

# 800<sup>Plus</sup>

# SMART

# YOKOGAWA

# UNIVERSAL DIGITAL METER & COUNTER

# Meter technology



## UNIVERSAL DIGITAL METER

- DC Volts and Amps
- AC RMS Volts and Amps
- Thermocouples and RTDs
- Process Signals
- Strain Gauge and Load Cell

## UNIVERSAL DIGITAL COUNTER

- Frequency and Period
- Rate and Total
- Integration and Square Root
- Quadrature and more

Indicator, data interface or control • Precision panel instrumentation with analog, digital and pulse inputs

# Selector Guide



### PLUG-IN OPTIONS

- Universal Power Supplies
- Analog Outputs 0-20 mADC and 0-10 VDC
- Digital Interface: RS-232, RS-485, BCD
- Dual Setpoint Controller

# 800<sup>Plus</sup>

## UNIVERSAL DIGITAL METERS & COUNTERS

Model Type:	800 <sup>Plus</sup> Universal Digital Meter							800 <sup>Plus</sup> Universal Counter		
Selector guide and price:	page 3	page 4	page 5		page 6		page 7			
Specifications	DC Volt & Amp	AC Volt & Amp	RTD Temperature	Thermocouple	Process Monitor	Strain Gauge	Load Cell	FR Counter/Timer	VF Counter/Timer	QD Quadrature Input
<b>Display:</b> Number of digits Range LED indicators Color	7-segment LED, 14.2mm, .56" high digits 5 digits -99999 to +99999 2 status indicators <i>Red or Green available with all models</i>							6 digits -999999 to +999999 3 status indicators		
<b>Accuracy (25°C):</b> Full scale or reading ± number of counts Span TEMPCO Zero TEMPCO	0.01%FS 1	0.1%FS 1	ANSI 0.04°C	TC type K 0.1°C	0.01%FS 1	0.01%FS 1	0.01%FS 1	±2ppm	0.015%	±2ppm
<b>Conversion:</b> Update rate Output update rate (UDM) Display update rate (UDM)	Patented A/D conversion method (US patent no. 5,262,780) 60/sec. @ 60Hz operation; 50/sec. @ 50 Hz operation 56/sec. @ 60Hz operation; 47/sec. @ 50 Hz operation 3.5/sec. @ 60Hz operation; 3/sec. @ 50Hz operation							1 / period time: Gate time + 30ms + 2 periods of the input signal (max): gate time selectable 0 to 199.99 seconds		
<b>Noise rejection:</b> CMR (DC to 60 Hz) NMR (50/60 Hz line) <b>Case:</b> <b>Environmental:</b>	Common Mode voltage from DC to 60 Hz safety rated to 250 VAC; 4.2 kVp per high voltage test 130 dB 90 dB with minimum filtering NEMA 4 (IP65) 1/8 DIN case made of high impact 94V-0 UL rated plastic Temperature: <i>Operating</i> 0°C~55°C, <i>Storage</i> -40°C~85°C; Relative humidity 95% at 40°C non-condensing									
<b>Operating Power:</b> Standard Option	Frequency 47 to 440 HZ and DC, consumption 5.3 Watts maximum Universal power supply 85 to 264 VAC, 90 to 370 VDC Universal power supply 8 to 28 VAC, 9 to 37 VDC									
<b>Excitation:</b> Outputs Isolation (power ground)	Selectable with shorting jumpers on power supply printed circuit board (normal setting 10 VDC) 5 VDC, ±5%, 100 mA max., 10 VDC, ±5%, 120 mA max., 24 VDC, ±5%, 50 mA max. Safety rated to 250 VAC, 4.2 kV peak per high voltage test									
<b>Dual Controller option:</b> Setup Output operation Filtering Time delay Lockouts Alarm status indicators	Power is provided by meter, update rate is 56 / second at 60 Hz, 47 / second at 50 Hz Setpoint values may be entered from front panel pushbutton or via RS-232 or RS-485 Either may be set to operate above or below setpoint, latching or non-latching, or output disabled Comparison to the setpoints may be from filtered or unfiltered input signal Selectable time delay of output status change from 1 to 128 readings Pushbutton control of display and change of setpoints, or display of setpoints, or disable Either of two red LED's may be set to indicate when output is on or off, or they may be disabled									
<b>Relay output:</b> Isolation Response to input signal	10 A at 240 VAC, 8 A at 24 VDC contact rating; safety certification: VDE, UL, CSA <i>Coil to contacts</i> :Safety rated to 250VAC, 4.2 kV peak; <i>Between open contacts</i> : Withstand 1 kVrms <i>Pick-up</i> : 26 milliseconds typical; <i>Release</i> : 22 milliseconds typical									
<b>Optotransistor output:</b> Isolation Response to input signal	Voltage rating: 30VDC; Current rating: 100 mA minimum at 1.2 VDC maximum Safety rated to 250 VAC, 4.2 kV peak per high voltage test 17 milliseconds typical									
<b>Analog output option:</b> Accuracy Response time	Power : provided by meter, Isolation: Withstand 3750 Vrms, 8mm creepage Use basic meter accuracy ±0.05% of analog output full scale 17 milliseconds for unfiltered input, same as basic meter for filtered output									
<b>RS-232 / RS-485 option:</b> Baud rates Type / Signal levels	Power : provided by meter; Isolation: safety rated to 250 VAC, 4.2 kVp per high voltage test 300, 600, 1200, 2400, 9600, 19200 Full duplex (RS-485) / meets RS-232 and RS-485 standards									
<b>BCD output option:</b> Type / Signal levels Controls	Power : provided by meter; Isolation: safety rated to 250 VAC, 4.2 kVp per high voltage test Tri-state, stored parallel / LSTTL, CMOS compatible BCD Enable, Hold, Data ready									



