

## SEM1600F USER INSTRUCTIONS

### Important - Please read this document before installing.

Every effort has been taken to ensure the accuracy of this document; however, we do not accept responsibility for damage, injury, loss or expense resulting from errors and omissions, and we reserve the right of amendment without notice.

### IMPORTANT – CE, UKCA & SAFETY REQUIREMENTS

Product must be DIN rail mounted, inside a suitable enclosure providing environmental protection to IP65 or greater.

To maintain CE UKCA requirements, input and supply wires must be less than 30 metres.

The product contains no serviceable parts, or internal adjustments. No attempt must be made to repair this product. Faulty units must be returned to supplier for repair. Before attempting any electrical connection work, please ensure all supplies are switched off.

ABSOLUTE MAXIMUM CONDITIONS (To exceed may cause damage to the unit).	
Supply voltage (SELV)	± 50 Vdc Protected for over-voltage and reverse connection
Current with over-voltage	± 200 mA
Input voltage	± 50 VDC, 35 v rms between any terminals
Input current	± 100 mA between any terminals
Environmental protection	IP65 or greater required
Ambient	Temperature (-30 to 75) °C RH (10 to 95)% non-condensing

**UK CA CE**    **Important – Read this document before installing.**

### 1-DESCRIPTION.

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

### 2-RECEIVING AND UNPACKING.

**Please** inspect the packaging and instrument thoroughly for any signs of transit damage. If the instrument has been damaged, please notify your supplier immediately.

### 3-SPECIFICATION.

Refer to the datasheet for full specification. Download at [www.status.co.uk](http://www.status.co.uk)

Factory defaults	I/P (4 to 20) mA Damping Rise 0 s, Fall 0 s O/P (4 to 20) mA
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### 4-INSTALLATION AND WIRING.

#### Important safety requirements

This equipment is suitable for Environment Installation BS EN61010-1 Pollution Degree 2; Installation CAT II; CLASS I and is classed as "PERMANENTLY CONNECTED EQUIPMENT". The equipment is intended for industrial and commercial application only and is not suitable for domestic or medical use.

The equipment must be mounted inside an enclosure that provides protection >= IP65. In NORMAL USE, the equipment will only be accessed for maintenance by qualified personnel.

**Please** ensure the equipment is mounted vertically with terminals (10, 11 and 12) at the bottom. This will provide maximum ventilation.

This equipment may generate heat. Ensure the enclosure size is adequate to dissipate heat. Be sure to consider any other equipment inside the enclosure.

The equipment surfaces may be cleaned with a damp cloth. Use a mild detergent/water. Ensure the supply is off before cleaning and, on completion of cleaning, the equipment is completely dry before the supply is turned back ON.

This equipment must be installed by a qualified person. All electrical wiring must be carried out in accordance with the appropriate regulations for the place of installation.

### 4.1~MECHANICAL.

Dimensions

Height 90 mm, Width 17.5 mm, Depth 56.4 mm

The equipment must be mounted on a DIN rail style DIN EN50022 inside a plastic or metal enclosure with a protection level >= IP65. All wiring must be secured. Maximum cable sizes 2.5 mm<sup>2</sup>. Connection is via screw clamp terminals.

### 4.2~ELECTRICAL CONNECTIONS

For wiring connections refer to the side label on the SEM1600F and this document.

**Supply** (10 to 48) Vdc, (10 to 32) Vac

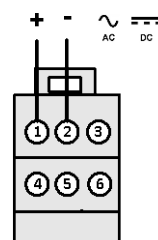
To maintain CE EMC requirements, input and supply wires must be less than 30 metres.

**Input** cable lengths > 3 m it is recommended to use screened or twisted pair.

**Maximum** mA output cable run = 1000 metres. The output loop should be grounded at a single point. Use twisted pair or screened cable.

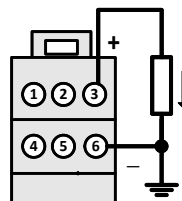
**Before** installation, care must be taken to ensure enough voltage is available in any loop to drive the total loop load.

