

# **SC-FF Series**

*Frequency Scaler & Pulse Isolator*

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**KEP**

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**DESCRIPTION:**

The SC-FF is a DIN rail mount, DC powered frequency scaler and pulse isolator. On the isolated pulse output, the SC-FF provides an isolation barrier of 500V from the input signal. All SC-FF units have an open collector pulse output with a maximum output frequency of 10KHz. The standard unit also has an isolated pulse output with a maximum count speed 1000 cps or 1KHz. The SC-FF also has an optional configuration with an output relay replacing the isolated output. The relay output has a maximum count speed of 10 cps or 10Hz.

The SC-FF supports several pulse input types. These input types include magnetic pickup, contact closure, and an isolated pulse input.

The pulse scaling permits a user to apply a scaling multiplier with a value of 0.0001 through 0.9999 and dividers of 1, 10, 100, 1000, and 10000. Pulse scaling is accomplished by rotary encoded and dip switch selections.

The pulse output has user selectable output pulse duration and internal pullup resistors. The user may select his pulse output configuration by means of a dip switch.

The unit is powered by 8-35 VDC. Reverse polarity protection is provided. Power and Pulse input/output indicators are provided. The unit is available in enclosures intended for either DIN rail, NEMA4X, or Explosion Proof

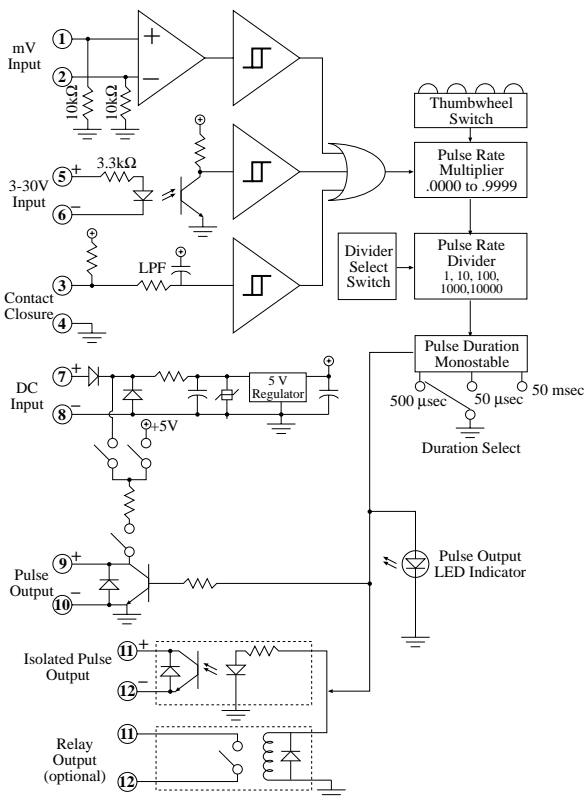
**APPLICATION:**

Frequency pulse scalars are often used to obtain pulse outputs in engineering units. They are also used as pulse stretching devices. Many PLC inputs and electromechanical counters need long pulse output durations. The SC-FF can be used as a pulse stretcher for applications requiring long pulse durations.

**OPERATION:**

The SC-FF can accept a variety of input types such as Magnetic pickup, Contact closure or Optically isolated pulse inputs. Output scaling is accomplished via switch settings. These switch settings allow the unit to divide or multiply the input frequency to obtain the desired scaling factor.

**Simplified Block Diagram**



**Specifications:**

**Pulse Input:**

Isolated Pulse:  
 Logic 1 (high): 3 - 30 VDC  
 Logic 0 (low): 0-0.4 VDC  
 0-10 kHz, 1 kΩ Input Impedance  
 Reverse Polarity Protection  
 Isolation Voltage: 500 V

**Contact Closure:**

Switch Debounce: 40 Hz maximum count rate  
 10 kΩ internal pullup to 5 VDC

**Magnetic Pickup:**

Sensitivity: 30 mV p-p  
 Bandwidth: 0-3500 Hz  
 Over Voltage Protection to 30 VDC  
 10 kΩ input resistance

**Outputs:**

Pulse Duration: 50 mSec, 50 μSec, 500 μSec (Switch selectable)  
 Pulse Output:

