORM

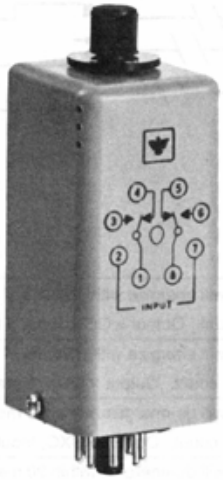
Sym.	Description
2	DPDT

VOLTAGE & FREQUENCY

Sym.	Description
Z6	24V 60 Hz
A6	120V 60 Hz
B6	240V 60 Hz

OPERATING MODE

Sym.	Description
11	Count registered on leading edge, Relay energized when counting
12	Count registered on leading edge, Relay energized when counted out
21	Count registered on lagging edge, Relay energized when counting
22	Count registered on lagging edge, Relay energized when counted out



The CG900 series is a delay timer available in 19 time ranges from 0.5 seconds to 30 hours. The timer uses CMOS integrated circuits for the timing function. The desired delay time is set by the adjustment of a calibrated knob referenced to an index mark on the housing. At time out, a DPDT relay is actuated for control of output loads.

The CG900 timer is housed in a molded Noryl® Case which provides high impact resistance and self extinguishing in case of fire or excessive heat. All external connections are made to the standard 8-pin octal relay base. An optional hold-down clamp is available for use with installations requiring horizontal mounting or exhibiting excessive vibration.

OPERATION

The timing base for the CG900 series timer is established by a precision capacitor and the adjustable dial potentiometer. The technology utilized in the CG900 series provides accurate control over extended time ranges to 30 hours.

Delay time starts upon application of power to the timer input terminals. At time out, the delay contacts transfer. Reset occurs whenever power is removed from the control input.

SPECIFICATIONS

Time Ranges

CATALOG SYMBOL	DIAL RANGE	MINIMUM SETTING	CATALOG SYMBOL	DIAL RANGE	MINIMUM SETTING
05	0.5 Sec	50 MS	16	4 Min	7.2 Sec
06	1 Sec	50 MS	17	8 Min	14.4 Sec
07	2 Sec	60 MS	20	15 Min	27 Sec
10	3.5 Sec	105 MS	21	30 Min	54 Sec
11	7.5 Sec	225 MS	22	60 Min	108 Sec
12	15 Sec	450 MS	23	120 Min	216 Sec
13	30 Sec	900 MS	24	4 Hr	7.2 Min
14	60 Sec	1.8 Sec	25	8 Hr	14.4 Min
15	120 Sec	3.6 Sec	26	15 Hr	27 Min
			27	30 Hr	54 Min

Setability
Within ± 10% of Maximum Range

Repeatability (Constant Voltage & Temperature)
± .1% or 25 ms typical

Repeatability (Voltage & Temperature Variation)
Variable Voltage ± 1% of setting or 25 ms
Variable Temperature ± 2% of setting or 25 ms

Reset Time
50 ms

Minimum Setting
3.0% of full scale or 50 ms whichever is greater

Voltage & Frequency
102 - 132 VAC, 50/60 Hz or 120 VDC
204 - 264 VAC, 50/60 Hz or 240 VDC

Burden	Timing	Timed-Out
120 VAC or DC	.8 VA Max	2.5 VA Max
240 VAC or DC	1.7 VA Max	5.2 VA Max

Output Rating
Relay - 10 amp steady state at 120 VAC or 28 VDC. See current derating curve for higher values of DC voltage.
Mechanical Lifetime - Over 20 million operations
Electrical Lifetime - Contingent on load characteristics

Power Interruption
Line voltage interruptions of 16.67ms or less will not reset unit

Power On Response
20ms Max after application of line voltage to terminals 2 & 7

Operating Temperature
0 to 60°C (+32 to 140°F)

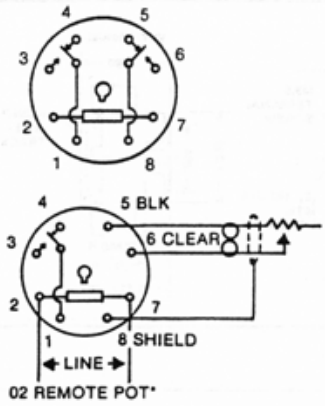
Transient Voltage Immunity
Performance unaffected by 50us, 600V peak transients superimposed on line input

Vibration
Unaffected by 2.5G sinusoidal vibration magnitudes in both directions of three perpendicular mounting axes imposed from 10 to 900 Hz.

