

# SEM1600F DIN RAIL FREQUENCY/PULSE CONDITIONER

## ➤ DUAL OR SINGLE UNIVERSAL FREQUENCY INPUTS SENSOR EXCITATION

## ➤ FREQUENCY (0.01 to 65000) Hz COUNTER (DC to 1000) Hz

## ➤ RATE, TOTALISE, K FACTOR, M FACTOR, MATHS

## ➤ RELAY OUTPUT

## ➤ mA, VOLTAGE, BIPOLAR VOLTAGE OUTPUT

## ➤ INTRODUCTION

The product is a cost effective “smart” powered conditioner that accepts all common process pulse signals with a frequency range between (0.01 to 65000) Hz in standard configuration and (DC to 1000) Hz in counter mode. Typical applications would be to measure flow or batch counting.

The product has a built-in capability to operate as a dual input which allows differential flow/count measurement with advanced maths functions. Or as a single channel input, with an external reset contact.

When operated in signal channel mode, the discrete input can be programmed to reset the total counter, batch counter or latched relay. The input can also be programmed to control the total counter direction with a combination of count-up, count-down or halt modes available.

## ➤ FEATURE HIGHLIGHTS

### THREE OPERATING MODES

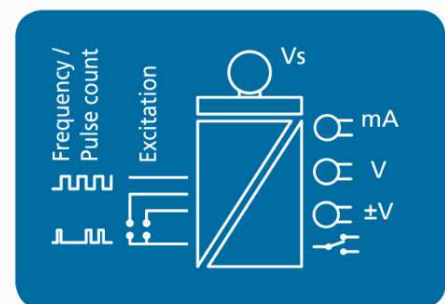
- Basic frequency mode to process signal mode, analogue + relay outputs.
- Advanced frequency mode with K factor, M factor, totalise, rate, maths functions, process signal, 12-point user linearisation for channel A using meter correction, analogue + relay outputs.
- Pulse counter mode with K factor, totalise, maths functions, process signal, analogue + relay outputs.

**USB CONFIGURATION** The product uses a built-in USB port for configuration, together with a simple to use, free menu-driven software configuration tool, allowing the user to take advantage of the products’ comprehensive specification.

**ANALOGUE OUTPUT** The output stage offers either voltage, bipolar voltage or active/passive current re-transmission signals. The output signal can be ranged to a scale anywhere within the process range.

**RELAY OUTPUT** A volt free output contact is provided capable of operating as either a trip relay, latched relay or pulsed relay. High and low-level relay functions are also available. Trip options on rate, count, totalize or maths functions.

**SIGNAL RETRANSMISSION SCALING** The input signal range for retransmission can be selected from any part of the maximum input capability. The output signal range can be selected from any part of the total output capability, for example (0 to 12) litres per minute input to (1 to 5) mA output.



# SEM1600F DIN RAIL FREQUENCY/PULSE CONDITIONER

ELECTRICAL INPUT Channel A, Channel B		SPECIFICATIONS @20 °C
Type	Range	Accuracy/ Stability/ Notes *1
Frequency Mode	(0.01 to 65000) Hz	
Minimum measuring value		0.01 Hz
Minimum cut off		0.02 Hz
Minimum pulse width		50 us
Sample time		0.1 s or 1 s
Type		
Counter Mode	(dc to 1000) Hz	
Minimum pulse width		50 us
Type Tacho (mV input)		
Low trigger		< 100 mV
High trigger		> 200 mV
Impedance		>100 KΩ
Over voltage		± 50 V
Type mA input		
Low trigger		< 1.2 mA
High trigger		> 2.1 mA
Impedance		1 KΩ
Type PNP, NPN, Contact		
Maximum current		16 mA @ 15 V excitation
Maximum current		9 mA @ 8 V excitation
Low trigger		< 1.2 mA
High trigger		> 2.1 mA
Impedance		1 KΩ
Type TTL		
Low trigger		< 1.0 V
High trigger		> 2.0 V
Impedance		100 KΩ
Sensor supply	15 Vdc ± 1.0 Vdc @ 25 mA	Excitation
Sensor supply Namur	8 Vdc ± 1.0 Vdc @ 25 mA	Excitation
Dual channel		Channel A frequency Channel B frequency
Single channel		Channel A frequency Channel B discrete
Discrete mode channel B input used for re-set or halt functions. Channel B offers all input sense options when set in discrete mode, in this mode input value is either high or low.		
NPN non-isolated inputs require external 2 KΩ pull up resistor.		

