DIN RAIL PULSE/FREQUENCY/CONDITIONER

SEM1600F

- DUAL OR SINGLE UNIVERSAL FREQUENCY INPUT(S) PLUS EXCITATION
- MODES FREQUENCY (0.01 to 65000) Hz ; COUNTER (DC to 1000) Hz
- RATE/TOTALISE, K FACTOR, M FACTOR, MATHS FUNCTIONS
- SECOND INPUT ACTS AS RE-SET IN SINGLE CHANNEL MODE
- VOLT FREE CONTACT RELAY,LATCHED RELAY,PULSE ACTIONS OUTPUT(S)
- ISOLATED OUTPUT CURRENT SINK/SOURCE or BIPOLAR VOLTAGE
- AC/DC POWER SUPPLY

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.

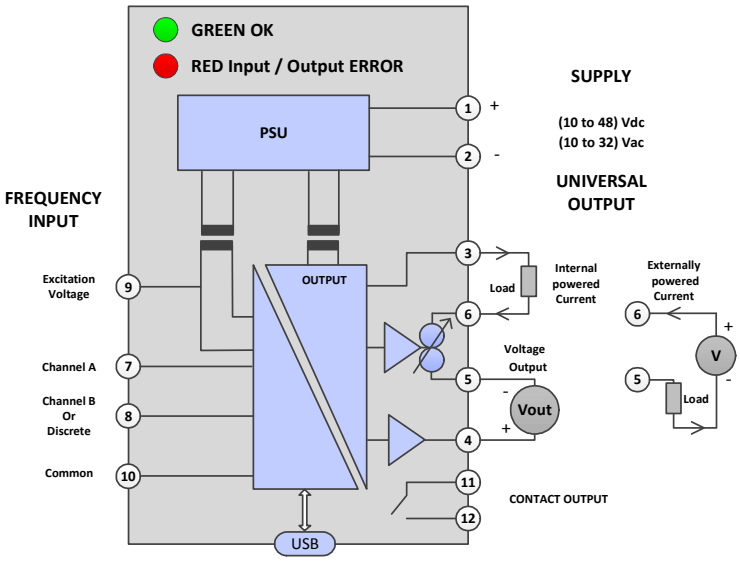
When operated in signal channel mode, the discrete input can be programmed to reset the total counter, batch counter or latched relay. The input can also be programmed to control the total counter direction with a combination of count up /count down or halt modes available.

A volt free output contact is provided capable of operating as either a relay, latched relay or pulsed relay. High and low level relay functions are also available.

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

The product uses a 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. The device can be configured to operate in three modes:-

- Frequency to process signal mode plus relay
- Advanced frequency mode with K factor, M factor, totalise, rate, maths functions, process signal + relay
- Counter mode with K factor, totalise, maths functions, process signal + relay



STATUS INSTRUMENTS

PC CONFIGURATION

EQUIPMENT

COMPUTER	Running Windows XP or later with USB port
USB CABLE	A to mini B

METHOD

Load PC with USB SPEEDLINK software.
Connect SEM1600F USB port to PC USB port using cable.
Run software, set configuration required and save to device.

SPECIFICATION @ 20°C

OPERATION MODES

Dual Channel	Channel A Frequency Channel B Frequency
Single Channel	Channel A frequency Channel B discrete input

INPUT TYPE

Note channel B offers all input sense option when set in discrete mode. In this mode channel B input value is either high or low.

Frequency Mode

Frequency Range	(0.01 to 65000) Hz
Min measuring Value	0.01 Hz
Min cut off	0.01 Hz
Min pulse width	50 uS
Sample Time	0.1 S or 1 S

Counter Mode

Range	(DC to 1000) Hz
Min pulse width	50 uS

Tacho (mV) input

Low trigger	< 100 mV
High Trigger	> 200 mV
Impedance	>100 KΩ
Over voltage	± 50 V

mA Input

Low trigger	< 1.2 mA
High Trigger	> 2.1 mA
Impedance	1 KΩ

PNP, NPN, Contact

Current Max	16 mA @ 15 V Excitation
Current Max	9 mA @ 8 V Excitation
Low trigger	< 1.2 mA
High Trigger	> 2.1 mA
Impedance	1 KΩ

