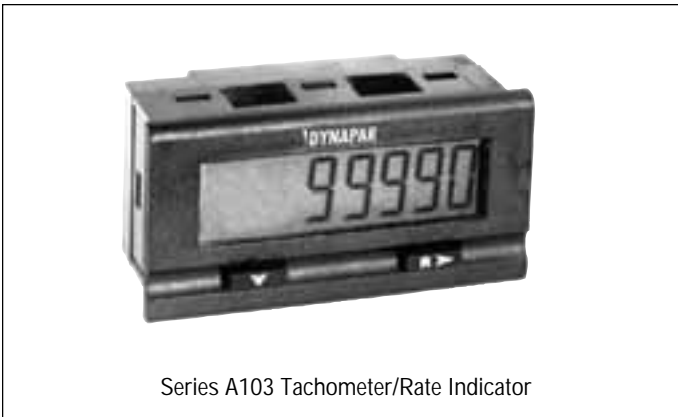


Ratemeters and Timers are used for measurement, display and control in applications that have speed or rate variables that can be sensed. Our Dynapar and Veeder-Root brands are respected throughout the industry for accurate, versatile, industrial duty rate indicators and controllers. This leadership 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.

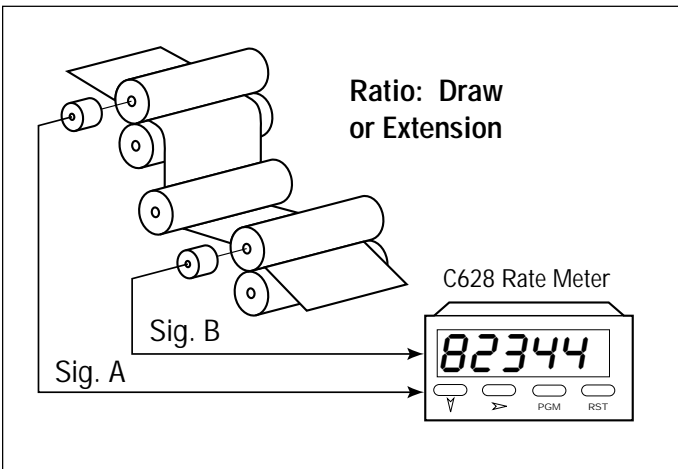
## RATEMETER FUNCTIONS

**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.

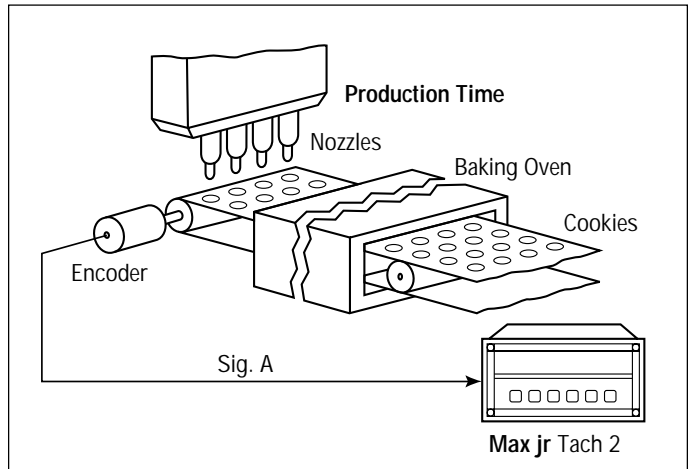
**Draw indicators and controllers** report on the relationship between two rates. Two sensors, A and B, are used to measure the rates  $R_a$  and  $R_b$ . Difference,  $R_a - R_b$ , is a draw function that is used when one section of a process is slower or faster than another; a single draw indicator is more desirable than two independent rate indicators. Ratio,  $R_a \div R_b$ , 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,  $(R_a - R_b) \div R_b$ , 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 measurement 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.



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

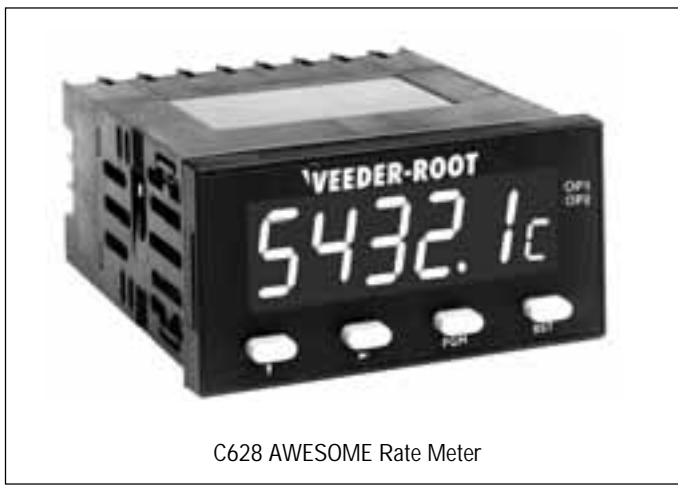
### SPECIFYING A RATE INDICATOR/CONTROLLER

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

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

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

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



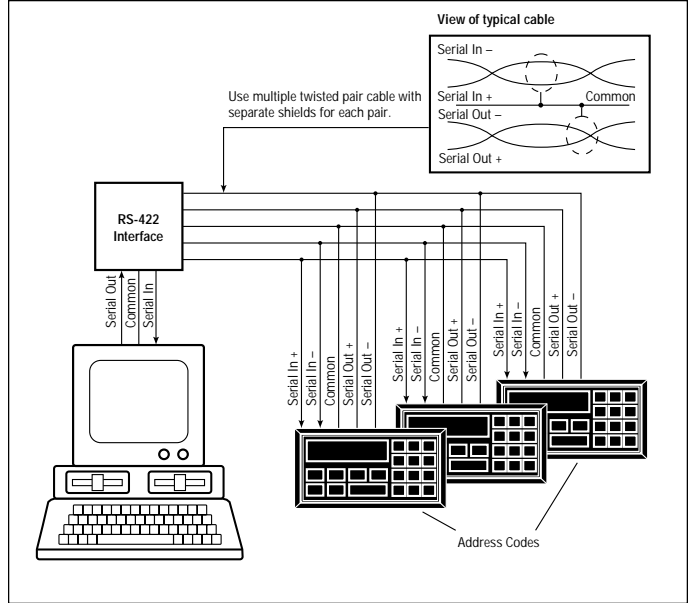
C628 AWESOME Rate Meter

### DATA COMMUNICATIONS

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

There are two forms of serial data communications interfaces offered:

- **RS-232** – Is intended for connection to a simple paper-tape, or multi-copy form printer. May also be used to communicate with nearby programmable logic controllers (PLC), or other system component. The distance between the external device and the indicator/controller should be limited to 50 feet.
- **RS-422/485** – Allows communication between multiple controllers and another system over a single bus. Operating distances of up to a mile can be maintained – even in severe industrial environments. Data collection and control tasks can be distributed between a computer, or PLC, and the motion controls.







### ELECTRONIC INPUT SIGNALS

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

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

4 R A T E I N D I C A T O R S A N D C O N T R O L L E R S




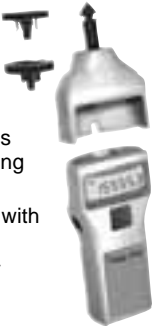

Dynapar brand	Series C628	Series A103	Series C342	MTjr1/2
<p><b>Page Number:</b> The ★ symbol denotes our "Star Products" which we recommend be given first consideration. They offer maximum functionality, performance, and value.</p> <p><b>Description and Features:</b> Condensed description and specification information is provided. Complete information is available by turning to the referenced page number that appears above each product's picture.</p>	<p>Page: 4.04 ★</p>  <ul style="list-style-type: none"> <li>AWESOME 0.71" high LED display changes color on alarm activation</li> <li>Single instrument provides rate and count</li> <li>Configurable sampling for optimal, flicker-free display presentation</li> <li>Optional RS-485 plug-in card</li> </ul>	<p>Page: 4.05 - 4.07 ★</p>  <ul style="list-style-type: none"> <li>Internally powered, economically priced unit with 4 large digits and a backlit LCD display</li> <li>Simple plug-and-play model for RPM display</li> <li>Programmable versions that include background totalization and a scaled pulsed output</li> </ul>	<p>Page: 4.08 ★</p>  <ul style="list-style-type: none"> <li>Very compact size. Available with LCD or LED display</li> <li>Models with internal lithium power source or external DC power supply</li> <li>Matching Series C342 counters and timers available</li> </ul>	<p>Page: 4.09</p>  <ul style="list-style-type: none"> <li>Industry standard 1/8 DIN, full 5 digit LED indicator</li> <li>Transistor outputs for high and low rate alarms</li> <li>MTJR2 features 2 inputs and can display ratios and time intervals</li> </ul>
<b>Dimensions</b>	48mm x 96mm	36mm x 72mm	24mm x 48mm	50mm x 98mm
<b>Display Type</b>	LED, Programmable Red or Green color	Backlit LCD (Backlight requires 12 VDC power)	7.0mm high LCD or 7.2mm LED	LED
<b>Number of Digits</b>	5 (0.71" high)	4 (plus dummy zero on prog. rate versions)	6, LSD fixed at zero	5 (0.56" high)
<b>Power Supply</b>	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
<b>Alarm Outputs</b>	2 NPN transistor, 1 SPDT 2A relay (2nd relay optional)	No	No	2 - NPN transistor
<b>Calibrator</b>	Multiplier 0.0001 to 9.9999	Multiplier 0.001 to 9.999	NO	Multiplier 0.0001 to 9.9999
<b>Max Frequency</b>	10 kHz	10 kHz	7.5 kHz	10 kHz
<b>Input Type</b>	Sinking, Sourcing, Magnetic	Sinking, Sourcing, Magnetic	Sinking, Sourcing,	Sinking, Sourcing, Magnetic
<b>Rate Calculation method</b>	Time Interval (1/Tau)	Time Interval (1/Tau)	6 Second gate	Time Interval (1/Tau)
<b>Sensor Power Supply</b>	9 - 15 VDC	9 - 15 VDC (Option module required)	No	12 VDC
<b>Front Panel Rating</b>	NEMA 4X	NEMA 4X	IP65	NEMA 4
<b>Serial Communication</b>	Optional RS-485	No	No	No

