Precision
Step Systems

Manual **Programmable Counter type SRB 3208**

Presentation

The SRB3208 is a multi-purpose 6 digit presettable counter with three programmable outputs and is suitable for use in conjunction with the Laurence, Scott & Electromotors Ltd Precision Step System, where demands for high counting frequencies are significant, but is also applicable with other systems where high speed and flexible presets are required.

Main Features

1) The LCD display features two rows of characters to indicate count value, preset values and operating status.
2) Four keys on the fascia enable selection of the operating parameters.
3) High counter frequencies up to 100KHz.
4) A side-mounted DIP switch enables the input frequency sensitivity to be reduced from 100KHz if required.
5) Non-volatile memory.
6) Programmable scale factor and decimal point for engineering units.
7) Inputs for one or two channel encoders.
8) Simple method of programming using a menu-guided display.

1. Programming as a Counter

To program the SRB3208 set the **DIP Switch A** to **ON**.

1.1. Counter function

Press keypad ☎ to select:

Count for pulse counting (use procedure **1.2**) or
FrEqu for frequency measurement (use procedure **2**) or
Hour time measurement (use procedure **3**)

Most PSS applications require pulse counting.
After selecting the **Count** function, press **P** to confirm programming.

1.2. Programming the Input Mode

Selecting **COUNT** in 1.1 produces a display:

InPut E1

Press ☎ to select:

E1 Input A = count input for single channel encoder
Input B = count direction input

E2 Input A = up input
Input B = down input

E3 Quadrature mode for two channel encoder

E4 Quadrature mode with pulse doubling

E5 Quadrature mode with pulse quadrupling

After selecting the **Input Mode**, press **P** to confirm programming.

1.3. Programming Input Polarity

After programming the **Input Mode** in 1.2 the display is:

InPut PoSPol

Press ⇧ to select:

nEGative **Pol**arity (npn) or **PoS**itive **Pol**arity (pnp) and then press **P** to confirm.

Note: The selected polarity applies to **all** inputs. Mixed polarities are not possible.

1.4. Programming the Operating Mode

After programming the **Input Polarity** in 1.3 the display is:

ModE 10

There are 11 operating modes available. Using Table 1 below, select the operating mode to suit the counter application using the keypad ⇧

Table 1. Operating Modes

Operating Mode	Output 0	Output 1	Output 2	Comments
1	< 0	= PR1	= 0	
2	≤ 0	= PR1	= PR2	
3	≤ 0	≥ PR1	≥ PR2	
4	≤ 0	≤ PR1	≤ PR2	
5	≤ 0	= PR1	= PR2	Resets to 0 when count = PR2
6	≤ 0	≥ PR1	= PR2	Resets to 0 when count = PR2
7	≤ 0	= PR1	= PR2	Resets to set value when count = 0
8	≤ 0	≤ PR1	≤ PR2	Resets to set value when count = 0
9	= 0	= PR1	Batch counter = PR2	Resets to set value when count = 0 Batch counter increments by 1
10	= 0	= PR1	Batch counter = PR2	Resets to 0 when count = PR1 Batch counter increments by 1
11	≥ PR1 – PR2 and ≤ PR1 + PR2	< PR1	> PR1	Positioning counter PR1 = position PR2 = preset

Mode 1: Counts down from SET value.
Set key sets counter to SET value.

Mode 2: Counts down from SET value.
Set key sets counter to SET value.

Mode 3: Counts up from 0.
Set key sets counter to 0.

Mode 4: Counts down from SET value.
Set key sets counter to SET value.

Mode 5: Counts up from 0.
Set key sets counter to 0.

Mode 6: Counts up from 0.
Set key sets counter to 0.

Mode 7: Counts down from SET value.
Set key sets counter to SET value.

Mode 8: Counts down from SET value.
Set key sets counter to SET value.

Mode 9: Counts down from SET value. Auto resets to SET value at 0.
Set key sets counter to SET value, resets batch count to 0 and resets the outputs.

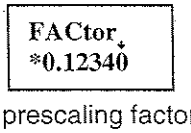
Mode 10: Counts up from 0. Auto resets to 0 at PRESET PR1.
Set key sets counter to 0, batch count to 0 and resets the outputs.