TTL input

Low trigger	< 1.0 V
High Trigger	> 2.0 V
Impedance	100 KΩ

Sensor supply

Namur	8 V dc ± 1.0 V @ 25 mA
Sensor	15 V dc ± 1.0 V @ 25 mA

OUTPUT VOLT FREE CONTACT

Max Voltage	24 V dc
Current	0.5 A dc
Relay Actions	High/Low level relay, High/Low latched relay
Frequency Mode Signal	Rate A, Total A, Rate B, Total B, Rate Maths Function, Total Maths Function.
Counter Mode Signal	Total A, Total B, Total Maths Function.
Pulse output	Period (20 to 10000) mS
Frequency Mode Signal	Total A, Total B, Total Maths Function.
Counter Mode Signal	Total A, Total B, Total Maths Function.

ANALOGUE OUTPUT

Output Types	Current /Voltage
Frequency Mode Signal	Rate A, Total A, Rate B, Total B, Rate Maths Function, Total Maths Function.
Counter Mode Signal	Total A, Total B, Total Maths Function.

OUTPUT CURRENT

Output Types	current sink, source
Current sink	Supply voltage (10 to 30) V dc
Current source	Max Load 750 R
Range	(0 to 20) mA
Max Range	21.5 mA
Output Connection	Screw Terminal
Accuracy	(mA output /2000) or 5 uA (Whichever is the greater)
Loop Voltage effect	0.2 uA / V (Sink Mode)
Thermal drift	1 uA / °C

OUTPUT VOLTAGE

Voltage output	Max Load current 5 mA
Range	(0 to 10) V, (-10 to 10) V
Max Range	10.5 V
Output Connection	Screw Terminal
Accuracy	± 5 mV

GALVANIC ISOLATION

Three port	500 V dc

GENERAL SPECIFICATION

Update time	100 mS
Response Time	200 mS
Start up time	4 seconds (Output start up condition lags)
LED Indication (STATE)	Green OK , Red = Input / Output Error
Warm-up time	1 minute to full accuracy
Active Scaling	Allows scaling of output against active input, Using USB port
Ambient storage temperature	(-20 to +70) °C
Ambient humidity range	(10 to 90) % RH non condensing

SUPPLY

Range	(10 to 48) V dc (10 to 32) V rms ac
Power	< 1 W @ full output current
Protection	Internal resettable fuse (0.5 A) + Over Voltage protection.

APPROVALS

EMC - BS EN 61326	Electrical equipment for measurement control and laboratory use.

Note - Signal input wires to be less than 30 metres to comply.
NPN inputs require external 2 KΩ pull up resistor.

