

Mathematical Functions MIN500

Function: The MIN500 consists of a multi-functional analogue computing circuit which is factory calibrated as either a divider, multiplier, squarer, square root extractor or rectangular weir lineariser. If the measured process variable is temperature dependent, such as flow for instance, then the MIN500 can also be factory calibrated to accept a temperature compensation input for mass flow computation.

Operational notes: The instrument is configured to carry out the mathematical function of a normalised input of 0 to 1 unit. So for a 4 to 20mA input combination the input A units will be $-(I^A - 4) \div 16$ units. Input B will be computed likewise. The specifications specific to each function are as follows:

Multiply	$A \times B = O/P$	Divide	$A \div B = O/P$	Square Root Extraction	$\sqrt{A} = O/P$
Multiplication with Temperature Compensation for Mass Flow Computation Squarer	$\frac{[(A \times B) \times 293.2]}{[293.2 + (10 \times C)]}$ $A^2 = O/P$	$= O/P$ where $C = 0$ at 20°C with a $1\text{V}/10^\circ\text{C}$ change		Cube Function	$A^3 = O/P$
		Rectangular Weir Lineariser	$A^{3/2} = O/P$	Cube Root Function	$\sqrt[3]{A} = O/P$

SPECIFICATIONS

Please note that the following are typical ranges. We also manufacture instruments to cater for other ranges, within limitations detailed below. All instruments come with span and zero potentiometers for fine tuning on site.

INPUTS:

DC Current

0 to 1mA into 1K ohms
0 to 10mA into 100 ohms
4 to 20mA into 62 ohms
10 to 50mA into 24 ohms
Other ranges as required

DC Voltage

Between 0 and 10 Volts
Minimum span 1 Volt DC
Maximum span 10 Volts DC

Input Impedance

1M ohm or greater

MIN500 Multiplier Only

Optional input for temperature compensation
0 Volts DC input at 20°C
1 Volt DC per 10°C change

So for compensation over a temperature range of $+20^\circ\text{C}$ to $+70^\circ\text{C}$ the MIN500 would require an input of 0 to 5 Volt DC

Compensation is available from -30°C to $+120^\circ\text{C}$

OUTPUTS:

DC Current

0 to 1mA into 10 to 20K ohms
0 to 10mA into 10 to 2K ohms
4 to 20mA into 10 to 1K ohms

DC Voltage

0 to 1 Volt DC into 100 ohms min
0 to 5 Volt DC into 500 ohms min
0 to 10 Volt DC into 1K ohms min

SUPPLY:

Power Supplies

18 to 30 Volt AC or DC, or
10 to 15 Volt AC or DC
with converter to maintain signal to power supply isolation

Power Required

1.5 Watts Maximum

Pilot Light

Red LED shows Power ON

GENERAL:

Linearity Error

Multiply $\pm 0.2\%$ of output span
Divide $\pm 0.2\%$ of output span with input B at 100%
 $\sqrt{A} \pm 0.1\%$ at 100% of output span
 $\pm 0.4\%$ at 10% of output span
 $A^2 \pm 0.2\%$ of output span
 $A^{3/2} \pm 0.2\%$ of output span

Temperature Coefficient

$\pm 0.1\%$ of span/ $\Delta 10^\circ\text{C}$

Operating/Storage Temperature Range

0 to $+50^\circ\text{C}$ / -20 to $+60^\circ\text{C}$

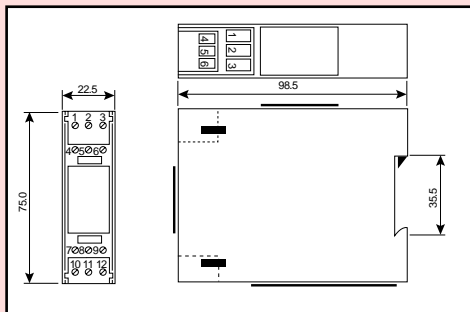
Operating/Storage Humidity Range

0 to 95% RH non-condensing

Weight

115 gms

MECHANICAL DETAILS



TERMINATION DETAILS

Terminal		Terminal	
1	Power Supply -ve	7	Output -ve
2	Power Supply +ve	8	Output +ve
3	Power Supply Screen	9	Unused
4	Input A -ve	10	Common -ve Input B & C
5	Input A +ve	11	Input B +ve
6	Unused	12	Temperature Compensation Input C +ve

ORDERING DETAILS

- Give identification code, i.e. MIN500
- Give Function required, i.e. Multiplier
- Give power supply voltage, 12 or 24 Volt AC or DC
- Give both input signals, type and range, i.e. 2 x 4 to 20mA
- Give details of output signal, type and range, i.e. 0 to 10 Volts