Mode 11: Used for position control with forward, reverse and stop outputs.
Set key sets counter to 0.

After selecting the **Operating Mode** press **P** to confirm programming.

1.5. Programming the Prescaling Factor.

After programming the **Operating Mode** in 1.4 the display is:



Press ⇧ and ⇦ to select the prescaling factor.

The ⇦ selects the decade and a small arrow on the display indicates the decade selected.

The ⇧ increments the selected digit.

The available range is 0.00001 to 9.99900 with the condition that either the most significant or least significant digits must be 0, otherwise the least significant digit(s) will be rounded to 0.

Example: 1.23456 becomes 1.23400

After selecting the **Prescaling Factor** press **P** to confirm programming.

1.6. Programming the Output Duration

After programming the **Prescaling Factor** in 1.5 the display is:

_n._0 s 1.725

Each output (0, 1 and 2) can be programmed to be pulsed or maintained. A pulsed output is adjustable from **0.001s** to **9.999s** in 1ms steps. A maintained output is programmed by setting the pulse duration to 0.000s and, during counting, must be externally reset by its associated input **RES1** or **RES2.**

Press ⇧ and ⇦ to select the required output and duration. A small arrow indicates the decade selected.

Press **P** to confirm programming.

1.6. Programming the Decimal Point

After programming the **Output Duration** the display is:

. dP 0.000

The decimal point is only for display purposes and does not effect the count.

Press ⇧ to select either **0, 0.0, 0.00, 0.000** or **0.0000**

Press **P** to confirm programming.

1.7. End of Programming - set the **DIP Switch A** to **OFF.**

2. Programming as a Frequency Counter

Outputs:

Output 0 operates when rate = 0
Output 1 operates when rate ≥ PR1
Output 2 operates when rate ≥ PR2

To program the SRB3208 set the **DIP switch A** to **ON** and select **FrEqu** as per **1.1.**

2.1. Programming the Input Mode

See **1.2**

2.2. Programming Input Polarity

See **1.3**

2.3. Programming the Rate

After programming the **Input Polarity** the display is:

timE 1/s

Press ⇧ to select the rate **1/s** or **1/min** and then press **P** to confirm programming.

2.4. Programming the Gate Time

After programming the **Rate** the display is:

G.AtE s
021.407

Press ⇧ and ⇦ to adjust the gate time from **2ms** to **999.999s**. A small arrow indicates the digit selected.

During counting, the display is updated at the same frequency as the gate time.

Press **P** to confirm programming.

2.4. Programming the Prescaling Factor

See **1.5**

2.5. Programming the Output Duration

See **1.6**

2.6. Programming the Decimal Point

See **1.7**

2.8. End of Programming – set **DIP Switch A** to **OFF**.

3.0. Programming as a Timer

To program the SRB3208 set the **DIP switch A** to **ON** and select **Hour** as per **1.1**.

3.1. Programming the Input Polarity

See **1.3**

3.2 Programming the Operating Modes

After programming the **Input Polarity** the display is:

ModE h
8

Press ⇧ to select the required **Mode 1 – 8**.

Outputs:

Modes 1 (Sec), **3** (Min), **5** (Hours) and **7** (H:M:S)

Output 0 operates when time = 0
Output 1 operates when time ≥ PR1
Output 2 operates when time ≥ PR2

Set key resets timer to 0.

Modes 2 (Sec), **4** (Min), **6** (Hour) and **8** (H:M:S)

Output 0 operates when time = 0
Output 1 operates when time ≥ PR1
Output 2 operates when time = PR2

Set key resets timer to 0.

3.3. Programming the Output Duration

See **1.6**

3.4. Programming the Decimal Point

In modes 1 – 6 the decimal point position selects the resolution to **1**, **0.1**, **0.01** or **0.001**. In modes 7 and 8 the decimal point position is not adjustable and the resolution is always **1sec**.

