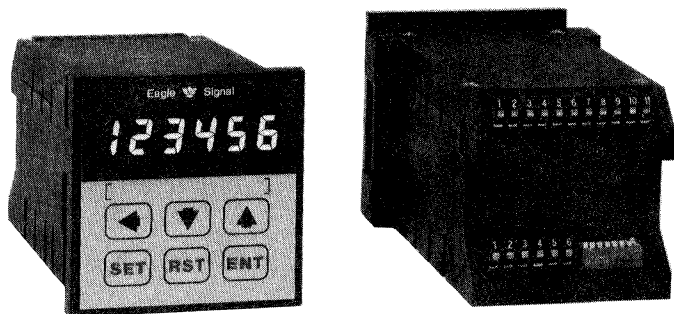## SX300 SERIES
MICROPROCESSOR BASED COUNTER

The SX300 counter is a microprocessor based, 6 digit counter housed in a standard DIN style case (68mm square cutout). The small case and front bezel require minimal panel space, yet provides large, easy to use programming keys and an easy to read .36 inch high LED display.

The SX300 counter is designed for a single direction count input from a solid state sensor or switch. The DC input versions will count up to 2500 counts per second. The AC input version will count up to 2500 counts per minute. Two individually programmable relays provide a wide variety of output combinations to suit most any application.

The SX300 counter provides a number of features normally found on larger and more expensive counters. These features are programmed using rocker switches on the back of the unit for simplicity and security.

Among the features of the SX300 counter are:

- NEMA 4 Hosedown Test rated.
- Two 5 Amp SPDT relay outputs.
- Eight output operating modes programmable for one or both outputs.
- Early Trip prewarn operation programmable for one output.
- Count input scaling using either a .0001 to 99.9999 multiplier or a 1 to 999999 divider.
- Programmable display decimal point position.
- Setpoint to zero or zero to setpoint cycle progress indication.
- LED indicators for output status.
- Program and setpoint changes may be made while the unit is operating.
- Front panel reset key and remote reset input.
- Keypad lock function.
- Non-volatile memory (NOVRAM) for program and data retention.
- Removable terminal blocks for wiring connections.
- +12 VDC sensor power supply.

SPECIFICATIONS

Operating Voltage and Frequency

Symbol	Voltage & Frequency
A6	120 VAC 50/60 Hz
B6	240 VAC 50/60 Hz

Count Input Voltage and Frequency

Symbol	Voltage & Frequency
SX311	10.5-28 VDC
SX312	120 or 240 VAC 50/60 Hz (Depending on unit operating voltage)
SX313	2.4-5 VDC

Count Speed
SX311/313 — 2500 counts per second (DC)
SX312 — 2500 counts per minute (AC)

	SX311/313	SX312
Minimum ON time	200 μSec	12 mSec
Minimum OFF time	200 μSec	12 mSec

Sensor Power Supply
+12 VDC, 100 milliamps maximum

Power Requirement
8 VA operating
12 VA with both relays energized

Setting Accuracy
Count — 100%
Pulse Output Time — .05% of setting or 50 milliseconds whichever is larger

Repeat Accuracy
Count — 100%
Pulse Output Time — .001% of setting or 35 milliseconds whichever is larger

Power On Response Time
200 milliseconds

Reset Time
15 milliseconds

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

Output Rating
Relay — 5 amp, 10-240 VAC

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

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

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

Eagle Signal Controls
A Division of Mark IV Industries, Inc.
8004 Cameron Road, Austin, Texas 78753 U.S.A.

CONTROL INPUT FEATURES

The SX300 counter uses all line voltage control inputs for high noise immunity.

The start input is used to enable the counter to register counts and to energize the outputs. This allows the count operation to be started independently of when power is applied to the unit. This input can be programmed to respond to sustained or momentary inputs.