Maximum Voltage: 48 VDC  
 Maximum Sink Current: 100 mA @ 1.0V max  
**Max. Output Speed: 10 kHz**  
 Reverse Polarity Protection  
 Overcurrent Protection  
 Jumper selectable for 5V, 24V or open collector pulse output

**Isolated Pulse Output (requires external pull-up resistor):**

Maximum Voltage: 30 VDC  
 Maximum Current: 10 mA  
 Max. Output Speed: 1 kHz  
 Isolation Voltage: 500 VDC  
 Reverse Polarity Protected

**Relay Output (optional):**

Contact Rating: 0.5 amps 240 VAC  
 Output Form: Form A (SPST)  
 Max. Output Speed: 10 Hz

**Power Input:**

Input Voltage Range: 8.5 to 35 VDC  
 Supply Current: 25 mA (nominal)  
 Reverse Polarity Protection  
 Transient Protection

**Pulse Scaling:**

Scaler: 0.0001 to .9999  
 Divider: /1, /10, /100, /1000, /10000

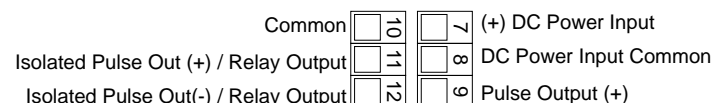
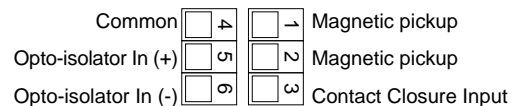
**Mounting Styles**

DIN Rail Mount: Plastic enclosure with a snap fastener for fitting to DIN 46 277 and DIN EN 50 022 assembly rails.

NEMA 4X: 4.92" x 4.92" NEMA 4X Enclosure for wall mounting.

Explosion Proof: Aluminum enclosure for:  
 Class I, Division 1, Groups B, C & D  
 Class II, Division I, Groups E, F & G.

**Wiring:**



## INPUT & OUTPUT SETTINGS

### REMOVING THE CASE:

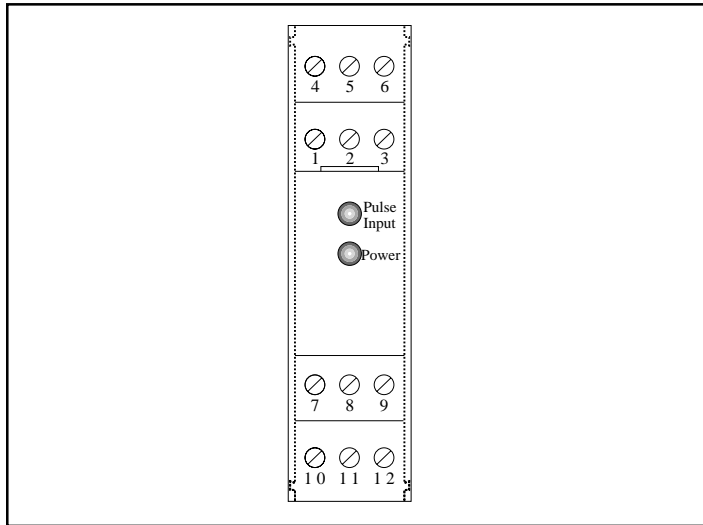
The case must be removed to change switch settings. To remove the case proceed as follows:

Refer to FIGURE 1. Using finger tips, carefully pry the case away from the terminal blocks (as shown with dotted lines).

Pry far enough to release the restraining clips on both sides of the case.

Press up on terminal block with thumbs. The assembly will pop out allowing it to be removed from case.

**FIGURE 1:**



### PULSE SCALING:

Pulse scaling, pulse duration, and internal pullups are all configurable with dip switches. Refer to the following tables to configure the unit for your application.

### FREQUENCY DIVIDING FACTOR:

The appropriate range is selected by turning "ON" the corresponding switch.