### SEM1600F Connections



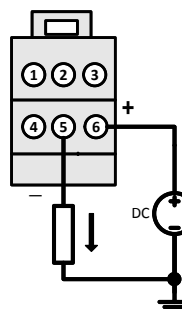
#### SUPPLY

Type	Local supply
dc	(10 to 48) V
ac	(10 to 32) V rms
Power	< 1 VA



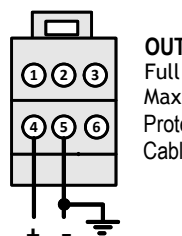
#### OUTPUT mA SOURCE

Type	Current signal, SEM1600F powered
Full Range	(0 to 20) mA
Max Load	750 R
Protection	Over voltage > 33 V



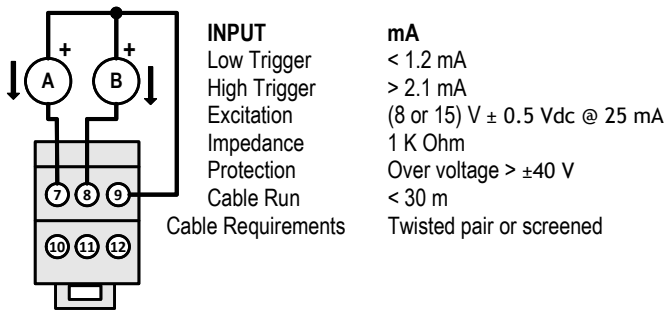
#### OUTPUT mA SINK

Type	Current signal, externally powered
Full Range	(0 to 20) mA
Loop Supply	(10 to 30) Vdc
Protection	Over voltage > 33 V



#### OUTPUT VOLTAGE or BIPOLAR VOLTAGE

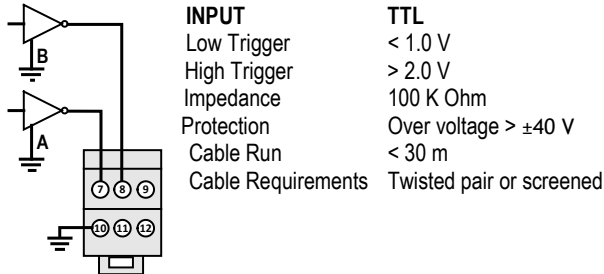
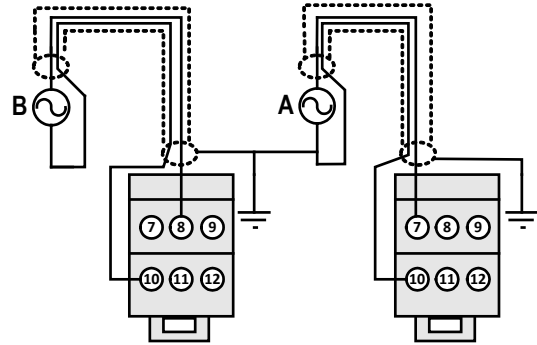
Full Range	(0 to 10) V dc or ±10.0 Vdc
Max Load Current	± 5 mA
Protection	Over voltage > ±15 V
Cable Run	< 30 m, must be earthed at one point



**INPUT**  
 Low Trigger < 1.2 mA  
 High Trigger > 2.1 mA  
 Excitation (8 or 15) V ± 0.5 Vdc @ 25 mA  
 Impedance 1 K Ohm  
 Protection Over voltage > ±40 V  
 Cable Run < 30 m  
 Cable Requirements Twisted pair or screened