A line voltage remote reset input is also provided which resets the counter and deenergizes the outputs when power is applied to this terminal.
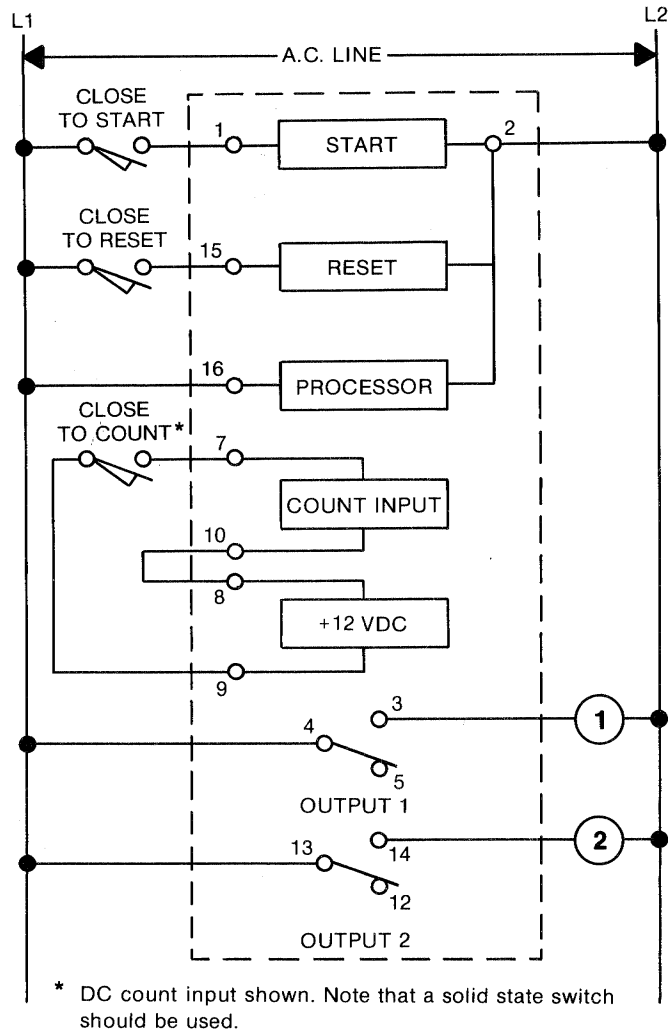
COUNT INPUT FEATURES

Three models of the SX300 counter series are available for different count sensor applications:

SX311   10.5-28 VDC input
SX312   120 or 240 VAC line input
SX313   2.4-5 VDC input

All versions of the SX300 series have optically isolated inputs. The DC count version can be used with either NPN sinking or PNP sourcing switch inputs without special user configuration.

A 12 VDC 100 milliamp power supply output is standard on all models to provide count sensor power.

* DC count input shown. Note that a solid state switch should be used.

OUTPUT FEATURES

There are two 5 amp SPDT relay outputs on the SX300 counter. LED indicators in the display show when these outputs are energized.
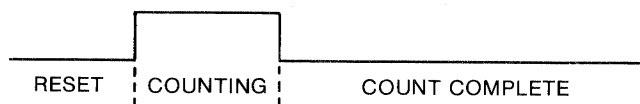
Output 1 Operating Modes

Output 1 is programmable for eight operating modes.

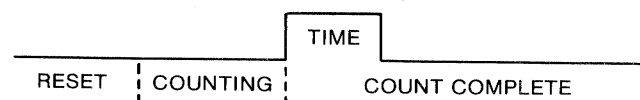**1. ON Delay** — Output 1 is energized at the end of the counting cycle.

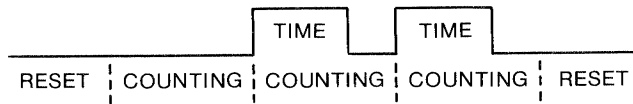**2. Interval** — Output 1 is energized during the counting cycle.

3 & 4. The ON Delay and Interval modes are also available with count totalization. In these modes the display will continue to indicate counts registered after the count cycle is complete.

5. Timed Pulse Output — Output 1 is energized for a programmable pulse time up to 99.99 seconds at the end of the count cycle.

6. Timed Pulse and Repeat — Output 1 is energized for a programmable pulse time up to 99.99 seconds at the end of the count cycle, with the count cycle automatically repeating.