S1	S2	S3	S4	OUTPUT
on	off	off	off	/10000
on	off	off	on	/1000
on	off	on	off	/100
on	off	on	on	/10
off	on	X	X	/1

### PULSE DURATION (for pulse & isolated pulse output):

S5	S6	Duration	Max CPS
OFF	OFF	50uS	10000
ON	OFF	500uS	1000
ON	ON	50mS	10

### INTERNAL PULLUP RESISTOR VOLTAGE (for pulse output)

S7	S8	Pulse Output Voltage
ON	OFF	5 VDC
OFF	ON	24 VDC
OFF	OFF	Open Collector

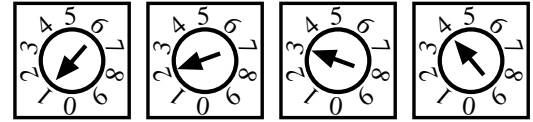
### OUTPUT ADJUSTMENTS:

$$\text{Frequency Out} = \frac{\text{Frequency In} \cdot \text{Scaling Factor}}{\text{Pulse Divider}}$$

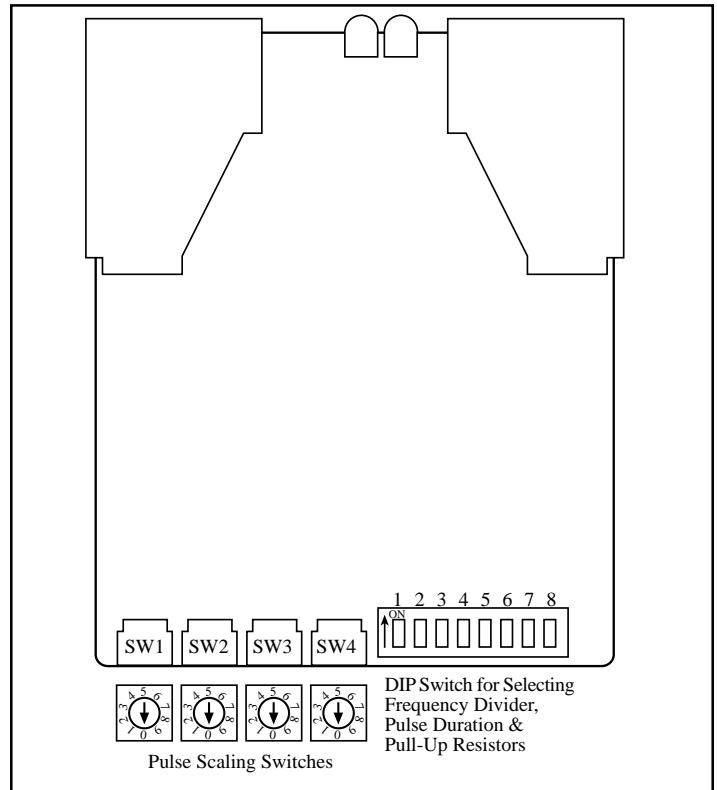
### PULSE SCALING FACTOR SWITCHES

Example:

$$0.1234 =$$



**FIGURE 2:**



### LED INDICATORS:

The SC-FF has two LED's which indicate the status of the unit. The table below describes the various states for the LED's.

#### POWER LED:

OFF

ON (constant)

#### MEANING:

The unit is off.

The unit is loop powered.