STATUS INSTRUMENTS

CONFIGURATION

DUAL CHANNEL FREQUENCY MODE

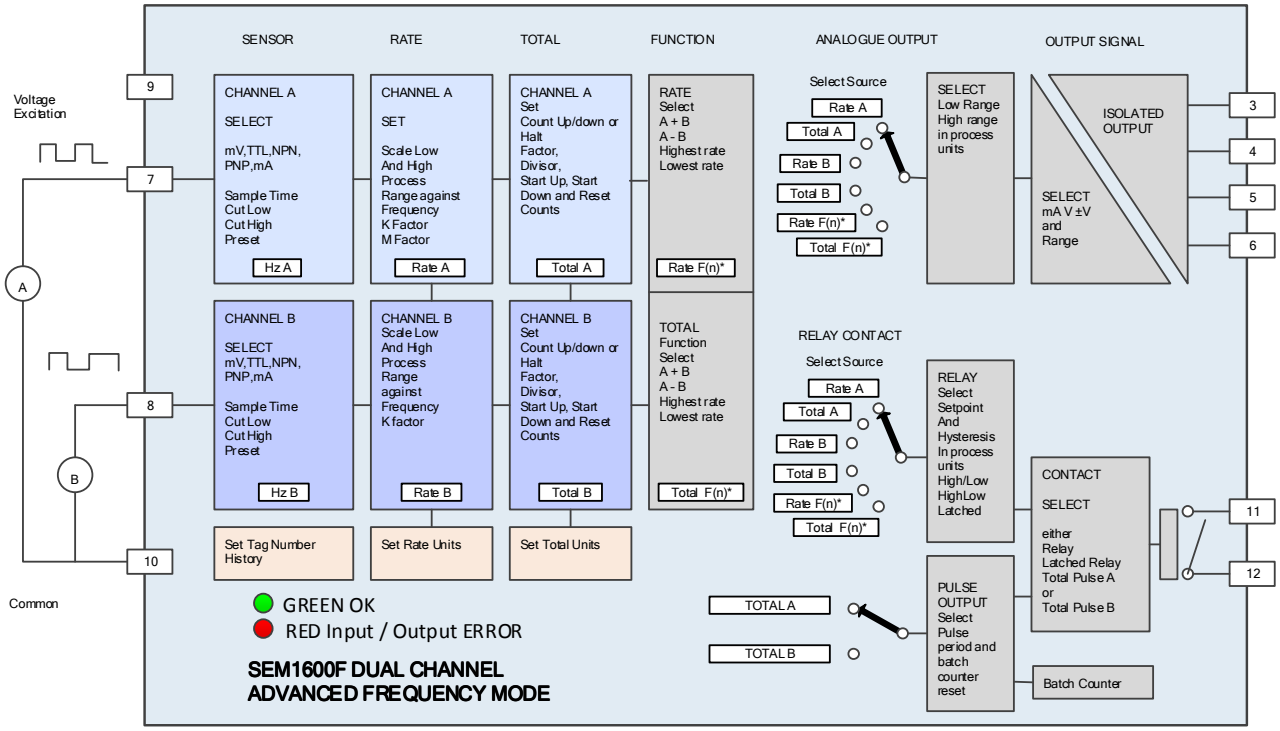
Sensor Excitation	8 V or 15 V dc
Channel A Channel B	
Sensor	
Type	TTL, mA, PNP, NPN, Contact, mV
Sample Time	100 mS or 1 second
Cut Low	(0.01 to 50000) Hz
Cut High	(5.0 to 65000) Hz
Preset	Sensor override user set signal
Rate	
Rate Low	Scale process low to frequency
Rate High	Scale process high to frequency
K factor	Range 0.0001 to 100000.0
M factor	15 correction points
Total	
Total direction	Count up, count down or halted
Total time base	Second, Minute, Hour
Total factor	(1 to 1000000)
Total Divisor	(1 to 100000)
Total Range	±10000000.000
Total Variables	Start, Reset-up, Reset-Down
COMMON	
Rate Units	6 Characters
Total units	6 Characters
Tag Number	8 Characters
FUNCTIONS	
Rate	A + B, A - B, Highest, Lowest Total A + B, A - B, Highest, Lowest
CONTACT	
Relay (Normally open)	
Action	High/low level relay, High/low level latched relay
Source	RateA, RateB, TotalA, TotalB, Rate Maths Function or Total Maths Function.
Hysteresis	(1 to 100000) units
Latch Reset	USB reset or power down
Pulse output (normally open)	
Source	TotalA or TotalB, Total Maths Function
Pulse period	(20 to 10000) mS
Batch counter	Advance on pulse
Batch Reset	1 to 100000000
ANALOGUE PROCESS OUTPUTS	
Source	RateA, TotalA, RateB, TotalB, Rate Maths Function or Total Maths Function
Low, High Range	Within working range
OUTPUT SIGNAL	
Type	mA, Volts, ± Volts
Low Scale	Any within O/P Range
High Scale	Any within O/P Range
LIVE PROCESS DATA READ, LOG	
Channel A	Hz, Rate, Total
Channel B	Hz, Rate, Total
Functions	Rate Maths Function, Total Maths Function
Batch Counter	Batch Total
Logger Type	desktop file *.txt format
Logger Period	(0.04 to 30) Minutes
Time Stamp	Each reading (log only)
LIVE COMMANDS	
Individual Resets	Total A, Total B, Batch
Master Reset	Total A, Total B, Batch
Relay	Reset Latched Relay