Sold by AA Electric 1-800-237-8274 Lakeland, FL • Lawrenceville, GA • Greensboro, NC • East Rutherford, NJ www.AAelectric.com

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

Sold by AA Electric 1-800-237-8274 Lakeland, FL • Lawrenceville, GA • Greensboro, NC • East Rutherford, NJ www.AAelectric.com

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MT1	SimTach D	Series 7990	
<p>Page: 4.10</p>  <ul style="list-style-type: none"> <li>Large, 5 digit LED display</li> <li>Dual channel inputs allow the unit to keep track of 2 separate rate values or their draw ratio</li> <li>6 transistor alarm outputs</li> <li>RS-485 communication enhances plant wide automation</li> </ul>	<p>Page: 4.11</p>  <ul style="list-style-type: none"> <li>No programming required</li> <li>Chose the 1 PPR input model for production rate monitoring</li> <li>Chose the 60 PPR input unit for displaying RPM</li> </ul>	<p>Page: 4.12</p>  <ul style="list-style-type: none"> <li>Can be programmed for use in counting and timing applications as well as rate</li> <li>Rugged metal case</li> </ul>	<div style="border: 2px solid black; padding: 10px;"> <h3 style="text-align: center;">Hand Tachometers— An Essential Item in Every Tool-Kit</h3> <p><b>Series HT50</b> – Shirt pocket sized. Complete kit provides everything needed for optical non-contact or mechanical in-contact measurements. <b>Page 4.13</b></p> <ul style="list-style-type: none"> <li>Compact and lightweight</li> <li>Simple push button operation</li> <li>Automatic display hold for three minutes or until another reading</li> <li>9 to 99,999 RPM measurement range with 0.1 resolution</li> <li>Automatic shutoff for power savings</li> </ul>  <hr/> <p><b>Series HT100</b> – Bright LED Display. Mode selector for measurement of RPM, linear feet or meters per minute, counts, or time. <b>Page 4.14</b></p> <ul style="list-style-type: none"> <li>Complete kit – includes Hand Tachometer, in-contact adaptor, carrying case, and reflective tape</li> <li>Microprocessor circuit allows switch selection of rate, time, or counting modes</li> <li>Measures speeds from 3 rpm to 99,999 rpm</li> <li>Fixed or floating decimal point operation</li> <li>Automatic shut-off with display memory recall</li> </ul>  </div>
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 transistor	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 Interval (1/Tau)		
12 VDC	12 VDC	No	
NEMA 4	NEMA 4	NEMA 4	
RS-422/485	No	No	

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



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

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

File No.: E185087



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

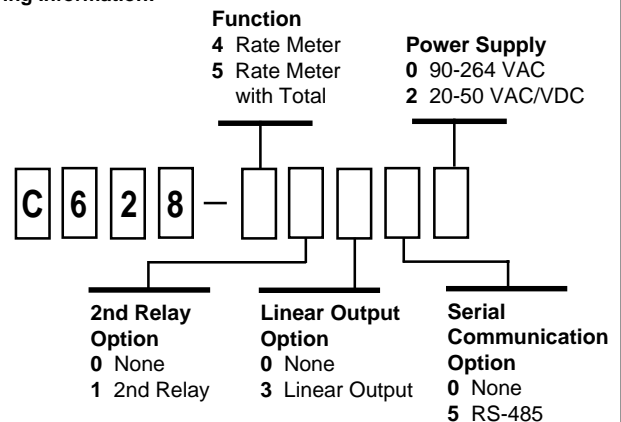
**Outputs:** Solid State: NPN open collector, 30 VDC max., 100 mA max.  
Relay: SPDT, 2 resistive @ 110 VAC  
Latency: 75 μ seconds, plus 8 ms for relay pull-in

**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%

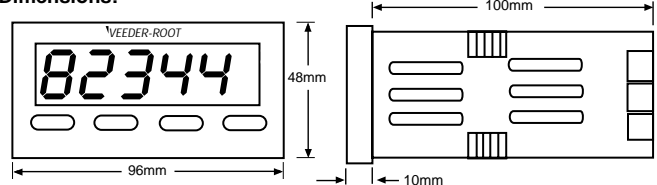
**4.04 DANAHER INDUSTRIAL CONTROLS**

- Resolution: 8 bits in 250ms (10 bits in 1s. typ.)
- Load Impedance: 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")

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



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

<b>A103 Totalizing Counters:</b>	<b>Section 1</b>
<b>A103 Preset Counters:</b>	<b>Section 2</b>
<b>A103 Time Indicators:</b>	<b>Section 5</b>
<b>A103 Preset Timers:</b>	<b>Section 5</b>

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.

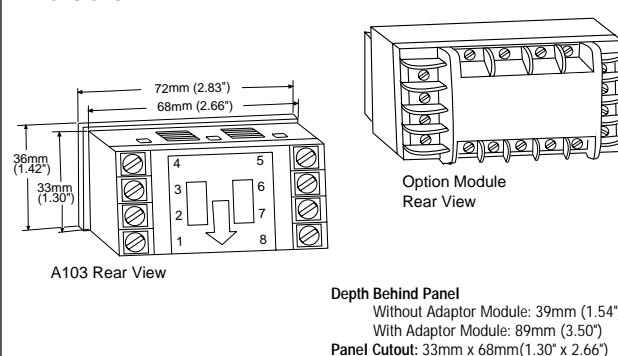
**High Voltage Input:** Allows A103 to accept 100 to 260 Volt AC/DC as signal input

**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		
<b>The following option modules attach to the rear of the A103 Tachometers:</b>			
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
<b>Replacement Battery:</b> 605472-0001			
<b>Panel Hole Punch:</b> A103-A40			

## Dimensions:



**Input scaling to measure any rate or speed... large display with backlighting**



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

<b>A103 Totalizing Counters:</b>	<b>Section 1</b>
<b>A103 Preset Counters:</b>	<b>Section 2</b>
<b>A103 Time Indicators:</b>	<b>Section 5</b>
<b>A103 Preset Timers:</b>	<b>Section 5</b>

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  $\mu$ sec 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.

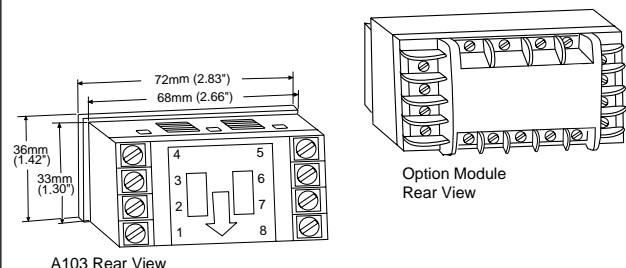
**High Voltage Input:** Allows A103 to accept 100 to 260 Volt AC/DC as signal input

**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		
<b>The following option modules attach to the rear of the A103:</b>			
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
<b>Replacement Battery:</b> 605472-0001			
<b>Panel Hole Punch:</b> A103-A40			

## Dimensions:



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

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



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

<b>A103 Totalizing Counters:</b>	<b>Section 1</b>
<b>A103 Preset Counters:</b>	<b>Section 2</b>
<b>A103 Time Indicators:</b>	<b>Section 5</b>
<b>A103 Preset Timers:</b>	<b>Section 5</b>



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.

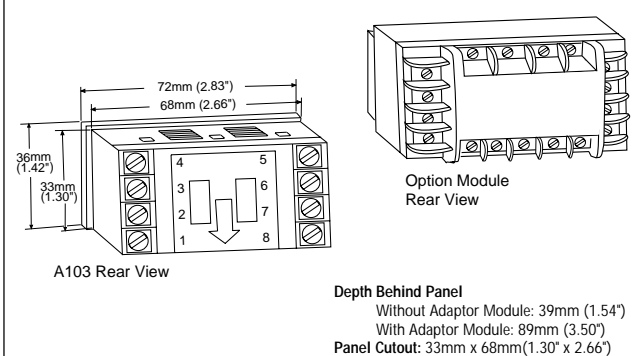
**High Voltage Input:** Allows A103 to accept 100 to 260 Volt AC/DC as signal input

**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		
<b>A103-005</b>	A103 Rate Meter & Totalizer		
<b>A103-009</b>	A103 Rate Meter & Totalizer w/Pulse Output		
<b>The following option modules attach to the rear of the A103 :</b>			
Model No.	AC Power Supply	Low Voltage Input	High Voltage Input
<b>A103-A12</b>	X		
<b>A103-A17</b>		X	
<b>A103-A19</b>	X	X	
<b>A103-A10</b>			X
<b>A103-A14</b>	X		X
<b>Replacement Battery:</b> 605472-0001			
<b>Panel Hole Punch:</b> A103-A40			

## Dimensions:





**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



**4**  
RATE INDICATORS/CONTROLLERS

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 programming 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.

### 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

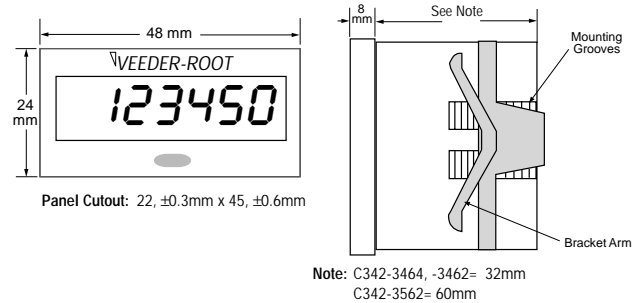
**Operating Temperature:** -10°C to 50°C

**Front Panel Rating:** IEC IP65

**Approvals:** CE

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:





*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.