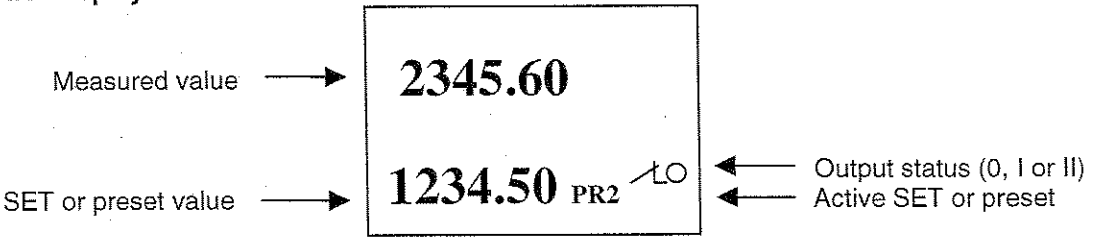
Press ⇧ to select the decimal point position and then press **P** to confirm programming.

3.5. End of Programming – set **DIP Switch A** to **OFF**.

4. Operating the Counter

After setting the DIP Switch A to OFF press **P** repeatedly until the display reverts to **4.1**. The counter is now ready for operation.

4.1. Display



Note: If the counter display range of –999999 to +999999 is exceeded the character **E** is displayed. However, the counter will continue to count up to 61999999 without count loss. Exceeding this value will cause a miscount.

4.2. Adjusting the SET and PRESET Values

Press **P** to select the **SET** or **PRESET** value to be adjusted.

Press the ⇦ key to select the decade and ⇧ to adjust the SET or PRESET **value**. Pressing either key for more than 2 sec causes decade selection or incrementing to be continuous.

Note:

a) For 2 consecutive PRESET values, the maximum input frequency is 400Hz otherwise the second output will not respond if an operating mode with " = " has been selected.

b) At maximum input frequency of 100KHz the PRESET values must be separated by more than:

15000 increments with a prescaling factor of 9.99900 and pulse quadrupling.
350 increments with a prescaling factor of 1.00000 and single pulse.

If the separation is less the second value is ignored.

c) Values may be adjusted during counting with immediate effect. To prevent unauthorised adjustment, the **KEY** input should then be switched **ON** so that the keys are inoperative.

Table 2. SET-key Functions

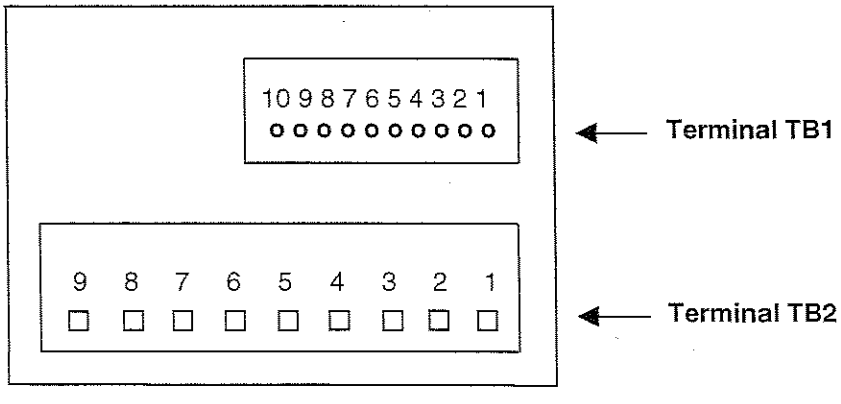
Function	Op Mode	SET key Function
Pulse Counting	1	Sets count to SET value
	2	Sets count to SET value
	3	Sets count to SET value
	4	Sets count to 0
	5	Sets count to SET value
	6	Sets count to 0
	7	Sets count to SET value
	8	Sets count to SET value
	9	Sets count to 0 Sets batch to 0 Resets outputs
	10	Sets count to 0 Sets count to 0 Resets outputs
	11	Sets count to 0
Frequency	-	No function
Time	1 – 8	Sets count to 0