SINGLE CHANNEL FREQUENCY MODE

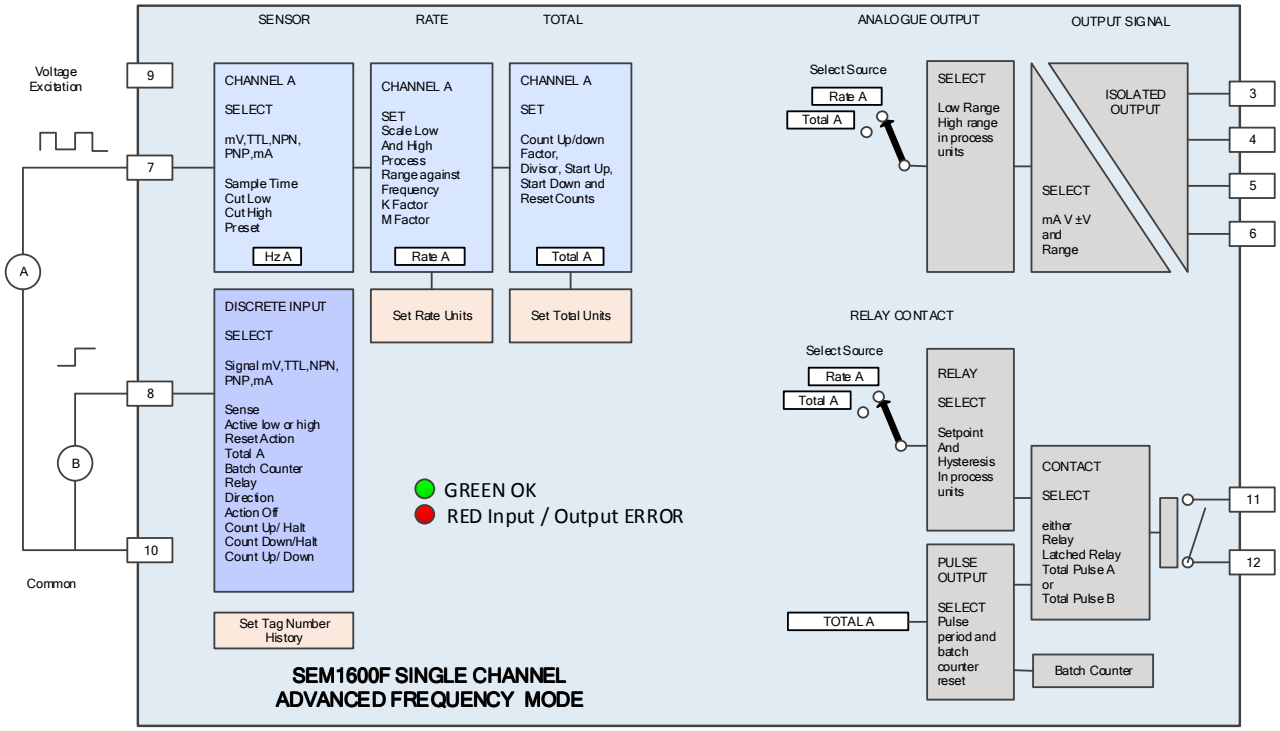
Sensor Excitation	8 V or 15 V dc
Channel A	
Sensor	
Type	TTL, mA, PNP, NPN, Contact, mV
Sample Time	100mS or 1 second
Cut Low	(0.00 to 50000) Hz
Cut High	(5.0 to 65000) Hz
Rate	
Rate Low	Scale process low to frequency
Rate High	Scale process high to frequency
K factor	Range 0.0001 to 100000.0
M factor	15 correction points
Total	
Total direction	Count up or count down
Total time base	Second, Minute, Hour
Total factor	(1 to 1000000)
Total Divisor	(1 to 100000)
Total Range	±10000000.000
Total Variables	Start, Reset-up, Reset-Down
Channel B	
Sensor	
Type	TTL, mA, PNP, NPN, Contact, mV
Active	Contact open (input High) or Contact Closed (low input)
Action Single or multi	Reset Total A, Reset Total B Reset Relay. Counter control, Off, Up/Halt, down/halt or up/down.
COMMON	
Rate Units	6 Characters
Tag Number	8 Characters
CONTACT	
Relay (Normally open)	
Action	High/low level relay, High/low level latched relay
Source	RateA, TotalA,
Hysteresis	(1 to 100000) units
Latch Reset	USB reset or power down or discrete
Pulse output (normally open)	
Source	TotalA
Pulse period	(20 to 10000) mS
Batch counter	Advance on pulse
Batch Reset	1 to 100000000
ANALOGUE PROCESS OUTPUTS	
Source	RateA, TotalA, Total Maths Function
Low Range	Within working range
High Range	Within working range
OUTPUT SIGNAL	
Type	mA, Volts, ± Volts
Low Scale	Any within O/P Range
High Scale	Any within O/P Range
LIVE PROCESS DATA READ, LOG	
Channel A	Hz, Rate, Total
Channel B	0 or 1 (1 = active)
Batch Counter	Batch Total
Logger Type	Save to desktop file *.txt format
Logger period	(0.04 to 30) Minutes
Time Stamp	Each reading (log only)
LIVE COMMANDS	
Individual Resets	Total A, Batch
Master Reset	Total A, Batch
Relay	Reset Latched Relay