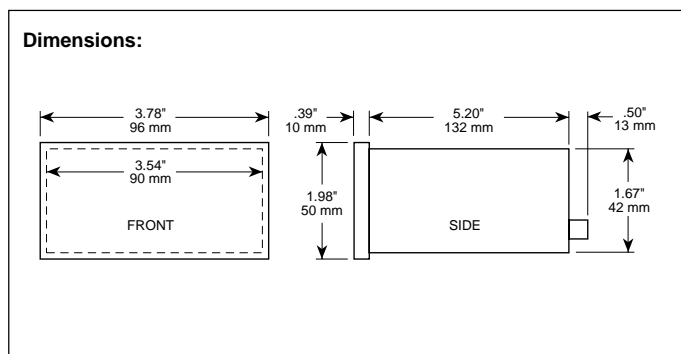
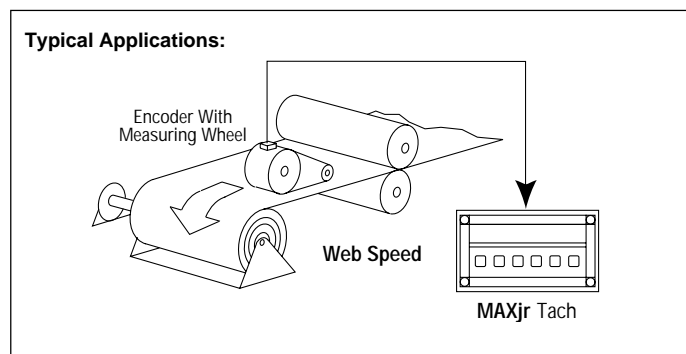
**Power Requirements:** 95 to 130, or 190 to 260 VAC, 50/60 Hz, 6 VA; 10 to 26 VDC @ 0.4 A max.

**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





**Two channel rate plus draw indicator and controller with serial communication port**

**4**  
RATE INDICATORS/CONTROLLERS

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  $\pm 5$  digit display capability
- Draw modes available: difference (A-B); ratio (A+B); percent draw (A-B)  $\div$  A or (A-B)  $\div$  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.

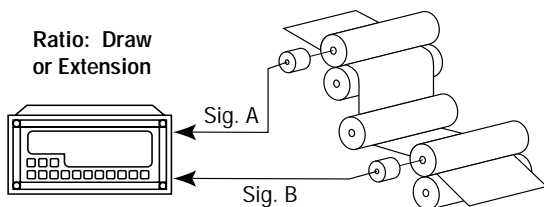
**For single channel rate, see MAXjr Tach 1 & 2**  
**For BCD Output Buffer, see PM62S**

**SPECIFICATIONS**

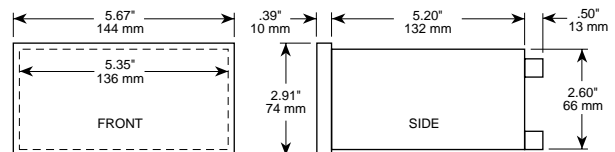
- Panel Mounting:** 2.68" x 5.43" cutout; 5.68" depth
- Accuracy:**  $\pm 0.01\%$  crystal controlled
- Inputs:** Pulsed (square wave) current source; 30 kHz max.
- Display:** 5 digit, 0.8" LED; update rate 0.6 seconds or 1 signal period
- Alarms:** (6); 1 high and low each for rate A, rate B and draw; 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  $\pm 5\%$  @ 0 to 175 mA
- Operating Temperature:** 32° to +122°F (0° to +50°C)

Model No.	Description
<b>MT100S00</b>	MAX Tach 1 Dual Rate and Draw Controller, 115 or 230 VAC
<b>MT100D00</b>	MAX Tach 1 Dual Rate and Draw Controller, 12 VDC
<b>MT101S00</b>	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.



**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.

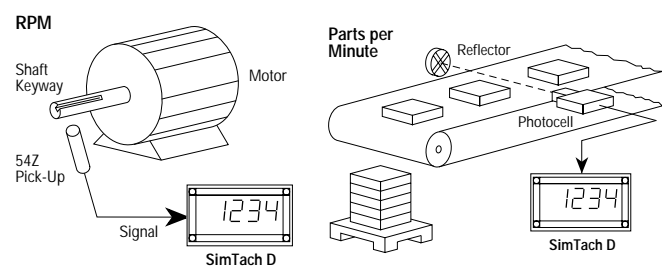
**Accessory Power:** +12 VDC ± 25% @ 0 to 125 mA

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

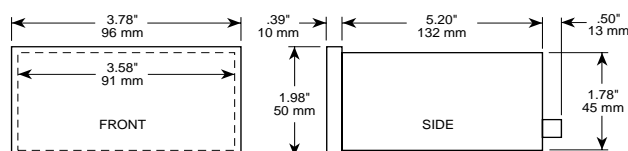
**For voltage inputs, see SimTach A**  
**For other PPR inputs, see MAXjr Tach 1**

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:**



**Dimensions:**



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



**Selectable functions and calibration make this low cost indicator family unique**

The FLEX Series 7990 is the best value in a low cost, versatile indicator for industrial applications. With its unique functionality, it can be used to totalize parts production, keep track of machine hours, indicate process times, or show production rate. Input scaling accommodates a variety of input sources and the ability to readout in meaningful engineering units.

- Eight digit hourmeter and elapsed timer with resolution in seconds, minutes or hours
- Four digit rate indicator uses a time interval measurement for improved accuracy
- Large 8 digit display; same size as competitive 6 digit models
- Compact, solid state design; battery operated
- Rugged, die cast metal housing
- NEMA-4 front panel seal with gasket and mounting clips (provided)
- Independent Program Enable and Front Panel Reset Enable

Accessories are available for termination of field wiring by use of the screw terminal adapter. Isolation and high voltage sources can be accommodated with the AC/DC input module. Connection to high voltage AC for timing applications is accomplished with the Triac adapter module.

Panel adapters, available with or without a locking key reset, allow easy mounting and retrofit to older and larger mechanical, electrical or electronic products.

**For Electrical Hour Meters, see Series 7795**  
**For 25x50 mm LCD Indicators, see MITE Series 7999**

**SPECIFICATIONS**

**Panel Mounting:** 2.625" x 1.313" cutout; 0.71" depth

**Accuracy:** ±1 Count or 0.01%

**Inputs:** Contact closure or open collector; selectable X1 or X2 logic; programmable multiplication by 0.001 to 9999 prescaler

**Display:**  
Hourmeter: 8 digit, 0.35" LCD  
Timer: 8 digit, 0.35" LCD  
Tachometer: 4 digit, 0.35" LCD

**Power:** Internal lithium battery with 8 year typical life.

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

**FLEX REPLACES MANY COMPETITIVE MODELS**

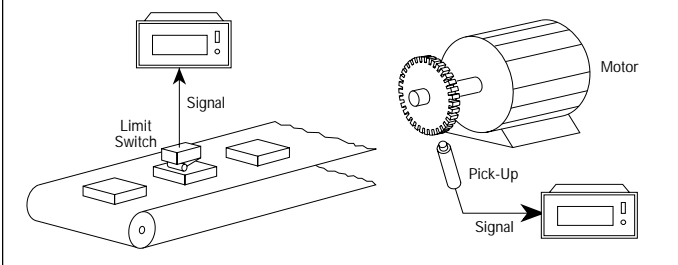
**FLEX Series 7990** can physically and electrically replace the following competitive models:

**FLEX 1** replaces: Red Lion Cub 2, Cub 2L and Cub 2L8

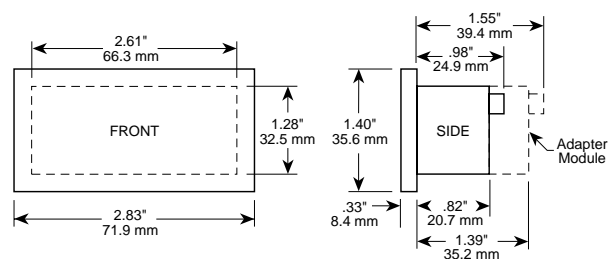
**FLEX 2** also replaces: Red Lion DITAK 5 and DITAK 6

Model No.	Description
0799008-101	FLEX 1 LCD Totalizer/Hourmeter/Timer
0799008-201	FLEX 2 LCD Totalizer/Hourmeter Timer/Tachometer
0328992-010	Screw Terminal Adapter
0328992-020	AC/DC Input Module
0328992-030	Triac Input Module
0328992-120	Panel Mount Adapter
0328992-110	Panel Mount w/Reset Key Adapter
BIK100	Basic Installation Kit (one included with each unit)

**Typical Applications:**



**Dimensions:**





### Remote Probe Accessory



**Part Number 605830-0001.**  
Maintains comfortable viewing by providing optical pickup of RPM sources in tight or hard to access areas. Easy plug-in connection.

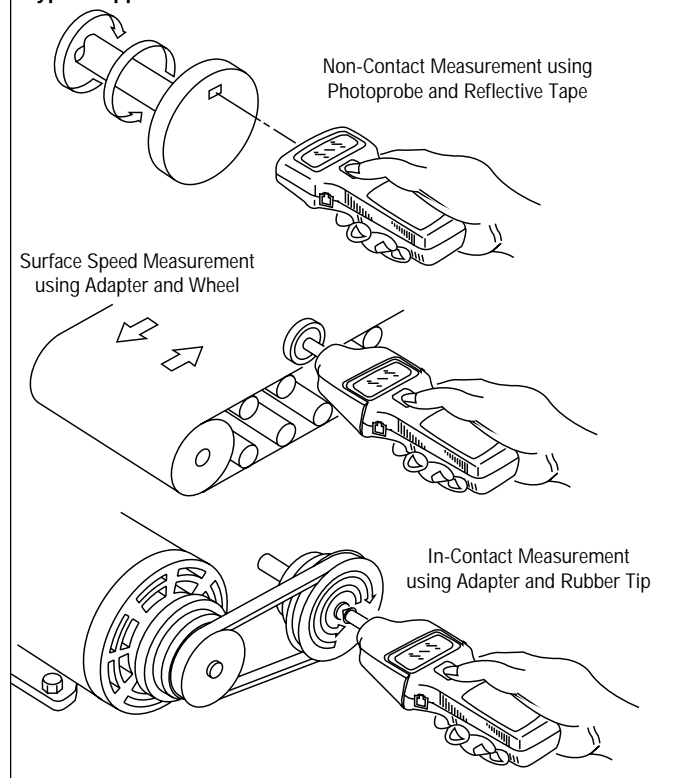
***Shirt-pocket size.  
Contacting or  
non-contacting . . .  
an essential part  
of your tool kit.***

The Dynapar brand Series HT50 hand tachometer provides a convenient, accurate means of measuring rotary or surface speeds on all types of machinery. For non-contacting measurement, the tachometer optically detects a reflective target on the rotating object to read revolutions per minute. Where in-contact measurement is desired, an accessory adaptor is used with the appropriate device – a wheel for surface speed or rubber tip for shaft rotation.