4.3. Input Frequency Damping

DIP Switch	A	B	C	D	E	F	Max Frequency
Input A	OFF	X	X	OFF	X	OFF	100KHz
	OFF	X	X	OFF	X	ON	1KHz
	OFF	X	X	ON	X	X	30Hz
Input B	OFF	X	OFF	X	OFF	X	100KHz
	OFF	X	OFF	X	ON	X	1KHz
	OFF	X	ON	X	X	X	30Hz
Program Mode	ON	X	X	X	X	X	

OFF = DIP Switch closed (top); ON = DIP Switch open; X = DIP Switch ON or OFF

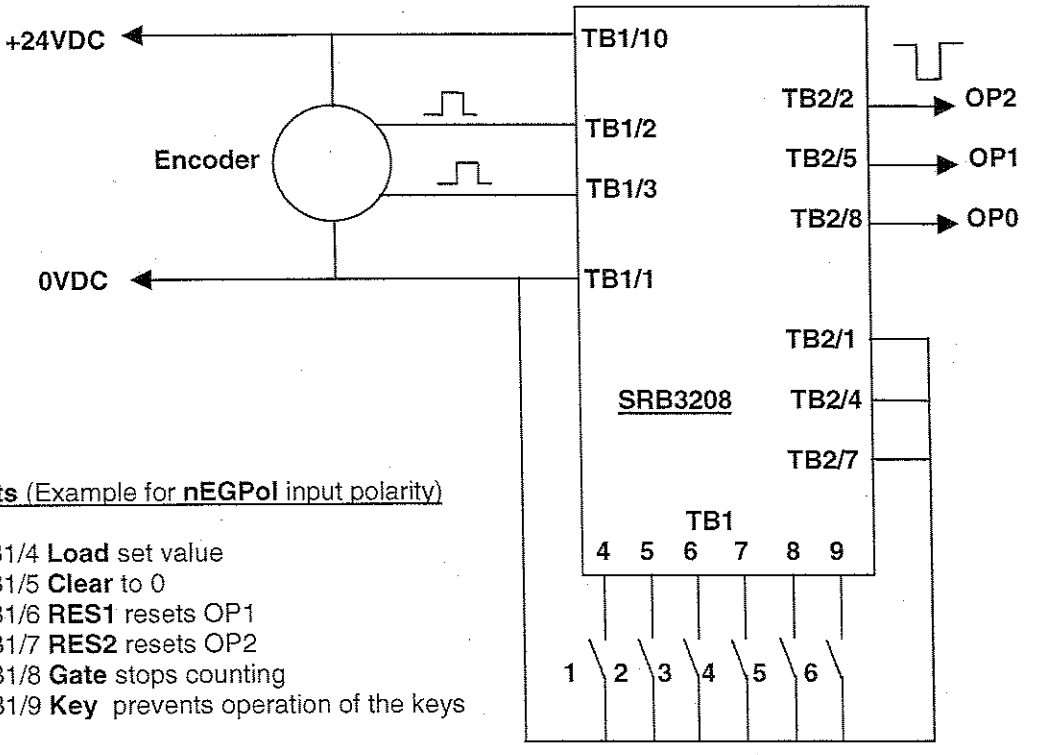
5. Connections



Terminal TB1	
1	0VDC (GND)
2	INPUT A
3	INPUT B
4	LOAD
5	CLEAR
6	RESET 1
7	RESET 2
8	GATE
9	KEY
10	+24VDC

Terminal TB2	
1	OUTPUT 2 emitter
2	OUTPUT 2 collector
3	Not connected
4	OUTPUT 1 emitter
5	OUTPUT 1 collector
6	Not connected
7	OUTPUT 0 emitter
8	OUTPUT 0 collector
9	Not connected

Fig.1. Example Connections:



Inputs (Example for **nEGPol** input polarity)

TB1/4 **Load** set value
TB1/5 **Clear** to 0
TB1/6 **RES1** resets OP1
TB1/7 **RES2** resets OP2
TB1/8 **Gate** stops counting
TB1/9 **Key** prevents operation of the keys