STATUS INSTRUMENTS

DIN RAIL PULSE/FREQUENCY/CONDITIONER



F(n) *= Maths Function



STATUS INSTRUMENTS

DUAL CHANNEL COUNTER MODE

Sensor Excitation	8 V or 15 V dc

Channel A Channel B

Sensor

Type	TTL, mA, PNP, NPN, Contact, mV

Total

Total direction	Count up, count down or halted
K factor	range 0.001 to 10000
Total Range	±10000000.000
Total Variables	Start, Reset-up, Reset-Down
Max pulse rate	50 pulses per second

COMMON

Total units	6 Characters
Tag Number	8 Characters

FUNCTIONS

Total	A + B, A – B, Highest, Lowest

CONTACT

Trip (Normally open)

Action	High/low level trip, High/low level latched trip
Source	TotalA, TotalB, or Total Maths Function.
Hysteresis	(1 to 100000) units
Latch Reset	USB reset or power down

Pulse output (normally open)

Source	TotalA or TotalB Total Maths Function
Pulse period	(20 to 10000) mS
Batch counter	Advance on pulse
Batch Reset	1 to 100000000

ANALOGUE PROCESS OUTPUTS

Source	TotalA, TotalB, Total Maths Function
Low, High Range	Within working range

OUTPUT SIGNAL

Type	mA, Volts, ± Volts
Low Scale	Any within O/P Range
High Scale	Any within O/P Range

LIVE PROCESS DATA READ, LOG

Channel A	Total
Channel B	Total
Functions	Total Maths Function
Batch Counter	Batch Total
Logger Type	desktop file *.txt format
Logger period	(0.04 to 30) Minutes
Time Stamp	Each reading (log only)

LIVE COMMANDS

Individual Resets	Total A, Total B, Batch
Master Reset	Total A, Total B, Batch
Relay	Reset Latched Relay

SINGLE CHANNEL COUNTER MODE

Sensor Excitation	8 V or 15 V dc

Channel A

Sensor

Type	TTL, mA, PNP, NPN, Contact, mV

Total

Total direction	Count up, count down or halted
K factor	range 0.001 to 10000
Total Range	±100000000000000
Total Variables	Start, Reset-up, Reset-Down
Max pulse rate	50 pulses per second

Channel B

Sensor

Type	TTL,mA,PNP,NPN,Contact, mV
Active	Contact open (input High) or Contact Closed (low input)
Action Single or multi	Reset Total A, Reset Total B Reset Relay. Counter control, Off, Up/Halt, down/halt or up/down.

