



# SUMMATOR

## TYPE 107-6A

- \* **Sum or subtract up to three inputs**
- \* **Performs averaging function with equal input ranges**
- \* **Wide range of inputs & outputs**
- \* **Voltage, current sink or source outputs**
- \* **AC or DC powered versions**
- \* **Wall or DIN rail mounting**
- \* **Current loop integrity feature**

**This instrument will sum (or subtract) up to three analogue signals. The output signal, current or voltage, will be proportional to the sum or difference of the input signals. With equal input ranges, this unit will perform an averaging function.**

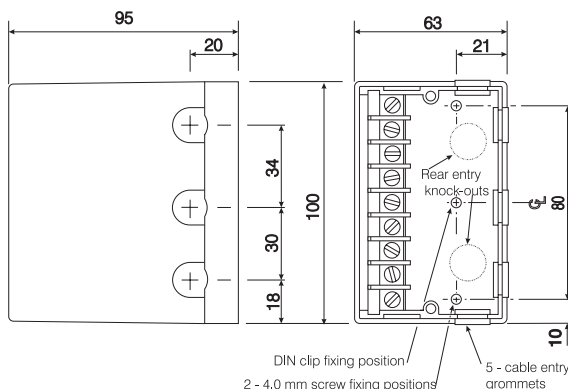
The input signals may represent different ranges, e.g. Input A = 0-1000 m<sup>3</sup>/h, Input B = 0-1500 m<sup>3</sup>/h, and may be of different process signal types. Voltage and current, true or live zero, inputs may be summed to give either a true or live zero based, voltage or current output signal.

For current inputs, when the plug-in module is removed, signal loops are maintained via a base section mounted shunt resistor. This resistor is matched to the unit for optimum accuracy.

A current sink output version is available which functions as a two-wire transmitter and sinks 4-20mA from an external power source.



### DIMENSIONS



### Information required when ordering

- Input signals (see specification overleaf)
- Percentage of output represented by each input at full scale or values of each input and the output in engineering units. Percentages or values for subtracting inputs should be specified as negative quantities.  
**Please note:** During normal operation, inputs are required to be such that their sum (or difference) falls within the range of the output signal. In overrange, where input conditions require the output to exceed zero or fullscale, the output signal will be automatically limited to these values.  
**Example 1 (in percentages)**  
Input A = 4-20mA giving an output of 0 to +33.33%  
Input B = 1-10V giving an output of 0 to +66.67%  
**Example 2 (in engineering units)**  
Input A = 4-20mA representing 0-1000m<sup>3</sup>/h  
Input B = 1-10V representing 0-1500m<sup>3</sup>/h  
Output = 4-20mA representing 0-2500m<sup>3</sup>/h  
**Example 3 (three input summator/subtractor)**  
Input A = 4-20mA giving an output of 0 to 70%  
Input B = 4-20mA giving an output of 0 to 50%  
Input C = 4-20mA giving an output of 0 to -20%
- Output signal (see specification overleaf)
- Supply voltage and frequency
- Whether a DIN Rail Mounting clip is required

## SPECIFICATION

### INPUTS

All inputs must be able to share a common connection. If they cannot be connected together, a Signal Isolator e.g. type 107-3A must be used to isolate the inputs.

0-10 mA into 100 ohms  
0-20 mA into 50 ohms  
4-20 mA into 62.5 ohms  
0-5v into greater than 1 M ohms  
1-5v into greater than 1 M ohms  
(Other inputs available to order)

### FUNCTION

$kA \pm kB \pm kC = \text{Output}$ . (The output is always positive. The subtractor result must always be positive).

### OUTPUTS

0-10 mA into 2000 (5000) ohms max. } figures in  
0-20 mA into 1000 (2500) ohms max. } brackets are  
4-20 mA into 1000 (2500) ohms max. } options  
0-5v into 500 ohms min.  
1-5v into 500 ohms min.  
Current Sink 4- 20 mA @ 50 Volts max.  
(Other outputs available to order)

### CALIBRATED ACCURACY

Set at 100% to be within  $\pm 0.1\%$  FSD

### LINEARITY ERROR

$\leq \pm 0.1\%$  FSD.

### SUPPRESSION/ELEVATION ERROR

$\leq \pm 0.1\%$  FSD.

### SUBTRACTOR

Note: the error in the output signal is relative to the largest input span, in engineering terms.

### CURRENT INPUT SHUNT ERROR

For current inputs, the isolator and a shunt resistor (mounted in the base section of the module) are calibrated as a matched pair. An error of  $\leq \pm 0.1\%$  can be expected if the instrument is used with an unmatched input resistor.

### OUTPUT RIPPLE

$\leq 0.2\%$  RMS of FSD.

### LOAD RESISTANCE EFFECT

$\leq 0.001\%$  of span/100 ohms change.

### ISOLATION

The inputs and output are not isolated from each other but are isolated from the power supply.

### STABILITY

Over 24 hours  $\pm 0.1\%$  FSD.  
Over 1 year  $\pm 0.25\%$  FSD.



**WARNING! THIS UNIT CAN BE MAINS POWERED, AND ALL INPUTS TO IT MUST BE ISOLATED FROM DANGEROUS VOLTAGES BEFORE THE FRONT COVER IS REMOVED. LIVE TERMINALS WILL BE EXPOSED.**

Continuous development may necessitate changes in these details without notice

### INPUT OVER-RANGE CAPABILITY

Voltage inputs 250 volts RMS or DC max.  
Current inputs: 0.5W max.

### TEMPERATURE COEFFICIENTS

Zero:  $\pm 0.02\%$  span/ $^{\circ}\text{C}$   
Span:  $\pm 0.02\%$  span/ $^{\circ}\text{C}$

### ENVIRONMENTAL

Temperature range:  
operating -10 to +50 deg C;  
storage -20 to +70 deg  
Humidity: 0-95% RH non-condensing

### SUPPLY VOLTAGE REJECTION

Output change  $< 0.01\%$  span/% supply change.

### POWER SUPPLY

A LED indicates when the power supply is connected.  
**Standard AC:** 110, 220 or 240V  $\pm 10\%$  50/60Hz; 5VA  
Fuse (internal) 100mA quick-blow (20 x 5mm)  
**Optional DC:** 12, 24 or 48V -10% to + 20%; 3.5W  
Fuse (internal) 250mA anti-surge (20 x 5mm)

### ENCLOSURE DETAILS

Base: Phenol (black) Cover: Polystyrol (light grey)  
Protection: IP40

### SAFETY & EMC

Safety: EN61010-1 Immunity: EN50082-1  
Emissions: EN50081-1 CE certified

### WEIGHT

Approximately 0.5 kg

### TERMINAL CONNECTIONS

#### Supply

1 — Line	} AC Mains Supply	Positive (+) Negative (-) Earth	} DC Supply Option
2 — Neutral			
3 — Earth			

#### Output

4 — Output (-)  
5 — Output (+)

#### Input

6 — Input C (+)  
7 — Input A (+)  
8 — Input common (-)  
9 — Input B (+)

**Please Note:** Options are not available unless specified at time of order.

# SIL

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