	TIME		TIME	
RESET	COUNTING	COUNTING	COUNTING	RESET

7 & 8. Repeat Cycle, ON or OFF Count Cycle First — Output 1 is energized and deenergized in repeating operation with either the ON or OFF count period first. The count periods are equal length, but unequal length count intervals can be obtained using the Early Trip prewarn output.

	COUNT	COUNT	COUNT	COUNT	
RESET	COUNT	COUNT	COUNT	COUNT	RESET
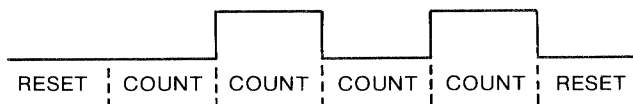
OFF Count Period First Shown

Output 2 Operating Modes

The second output on the SX300 counter can be programmed to operate either in parallel to Output 1, providing DPDT relay operation from the two SPDT relays, or it can be programmed as an Early Trip prewarn output that will be energized a number of counts before the end of the cycle. An example of Early Trip prewarn operation with the ON Delay mode for Output 1 is shown here for reference.

OUT 1

OUT 2

RESET	COUNTING	COUNT COMPLETE	RESET
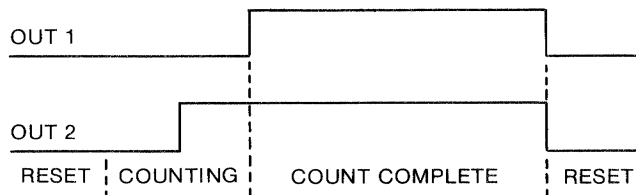
RESET OPERATION

The SX300 counter is programmable to either reset on power interruption and start over when power is reapplied or to retain its actual cycle progress value and continue with the cycle when power is reapplied.

COUNT INPUT SCALING

The SX300 counter can be programmed to scale count inputs in order to provide settings and cycle progress display in engineering units relevant to the process being measured. The SX300 counter offers two programmable modes of count input scaling. A .0001 to 99.9999 multiplier scale factor is available for cut-to-length and unit conversion applications. A 1 to 999999 divider scale factor is also available for direct count-to-unit applications such as flow control.

## DISPLAY DECIMAL POINT POSITION

0.0.0.0.0.0

The SX300 display has a programmable decimal point that can be positioned between any of the 6 digits to show correct units of measure.

CYCLE PROGRESS INDICATION

The SX300 count progress display can be programmed either to cycle DOWN from the setpoint to zero or to cycle UP from zero to the setpoint.

FRONT PANEL PROGRAMMING

The SX300 counter uses a sealed front panel keypad for entry of variable data such as setpoints.
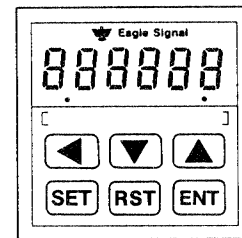
Pressing the SET key calls the setpoint to the display. The setpoint will be displayed with the least significant digit flashing. The position of the flashing digit is controlled using the ◀ key. The ▲ and ▼ keys increment and decrement the value of the flashing digit. The ENT key enters any setpoint changes into memory.

In addition to changes to the main setpoint, the front keypad is also used to change the scale factor, the Early Trip setpoint for Output 2, the timed pulse output length, and the display decimal point position. This programming is done with a prompted set-up routine. The SET key is used to scroll through the prompts and variables. To enter the prompted set-up routine it is necessary to press and hold the SET key for at least 5 seconds, This prevents inadvertant entry into the set-up routine.

The RST key on the front panel is a manual reset. Pressing the RST key resets the counter and holds the outputs in their normal, deenergized states until the key is released.

A keypad lock function is provided for security. Pressing and holding the ENT key for about five seconds will alternately lock and unlock the front keypad. When locked, the SET key will call all variables, but the ◀, ▲, and ▼ keys will be inoperative so that changes cannot be made. The RST key is also inoperative when the keypad is locked.