COMMON

Rate Units	6 Characters
Tag Number	8 Characters

CONTACT

Trip (Normally open)

Action	High/low level trip, High/low level latched trip
Source	RateA, TotalA,
Hysteresis	(1 to 100000) units
Latch Reset	USB reset or power down or discrete

Pulse output (normally open)

Source	TotalA
Pulse period	(20 to 10000) mS
Batch counter	Advance on pulse
Batch Reset	1 to 1000000000

ANALOGUE PROCESS OUTPUTS

Source	RateA, TotalA, Total Maths Function
Low Range	Within working range
High Range	Within working range

OUTPUT SIGNAL

Type	mA, Volts, ± Volts
Low Scale	Any within O/P Range
High Scale	Any within O/P Range

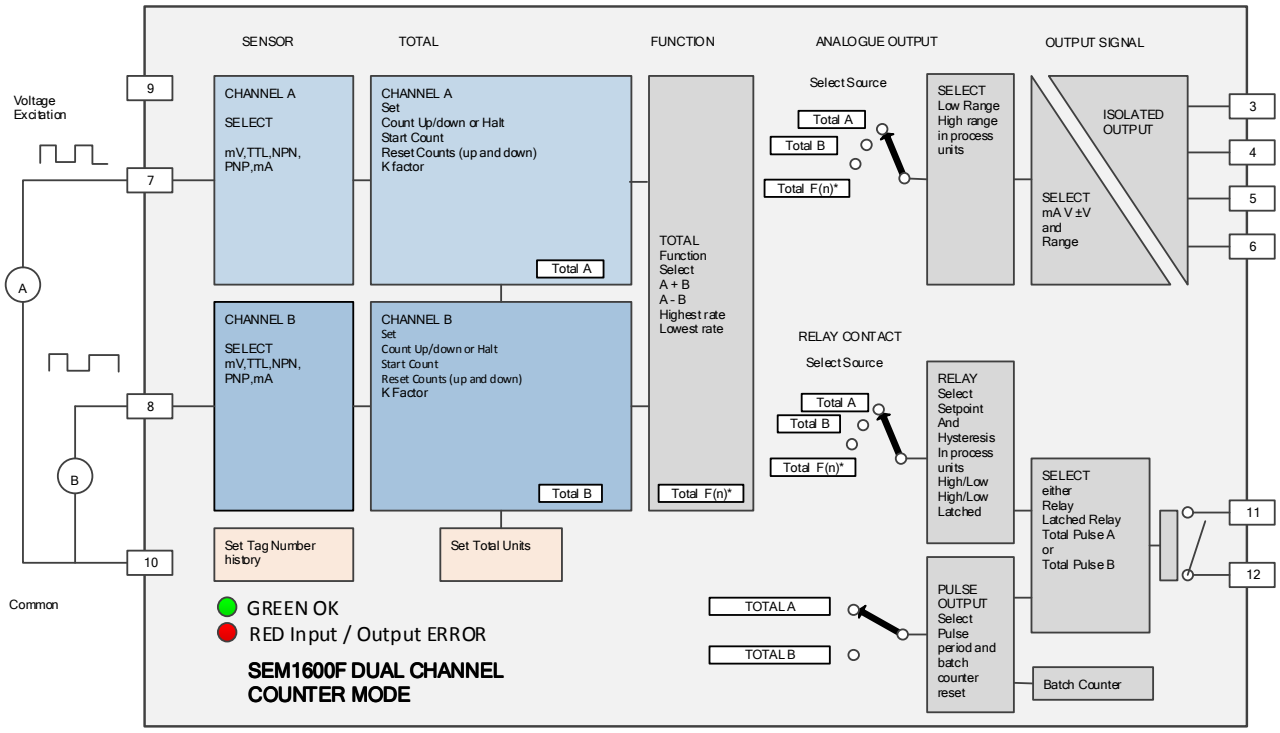
LIVE PROCESS DATA READ, LOG

Channel A	Total
Channel B	0 or 1 (1 = active)
Batch Counter	Batch Total
Logger Type	Save to desktop file *.txt format
Logger period	(0.04 to 30) Minutes
Time Stamp	Each reading (log only)

LIVE COMMANDS

Individual Resets	Total A, Batch
Master Reset	Total A, Batch
Relay	Reset Latched Relay