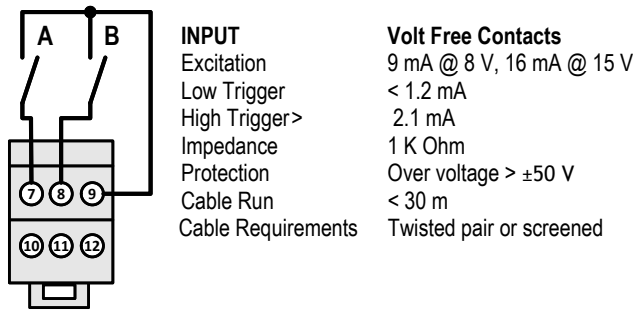
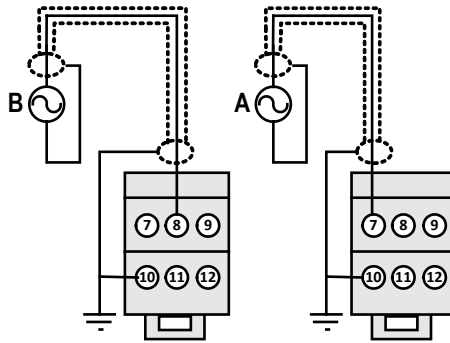
**INPUT** **mV (TACHO)**  
 Low Trigger < 100 mV  
 High Trigger > 200 mV  
 Impedance 100 K Ohm  
 Protection Over voltage > ±40 V  
 Cable Run < 30 m  
 Cable Requirements Twisted pair or screened

**Screened cable**

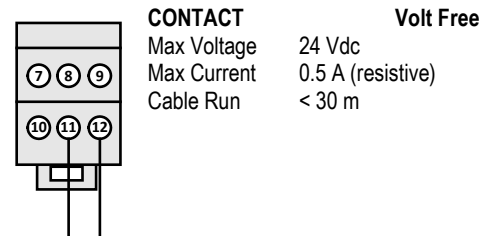


**INPUT**  
 Low Trigger < 1.0 V  
 High Trigger > 2.0 V  
 Impedance 100 K Ohm  
 Protection Over voltage > ±40 V  
 Cable Run < 30 m  
 Cable Requirements Twisted pair or screened

**Single core screened cable**



**INPUT**  
 Excitation 9 mA @ 8 V, 16 mA @ 15 V  
 Low Trigger < 1.2 mA  
 High Trigger > 2.1 mA  
 Impedance 1 K Ohm  
 Protection Over voltage > ±50 V  
 Cable Run < 30 m  
 Cable Requirements Twisted pair or screened

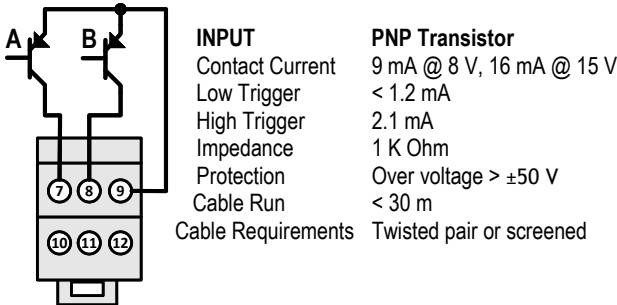


**CONTACT**  
 Max Voltage 24 Vdc  
 Max Current 0.5 A (resistive)  
 Cable Run < 30 m

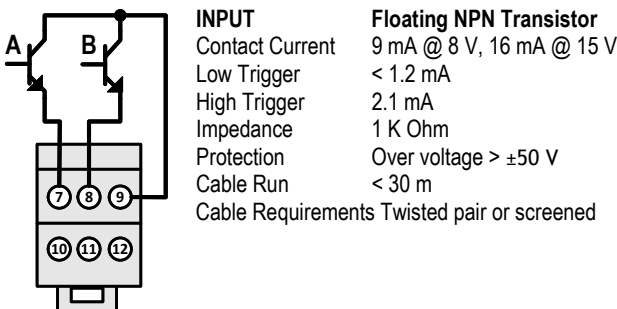
**Volt Free**

**4.3~STATE LED**

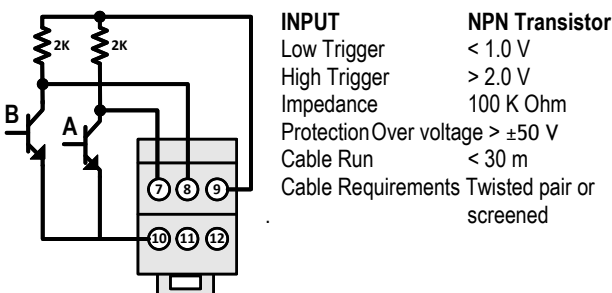
The State LED is GREEN under normal run conditions indicating an in-range input signal. If the input signal is out of range or is lost, the State LED will light RED.