- Optical non-contact or in-contact measurement
- Compact and lightweight
- Simple push button operation
- Automatic display hold for three minutes or until another reading
- 6.0 to 99999 RPM measurement range with 0.1 resolution
- Automatic shutoff for power savings

The Series HT50 hand tachometer can be used for everyday checks of motors, conveyors, HVAC equipment and line speeds. It also provides an excellent reference source for checking speed indicators on machinery control panels.

#### Typical Applications:



### SPECIFICATIONS

**Measurement Range:** 6.0 to 99999.9 RPM; 3.00 to 3000.00 meters or yards per minute using in-contact adaptor and appropriate wheel

**Resolution:** 0.1 RPM

**Accuracy:** RPM:  $\pm 0.01\%$ , Surface Speed:  $\pm 0.05\%$ ; and  $\pm 1$  digit

**Optical Range:** 50 to 300 mm (2 to 12 inches) using reflective tape

**Update Time:** 1 to 10 seconds sample time

**Display:** 6 digit LCD; low battery and reflective light input indicators

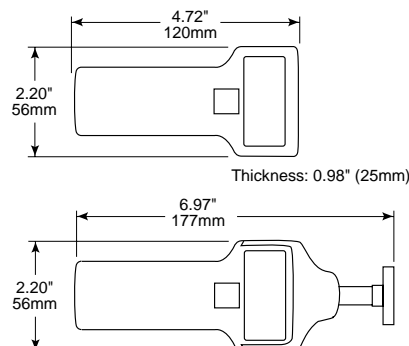
**Display Hold:** 3 minutes from last measurement then auto power-off

**Power Requirements:** (4) 1.5V batteries, AAA size, included. 20 hours continuous measurement

**Operating Temperature:** 40° to +104°F (5° to +40°C)

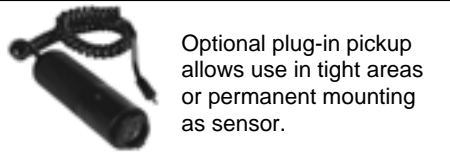
Model No.	Description
HT50 02	Hand Tachometer System (Includes: Hand Tachometer; In-Contact Adaptor; Rubber Tips (3 pcs.); Reflective Tape (10 sheets); Surface Speed Wheels (1/10 m/min and 1/10 yd/min); Carrying Case; Dry Batteries (4-AAA size, 1.5 V); Instruction Manual
605830-0001	Accessory Remote Probe
0576008-394	Replacement Rubber Tip for In-contact Adaptor
0576008-395	Replacement 1/10 Yard Wheel
0576008-396	Replacement 1/10 Meter Wheel
605831-0002	Replacement In-contact Adaptor
0616483-001	Reflective Tape (Replacement)

#### Dimensions:





*Large, red LED display is easy to see from any angle . . . instantly switches between speed, time interval, or count measurements.*



Optional plug-in pickup allows use in tight areas or permanent mounting as sensor.

4 RATE INDICATORS/CONTROLLERS

The HT100 Hand-Held Rate & Time Indicator's display provides a highly visible reading, even in dim light or at indirect viewing angles.

When used as a non-contact indicator, a marker (reflective tape, supplied) is placed on the shaft, or other target that is to be measured. The HT100 is then simply pointed at the marker to read rate-per-minute, seconds-per-event, or counts. An in-contact adaptor is provided that allows display of linear feet or meters per minute, RPM, or counts.

- Complete kit – includes Hand Tachometer, in-contact adaptor, carrying case, and reflective tape
- Microprocessor circuit allows switch selection of rate, time, or counting modes
- High contrast LED display can be easily seen in dim or shadowed lighting conditions
- Measures speeds from 3 rpm to 99,999 rpm
- Fixed or floating decimal point operation
- Automatic shut-off with display memory recall
- Up to eight hours operating time from set of standard AA cells
- Target-detect, and battery-low indicators
- Lightweight yet rugged design, fits comfortably in hand
- Optional plug-in pickup allows remote or fixed mount sensing

The HT100 system is packaged in a rugged carrying case. A generous supply of reflective tape is included.

**For LCD Hand Tachometer, see HT50**  
**For Panel-Mount Tachometer, see A103**

## SPECIFICATIONS

**Measurement Range:** RPM: 3 to 99,999; M/min: 0.3 to 19,999; Ft/min: 0.3 to 19,999; Time-interval: 0.01 to 99,999 sec.; Counts: 1 to 99,999

**Display:** 5 digit red LED, 0.4" (10.5 mm), floating decimal in autorange mode

**Display Update Time:** 0.8 second above 75 rpm, time between pulses below 75 rpm

**Accuracy:** RPM:  $\pm 0.05\%$  of reading,  $\pm 1$  digit; M/min & Ft/min:  $\pm 2\%$  of reading

**Time Base:** Crystal controlled

**Auto/Fixed Ranges:** User selectable via yellow switch

**Resolution:** Rate, Fixed Decimal Mode:  $\pm 1$  digit; Rate, Autorange: Maximum 0.001 units (revs/meters/feet); Time Modes: Max. 0.01 sec., autoranging only; Count Mode: 1 count (1 pulse/shaft rev. in contact mode)

**Auto Power-Off:** After release of button, reading displayed for 10 seconds then switches off

**Memory Recall:** Last reading available for up to 1 minute after automatic power-off

**Over Range:** Display flashes

**Under Range:** Display reverts to zero (rate modes)

**On Target Indicator:** Green LED glows when optical alignment is correct

**Battery Low Indication:** Red LED glows when batteries are nearing replacement level

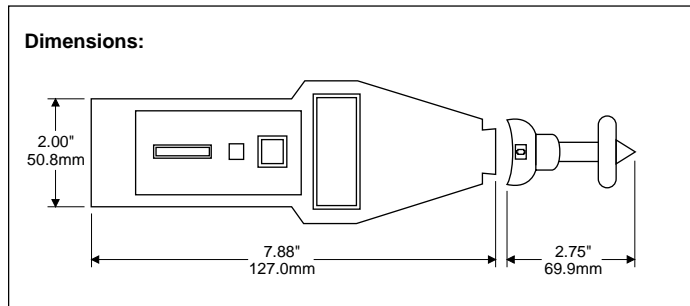
**Optical Range:** 1" - 3 feet (25 mm - 1000 mm)

**Light Source:** Visible light, long life lamp

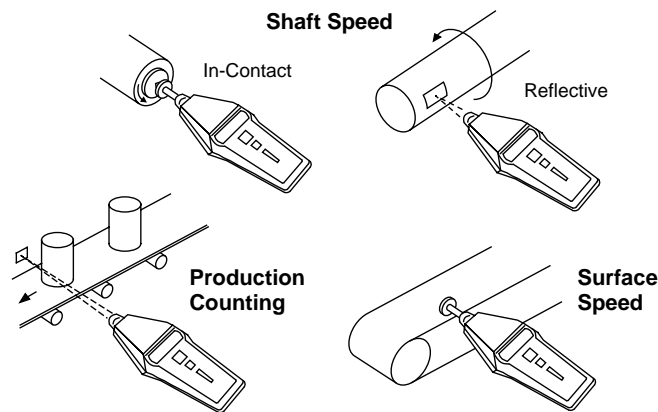
**Operating Temperature:** 32° to 113° F (0 to 45° C)

**Net Weight:** 1 lb., 12 oz. (794 g)

Model No.	Description
<b>HT100</b>	Hand-Held Rate & Time Indicator Kit, includes in-contact adaptor, reflective-tape, batteries, case
<b>PROB00</b>	Plug-in Pickup; allows remote sensing
<b>PMB</b>	Bracket for Plug-in Pickup
<b>0616483-001</b>	Replacement supply of reflective tape (3.5" x 3/8")
<b>605153</b>	Replacement in-contact adaptor (includes wheel & tip)
<b>605156</b>	Replacement in-contact wheel
<b>605154</b>	Replacement in-contact tip



### Typical Applications:



Many industrial and process applications require display of totalized quantities as well as indication of production rate or speed. In addition, control based on preset count or rate limits is frequently desired.

Although multiple functions can be accomplished by mounting several individual instruments on a control panel, each one will consume panel area, costs may be higher than necessary, and installation and wiring tasks can be unduly complex.

## THERE'S A BETTER WAY

Our many years of experience in the design and application of counting, speed measuring, and related instrumentation has enabled us to define products that include the frequently combined functions of two or more products. Therefore, the multifunction instruments offered in this catalog have the benefits of compact size, simplified installation and wiring, and very low cost-per-function.

## GENERAL FEATURES AND SPECIFICATIONS

Multifunction instruments are combinations of the totalizer, predetermining counter, and rate measurement techniques described elsewhere in this catalog. Therefore, we recommend a review of the introduction sections for these products as a means to better understand the products listed here.

## WHAT TO SPECIFY

Start by reviewing the functions required in your new or existing application. Does it include totalizing tasks combined with tachometer or other speed indication? Our **Series 7975** may be just what's required for production monitoring tasks where totalized quantity and rate of production is important.

Will the application benefit by the control provided by a predetermining counter such as batching, cutting-to-length, or positioning? Could high/low speed alarms enhance the application? If two or more of these functions are required, a multifunction instrument such as our Series 7975 is a good choice for the job.

## SPECIAL PURPOSE CONTROLLERS AND MONITORS

For applications that require a predetermining counter with more than six preset limits, the ideal controller may be our Series 7920 or Series 79201. These unique products will control multi-step sequential operations by count and/or time (79201).



Series 7920/79201

Our Series 7935 is a full featured production monitor. It collects and segregates data by up to 5 work-shifts – production totals, downtime, efficiency, and fault or stop reasons. In addition, the Series 7935 provides a two preset predetermining counter that can be used to control lot or batch size, dual rate or speed functions with ratio calculation and alarm limits, and RS-422 data communications.



Series 7935 Production Data Control

The SFC40 is ideal for liquid transfer and dispensing operations. It includes start/stop control outputs, a 7 digit totalizer, dual limit batch controller, and a flowrate indicator with high/low alarm limits.



