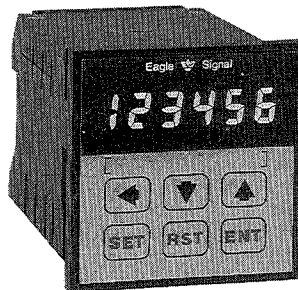




SX300 SERIES MICROPROCESSOR BASED COUNTER



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 microseconds	12 milliseconds
Minimum OFF time	12 milliseconds	200 microseconds

Sensor Power Supply

+12 VDC, 75 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 (resistive), 10 to 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.

Laboratory Testing 
U.L. Recognition E96337

Eagle Signal Controls

Industrial Control Products
8004 Cameron Road, Austin, Texas 78754

COUNT CONTROL



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.

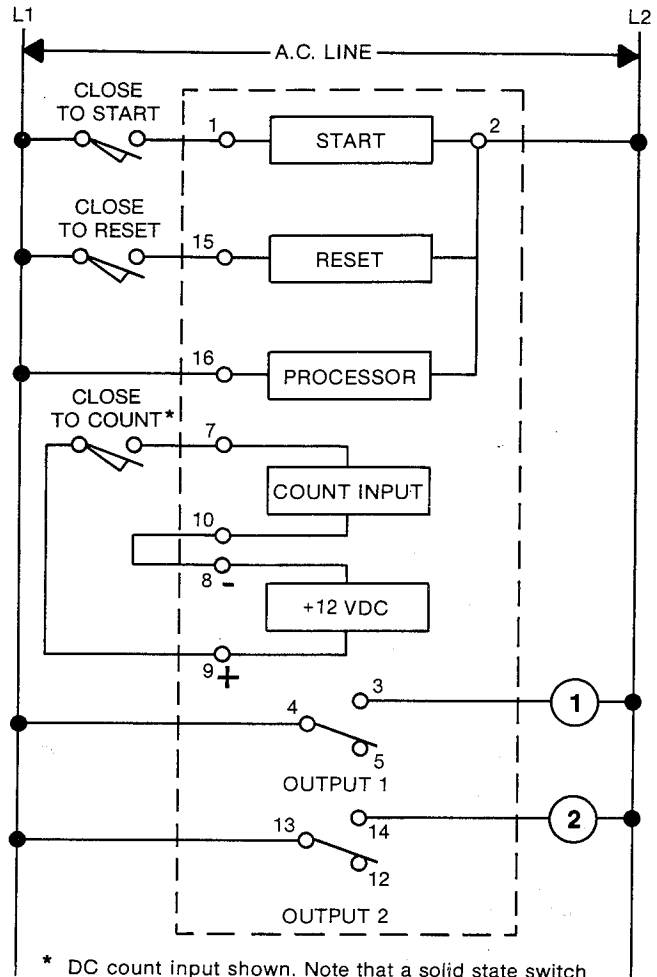
COUNT INPUT FEATURES

Three models of the SX300 Series counter 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

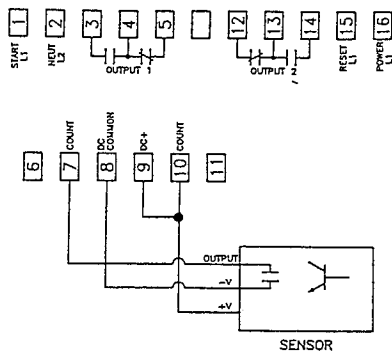
All versions of the SX300 series have optically isolated inputs. The DC count version can be used with either NPN sinking or PNP sourcing switch inputs without special user configuration.

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

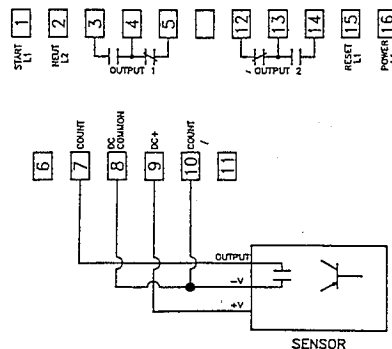


* DC count input shown. Note that a solid state switch should be used.