**INPUT**  
 Contact Current 9 mA @ 8 V, 16 mA @ 15 V  
 Low Trigger < 1.2 mA  
 High Trigger 2.1 mA  
 Impedance 1 K Ohm  
 Protection Over voltage > ±50 V  
 Cable Run < 30 m  
 Cable Requirements Twisted pair or screened



**INPUT**  
 Contact Current 9 mA @ 8 V, 16 mA @ 15 V  
 Low Trigger < 1.2 mA  
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**INPUT**  
 Low Trigger < 1.0 V  
 High Trigger > 2.0 V  
 Impedance 100 K Ohm  
 Protection Over voltage > ±50 V  
 Cable Run < 30 m  
 Cable Requirements Twisted pair or screened

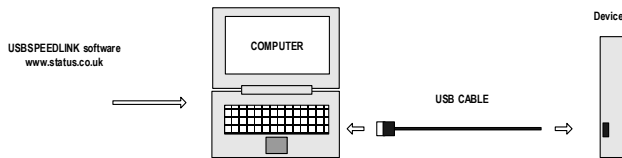
## 5~USER CONFIGURATION.

The SEM1600F can be configured using a Windows PC. Live input and output values can also be viewed on a PC or a suitable Android device.

### 5.1~PC CONFIGURATION USBSpeedLink Software

**!** During configuration the equipment takes its power from the USB port, therefore no power connection is required. The equipment can be configured whilst powered but the computer used must be portable battery-powered or a USB isolator should be used to isolate the SEM1600F from the supply earth to avoid grounded earth loop effects.

Observe any warning information given in the software.

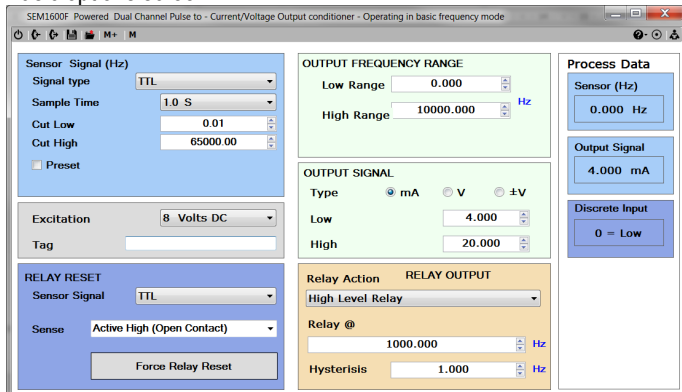


### 5.1~PC CONFIGURATION

PC Configuration steps	
1	Download and install the USBSpeedLink software from <a href="http://www.status.co.uk">www.status.co.uk</a>
2	Run the software and open to the correct screen for the SEM1600F
3	Connect to the PC using an A to Mini B USB lead.*1
4	Read the SEM1600F configuration into the software. Three modes are available Basic, Advanced and Counter. Configure the device to the required settings for operation
5.1	See 5.1 for Basic Operation
5.2	See 5.2 for Advanced Operation
5.3	See 5.3 for Counter Operation
6	Read data: Live process data can be displayed showing input and output values. This can only be done if the device is powered as well as connected to the software via the USB lead.*3 See 5.5 for Process Data
7	Write/Save the configuration to the device.*2
*1 Once only, on the first time connecting to the SEM1600F, drivers will install to the PC, allow time for this before proceeding.	
*2 The configuration is not saved onto the device unless the configuration screen is sent.	
*3 The SEM1600F can be configured whilst connected and powered, but a portable battery powered computer or USB isolator must be used to avoid the effects of ground loops.	