STATUS INSTRUMENTS



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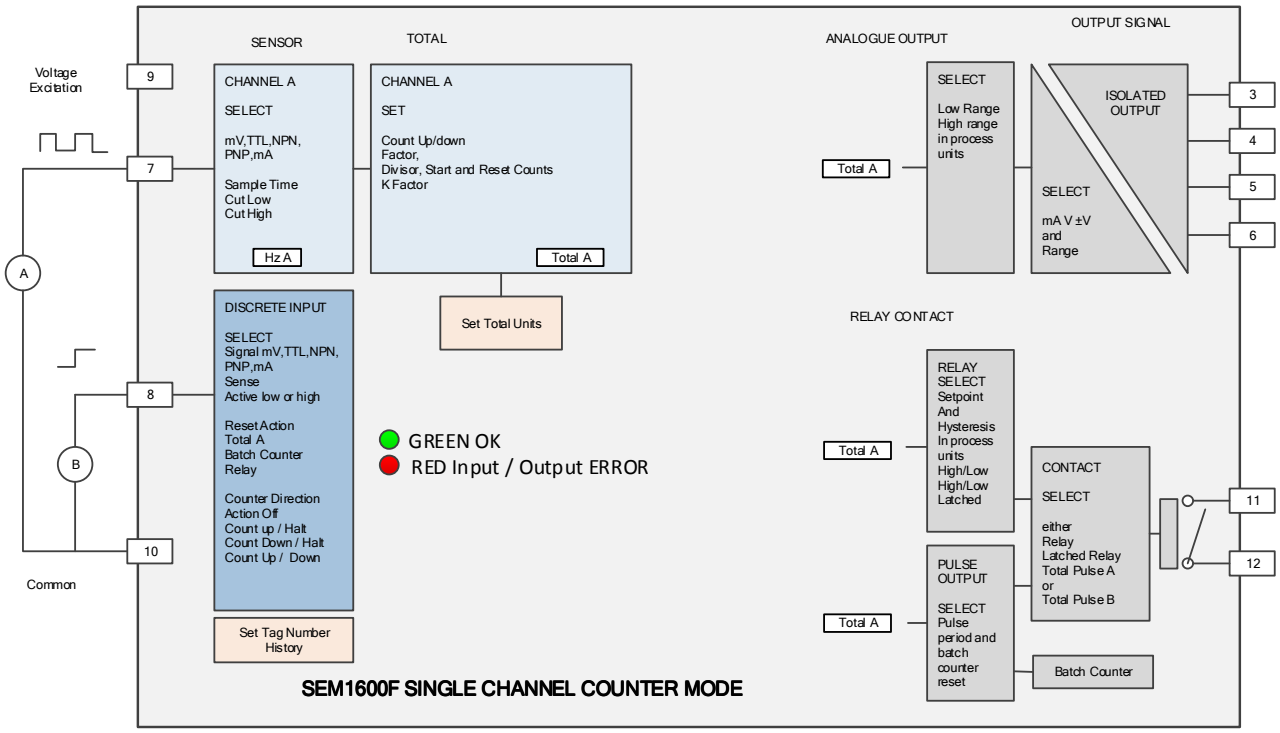
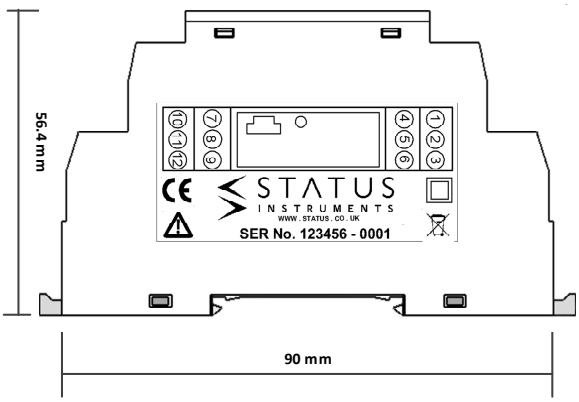
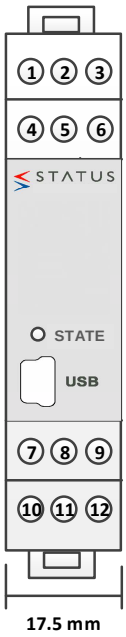


STATUS INSTRUMENTS

MECHANICAL





REFER TO
INSTRUCTION MANUAL
BEFORE USE

MECHANICAL DETAIL

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