# DC VOLTS and AMPS

# Selector Guide

Model Format:



Insert model code from the selection below:

- 1 Basic DPM, display & power supply:**
- 810** Green LED display, 85~264 VAC, 90~370 VDC .....
  - 811** Green LED display, 8~28 VAC, 9~37 VDC .....
  - 820** Red LED display, 85~264 VAC, 90~370 VDC .....
  - 821** Red LED display, 8~28 VAC, 9~37 VDC .....

- 2 Output options:**
- 00** None .....
  - 01** Adjustable analog output range of 0-20 mA and 0-10 V .....
  - 10** Dual Form C, 10 Amp relays .....
  - 11** Dual Form C, 10 Amp relays & analog output 0-20 mA and 0-10 V .....
  - 20** Opto-Isolated open collectors .....
  - 21** Opto-Isolated open collectors & analog output 0-20 mA and 0-10 V.....

- 3 Digital interface options:**
- 0** None .....
  - 1** RS-232 .....
  - 2** RS-485 .....
  - 3** BCD .....

- 4 Input range options:**
- DCV1** 200.00 mVDC .....
  - DCV2** 2.0000 VDC .....
  - DCV3** 20.000 VDC .....
  - DCV4** 200.00 VDC .....
  - DCV5** 660.0 VDC .....
  - DCA1** 2.000 mADC .....
  - DCA2** 20.000 mADC .....
  - DCA3** 200.00 mADC .....
  - DCA4** 5.000 ADC .....

**Ordering Example:** Model 821-00-0-DCV3 has red LED display with 8~28 VAC, 9~37 VDC power and 20.000 VDC input range.

The 800<sup>Plus</sup> Universal Digital Meter is a versatile, cost effective solution to a wide variety of monitoring and control applications. The input can be changed by the user to any of the DC voltage and current values listed above by re-locating shorting jumpers on the plug-in signal conditioner card. No calibration equipment is required when changing ranges since they are digitally precalibrated at the factory. Rescaling is accomplished via front panel pushbuttons. Optional alarms and outputs are also front panel programmable.

Refer to product bulletin 800SP-A for complete specifications and description of all features.

# 800<sup>Plus</sup>

## UNIVERSAL DIGITAL METER

### RMS VOLTS and AMPS

### Selector Guide

Model Format:



Insert model code from the selection below:

**1 Basic DPM, display & power supply:**

- 810** Green LED display, 85~264 VAC, 90~370 VDC.....
- 811** Green LED display, 8~28 VAC, 9~37 VDC.....
- 820** Red LED display, 85~264 VAC, 90~370 VDC.....
- 821** Red LED display, 8~28 VAC, 9~37 VDC.....