Laboratory Testing
U.L. Recognition E79139
C.S.A. Certification LR26861

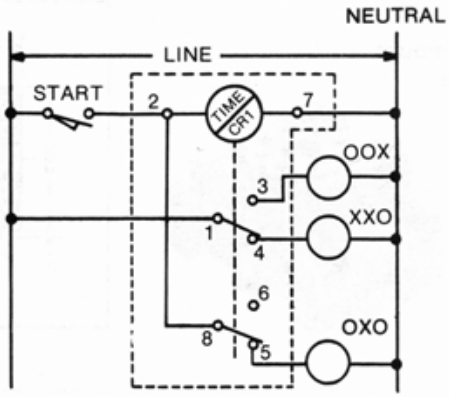
CG900 ELECTRICAL DATA

Terminal Configuration



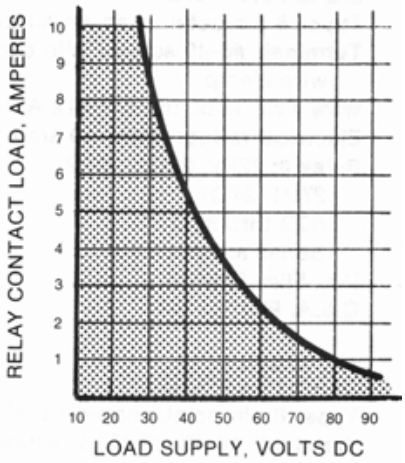
The wires from the remote potentiometer must be a shielded twisted pair connected to terminals 5 and 6 the octal socket. The shield must be connected to terminal 8. The shield must remain unconnected (floating) at the potentiometer end of the cable. Cable length cannot exceed 12 feet.

Schematic Diagram



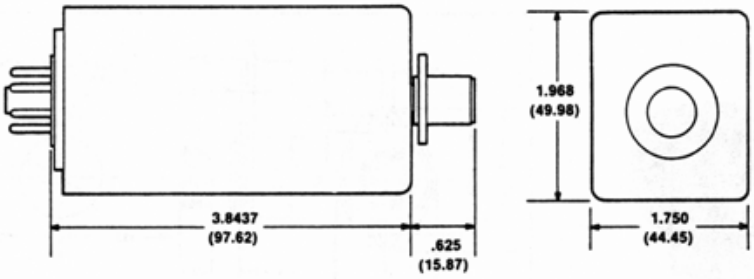
NOTE: Schematic diagram is for typical application with 120 VAC supplying both control input and load power. When control input and load voltages differ, this diagram must be modified to separate the two voltage sources.

Output Derating Data



MOUNTING DIMENSIONS

XXX = inches.
(XXX) = millimeters.



ACCESSORIES

PART NUMBER	DESCRIPTION
60SR2P06	Octal Socket, Surface Mount
CG900-51	Latch Kit for PDC-581
CG900-6	Remote Pot Kit

ORDERING INFORMATION

CG9 06 A3 00

Time Range Symbol
Refer to Time Range Chart

VOLTAGE/FREQUENCY

SYMBOL	DESCRIPTION
A3	120 VAC 50/60 Hz or 110 DC
B3	240 VAC 50/60 Hz or 240 DC

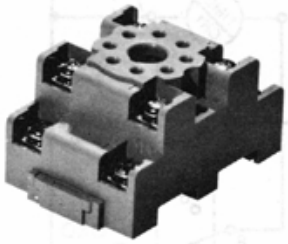
FEATURES

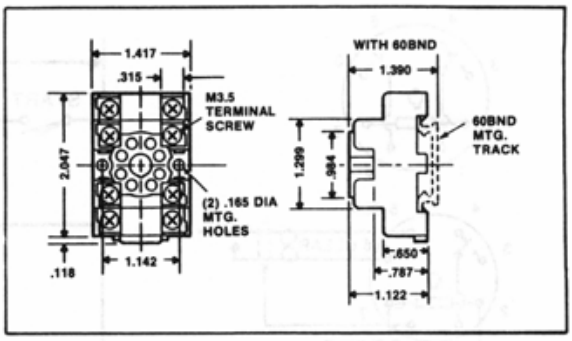
SYMBOL	DESCRIPTION
Blank	Standard
02	Modified for Remote Pot* Installation

* Remote Pot Kit is CG900-6

60SR2P05

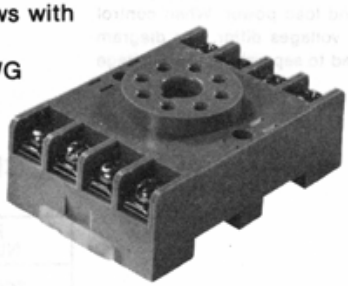
Type: 8 pin octal, snap-on/surface mount
Terminal: #6-40 screws with captive wire clamp
Wire size: Max. up to 2-#12 AWG
Electrical rating: 300V, 10 amp
Relay #: 22P2, 22Q2, 23P2, 27P1, 27Q1, 80Q thru 86Q Series as specified.
U.L. File: E76608
C.S.A. File: 35144