5.1. Inputs

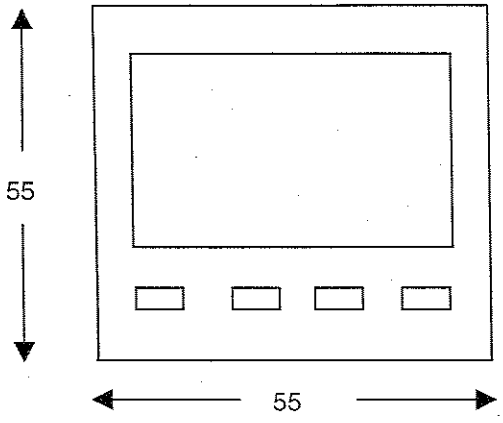
Use screened cables for connections to the Counter inputs. Connect screen to earth (PE) at the transmitter end. Avoid installing these cables near equipment that produces interference.

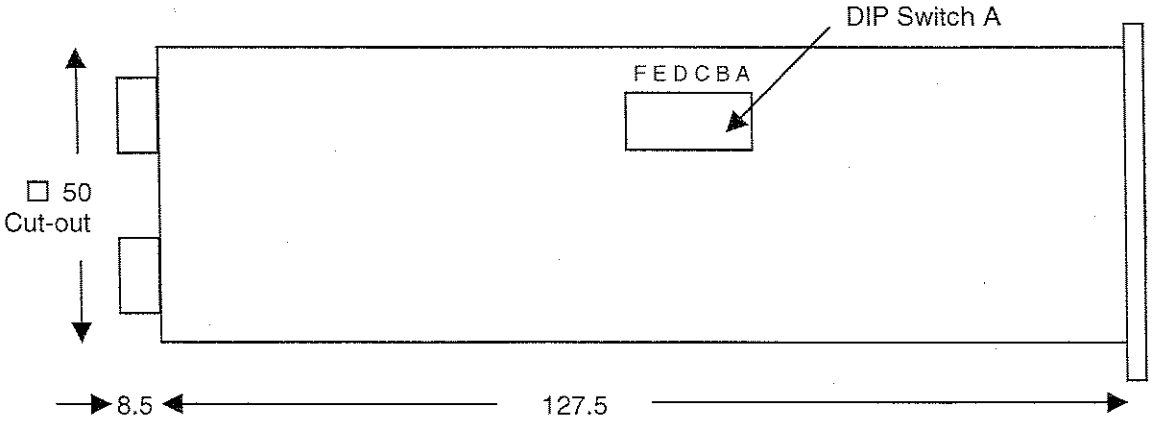
5.2. Outputs (Example in fig.1 shows **collector load** outputs)

The isolated outputs OP0, OP1 and OP2 have uncommitted collectors and emitters and each can be connected with a collector or emitter load (equivalent to an npn or pnp load). However, the collector must be connected such that it is always positive with respect to its emitter.

If a counter output operates an inductive load (ie. relay coil, solenoid etc) a free-wheel diode should be connected across the load.

7. Dimensions





8. Technical Data

8.1. Operating Voltage: 20 – 30Vdc at 5W

8.2. Display: 2 rows of 6 digits 7mm x 7 segment LCD display

8.3. Inputs:

Inputs A and B for pulse counting and direction

Programmable for single, doubling or quadrupling pulse counting

Programmable polarity for npn or pnp inputs

Maximum input frequency 100KHz

Input damping at 30Hz, 1KHz or 100KHz selected by DIL switch

Gate Input inhibits counting

Load Input loads the SET value into the counter

Clear Input sets the counter to zero

Reset 1 Input resets output 1

Reset 2 Input resets output 2

Key Input disables the keypads

Logic 0 = 0 to 4Vdc. Logic 1 = 16 to 24Vdc. Input resistance 10K

8.4. Outputs:

3 programmable opto-coupled outputs rated at 30Vdc and 15mA

Outputs may be programmed to reset counter with pulse counting or batch counting

Programmable output duration range 0.001 to 9.999s or continuous

8.5. Programming:

Menu-guided by display using 4 keypads

Prescaling Factor range 0.00001 to 9.99900 for engineering units

Decimal Point 0, 0.0, 0.00, 0.000 and 0.0000

8.6.Dimensions:

50 x 50mm panel cut-out

Depth 136mm