**2 Output options:**

- 00** None.....
- 01** Adjustable analog output range of 0-20 mA and 0-10 V.....
- 10** Dual Form C, 10 Amp relays.....
- 11** Dual Form C, 10 Amp relays & analog output 0-20 mA and 0-10 V.....
- 20** Opto-Isolated open collectors.....
- 21** Opto-Isolated open collectors & analog output 0-20 mA and 0-10 V.....

**3 Digital interface options:**

- 0** None.....
- 1** RS-232.....
- 2** RS-485.....
- 3** BCD.....

**4 AC input:**

- RMV1** 200.00 mVAC.....
- RMV2** 2.0000 VAC.....
- RMV3** 20.000 VAC.....
- RMV4** 200.00 VAC.....
- RMV5** 660.0 VAC.....
- RMA1** 2.000 mAAC.....
- RMA2** 20.000 mAAC.....
- RMA3** 200.00 mADC.....
- RMA4** 5.000 AAC.....

**Ordering Example:**

Model 821-10-1-RMV5 has red LED display with 8~28 VAC, 9~37 VDC power, dual 10A relay outputs, RS-232 digital interface and 660.0 VAC input range.

The 800<sup>Plus</sup> Universal Digital Meter is a versatile, cost effective solution to a wide variety of monitoring and control applications. The input can be changed by the user to any of the RMS voltage or current values listed above by re-locating shorting jumpers on the plug-in signal conditioner card. No calibration equipment is required when changing ranges since they are digitally precalibrated at the factory. Rescaling is accomplished via front panel pushbuttons. Optional alarms and outputs are also front panel programmable.

Refer to product bulletin 800SP-A for complete specifications and description of all features.

# YOKOGAWA



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FAX 781.665.0780 - TestEquipmentDepot.com



## RTD and THERMOCOUPLE

## Selector Guide

Model Format:



Insert model code from the selection below:

**1 Basic DPM, display & power supply:**

- 810** Green LED display, 85~264 VAC, 90~370 VDC.....
- 811** Green LED display, 8~28 VAC, 9~37 VDC.....
- 820** Red LED display, 85~264 VAC, 90~370 VDC.....
- 821** Red LED display, 8~28 VAC, 9~37 VDC.....

**2 Output options:**

- 00** None.....
- 01** Adjustable analog output range of 0-20 mA and 0-10 V.....
- 10** Dual Form C, 10 Amp relays.....
- 11** Dual Form C, 10 Amp relays & analog output 0-20 mA and 0-10 V.....
- 20** Opto-Isolated open collectors.....
- 21** Opto-Isolated open collectors & analog output 0-20 mA and 0-10 V.....

**3 Digital interface options:**

- 0** None.....
- 1** RS-232.....
- 2** RS-485.....
- 3** BCD.....

**4 Temperature Type:**

- P385C** Pt100 Ohm RTD DIN -202 to 850°C.....
- P385F** Pt100 Ohm RTD DIN -331 to 1562°F.....
- P392C** Pt100 Ohm RTD ANSI -202 to 850°C.....
- P392F** Pt100 Ohm RTD ANSI -331 to 1562°F.....
- JC** J Thermocouple -210 to 760°C.....
- JF** J Thermocouple -347 to 1400°F.....
- KC** K Thermocouple -244 to 1372°C.....
- KF** K Thermocouple -408 to 2501°F.....
- TC** T Thermocouple -257 to 400°C.....
- TF** T Thermocouple -430 to 752°F.....
- EC** E Thermocouple -240 to 1000°C.....
- EF** E Thermocouple -400 to 1830°F.....
- SC** S Thermocouple -46 to 1768°C.....
- SF** S Thermocouple -51 to 3213°F.....
- RC** R Thermocouple -45 to 1768°C.....
- RF** R Thermocouple -49 to 3214°F.....

**Ordering Example:** Model 820-00-2-P392F has red LED display with 85~264 VAC, 90~370 VDC power, RS-485 digital interface and ANSI Pt100 Ohm RTD input range of -331 to 1562°F

The 800<sup>Plus</sup> Universal Digital Meter inputs can be changed by the user to any of the RTD or thermocouple values listed above by re-locating shorting jumpers on the plug-in signal conditioner card. No calibration equipment is required. Refer to product bulletin 800SP-A for complete specifications and description of all features.