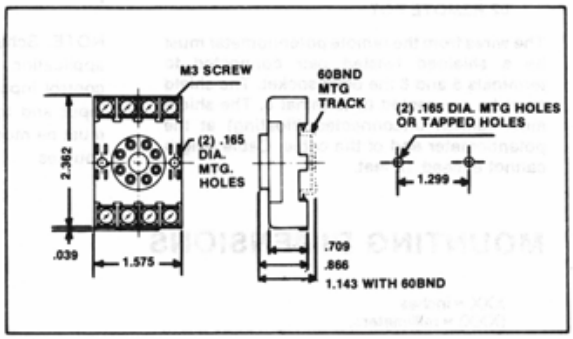




60SR2P06

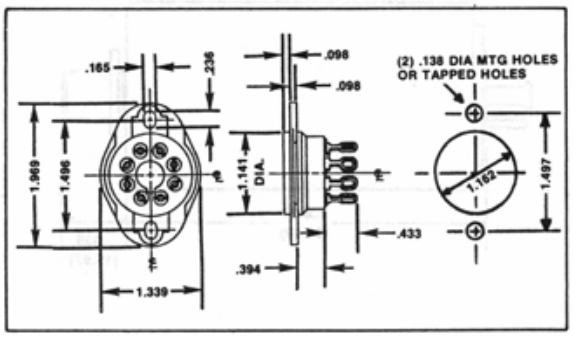
Type: 8 pin octal, snap-on/surface mount
Terminal: #6-40 (or M3.5) screws with captive wire clamp
Wire size: Max. up to 2-#12 AWG
Electrical rating: 300V, 10 amp
Relay #: 22P2, 22Q2, 23P2, 27P1, 27Q1, 80Q thru 86Q Series as specified.
U.L. File: E76608
C.S.A. File: 35144





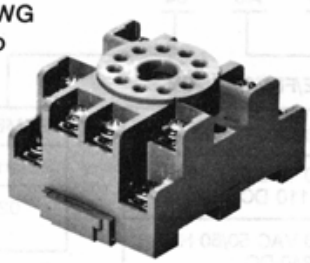
60SR2P51

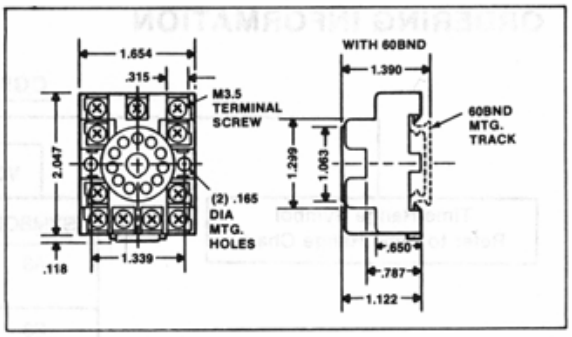
Type: 8 pin octal, panel mount
Terminal: Solder
Electrical rating: 300V, 10 amp
Relay #: 22P2, 22Q2, 23P2, 27P1, 27Q1, 80Q thru 86Q Series as specified.



60SR3P05

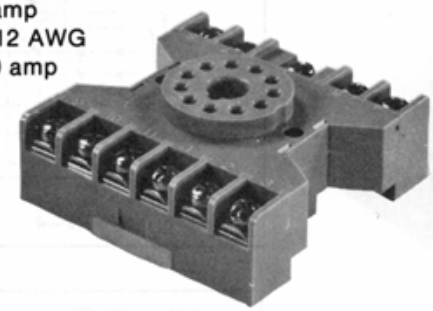
Type: 11 pin, snap-on/surface mount
Terminal: #6-40 screws with captive wire clamp
Wire size: Max. up to 2-#12 AWG
Electrical rating: 300V, 10 amp
Relay #: 22P3, 22Q3, 23P3, 27P2, 27Q2, 80Q thru 85Q Series as specified.
U.L. File: E76608
C.S.A. File: 35144