SFC 40 Batch Controller

The following is a summary of our multifunction instrument features:

Model	Totals	Rate	Rate Alarm	Preset Count	Down Time	Data Out
7935	5 Shift	2+Ratio	Yes	Yes	5 Shift	Yes
7920				50 Limits		
79201				50 Limits		
SFC40	Yes	Yes	Yes	2 Limits		Yes

### ELECTRONIC INPUT SIGNALS


Electronic counters need a signal that represents the unit to be counted, which is often available as a voltage pulse or contact closure that already exists on your machine or process. However, for cases where no signal is available, a suitable sensor will have to be furnished. Our Multifunction Indicators/Controllers have the advantage of sharing a single sensor as input for several functions. Individual calibration factors allow the count and rate to be presented in different engineering units. For example, the totals and speed of a winding machine can be monitored, with totals displayed in feet, while speed can be shown in RPM – using the same sensor.





Anything that can be sensed can be counted and we offer several types of accessory sensors. There are four general categories 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

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	
<p><b>Page Number:</b> The  symbol denotes our "Star Products" which we recommend be given first consideration. They offer maximum functionality, performance, and value.</p> <p><b>Description and Features:</b></p> <p>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.</p>	<p>Page: 7.04</p>  <ul style="list-style-type: none"> <li>■ Designed specifically for applications that require monitoring and control of liquid flow</li> <li>■ Hi and Low alarm outputs for flow rate</li> <li>■ Background totalization and batch control</li> </ul>	<p>Page: 7.05</p>  <ul style="list-style-type: none"> <li>■ Uniquely suited for paper, film and foil converting applications</li> <li>■ Sheet length controller monitors web delivery and radial knife position</li> <li>■ Ream and Batch control output enables complete process automation</li> </ul>	<p>Page: 7.06</p>  <ul style="list-style-type: none"> <li>■ Roll Diameter indicator and controller for use in both wind and unwind applications</li> <li>■ 3 presets for control of Roll full/empty status</li> <li>■ 10 VDC output can be used as a trim input to a speed controller</li> </ul>	
<b>Dimensions</b>	74mm x 144mm	74mm x 144mm	74mm x 144	
<b>Display Type</b>	LED	LED	LED	
<b>Number of Digits</b>	7 (0.6" high)	6 (0.6" high)	5 (0.6" high)	
<b>Power Supply</b>	115, 240VAC (switch selectable) or 12 VDC	115, 240VAC (switch selectable)	115, 240VAC (switch selectable) or 12 VDC	
<b>Calibrator</b>	Ind. multipliers, 0.0001 to 9.9999, for Rate and Batch	Multiplier 0.0001 to 9.9999	Multiplier 0.0001 to 9.9999	
<b>Max Frequency</b>	10 kHz	10 kHz Web input; 5 kHz knife input	20 kHz	
<b>Signal Input Type</b>	Sourcing	Sourcing	Sourcing	
<b>Control Inputs</b>	Start, Stop, Inhibit, Batch Reset, Total Reset	Inhibit, Batch Reset, Ream Reset, Total Reset	Inhibit, Select A/B, Reset	
<b>Number of Presets</b>	2 Batch, 2 Rate	Ream Preset, Batch Preset, Short & Long Alarms	3	
<b>Control Outputs</b>	4 NPN transistors. Optional 2 SPDT Relays - 5 Amp	6 NPN transistor	3 NPN transistors	
<b>Sensor Power Supply</b>	12 VDC	12 VDC	12 VDC	
<b>Front Panel Rating</b>	NEMA 4	NEMA 4	NEMA 4	
<b>Serial Communication</b>	RS-422/485	RS-422/485	RS-422/485	

Series 7920	Series 79201	Series 7935		
<p>Page: 7.07</p>  <ul style="list-style-type: none"> <li>■ 50 preset counter for complex operations</li> <li>■ Programmable individual prewarm outputs</li> </ul>	<p>Page: 7.08</p>  <ul style="list-style-type: none"> <li>■ Program library stores unique operating sequences that can be called up automatically or through the front panel</li> <li>■ Up to 100 stored presets in a maximum of 50 programs</li> <li>■ Timing functions provide Interval or Delay operation of outputs</li> </ul>	<p>Page: 7.09</p>  <ul style="list-style-type: none"> <li>■ Production monitor tracks key data such as totals, rate, ratio, downtime, % efficiency, number of events (by fault code) and time lost</li> <li>■ Serves as a dual preset counter</li> <li>■ RS-422 port enables production data to be downloaded to a computer</li> </ul>		
152mm x 201mm	152mm x 201mm	136mm x 215mm		
LED	LED	LED		
6 (0.43" high)	6 (0.43" high)	6 (0.56" high)		
120 VAC	120 VAC	115, 240VAC (switch selectable)		
Multiplier 0.00001 to 10.0	Multiplier 0.00024 to 10.0	Multiplier or Divider 1 to 999999		
10 kHz	10 kHz	1 kHz		
Sinking	Sinking	Sinking		
Reset	Halt, Execute, Index	Count Direction, Run/Stop, Reset, Security, Fault		
50	50	2		
16 NPN transistors	16 NPN transistors	2 SPDT Relays - 5 Amps and 2 NPN transistors		
12 VDC	12 VDC	12 VDC		
IP54	IP54	NEMA 4		
No	No	RS-422		



*A complete liquid-flow measurement and delivery control system . . . includes: totalizer, rate indicator, and dual preset batch counter*

The SFC40 integrates three necessary functions required for efficient delivery, transfer, or dispensing of liquids. A seven decade totalizer keeps an accurate inventory of total volume. Flow rate can be instantly displayed, while high/low presets immediately produce alarm outputs if flow rate deviates outside of acceptable limits. Its six decade batch counter includes dual presets, each with an independent output, for use in two-stage flow control. Front-panel START and STOP buttons coordinate the outputs in the command of pump control circuitry. A full complement of programmable features assure that the SFC40 can be easily calibrated and configured to specific application requirements.

- Replaces individual totalizer, rate indicator, and batch controller
- Two calibrators: rate indicator, and batch controller/totalizer
- Bright, easy-to-see red LED display with programmable decimal point
- Rugged industrial grade enclosure – NEMA-4 rated front panel
- Totalizer provides grand total of all flow – 7 decades capacity
- Rate indicator with high/low alarm outputs
- Batch controller with dual limits and outputs
- Front panel START/STOP buttons, plus remote START, STOP, INHIBIT, and RESETS
- RS-422/485 communications for computer, printer, or PLC data transfer
- Non-volatile memory of program, preset, and counted data

The SFC40 can be used with any flow meter, or calibrated pump, that is compatible with the substance to be measured, and which provides suitable signal levels. It may also be applied to a variety of other production applications that require totalization, rate monitoring, and control of batch or lot size.

**SPECIFICATIONS**

**Input Power:** 100 to 130 VAC or 200 to 260 VAC, 50/60 Hz, 20 VA max.

**Accessory Power:** 12 VDC  $\pm$ 5% @ 175 mA

**Rate Indicator:** Decades: 5; Accuracy: 0.01%; Update Time: 0.8 seconds; Calibrator: 5-decade, 0.0001 to 9.9999

**Totalizer:** Decades: 7; Calibrator: 5-decade, 0.0001 to 9.9999 shared with batch controller

**Batch Controller:** Decades: 6; Presets: 2, 6-decade

**Input Frequency:** 0 to 10 kHz (x1 logic); .1 to 10 kHz for rate

**Signal Input:** 3.5 to 15 volt squarewave @ 3.25 mA source

**Control Inputs:** Contact closure or 10 to 20 volt squarewave @ 2.5 mA sink

**Outputs:** Type: 4 solid state, current sink 100 mA max.; 28 VDC max.; 2 SPDT, 5 amp relays optional for batch controller; Operation: Batch controller is latch or momentary (0 to 99.99 seconds); Rate Alarms: Latch, momentary, follow

**Serial Communications:** RS-485/422

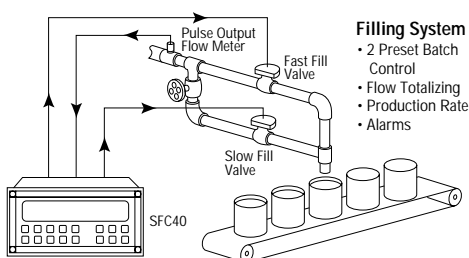
**Operating Temperature:** 32° to 122°F (0° to 50°C)

**Diagnostics:** User initiated tests of inputs, outputs, keyboard

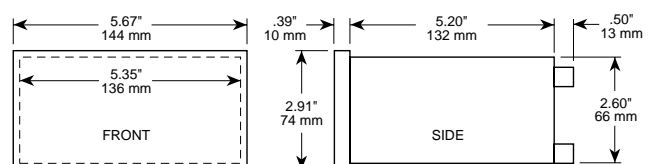
Model No.	Description
SFC400S00	SFC40 without relays; 115 or 240 VAC, selectable
SFC401S00	SFC40 with relays; 115 or 240 VAC, selectable

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

**Typical Applications:**



**Dimensions:**



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

7 MULTIFUNCTION PRODUCTS



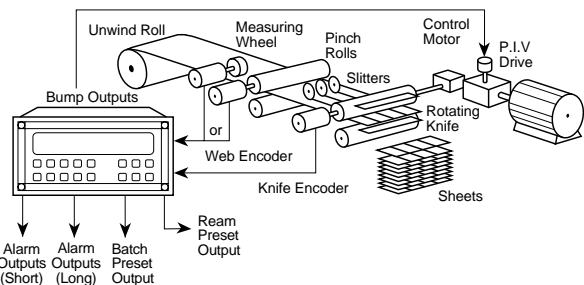
**Sheet length and ream control . . . for web processing applications**

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

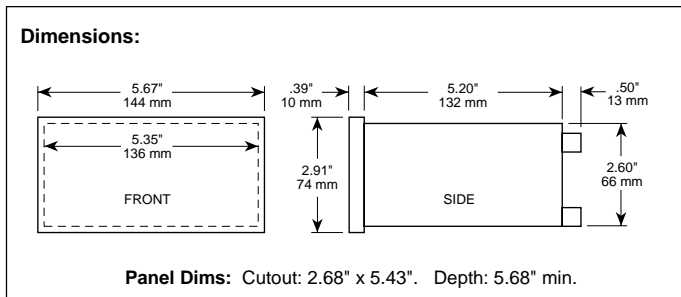
**Program Security:** System LOCK and programmable preset lock

**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



7 MULTIFUNCTION PRODUCTS

Sold by AA Electric 1-800-237-8274 Lakeland, FL • Lawrenceville, GA • Greensboro, NC • East Rutherford, NJ www.AAelectric.com



**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

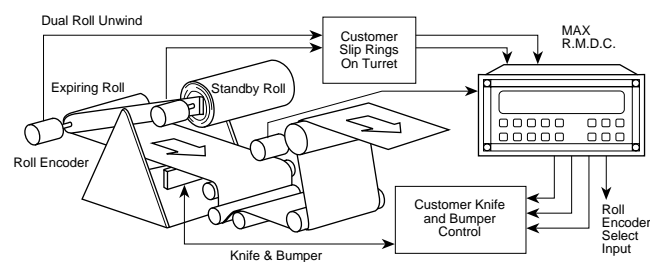
**Outputs:** 3 solid state, 100 mA sink, 28 VDC max.