# 800<sup>Plus</sup>

## UNIVERSAL DIGITAL METER

### PROCESS INPUTS, LOAD CELL, STRAIN GAUGE Selector Guide

Model Format:



Insert model code from the selection below:

#### 1 Basic DPM, display & power supply:

810	Green LED display, 85~264 VAC, 90~370 VDC .....
811	Green LED display, 8~28 VAC, 9~37 VDC .....
820	Red LED display, 85~264 VAC, 90~370 VDC .....
821	Red LED display, 8~28 VAC, 9~37 VDC .....

#### 2 Output options:

00	None .....
01	Adjustable analog output range of 0-20 mA and 0-10 V .....
10	Dual Form C, 10 Amp relays .....
11	Dual Form C, 10 Amp relays & analog output 0-20 mA and 0-10 V .....
20	Opto-Isolated open collectors .....
21	Opto-Isolated open collectors & analog output 0-20 mA and 0-10 V .....

#### 3 Digital interface options:

0	None .....
1	RS-232 .....
2	RS-485 .....
3	BCD .....

#### 4 Signal Input:

P	Process monitor 4-20 mA DC = 0-10000 on display ...
P1	Process monitor with custom scaling (specify input/display
SG	Strain gauge (4 wire ratio) 0 to 200 mV = 0 to 20000 .
SG1	Strain gauge w/custom scaling (specify inputs/display rdgs)
WM1	Load cells (6 wire ratio) specify inputs/display rdgs/excitation

#### Ordering Example:

Model 811-10-1-P1 has green LED display with 8~28 VAC, 9~37 VDC power, dual 10 A relay outputs, RS-232 digital interface and customer specified input range of 4-20 mA DC = 0 to 1600.0 on display

The 800<sup>Plus</sup> Universal Digital Meter is a versatile, cost effective solution to a wide variety of monitoring and control applications. The input can be changed by the user to other values *within* each signal input category above by re-locating shorting jumpers on the plug-in signal conditioner card. No calibration equipment is required when changing ranges since they are digitally precalibrated at the factory. Rescaling is accomplished via front panel pushbuttons. Optional alarms and outputs are also front panel programmable.

Refer to product bulletin 800SP-A for complete specifications and description of all features.

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# UNIVERSAL DIGITAL COUNTER



## FREQUENCY, RATE, TOTAL, TIMER

## Selector Guide

Model Format:



Insert model code from the selection below:

**1 Counter, display & power supply:**

- 850** Basic counter, green LED display, 85~264 VAC, 90~370 VDC .....
- 851** Basic counter, green LED display, 8~28 VAC, 9~37 VDC .....
- 860** Basic counter, red LED display, 85~264 VAC, 90~370 VDC .....
- 861** Basic counter, red LED display, 8~28 VAC, 9~37 VDC .....
- 870** Extended counter, green LED display, 85~264 VAC, 90~370 VDC .....
- 871** Extended counter, green LED display, 8~28 VAC, 9~37 VDC .....
- 880** Extended counter, red LED display, 85~264 VAC, 90~370 VDC .....
- 881** Extended counter, red LED display, 8~28 VAC, 9~37 VDC .....

**2 Output options:**

- 00** None .....
- 01** Adjustable analog output range of 0-20 mA and 0-10 V .....
- 10** Dual Form C, 10 Amp relays .....
- 11** Dual Form C, 10 Amp relays & analog output 0-20 mA and 0-10 V .....
- 20** Opto-Isolated open collectors .....
- 21** Opto-Isolated open collectors & analog output 0-20 mA and 0-10 V .....

**3 Digital interface options:**

- 0** None .....
- 1** RS-232 .....
- 2** RS-485 .....
- 3** BCD .....

**4 Counter inputs:**

- FR** AC, pulses from transistors, contact closures, magn. pickup
- VF1** Analog to frequency converter (4-20 mA) .....
- VF2** Analog to frequency converter (0-1 mA) .....
- VF3** Analog to frequency converter (0-10 V) .....
- VF4** Analog to frequency converter (special range-contact factory)
- QD** Differential or single-ended inputs from quadrature encoders

**Ordering**

**Example:**

Model 861-20-0-FR has red LED display with 8~28 VAC, 9~37 VDC power, open collector output and dual channel counter/timer function.