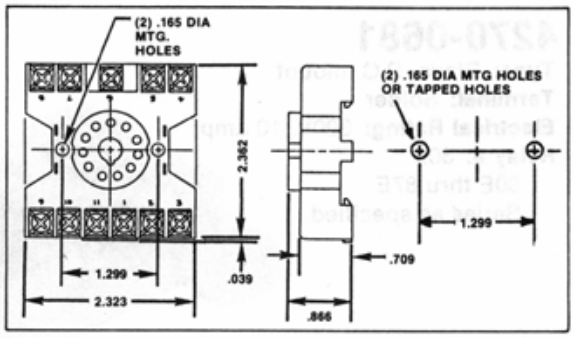




60SR3P06

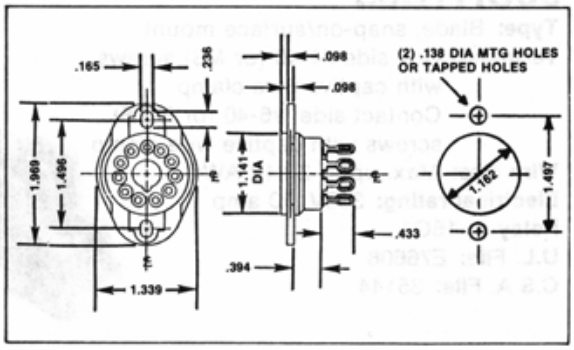
Type: 11 pin octal, snap-on surface mount
Terminal: #6-40 (or M3.5) screws with captive wire clamp
Wire size: Max. up to 2-#12 AWG
Electrical rating: 300V, 10 amp
Relay #: 22P3, 22Q3, 23P3, 27P2, 27Q2, 80Q thru 85Q Series as specified.
U.L. File: E76608
C.S.A. File: 35144





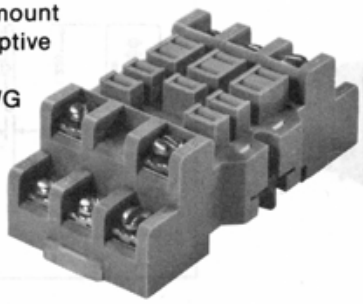
60SR3P51

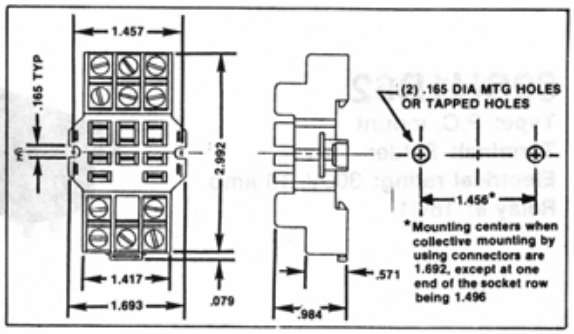
Type: 11 pin octal, panel mount
Terminal: Solder
Electrical rating: 300V, 10 amp
Relay #: 22P3, 22Q3, 23P3, 27P2, 27Q2, 80Q through 85Q Series as specified.



60SR3B05

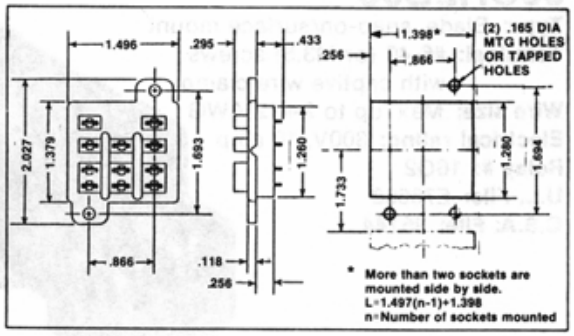
Type: Blade, snap-on/surface mount
Terminal: #6-40 screws with captive wire clamp
Wire size: Max. up to 2-#12 AWG
Electrical rating: 300V, 10 amp
Relay #: 30, 80E thru 87E Series as specified.
U.L. File: E76608
CSA File: 35144





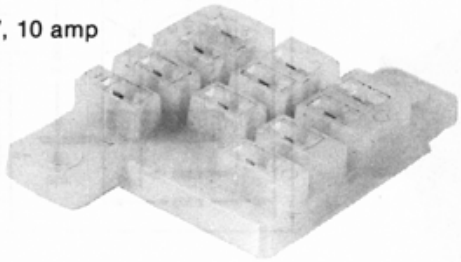
60SR3B51

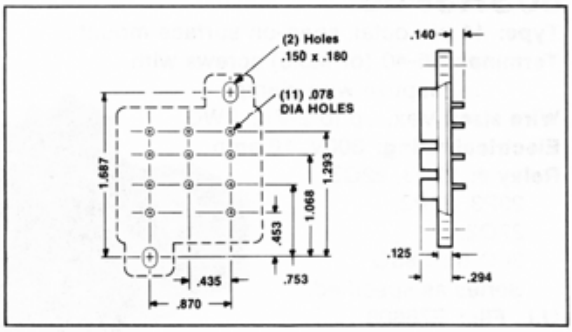
Type: Blade, panel mount
Terminal: Solder
Electrical rating: 300V, 10 amp
Relay #: 30, 80E thru 87E Series as specified.