### 5.1~Basic options

#### Basic options screen



#### Basic Configuration Steps

This is the simplest mode of operation and should be suitable for most applications. The SEM1600F operates as a single channel frequency meter, giving an analogue and a relay output based upon the input value.

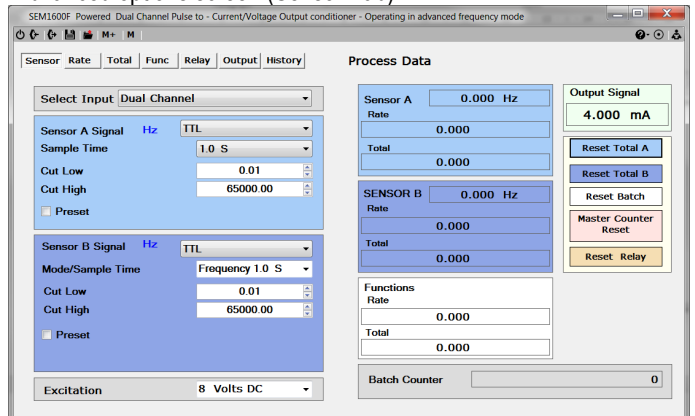
#### SENSOR

Signal type	Select the sensor input type from the dropdown
Sample Time	Select average sample time from the dropdown

Cut Low	The value at which the input Frequency will be considered to read 0 Hz. This is used to reduce delays on reading Zero
Cut High	Maximum sensor speed. Used to avoid overrange errors
Pre-set	A diagnostic tool to test the response of the SEM1600F at simulated pre-set frequencies
Excitation	Power supply to sensor, select from dropdown
Tag	Free type field
RELAY RESET	
Sensor Signal	Input type for latched relay reset. Select from dropdown
Sense	High, Low. Select from dropdown
Force Reset	Software Relay reset
OUTPUT FREQUENCY RANGE	
Low Range	Frequency value in Hz to map to analogue Low value
High Range	Frequency value in Hz to map to analogue High value
OUTPUT SIGNAL	
Type	mA, V or $\pm$ V analogue signal. Select from radio buttons
Low	Analogue value map to frequency Hz Low value
High	Analogue value map to frequency Hz High value
RELAY ACTION	
Relay Action	Type of relay Alarm required. Select from dropdown
Relay	Setpoint value for relay Alarm
Hysteresis	Dead-band value in Hz, will hold relay in Alarm when the input value comes out of alarm condition (excluding Latched Alarms)

### 5.2~Advanced options

#### Advanced options screen (Sensor Tab)



#### Advanced Configuration Steps

Advanced mode of operation giving functionality such as two channel comparisons, totalisation and user linearisation.

#### SENSOR TAB

See Basic Configuration Steps (SENSOR), (Excitation)

Use this Tab to set up the SEM1600F with a single or dual channel input. With single CH input the second CH can be used as a digital switch with options to reset or pause the Total/Batch and Relay. With dual CH selected the two inputs can be used in comparisons of the rate and total values, A-B, Highest or Lowest

#### RATE TAB

Use to set up the frequency range to an engineering range, Lt/min for example.

Allows the use of a K factor value to be entered.

For CH A only gives the option of a 15-point Meter correction for use with sensor calibration certificates.

#### TOTAL TAB

The SEM1600F can be used to totalise the rate from both input channels. The total value can be used for the source of analogue and relay outputs. The channel totalisation settings are independent of each other allowing flow meters of different types to be compared.

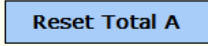

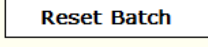
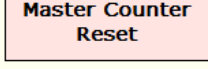
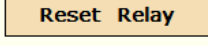
#### FUNCTION TAB

Use this TAB to set up functions of comparison for the input values of Rate and Total for channel A and B.

The functions can then be used as the source of analogue and relay outputs.