**Serial Communications:** RS-422/485 differential, ASCII

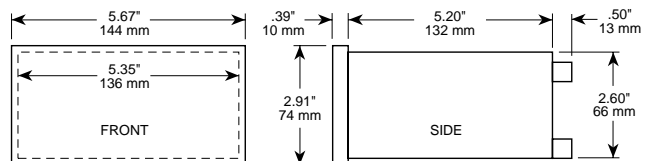
**Operating Temperature:** 32° to 122°F (0° to 50°C)

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.

7 PRODUCTS SUCCESSORS



**50 presets with programmable configuration and 16 control outputs . . . exceptional flexibility for drilling, punching, forming and many other applications**

High speed uni- and bidirectional counting, and 50 presets, make difficult application problems easy to solve, without shortcut or compromise. Series 7920, Programmable Multicontroller, will control complex operations with maximum reliability and accuracy. Its full numeric keypad and display prompting allows error-free entry of preset values. A nonvolatile memory stores all program data, and captures count values instantly at loss of AC power.

- 6 decade capacities counter and presets – speed to 10 kHz
- Nonvolatile memory protects program and counted data
- Bidirectional or unidirectional count input with calibration factor
- 50 presets and 16 outputs with programmable assignments
- Prewarn function signal at selected count before any preset
- Two preset processing modes: sequential; ascending
- Lockout function removes or reinstates presets within sequence
- Output logic includes LATCH and MOMENTARY-TIME
- Auxiliary DC power output of 12 volts, 500 mA – filtered and regulated
- Security lock restricts access to program content, and panel controls

Programmable input modes provide add/subtract, count/direction, and quadrature operation with X1, X2, X4 selectable count logic.

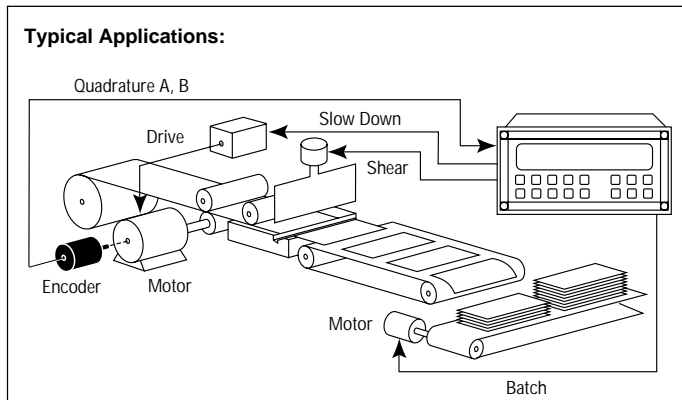
**For combined time & count programs, see Series 79201**  
**For production monitoring capabilities, see Series 7935**

**SPECIFICATIONS**

**Number of Decades:** Counter: 6 decades plus 6 decades each preset register; Batch Counter: 6 decades with preset

**Display:** 0.43" red LEDs; 6-digit count display and 2-digit level display

**Typical Applications:**



**Count Input:** Programmable for operation in unidirectional and bidirectional input modes; Maximum Count Speed: 10 kHz, 30 Hz typical when internal switch-contact bounce filter is used

**Preset Levels:** 50 levels standard; presets may be examined without disrupting counting/control process

**Lockout:** Any preset level may be deleted from the operating sequence by means of lockout; preset values for locked out levels retained in memory for subsequent return to sequence

**Prewarn Levels:** One level of common prewarn with equal effect on all active preset levels; individual prewarn levels, each affecting only its assigned preset level may be programmed

**Control Outputs:** 16 open collector NPN transistors, normally off; rated for 24 VDC and 150 milliamps maximum

**Control Output Timing:** Output(s) will actuate within 10 ms of preset coincidence; outputs may be programmed for hold-time of 0.1, 0.2, 0.5, 1, 2, 5, 10 or 20 seconds or for latch

**Panel Reset:** Reset to zero; preset level sequence is returned to level 01 or lowest level which is not in lockout condition; any latched outputs are released at reset

**Remote Reset:** Reset command may be initiated by remote contact closure, pulse or open collector NPN transistor

**Calibrator Factor:** Multiplication factor of 0.00001 to 10.0 may be applied for factoring count input signal

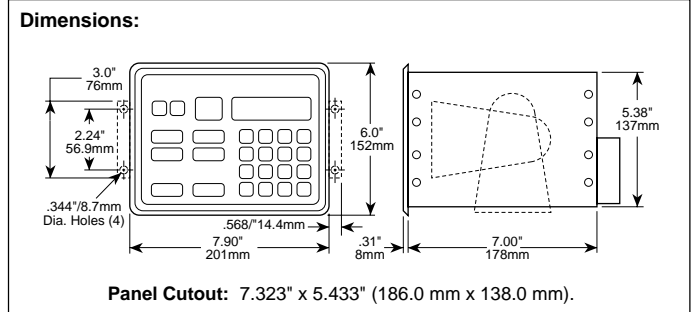
**Accessory Equipment Power Supply:** Regulated 12 VDC provided for operation of external sensor and relays; maximum current demand not to exceed 500 mA

**Power Requirement:** 105 to 120 VAC, 50/60 Hz, 25 watts

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

**Mounting:** Panel mount or secured bench mounting using hardware supplied; accommodates up to 0.25" (6.35 mm) panel

Model No.	Description
0792006-101	Programmable Multicontroller, 115 VAC





***A powerful multi-step sequential controller . . . manages complex positioning and processing tasks – by count or time***

The Production Programmer's extensive instruction set and flexible configuration easily adapts to many manufacturing and process industry applications. It stores up to 50 sequential preset count and/or timing steps which control as many as 16 external circuits. In addition, a number of unique operating sequences can be maintained in its program "library", ready to be effortlessly called to action by a few quick keystrokes. This feature can save hours of set-up and reprogramming, as required with other multi-step controllers.

- Counting steps have 6 decade capacities
- Nonvolatile memory protects program and counted data
- Bidirectional or unidirectional count input with calibration factor
- Timing steps duration from 0000.01 second, to 9999.99 minutes
- 16 outputs with programmable assignment to any step
- Output logic includes LATCH, TOGGLE, or MOMENTARY
- Instruction set includes repeat loops, and nested loops
- Program "library" allows flexible assignment of steps per program
- Auxiliary DC power output of 12 volts, 500 mA – filtered and regulated
- Security lock restricts access to program content, and panel controls

Many applications using mechanical cam-timers, or limit switch sensing of position, are plagued with slow, tedious setup. The Series 79201 can replace these devices and provide fast, easy programmable adjustment of process variables.

**For production monitor features, see Series 7935, SFC40**  
**For related products, see Series 7920, MAX Count 6**

**SPECIFICATIONS**

**Display:** 0.43" high red LEDs; 6-digit data display and 2-digit identification display are used in conjunction with keyboard for all operating and programming functions

**Counting Functions:** Preset: Program steps assigned as presets compare the content of the 79201's 6-decade counting register with the step's entered operating value; when count becomes equal to or greater than the operating value, the step's output function will be performed and

program progresses to next step; instruction codes provide the flexibility for automatic reset or non-reset of the counting register at completion of step; Prewarn: Provides an early-warning output prior to any individual preset step's output

**Count Input:** Programmable via internal switches for operation in unidirectional input modes; Maximum Count Speed: 10 kHz, 40 Hz typical when internal switch-contact bounce filter is used; Prescaling Factor: Multiplication factor of 0.00024 to 10.00000 may be applied for calibrating or correcting count input signal

**Timing Functions:** Program steps assigned as timers provide an output during timing duration (interval) or after timing duration (delay)

**Timer Resolution:** Each step is individually programmable for resolution of XXXX.XX seconds or XXXX.XX minutes

**Output Channels:** 16 open collector NPN transistors, normally OFF; rated for 24 VDC and 150 mA maximum

**Output Functions:** Latch: Output turns ON until unlatch or toggle instruction is provided by subsequent program step; Unlatch: Turns ON-output OFF; Toggle: Reverses state of output, turns ON-output OFF, OFF-output ON; Momentary (Hold Times): At completion of program step, output turns ON and times for momentary duration; Output Cycle Time: Output(s) will initiate assigned function within 1 ms of program step completion

**Security:** Provides protection against unauthorized access to program storage and operating controls

**Accessory Equipment Power Supply:** Regulated 12 VDC provided for operation of external sensor and relays; maximum current demand not to exceed 500 mA