4270-0681

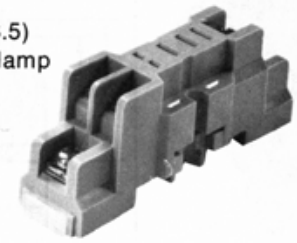
Type: Blade, P.C. mount
Terminal: Solder
Electrical Rating: 300V, 10 amp
Relay #: 30,
80E thru 87E
Series as specified.

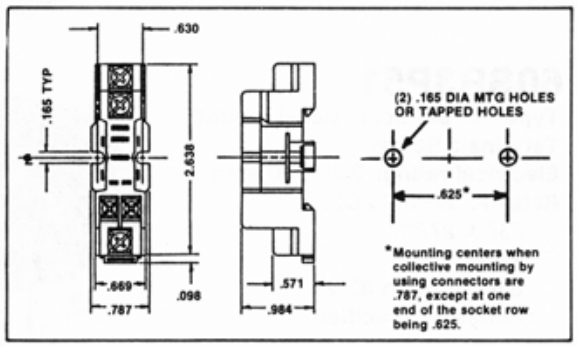




60SH1B05

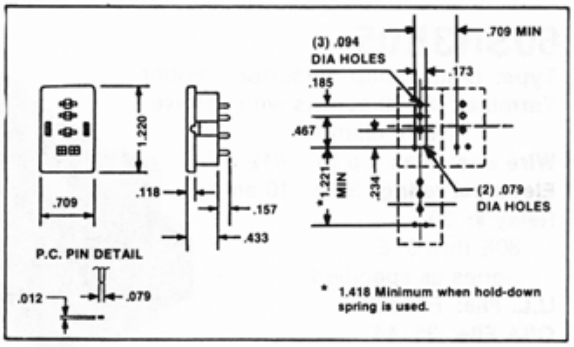
Type: Blade, snap-on/surface mount
Terminal: Coil side:#4-40 (or M3) screws
with captive wire clamp
Contact side: #6-40 (or M3.5)
screws with captive wire clamp
Wire size: Max. up to 2-#12 AWG
Electrical rating: 300V, 10 amp
Relay #: 16Q1
U.L. File: E76608
C.S.A. File: 35144





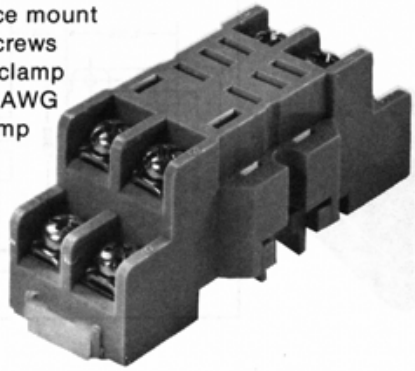
60SH1B62

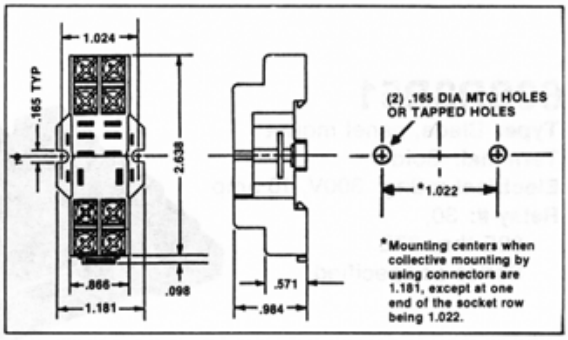
Type: P.C. mount
Terminal: Solder
Electrical rating: 300V, 10 amp
Relay #: 16Q1



60SH2B05

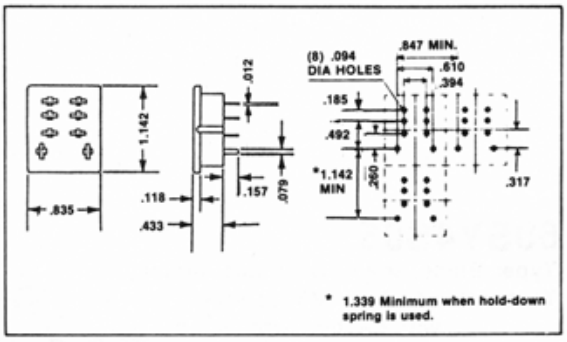
Type: Blade, snap-on/surface mount
Terminal: #6-40 (or M3.5) screws
with captive wire clamp
Wire size: Max. up to 2-#12 AWG
Electrical rating: 300V, 10 amp
Relay #: 16Q2
U.L. File: E76608
C.S.A. File: 35144