WIRING EXAMPLES



3 wire NPN Count Sensor (SX311 Only)



3 Wire PNP Count Sensor (SX311 Only)

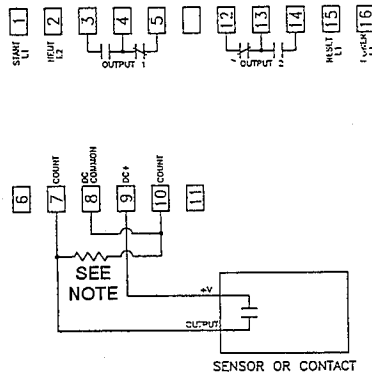
- NOTE -

The maximum current output for the SX300's sensor power supply is 75 milliamps. For sensor arrangements requiring more than this amount of current, it is suggested that an external power supply be used.

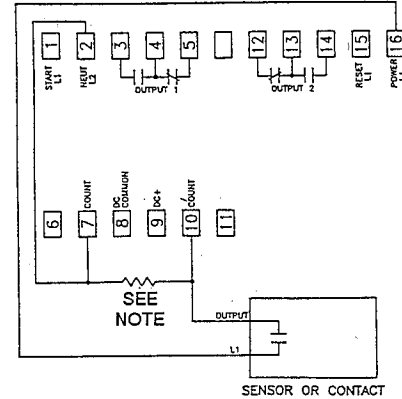
COUNT CONTROL



The following two-wire connections can be used for either solid state sensor or contact closure inputs. When contact closure inputs are used, care must be taken to ensure that contact bounce does not cause erroneous count inputs.



2 Wire DC Count Input (SX311 Only)



2 Wire AC Count Input (SX312 Only)

- NOTE -

Many two-wire solid state sensors have an OFF state leakage current that is unacceptably high for the count input circuit. This leakage current will hold the count input on continuously, not allowing counts to be registered. This can be remedied by placing a 9000 Ohm, three-watt resistor (Eagle part number PCR-1418) across terminals 7 and 10.

OUTPUT FEATURES

There are two 5 amp SPDT relay outputs on the SX300 counter. These relays are socket mounted for easy service. LED indicators in the display show when these outputs are energized.

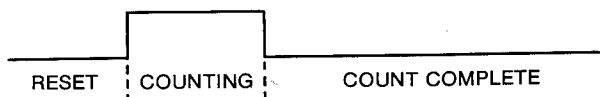
Output 1 Operating Modes

Output 1 is programmable for eight operating modes.

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

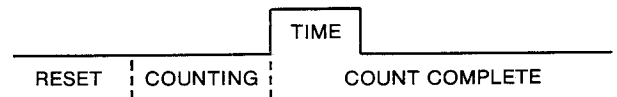


2. Interval — Output 1 is energized during the counting cycle.

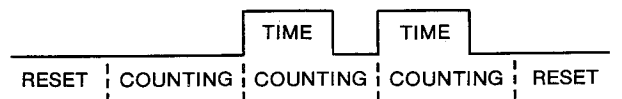


3 & 4. The ON Delay and Interval modes are also available with count totalization. In these modes the display will continue to indicate counts registered after the count cycle is complete.

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.



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.

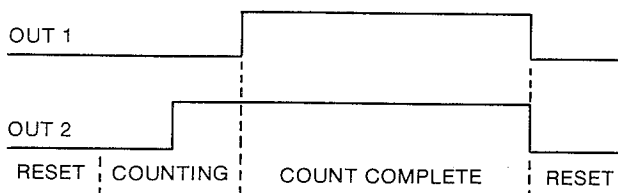


OFF Count Period First Shown



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.