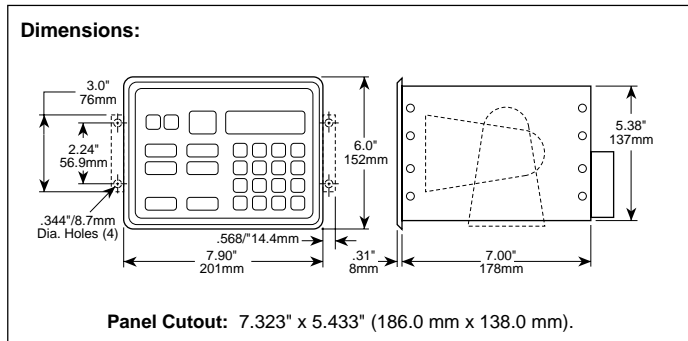
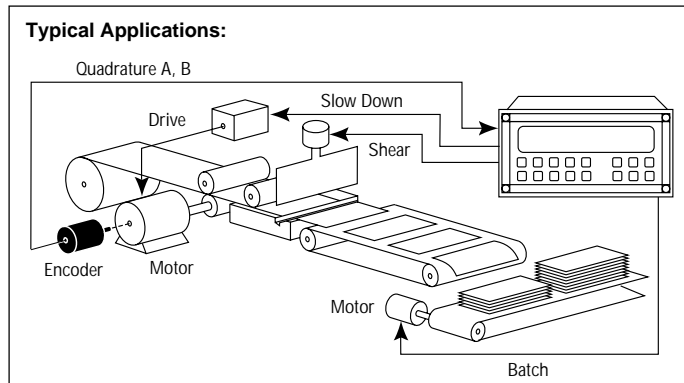
**Electrical Connection:** Power line via captive 3-wire line cord, 6 feet; input/output and command interface via two 25-pin bulkhead connectors on rear panel; mating connectors provided

**Power Requirements:** 115 VAC ±10%, 50/60 Hz, 25 watts

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

**Weight:** 7 lbs (3.18 kg)

Model No.	Description
0792016-001	Production Programmer, 115 VAC



7 PRODUCTS

Sold by AA Electric 1-800-237-8274 Lakeland, FL • Lawrenceville, GA • Greensboro, NC • East Rutherford, NJ www.AAelectric.com



**A complete production information center . . . totals, speeds, ratio, downtime by reason, efficiency and more – plus RS-422 data communications**

The factors affecting production yields and efficiency require constant analysis in order to maintain quality standards. Series 7935 Production Data Control gives factory and management personnel instant access to vital information needed to make necessary evaluations and corrections. Production totals, downtime (or uptime), percentage efficiency, plus a full history of stop-reasons including total events and time lost, are collected for each work shift – up to five shifts.

- Increases manufacturing yields and quality by identifying stop reasons
- Five shift segregation of important production information
- Brilliant 0.56" (14.2 mm) red LED display
- Compact – panel mount, NEMA-4 rated front panel
- Accurate production count with preset, prevents overrun and underrun
- Records production totals, downtime, efficiency, and stops
- Monitors speed by RPM, length or parts per minute, or other unit
- Provides alarm outputs at high/low speed limits or ratio deviation
- Predetermining counter for controlling batch or lot size
- RS-422 communications permits centralized reporting by computer

Additional features include a 2-preset counter for controlling production batch or lot size, dual rate/ratio indicators with preset alarms, and a total running hour meter. Up to 100 units may be networked to a PC or other computer via its RS-422 data interface. The computer can generate reports by exception, grouping, statistic, or other programmable conditions.

**For specialized flow measurement and control, see SFC40**  
**For sheet-length and ream control/monitor, see MAX S.L.R.C.**

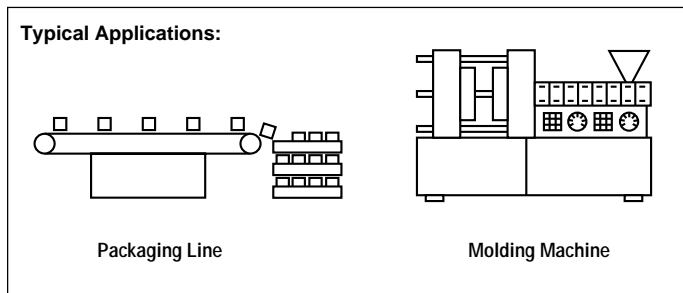
**SPECIFICATIONS**

- Display:** Red, 0.56" high (14.2 mm) LED, 6 data digits, 2 identification digits; programmable decimal point position.
- Front Panel:** Membrane laminate, moisture- and dust-tight when panel mounted with gasket, tactile response keys
- Input Power:** Selectable 115/230 VAC, ± 10%; 50/60 Hz; 20 watts, maximum
- Transducer Power:** Output of 12 VDC regulated ±5%, 120 mA, maximum
- Shift Functions:** Acquired for 5 work shifts; production count, downtime (or uptime), efficiency, fault data
- Machine Functions:** Rate-1, Rate-2, Ratio, Running Hours, Preset Counter
- Memory:** Nonvolatile, retains all program and data during absence of power
- Security:** Multiple level, programmable digital code security-locks
- Signal Inputs:** 2 inputs, NPN transistor; 1 kHz, 500 µsec. min. pulse width; programmable filter for switch-contact: 25 Hz, 20 msec. min. pulse width  
*Primary Input:* Signal for shift total, running total, preset counter, rate-1, and ratio features  
*Secondary Input:* Signal for rate-2 and ratio features
- Calibrator:** 6 independent scalars provided for counted data, rate, and ratio
- Command Inputs:** Run/stop, remote reset, remote shift change, selectable direction or stop count; NPN transistor or switch contact, 50 msec. min. pulse width
- Fault Reason Inputs:** 7 inputs for external sensors (or switches) that signal fault or other unusual process condition
- Preset Counter Outputs:** 2 form-c relays rated 115/230 VAC, 5 amp noninductive, 2 NPN transistors rated 30 VDC, 100 mA
- Rate Alarm Outputs:** 2 NPN transistors rated 30 VDC, 100 mA
- Serial Interface:** RS-422, ASCII, programmable baud rate
- Operating Temperature:** 32° to 131°F (0° to 55°C)
- Weight:** 3.25 lbs. (1.47 kg.)

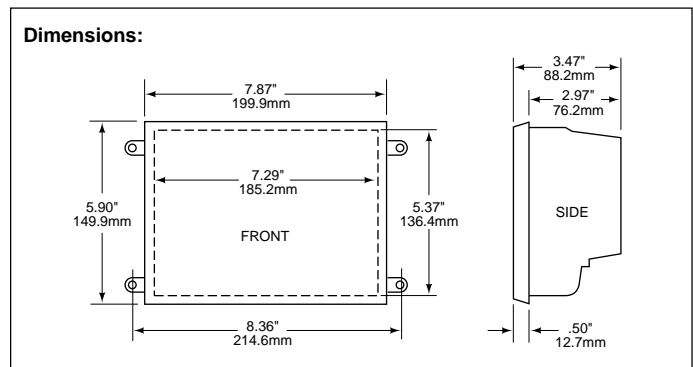
7 MULTIFUNCTION PRODUCTS

Sold by AA Electric 1-800-237-8274 Lakeland, FL • Lawrenceville, GA • Greensboro, NC • East Rutherford, NJ www.AAelectric.com

**Typical Applications:**



Model No.	Description
0793506-260	Series 7935 with RS-422 interface



Over thirty years experience in electronics and motion control applications to provide the widest selection of Dynapar brand products for the industrial drive control market. These products bring unprecedented ease of use, increased flexibility and better performance into the mainstream of industrial control. A full line of Dynapar brand encoders and accessories complement the electronic controllers and allow one stop shopping for complete motion control solutions.

## MOTION CONTROL FUNCTIONS

**Closed loop speed controls** use an electronic controller and a feedback device which is coupled to the system. By knowing the desired speed and measuring the actual speed, the controller can make adjustments continuously to provide better accuracy, load regulation and isolation from power line disturbances.

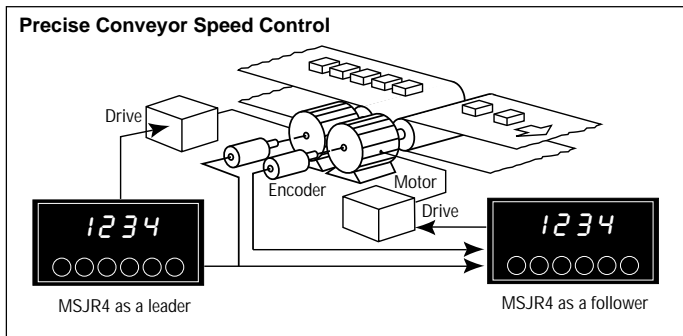
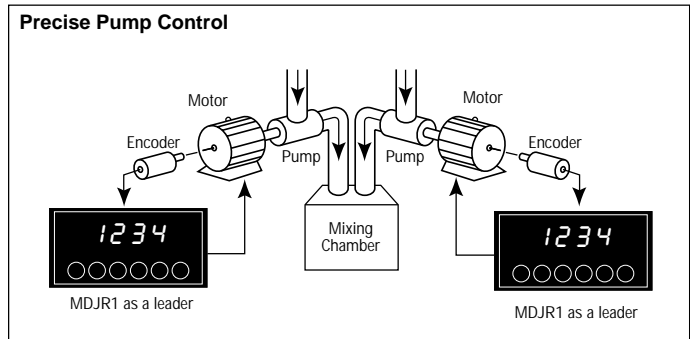
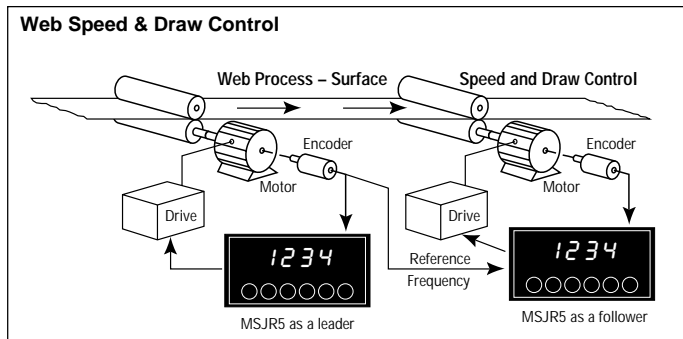
**Master speed controls** regulate a single motor or drive using an operator adjustable setpoint. The speed is usually entered numerically with a keyboard and display; some products also include a means of remote adjustment. Other functions may include the ability to start and stop at preprogrammed rates for smooth acceleration and deceleration. Applications that are ideal for closed loop speed control, such as extrusions pumps, are typical of processes that depend upon speed to maintain quality.