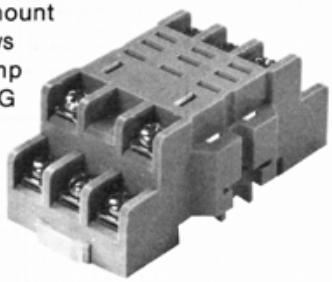
60SH2B62

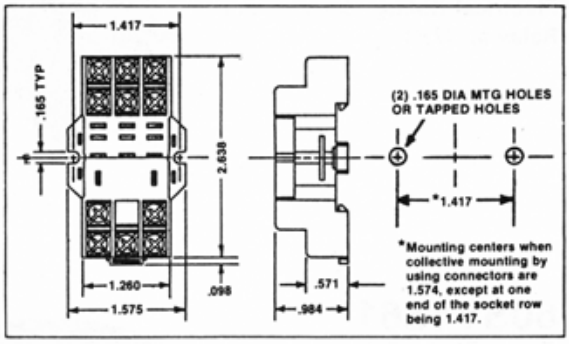
Type: Blade, P.C. mount
Terminal: Solder
Electrical rating: 300V, 10 amp
Relay #: 16Q2



60SH3B05

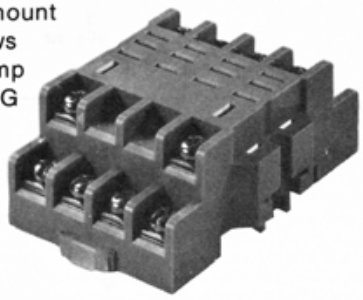
Type: Blade, snap-on/surface mount
Terminal: #6-40 (or M3.5) screws with captive wire clamp
Wire size: Max. up to 2-#12 AWG
Electrical rating: 300 V, 10 amp
Relay #: 16Q3, 18Q2
U.L. File: E76608
C.S.A. File: 35144

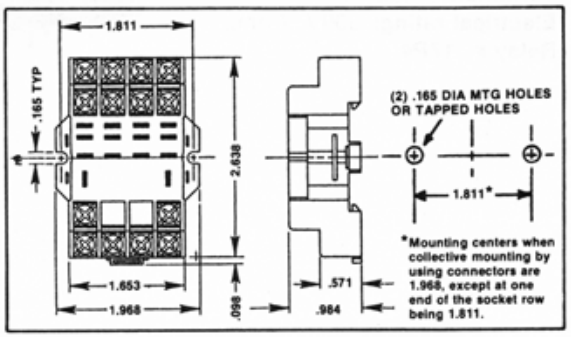




60SH4B05

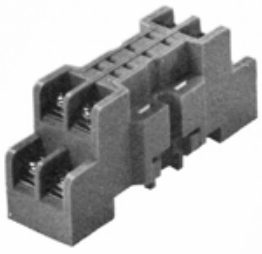
Type: Blade, snap-on/surface mount
Terminal: #6-40 (or M3.5) screws with wire captive clamp
Wire size: Max. up to 2-#12 AWG
Electrical rating: 300V, 10 amp
Relay #: 16Q4
U.L. File: E76608
C.S.A. File: 35144

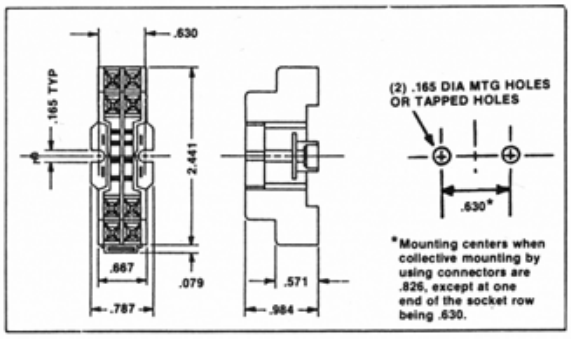




60SY2S05

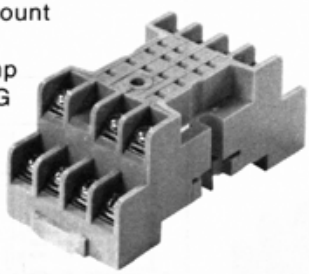
Type: Blade, snap-on/surface mount
Terminal: #4-40 (or M3) screws with captive wire clamp
Wire size: Max. up to 2-#14 AWG
Electrical rating: 300V, 7 amp
Relay #: 17P2
U.L. File: E76608
C.S.A. File: 35144