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

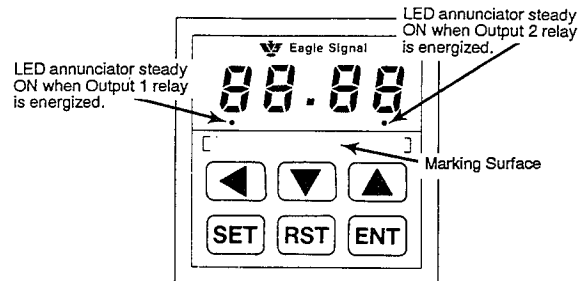
The SX300 display has a programmable decimal point that can be positioned between any of the 6 digits to show correct units of measure.

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 inadvertent 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.

COUNT CONTROL



SWITCH PROGRAMMING

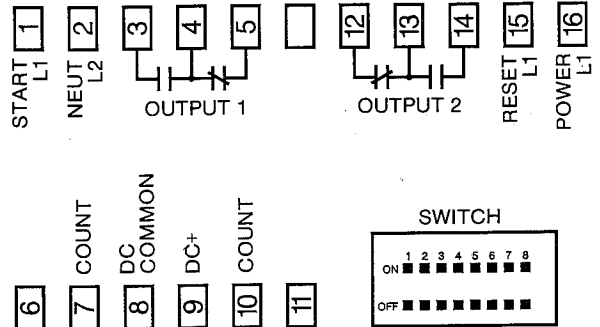
The SX300 counter uses eight switches on the back of the unit for programming the operating modes as follows:

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

SYM.	OPERATING MODE	SWITCH NUMBER							
		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

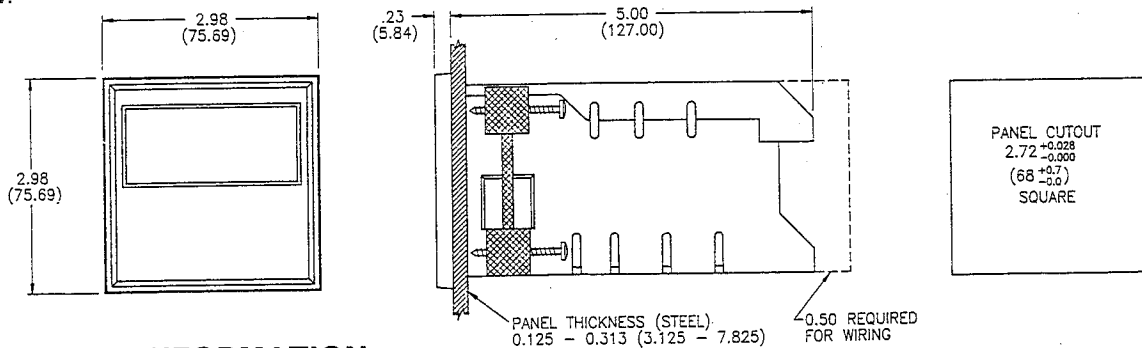
TERMINAL ASSIGNMENTS

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

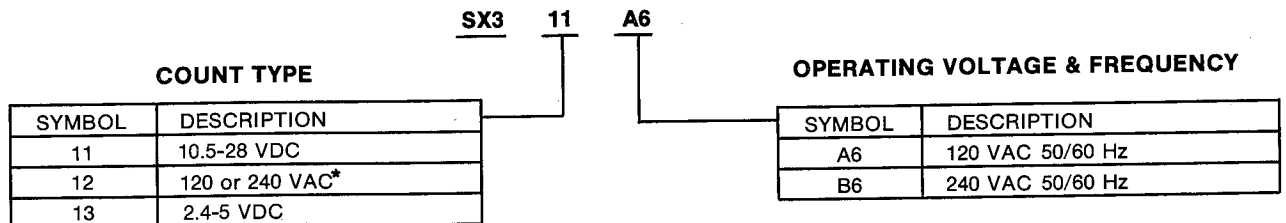


MOUNTING

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



ORDERING INFORMATION



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