SEM1600F DIN RAIL FREQUENCY/PULSE CONDITIONER

> **DUAL OR SINGLE UNIVERSAL FREQUENCY INPUTS SENSOR EXCITATION**

> **FREQUENCY (0.1 to 65000) Hz**
> **COUNTER (DC to 1000) Hz**

> **RATE, TOTALISE, K FACTOR, M FACTOR, MATHS**

> **RELAY OUTPUT**

> **USB PC CONFIGURATION, ANDROID VIEW**

> ## INTRODUCTION

The product is a cost effective "smart" powered conditioner that accepts all common process pulse signals with a frequency range between (0.1 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.

USB PC CONFIGURATION
The SEM1600F is quick and easy to configure using a standard-type USB lead and the free-of-charge USBSpeedLink Windows software.

USB ANDROID VIEW The SEM1600F can be connected to an Android phone or tablet using an OTG USB adaptor. Running a free App the Android device can then be used to view live data from the SEM1600F

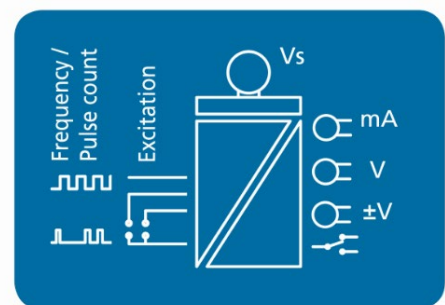> ## FEATURE HIGHLIGHTS

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 Minimum measuring value Minimum cut off Minimum pulse width Sample time	(0.1 to 65000) Hz 1 Hz resolution above 65 Hz	 0.1 Hz 0.1 Hz 50 us 0.1 s or 1 s
Type		
Counter Mode Minimum pulse width	(dc to 1000) Hz	 50 us
Type Tacho (mV input)		
Low trigger High trigger Impedance Over voltage		< 100 mV > 200 mV >100 KΩ ± 50 V
Type mA input		
Low trigger High trigger Impedance		< 1.2 mA > 2.1 mA 1 KΩ
Type PNP, NPN, Contact		
Maximum current Maximum current Low trigger High trigger Impedance		16 mA @ 15 V excitation 9 mA @ 8 V excitation < 1.2 mA > 2.1 mA 1 KΩ
Type TTL		
Low trigger High trigger Impedance		< 1.0 V > 2.0 V 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 uV/°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 www.status.co.uk
Operating system	Microsoft Windows	Windows 7 or later

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

SEM1600F DIN RAIL FREQUENCY/PULSE CONDITIONER

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

SEM1600F DIN RAIL FREQUENCY / PULSE CONDITIONER

Live data	Read count A, B	Numeric value
	Process total A, B	process unit value
	Discrete condition B	High, low
	Function	Process unit value
	Batch count	Numeric value
	Analogue output signal	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		

ANDROID USER INTERFACE

Type/Function	Range/Description	Accuracy/Stability/Notes
Hardware	USB Lead	OTG plus A to Mini B
Software	USBVeiw	Download from www.status.co.uk
Read live data	Signal	Channel A Hz, Channel B Hz/Digital state
	Process variable	Process unit
	Output	mA, V, ±V, Relay state

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

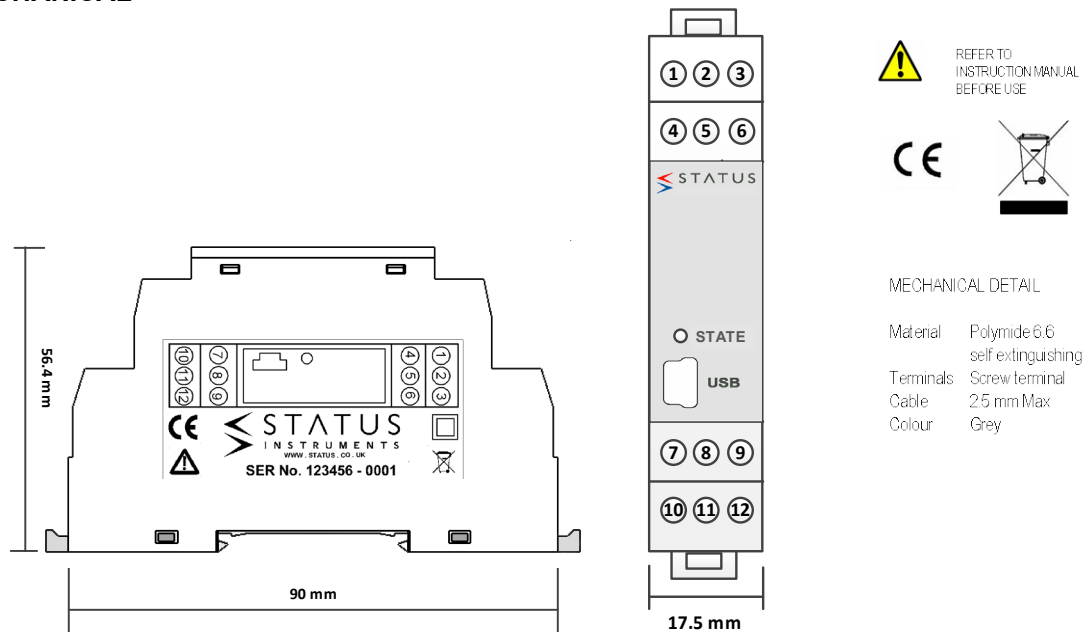| Function	Description
Ambient temperature	Operating / storage (-20 to 70) °C
Ambient Humidity	Operating / storage (10 to 90) %RH non-condensing
Protection requirement	Device must be installed in an enclosure offering >IP65 Protection
USB configuration ambient	(10 to 30) °C

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

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MECHANICAL

MECHANICAL DETAIL

Material	Polyamide 6.6 self extinguishing
Terminals	Screw terminal
Cable	2.5 mm Max
Colour	Grey

REFER TO INSTRUCTION MANUAL BEFORE USE

ORDER CODE

Basic frequency	**SEM1600F**
Advanced frequency	
Pulse counter	

ACCESSORIES

USB configuration software	USBSpeedLink free of charge from www.status.co.uk
Android live data view	USBView free of charge from www.status.co.uk
Loop powered display	Refer to www.status.co.uk
USB Leads	Contact sales@status.co.uk

To maintain full accuracy annual calibration is required contact support@status.co.uk for details
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