Basic Counter	Type	Extended Counter
Frequency, rate, total (up or down), period (2 channels simultaneously), time interval A to B, square root of rate.	<b>FR</b>	Basic counter plus rate & total simultaneously, linearize non-linear inputs, ratio, draw, arithmetic function(A * B, A / B, A + B, A - B), phase angle, stop watch, up/down counting, batch counting.
Rate, square root of rate (differential pressure or target-type flow meters).	<b>VF</b>	Basic counter plus rate and total simultaneously, linearize non-linear inputs, batch counting, 1 / rate (time).
Position or length from encoders. Accepts differential or single-ended inputs. 1x, 2x, or 4x inputs. Z channel inputs.	<b>QD</b>	Extended counter not required for QD applications

Note: Refer to product bulletin 800SP-A for complete details and specifications.

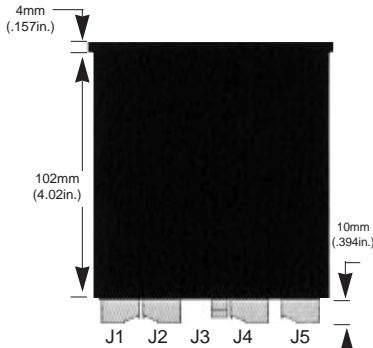


## Panel Mounting and Cutout

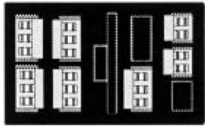
Ensure the O-ring is in place. Turn the two mounting screws counterclockwise until the space between the mounting pawl and the bezel is greater than the panel thickness. Insert the meter in the panel cutout. Turn the mounting screws clockwise until the meter is securely mounted in the panel. Do not overtighten the mounting screws.



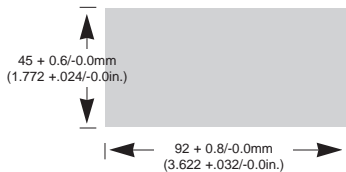
FRONT VIEW



TOP VIEW



REAR VIEW



PANEL CUTOUT



Mounting Pawl

# 800<sup>Plus</sup> SMART Meter technology

## UNIVERSAL DIGITAL METER & COUNTER

### Front Panel Setup Keys

#### MENU KEY

The menu key steps through the various meter parameters that may be selected. These menu items may be "locked out" from front panel selection by software and hardware.

#### PEAK DISPLAY KEY (DIGIT SELECT)

In the Operating Mode, pressing the Peak Display Key causes the peak value of the input signal to be displayed. Pressing the key again returns the display to the present value. In Menu Mode, the Digit Select Key (Peak Display Key) is used to select input type and decimal point or to select one of the five display digits for programming. In the main menu, pressing the Digit Select Key causes the value or code that is stored for that menu item to be displayed and the left hand digit flashes. Each time the key is pressed, the next digit to the right will flash. The value of the flashing digit may be changed using the Value Select Key. In the Alarm Mode, pressing the Digit Select Key causes the most significant digit of the displayed setpoint value to flash. Digits are then selected the same as in the Menu Mode.



#### RESET KEY (VALUE SELECT)

In the Operating Mode, holding the Reset Key depressed and pressing any other key causes a reset to occur. The Menu Key resets all meter functions, the Alarm Key resets any alarm conditions and the Peak Display Key resets the peak value to present value. In the Menu Mode or Alarm Mode, the Value Select Key (Reset Key) sets the value of the flashing digit. Each time the key is pressed, the value increases by one. Holding the key down causes the digit to automatically step through the numbers.

#### ALARM KEY (REVERSE MENU)

In the Operating Mode, pressing the Alarm Key displays the setpoint of Alarm 1 and then Alarm 2. These values may be changed using the Digit Select Key and the Value Select Key. In the Menu Mode, pressing the Alarm Key steps the display backward through the menu.

#### Connectors

The 800<sup>Plus</sup> Universal Digital Meter uses UL/VDE rated screw terminal connections that plug into the mating PC jack.



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