SWITCH PROGRAMMING

The SX300 counter uses eight switches on the back of the unit for programming the operating modes as follows:

X = Switch ON   O = Switch OFF   Blank = Does Not Apply

| SYM.	OPERATING MODE	1	2	3	4	5	6	7	8
	OUTPUT 1 OPERATION								
1	ON Delay	O	O	O					
2	ON Delay & Totalize	O	O	X					
3	Interval	X	O	O					
4	Interval & Totalize	X	O	X					
5	Timed Pulse	O	X	O					
6	Timed Pulse & Repeat	X	X	O					
7	Repeat - OFF First	O	X	X					
8	Repeat - ON First	X	X	X					
	OUTPUT 2 OPERATION								
1	Same as Output 1					O			
2	Early Trip Prewarn					X			
	CYCLE PROGRESS								
1	Down - From setpoint down to zero						O		
2	Up - From zero up to setpoint						X		
	SCALE FACTOR								
1	Divider - 1 to 999999							O	
2	Multiplier - .0001 to 99.9999							X	
	RESET MODE								
1	Reset on Power Interruption							O	
2	Non-Reset on Power Interruption							X	
	START MODE								
1	Sustained Start Input								O
2	Momentary Start Input								X

TERMINAL ASSIGNMENTS

The SX300 counter series uses two removable terminal blocks to provide wiring connections, with the following terminal assignments.
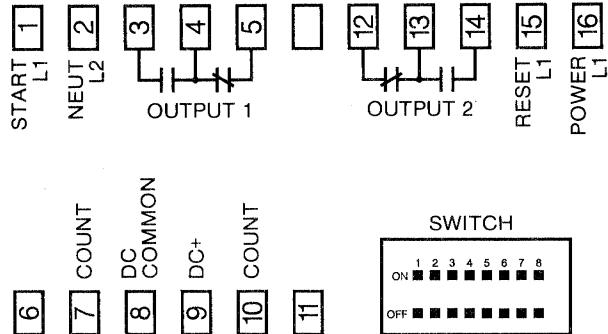
MOUNTING

The SX300 counter uses two removable mounting clips with adjustable screws to mount the enclosure in a panel as shown below.
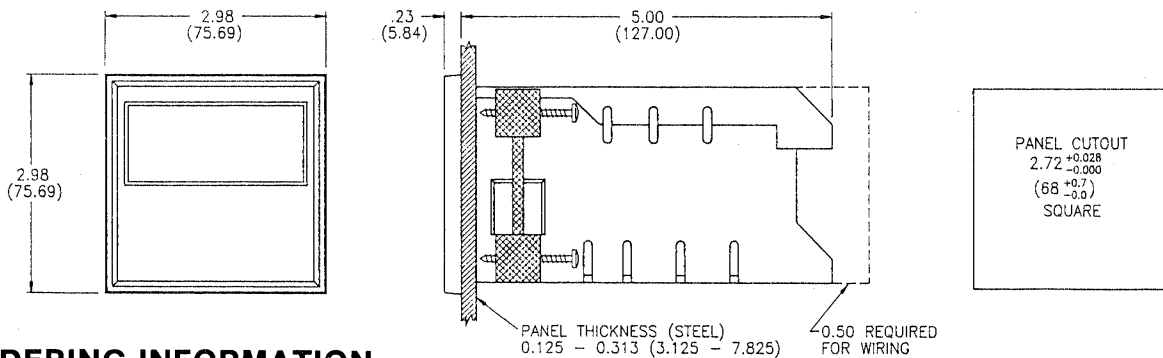
ORDERING INFORMATION

SX3   11   A6

COUNT TYPE

SYMBOL	DESCRIPTION
11	10.5-28 VDC
12	120 or 240 VAC*
13	2.4-5 VDC

OPERATING VOLTAGE & FREQUENCY

SYMBOL	DESCRIPTION
A6	120 VAC 50/60 Hz
B6	240 VAC 50/60 Hz

* 120 VAC if A6 Operating Voltage is Selected
  240 VAC if B6 Operating Voltage is Selected