OUTPUT ANALOGUE mA CURRENT		SPECIFICATIONS @20 °C
Type/ Function	Range/ Description	Accuracy/ Stability/ Notes
Two wire current	(0 to 20) mA (4 to 20) mA	(mA output /2000) or 5 uA (Whichever is the greater)
Current source	(0 to 20) mA	Maximum load 750 Ω
Current sink	Supply voltage (10 to 30) VDC	SELV
Loop voltage effect		0.2 uA/ V (sink mode)
Maximum output		21.5 mA
Thermal stability	Zero at 20 °C	1 uA/ °C
The mA output range can be set to anywhere within the maximum capability		

# SEM1600F DIN RAIL FREQUENCY/PULSE CONDITIONER

OUTPUT ANALOGUE VOLTAGE		SPECIFICATIONS @20 °C
Type/ Function	Range/ Description	Accuracy/ Stability/ Notes
Two wire voltage	(0 to 10) VDC (-10 to 10) VDC	± 5 mV
Maximum output		10.5 VDC, -10.5 VDC
Thermal stability	Zero at 20 °C	± 10 $\mu$ V/°C
The voltage output range can be set to anywhere within the maximum capability		

OUTPUT RELAY	
Type/ options/ function	Description
Type	Single pole change-over (common, N/o, N/c)
Rating	24 VDC ; 0.5 A

USB CONFIGURATION USER INTERFACE		
Type/ options/ function	Description	Notes
Configuration hardware	USB mini B port	Cable not included
Configuration software	USBSpeedLink	Download <a href="http://www.status.co.uk">www.status.co.uk</a>
Operating system	Microsoft Windows	Windows 7 or later

USB CONFIGURATION USER INTERFACE BASIC FREQUENCY MODE		
Type/ options/ function	Description	Notes
Sensor configuration		TTL, NPN, PNP, contact, NAMUR, mV
Sensor signal A		TTL, NPN, PNP, contact, NAMUR, mV
Discrete input B		Minimum value 0.01 Hz
Cut low A	Input limit = 0.0 Hz	Maximum value 65 KHz
Cut high A	Input limit = 65 KHz	(0.1 or 1.0) s
Sample time A		(0 to 65000) Hz, for diagnostics
Pre-set sensor to setpoint	Locks input value A	(8 or 15) Vdc
Sensor excitation	Power supply out	Active high, active low
Channel B discrete input	Sense	Relay
Channel B discrete input	Reset action	
Relay configuration		
Relay action	High, low	Latched options
Relay source	Signal A	Hz
Set point		Hz
Hysteresis		Hz
Analogue output configuration		
Output source	Signal A	Hz
Input signal range	High, low	Hz
Output signal type	mA, V, bipolar V	
Output signal range	High, low	Any value within range for output type
Live data	Read sensor A	Hz
	Read discrete input B	High, low
	Output signal	In mA or V
	Record live data	Save data to CSV file
	Store configuration to PC	Save data to file
Other device options	Tag	Eight characters
	Factory reset	Return to original factory settings