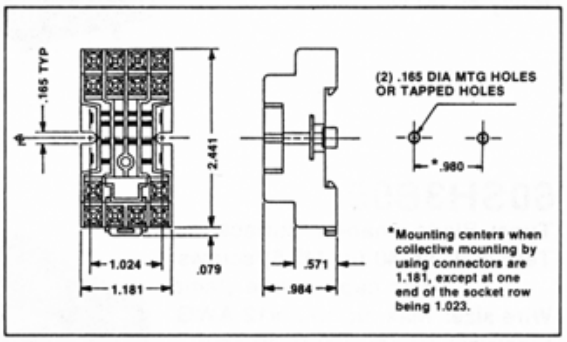




60SY4S05

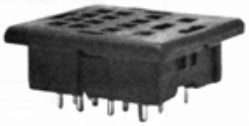
Type: Blade, snap-on/surface mount
Terminal: #4-40 (or M3) screws with captive wire clamp
Wire size: Max. up to 2-#14 AWG
Electrical Rating: 300V, 7 amp
Relay #: 17P4

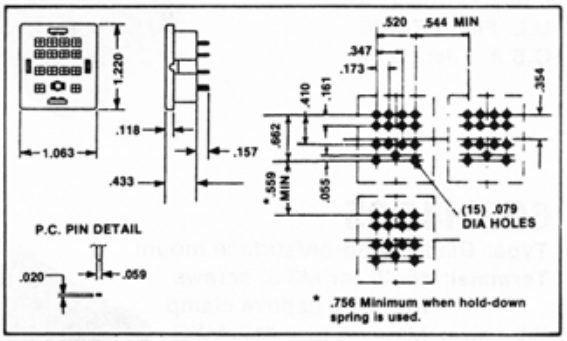




60SY4S61

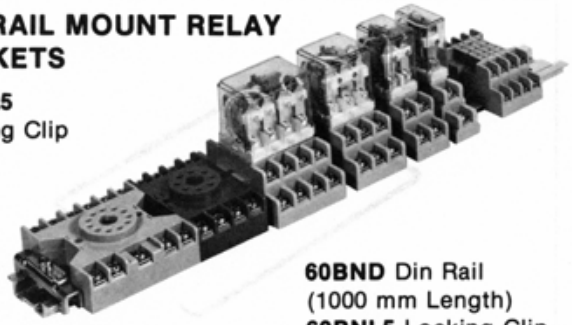
Type: Blade, P.C. mount
Terminal: Solder
Electrical rating: 300V, 7 amp
Relay #: 17P4



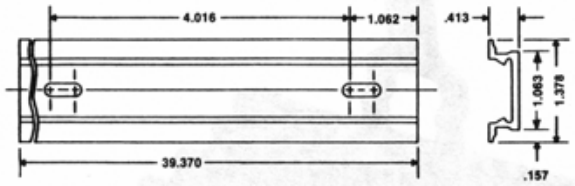


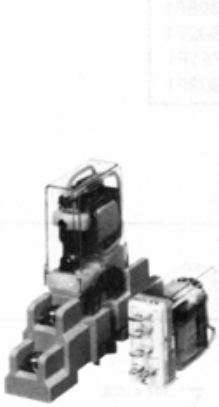
DIN RAIL MOUNT RELAY SOCKETS

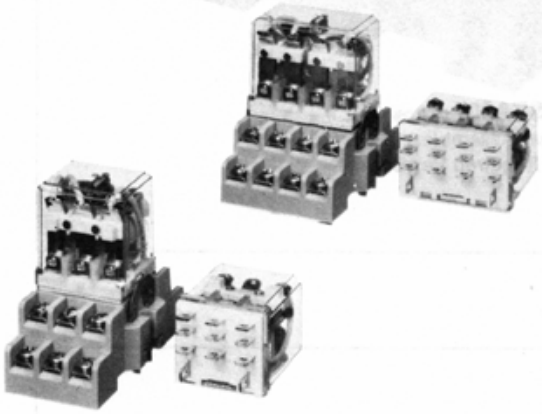
60BNL5
Locking Clip

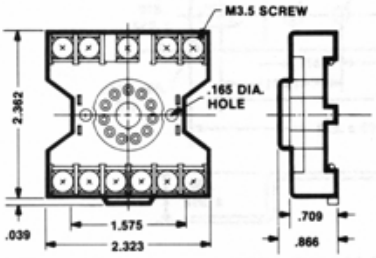


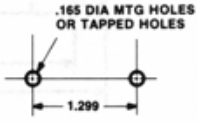
60BND Din Rail
(1000 mm Length)
60BNL5 Locking Clip