#### PULSE LED:

BLINKING

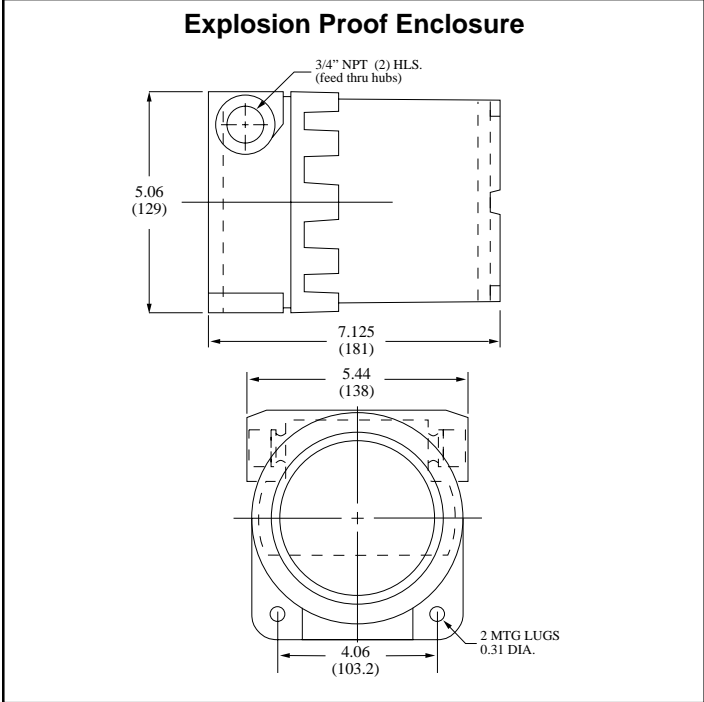
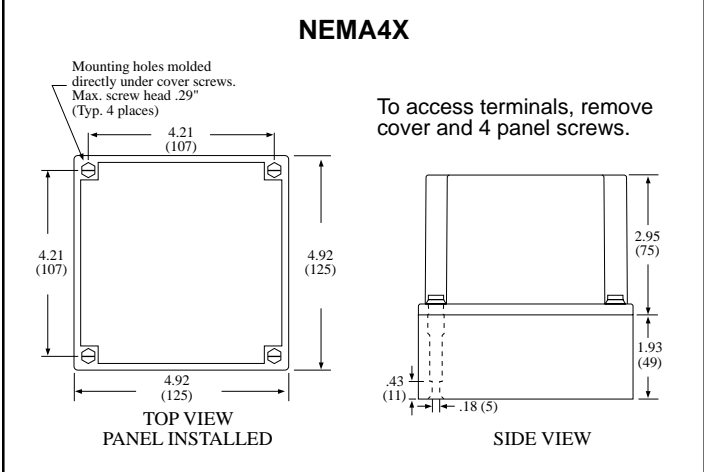
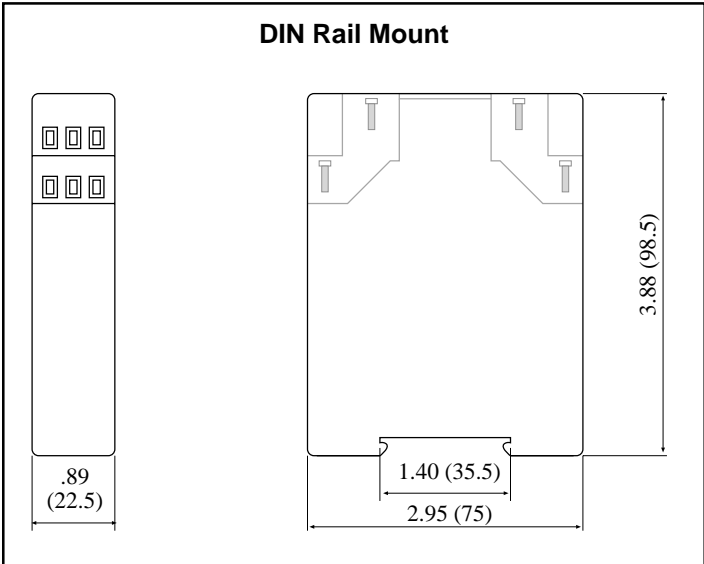
ON

#### MEANING:

The unit is receiving an input frequency. The LED will blink at a rate proportional to the input frequency.

The unit is not receiving a pulse input. (The LED may appear to be constantly "ON" at high input frequencies)

**Dimensions**



**WARRANTY**

This product is warranted against defects in materials and workmanship for a period of two (2) years from the date of shipment to Buyer.

The Warranty is limited to repair or replacement of the defective unit at the option of the manufacturer. This warranty is void if the product has been altered, misused, dismantled, or otherwise abused.

ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED, ARE EXCLUDED, INCLUDING BUT NOT LIMITED TO THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

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**Decoding Part Number:**

<b>Example</b>	<b>SC-FF</b>	<b>1</b>	<b>B</b>	<b>ET</b>
<b>Series</b>	_____	_____	_____	_____
	FF= Frequency to Frequency			
<b>Output Type</b>	_____	_____	_____	_____
	1 = Open Collector & Isolated Pulse (STD)			
	2 = Open Collector & Relay Output			
<b>Mounting:</b>	_____	_____	_____	_____
	B= Nema 4X			
	C= Explosion Proof			
	D= DIN Rail			
<b>Options:</b>	_____	_____	_____	_____
	ET= Extended Temp: -4° to 185°F (-20° to 85° C)			
<b>Accessories: (add to end of part number)</b>	_____			
	DR-4= 4" DIN Rail			