# SEM1600F DIN RAIL FREQUENCY/PULSE CONDITIONER

USB CONFIGURATION USER INTERFACE ADVANCED FREQUENCY MODE		
Type/ options/ function	Description	Notes
Sensor configuration Channels Sensor signal A, B Cut low A, B Cut high A, B Sample time A, B Pre-set sensor to setpoint Sensor excitation Channel B as discrete Channel B as discrete Channel B as discrete	Dual or single + discrete  Input limit = 0.0 Hz Input limit = 65 KHz  Locks input value A, B Power supply out Sense Reset action (any combination) Count action	TTL, NPN, PNP, contact, NAMUR, mV Minimum value 0.01 Hz Maximum value 65 KHz (0.1 or 1.0) s (0 to 65000) Hz, for diagnostics (8 or 15) Vdc Active high, low Total A/Batch/Relay Up/down, up/halted, down/halted
Rate configuration Rate engineering units Input range A,B K factor A, B Meter correction Chl. A only	User defined High, low Number of pulses per unit Up to 12-point calibration	Six characters Hz to engineering unit Numeric value Hz * (0.1 to 10)
Total configuration *1 Total engineering units Total A, B Time base A, B Factor and divisor A, B Reset total at values A, B Reset total to value A, B	User defined Count   Up, down	Six characters Up, down, halted Second, minute, hour Numeric value Numeric value Numeric value
Function configuration Rate function Total function		A+B, A-B, highest, lowest A+B, A-B, highest, lowest
Relay configuration Relay action Relay source  Set point Hysteresis Total pulse out every: -*2 Pulse duration *2 Batch counter reset at:-	High, low, pulse Rate (A, B), total (A, B), rate function, total function  increments batch count  Resets to zero	Latching options  Engineering unit value Engineering unit value Engineering unit value (20 to 10000) ms Numeric value
Analogue output configuration Output source  Input signal range Output signal type Output signal range	Rate (A, B), total (A, B), rate function, total function High, low  High, low	Any value within engineering unit range mA, V, bipolar V Any value within range for output type
History	Software version Operational time Meter run time with input (A or B > 0.6 Hz) Maximum input frequencies Device data	Number Time period  Time period (A, B) Hz Number of power ups
Other device options	Tag Reset total A, B Reset batch Reset master counter Reset relay	Eight characters To zero (or pre-set value) To zero To zero Clear latched relay

# SEM1600F DIN RAIL FREQUENCY/PULSE CONDITIONER

Live data	Read sensor A, B Rate A, B Total A, B Discrete condition B Rate function Total function Batch count Analogue output signal Relay 1 state	Hz Engineering unit value Engineering unit value High, low Engineering unit value Engineering unit value Numeric value Value in mA, V or bipolar V Off, on
Record live data	Save data to CSV file, with adjustable log period	Date/time, input value(s), output value
Store configuration to PC	Save data to file	
*1 Total = (Rate * Factor) / (Time base * Divisor)		
*2 Pulse relay action only		

USB CONFIGURATION USER INTERFACE COUNTER MODE		
Type/ options/ function	Description	Notes
Sensor configuration Channels Sensor signal A, B Pre-set count to value Sensor excitation Channel B as discrete Channel B as discrete Channel B as discrete	Dual or single + discrete  Locks count value A, B Power supply out Sense Reset action (any combination) Count action	TTL, NPN, PNP, contact, NAMUR, mV Numeric value for diagnostics (8 or 15) Vdc Active high, low Total A/Batch/Relay Up/down, up/halted, down/halted
Total configuration Process units Total A, B K factor A, B Reset count at values A, B Reset count to value A, B	User defined Count Process units per count Up, down	Six characters Up, down, halted Numeric value Numeric value Numeric value
Function configuration Total function		A+B, A-B, highest, lowest
Relay configuration Relay action Relay source Set point Hysteresis Total pulse out every: -*1 Pulse duration *1 Batch counter reset at:-	High, low, pulse Total A, B, rate total function  Increment batch counter  Resets to zero	Latching options  Engineering unit value Engineering unit value Engineering unit value (20 to 10000) ms Numeric value
Analogue output configuration Output source Input signal range Output signal type Output signal range	Total A, B, total function High, low  High, low	Any value within engineering unit range mA, V, bipolar V Any value within range for output type
History	Software version Operational time Device data	Number Time period Number of power ups
Other device options	Tag Reset total A, B Reset batch Reset master count Reset relay	Eight characters To zero (or pre-set value) To zero To zero Clear latched relay

# SEM1600F DIN RAIL FREQUENCY/PULSE CONDITIONER

Live data	Read count A, B Process total A, B Discrete condition B Function Batch count Analogue output signal	Numeric value process unit value High, low Process unit value Numeric value Value in mA, V or bipolar V
Record live data	Save data to CSV file, with adjustable log period	Date/time, input value(s), output value
Store configuration to PC	Save data to file	
*1 Pulse relay action only		

GENERAL	
Function	Description
Update time	100 ms
Response time	200 ms
Start-up time	5 s (output condition lags)
Warm-up time	60 s until full accuracy
Galvanic isolation	Three way (input, output, supply) 500 Vdc
Default configuration	
State LED	Red = fault, green = OK, input and output condition monitored
Supply range	(10 to 32) VAC rms, (10 to 48) VDC SELV
Power	< 1 W @ full output current
Protection	Internal resettable fuse (0.5 A) + over-voltage protection