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




## SPECIFYING A MOTION CONTROLLER

In choosing a master speed control, the primary consideration is given to the accuracy needed. This is usually a price/performance issue, with higher accuracy control costing more. Accuracies can range from 0.1% to 0.01%. Better performance will also enter into the feedback device selection, the drive/motor combination and even the mechanical design of the machinery. How the operator sets the speed is another requirement; it may be a keyboard entry, a knob adjustment, pushbuttons or a combination of these. The simplest products offer a single setpoint and method of adjustment while more complex products have multiple setpoints or means of adjustment. Added functionality such as ramping and open loop operation may be important.

For speed followers accuracy is also a factor in system performance. If the follower is at least as accurate as the signal it is following, performance will not be compromised. Our motion control products include features which make them very easy to setup and operate. Setpoints can be programmed in meaningful units such as length or a percentage of the master rate. Calibration for speed readout and ramp control are typical of the attention paid to user interface details.



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	
<p><b>Page Number:</b> The ★ symbol denotes our "Star Products" which we recommend be given first consideration. They offer maximum functionality, performance, and value.</p> <p><b>Description and Features:</b></p> <p>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.</p>	<p>Page: 8.02, 8.03 ★</p>  <ul style="list-style-type: none"> <li>■ Cost efficient solution for applications that can benefit from closed loop PID speed control such as material handling conveyors, extruders, mixing pumps, etc.</li> <li>■ Programmable to be a stand-alone controller or as a follower to coordinate with the speed or another motor</li> <li>■ MSJR5 provides analog trim input for automated dancer control</li> </ul>	<p>Page: 8.04 ★</p>  <ul style="list-style-type: none"> <li>■ Digital front end PID control with built in DC drive simplifies wiring and installation</li> <li>■ Chose MDJR1 for for 90 or 180 VDC fractional horsepower motors</li> </ul>	<p>Page: 8.05 ★</p>  <ul style="list-style-type: none"> <li>■ Digital front end PID control with built in DC drive simplifies wiring and installation</li> <li>■ Chose MDJR2 for 90 or 180 VDC motors up to 2 HP</li> </ul>	
<b>Dimensions</b>	48mm x 96mm	48mm x 96mm	96mm x 96mm	
<b>Display Type</b>	LED	LED	LED	
<b>Number of Digits</b>	5	5	5	
<b>Power Supply</b>	85 - 265 VAC	85 - 265 VAC	85 - 265 VAC	
<b>Control Outputs</b>	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	
<b>Alarm Outputs</b>	2 NPN transistors	2 NPN transistors	2 NPN transistors	
<b>Signal Input Type</b>	Sinking, Sourcing, Magnetic	Sinking, Sourcing, Magnetic	Sinking, Sourcing, Magnetic	
<b>Control Inputs</b>	Auto/Manual, Trim Reset/ Jog, Ramp Hold	Auto/Manual, Trim Reset/ Jog, Ramp Hold	Auto/Manual, Trim Reset/ Jog, Ramp Hold	
<b>Max Frequency</b>	20 kHz	20 kHz	20 kHz	
<b>Sensor Power Supply</b>	Selectable 5 or 12 VDC	Selectable 5 or 12 VDC	Selectable 5 or 12 VDC	
<b>Front Panel Rating</b>	NEMA 4	NEMA 4	NEMA 4	



*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.

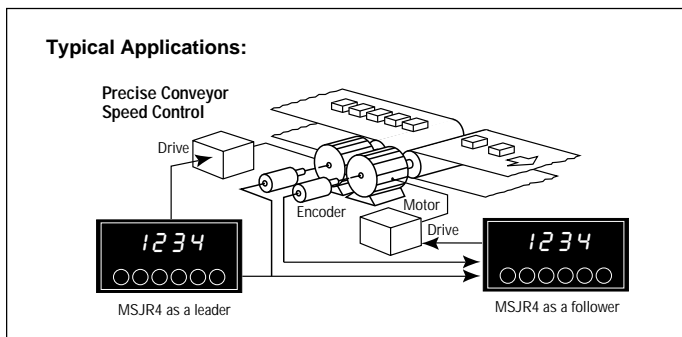
Inherent in the MSJR4 is a large, LED display of actual process time or speed, which can be scaled into meaningful units (feet per minute, gallons per second, or RPM) for operator ease in monitoring and setting the desired speed.

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.

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



## SPECIFICATIONS

**Input Power:** universal, 85 to 265 VAC, 50-60 Hz, 18 VA

**Sensor Power:** selectable, 5 or 12 VDC  $\pm$  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 setpoint

**Security:** 3 levels: Program (Disable/Enable); Setup (Off/On) and Setpoint Adjustment (Incremental/Digit by Digit/Both/None)

**Signal Inputs:** Feedback and Reference: squarewave (pulse) or sinewave (magnetic), 20 kHz max each

**Control Inputs:** Auto/Manual; Trim Reset/Jog; Ramp Hold

**Analog Output:** 0 to 10 VDC at 5 mA max using internal reference; or 0 to external Reference voltage, 15 VDC max

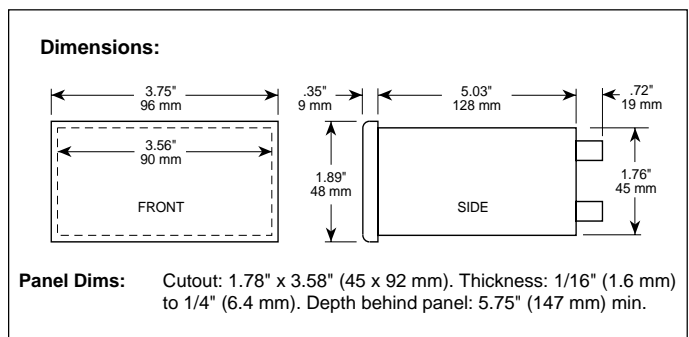
**Alarm Outputs:** open collector, 100 mA max. sink, 28 VDC max

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

**Loop Time:** 16 milliseconds

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

Model No.	Description
MSJR4U00	Digital Speed Controller





***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  $\pm$  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 setpoint

**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

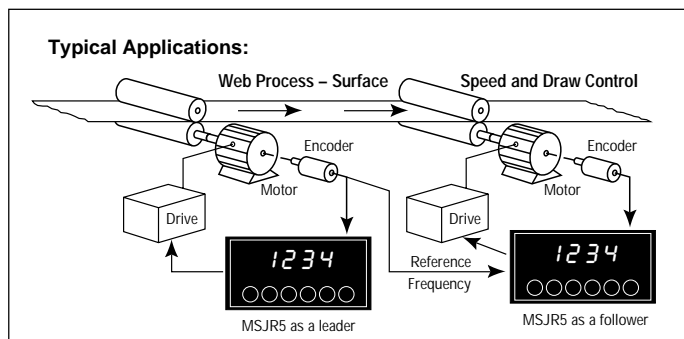
**Alarm Outputs:** open collector, 100 mA max. sink, 28 VDC max

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

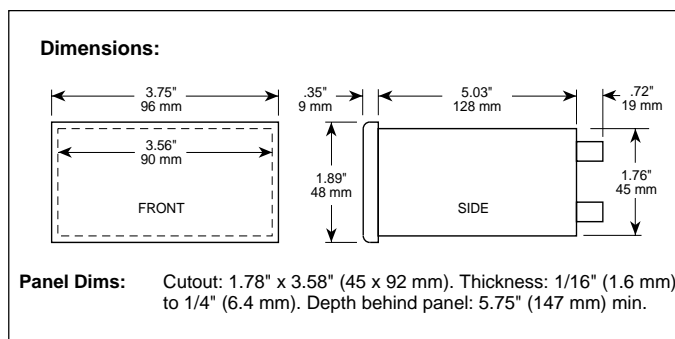
**Loop Time:** 16 milliseconds

**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





*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.

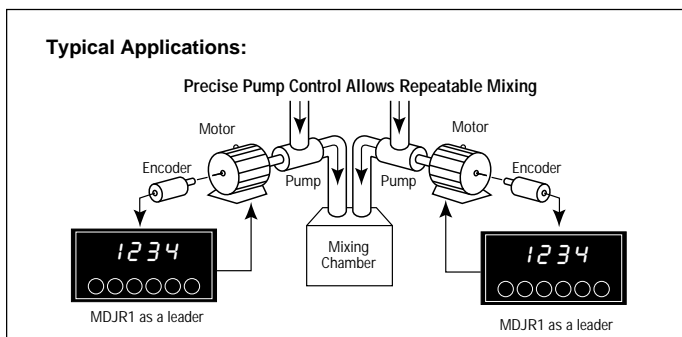
The MDJR1 has a large, LED display. Actual process time or speed can be scaled into meaningful units (feet per minute, gallons per second, or RPM) for operator ease in monitoring and setting the desired speed.

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 setpoint

**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

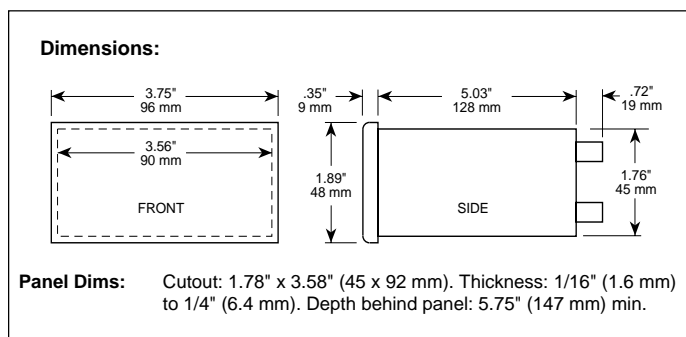
**Alarm Outputs:** open collector, 100 mA max. sink, 28 VDC max

**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





***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.

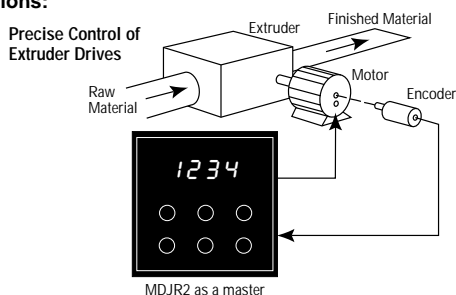
General features include:

- 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**

**Typical Applications:**



**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  $\pm$  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 setpoint

**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