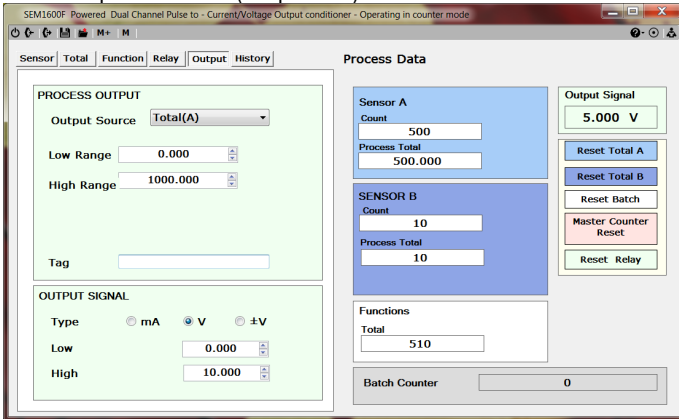
<b>Advanced Configuration Steps (continued)</b>
<b>RELAY TAB</b>
See Basic Configuration Steps (RELAY RESET), (RELAY ACTION)
Select options for the relay output. Rate, Total and Function options This Tab is also used to reset the Batch counter (count of the number of times the Total has reset)
<b>OUTPUT TAB</b>
See Basic Configuration Steps (OUTPUT SIGNAL), (Tag)
Select options for the analogue output. Rate, Total and Function options.
<b>HISTORY TAB</b>
Displays information on the maximum frequency input to the SEM1600F (pre-set values excluded) Also, the total runtime for the instrument, this can be used in maintenance planning.
<b>RESET CONTROL BUTTONS</b>
Options for resetting various values are available in the configuration software.

**Reset Control Buttons**

	Reset Total A to Reset Value
	Reset Total B to Reset Value
	Reset Batch count to 0
	Reset Master Counter to 0
	Reset latched Relay

**5.3~Counter options**

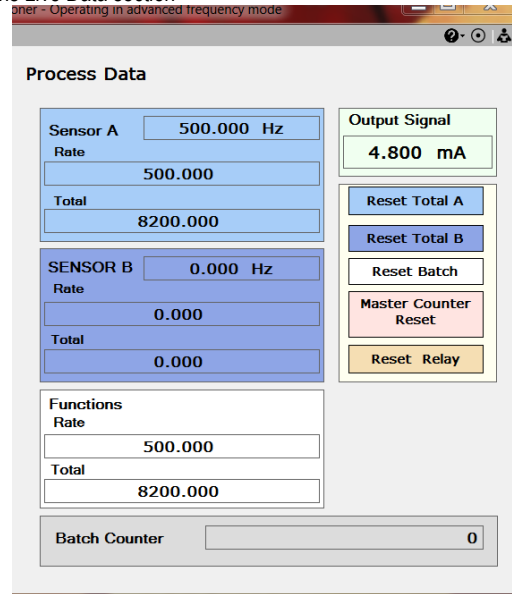
**Counter options screen (Output Tab)**



<b>Counter Configuration Steps</b>
In this mode the SEM1600F acts a pulse counter, counting the number of pulses on the input and not the frequency of the pulses. This makes the SEM1600F suitable for use on count monitoring applications.
See Advanced Configuration Steps
The configuring in the Counter mode is similar as for the Advanced mode. Rate and Rate Functions are not applicable in the Counter mode

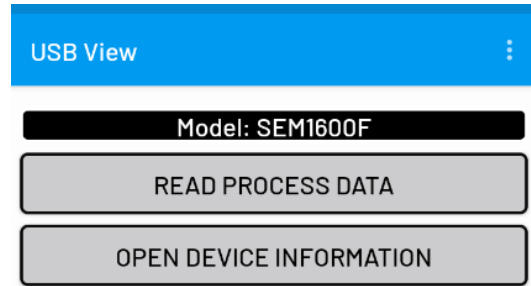
**5.5~Live Data**

All screens Live Data section



**5~5 ANDROID MONITORING USB View Software**

Using a suitable OTG USB lead to connect the SEM1600F to an Android device, live data reading can be taken.  
The USBView app. can display input temperature/value, output mA/V and the Tag information.



READ PROCESS DATA displays information on input and output conditions