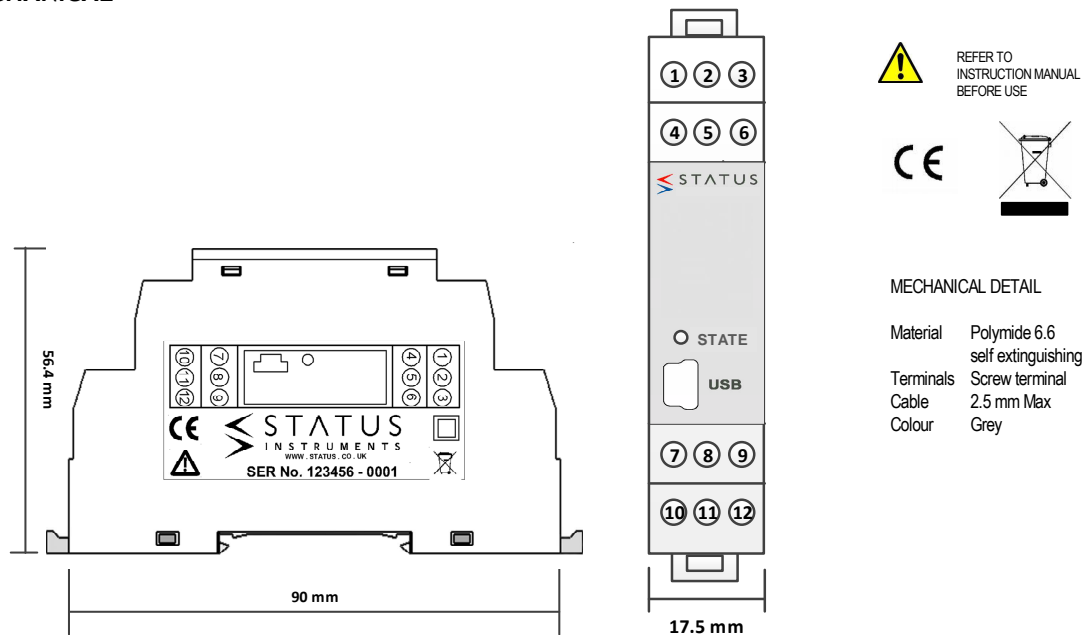
MECHANICAL	
Function	Description
Dimensions	17.5 mm width, 56.4 mm depth from rail, 90 mm height
Enclosure	DIN rail mount
Material	Polymide 6.6 self-extinguishing: Grey
Connections	Screw terminals 2.5 mm wire maximum
Weight	60 g approximate

ENVIRONMENTAL	
Function	Description
Ambient temperature	Operating / storage (-20 to 70) °C
Ambient Humidity	Operating / storage (10 to 90) %RH non-condensing
Protection requirement	Device must be installed in an enclosure offering >IP65 Protection
USB configuration ambient	(10 to 30) °C

APPROVALS	
EMC	BS EN 61326: Note - Sensor input wires to be less than 30 m to comply
Ingress protection	BS EN 60529
RoHS	Directive 2011/65/EU

# SEM1600F DIN RAIL FREQUENCY/PULSE CONDITIONER

## MECHANICAL



## ORDER CODE

Basic frequency	SEM1600F
Advanced frequency	
Pulse counter	

## ACCESSORIES

USB configuration software	USBSpeedLink free of charge from <a href="http://www.status.co.uk">www.status.co.uk</a>
Loop powered display	Refer to <a href="http://www.status.co.uk">www.status.co.uk</a>
48-200-0001-01	Standard USB A to USB mini B cable for configuration

To maintain full accuracy annual calibration is required contact [support@status.co.uk](mailto:support@status.co.uk) for details  
The data in this document is subject to change. Status Instruments assumes no responsibility for errors

Status Instruments Ltd  
Status Business Park  
Gannaway Lane, Tewkesbury  
Gloucestershire, UK  
GL20 8FD

Tel: +44 (0)1684 296818  
Fax: +44 (0)1684 293746  
Email: [sales@status.co.uk](mailto:sales@status.co.uk)  
Website: [www.status.co.uk](http://www.status.co.uk)