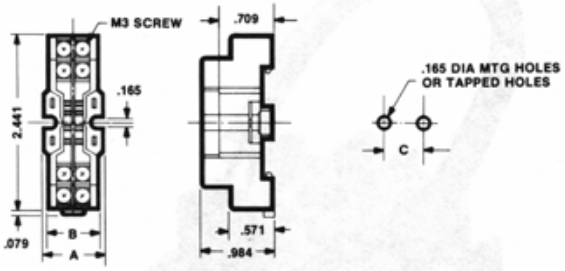


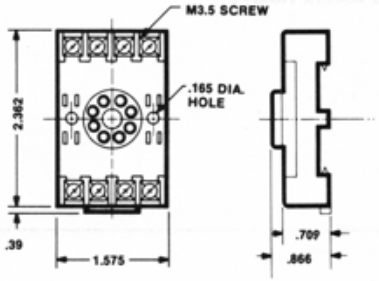


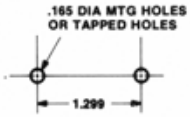




60SR3P06



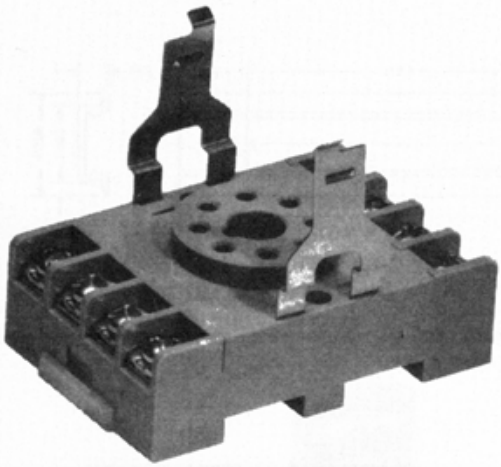




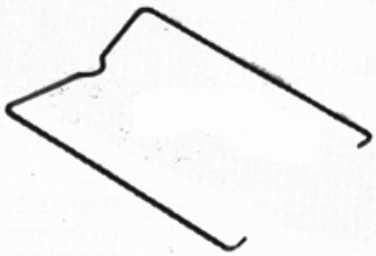
60SR2P06

See Chart Below for A - C Dimensions

Relay Type	Socket	Dimension A	Dimension B	Dimension C
DPDT	60SY2S05	.826	.669	.630
SPDT	60SH1B05	.787	.669	.630
4PDT	60SY4S05	1.181		.980
DPDT	60SH2B05	1.181	.870	1.023
3PDT	60SH3B05	1.574	1.259	1.417
4PDT	60SH4B05	1.968	1.653	1.811

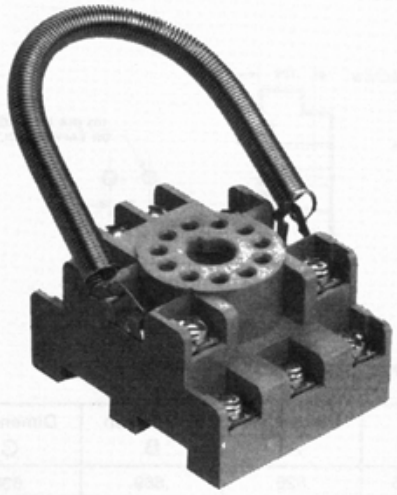


60SFA201 Clips ONLY
Shown Assembled in Socket
2 Required Per Socket

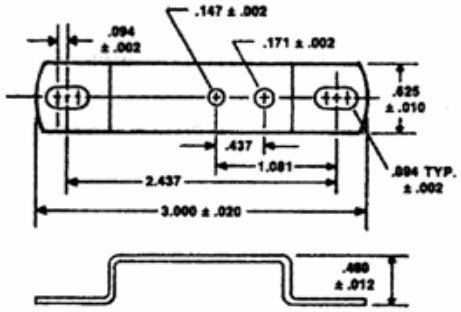


Hold Down Spring
Part Number Varies In Size Only
Refer to Relay Listing for correct part number.

60SH3B05F1
60SH4B02F1
60SR2P51F1
60SR3B02F1



Z-100071 Hold Down Spring ONLY
Shown Assembled in Socket



2014-0020 Mounting Kit
For Stud Mount Relays

Glossary of Terms

+/- 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 repetitious 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.

Glossary of Terms

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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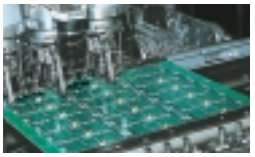

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