SC-FF Series

Frequency Scaler & Pulse Isolator

Flowmetrics, Inc.

“Where Quality is Measurable”

9201 Independence Avenue • Chatsworth, CA 91311
(818) 407-3420 • FAX (818) 700-1961

99830 08/27/01
## INDEX

DESCRIPTION ........................................................................................................... 1

SPECIFICATIONS ................................................................................................. 1

WIRING HOOKUP .................................................................................................... 1

INPUT & OUTPUT SETTINGS .................................................................................. 2

REMOVING THE CASE .......................................................................................... 2

PULSE SCALING ..................................................................................................... 2

PULSE DURATION ................................................................................................. 2

OUTPUT ADJUSTMENTS ....................................................................................... 2

RESPONSE TIME SETTINGS .................................................................................. 2

LED INDICATORS .................................................................................................. 2

DIMENSIONS .......................................................................................................... 3

WARRANTY ............................................................................................................... 3

DECODING PART NUMBER ...................................................................................... 3
**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 scalers 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.

**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
- 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:**

- Common (+) and (-) DC Power Input
- Opto-isolator In (+) and (-) Contact Closure Input
- Isolated Pulse Out (+) / Relay Output
- Isolated Pulse Out(-) / Relay Output
- Magnetic pickup
- Contact Closure Input

---

**Simplified Block Diagram**

[Diagram showing various inputs and outputs, including pulse input, pulse output, relay output, etc.]
**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:**

![FIGURE 1:](image)

**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.

<table>
<thead>
<tr>
<th>S1</th>
<th>S2</th>
<th>S3</th>
<th>S4</th>
<th>OUTPUT</th>
</tr>
</thead>
<tbody>
<tr>
<td>on</td>
<td>off</td>
<td>off</td>
<td>off</td>
<td>/10000</td>
</tr>
<tr>
<td>on</td>
<td>off</td>
<td>off</td>
<td>on</td>
<td>/1000</td>
</tr>
<tr>
<td>on</td>
<td>off</td>
<td>on</td>
<td>off</td>
<td>/10</td>
</tr>
<tr>
<td>on</td>
<td>off</td>
<td>on</td>
<td>on</td>
<td>/1</td>
</tr>
<tr>
<td>off</td>
<td>on</td>
<td>X</td>
<td>X</td>
<td>/1</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>S5</th>
<th>S6</th>
<th>Duration</th>
<th>Max CPS</th>
</tr>
</thead>
<tbody>
<tr>
<td>OFF</td>
<td>OFF</td>
<td>50uS</td>
<td>10000</td>
</tr>
<tr>
<td>ON</td>
<td>OFF</td>
<td>500uS</td>
<td>1000</td>
</tr>
<tr>
<td>ON</td>
<td>ON</td>
<td>50mS</td>
<td>10</td>
</tr>
</tbody>
</table>

**INTERNAL PULLUP RESISTOR VOLTAGE (for pulse output):**

<table>
<thead>
<tr>
<th>S7</th>
<th>S8</th>
<th>Pulse Output Voltage</th>
</tr>
</thead>
<tbody>
<tr>
<td>ON</td>
<td>OFF</td>
<td>5 VDC</td>
</tr>
<tr>
<td>OFF</td>
<td>ON</td>
<td>24 VDC</td>
</tr>
<tr>
<td>OFF</td>
<td>OFF</td>
<td>Open Collector</td>
</tr>
</tbody>
</table>

**OUTPUT ADJUSTMENTS:**

Frequency Out = Frequency In • Scaling Factor

**PULSE SCALING FACTOR SWITCHES**

Example:

0.1234 =

**FIGURE 2:**

![FIGURE 2:](image)

**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:**

<table>
<thead>
<tr>
<th>MEANING:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>OFF</td>
<td>The unit is off.</td>
</tr>
</tbody>
</table>

| ON (constant) | The unit is loop powered. |

**PULSE LED:**

<table>
<thead>
<tr>
<th>BLINKING</th>
<th>MEANING:</th>
</tr>
</thead>
<tbody>
<tr>
<td>ON (BLINKING)</td>
<td>The unit is receiving an input frequency. The LED will blink at a rate proportional to the input frequency.</td>
</tr>
<tr>
<td>ON</td>
<td>The unit is not receiving a pulse input. (The LED may appear to be constantly &quot;ON&quot; at high input frequencies)</td>
</tr>
</tbody>
</table>
Dimensions

DIN Rail Mount

- 3.88 (98.5)
- 2.95 (75)
- 1.40 (35.5)
- 0.89 (22.5)

NEMA4X

- Mounting holes molded directly under cover screws.
- Max. screw head .29" (Typ. 4 places)

To access terminals, remove cover and 4 panel screws.

Explosion Proof Enclosure

- 5.06 (129)
- 7.125 (181)
- 5.44 (138)
- 4.06 (103.2)

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.

Decoding Part Number:

Example: SC-FF 1 B ET

Series

FF = Frequency to Frequency

Output Type

1 = Open Collector & Isolated Pulse (STD)
2 = Open Collector & Relay Output

Mounting:

B = Nema 4X
C = Explosion Proof
D = DIN Rail

Options:

ET = Extended Temp: -4° to 185°F (-20° to 85° C)

Accessories: (add to end of part number)
DR-4 = 4" DIN Rail