



ROOT EXTRACTOR

Type B12-7

- Square root, $\frac{3}{2}$ Law & $\frac{5}{2}$ Law functions
- Performs Input / Output Signal Level Changes
- 15 V sensor / loop supply option
- High impedance output drive option
- AC or low voltage (11-32 VDC, 12-24VAC) powered versions
- Wall or DIN rail mounting
- Module unplugs without disturbing wiring or breaking input current loops



The B12-7 Root Extractor provides cost-effective signal conditioning for flow-rate measurements from differential pressure transmitters, flumes and weirs. Options including high impedance output drive and a sensor excitation power supply are available at no extra cost.

Applications

Square root: The transfer function provides an output proportional to $\sqrt{\text{Input}}$

This may be used to compute the flow-rate in a pipeline where the flowrate is measured with a DP transmitter (differential pressure is proportional to the flow-rate²).

$\frac{3}{2}$ Law: The transfer function provides an output proportional to $(\text{input})^{\frac{3}{2}}$

With this option the unit will provide an output proportional to flow rate from a level measurement signal from a flume or weir

$\frac{5}{2}$ Law: The transfer function provides an output proportional to $(\text{input})^{\frac{5}{2}}$.

This function will provide a signal proportional to flow rate from a 'V' notch weir level measurement.

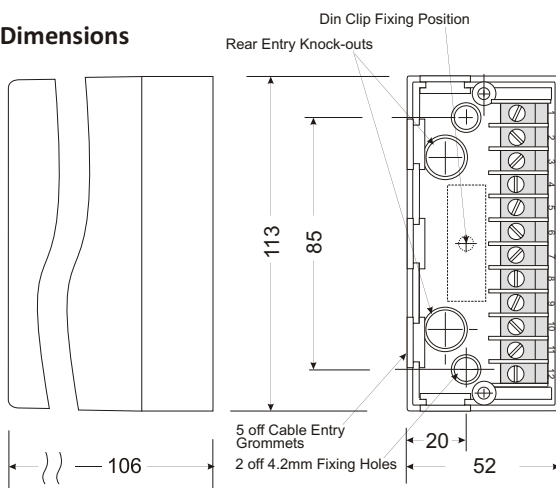
Information required when ordering

- Specify type
- Input signal
- Output signal
- Supply voltage and frequency

Options

- High output drive required (mA outputs) ?
- Transducer supply required ?
- DIN rail mounting clip required ?

Dimensions



Specifications

Notes:

1. Inputs and outputs, other than those shown - our sales team will be pleased to advise.
2. Input and output ranges are factory calibrated for one type of signal and not user configurable.

Inputs

Current from 0-1mA to 0-30mA and Voltage from 0-1V to 0-250V. Typical inputs: 0-10mA (100R), 0-20mA (50R), 4-20 mA (62R), 0-5V, 1-5V, 0-10V, 2-10V (>200k)
Input impedances shown in brackets.

Input Signal Cut-off (square root only)

Input signals below 0.9% of span are automatically cut-off to zero.

Input Signal No-break Loop Facility

mA input signal loops are maintained when the unit is unplugged from the base section.

Input Overrange Protection

Voltage Inputs: 250 volts RMS or DC, Current Inputs: 50mA

Outputs

0-10mA (2000R), 0-20 mA (1000R), 4-20 mA (1000R)
High impedance output drive options: 0-10mA (5000R), 0-20 mA (2500R), 4-20 mA (2500R) *Maximum output impedances in ohms shown in brackets.*
0-5v, 1-5V, 0-10V, 2-10V (500R minimum)
Current sink 4-20mA @ 50 volts max.

Transmitter Excitation Supply

15VDC @ 20mA maximum

Response Time

1 sec as standard.

Isolation

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

Calibrated Accuracy

Error $\pm 0.1\%$ of span (2-100% input).

Linearity Error

$\pm 0.1\%$ FSD

Suppression / Elevation Error

$\pm 0.1\%$ FSD

Output Ripple

0.2% RMS of FSD

Load Resistance Effect

0.001% of span / 100 ohm change

Stability

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

Interference Rejection

Filtering is incorporated to attenuate R.F. and other industrial noise.

Common Mode Rejection

<0.2% error for 250V RMS 50/60 Hz, or 400V DC, common mode signals.

Temperature Coefficients

Zero: $\pm 0.02\%$ span / °C, Span: $\pm 0.02\%$ span / °C

Environmental

Temperature: operating -10 to +60°C, storage -20 to +70°C
Humidity: 0 – 95% RH non-condensing

Power Supply

AC Supply: 110, 220 or 230V $\pm 10\%$ 50/60Hz 5VA

Fuse: 100mA quick-blow (internal)

Low voltage: 11-32VDC 4 W / 12-24VAC

Fuse: 250mA anti-surge (internal)

Supply Voltage Rejection

Span change: <0.02% span / % supply change.

Safety & EMC

Safety: EN61010-1, Immunity: EN50082-1,

Emissions: EN50081-1, CE certified

Mechanical

Weight: approx. 0.5kg

Enclosure: Fire retardent materials - PPO base, ABS cover

Screw terminal wire capacity: 2 x 1.5mm²

Electrical Connections



WARNING: these details are provided for pre-sales information only. Installation must be carried out in accordance with the User Guide

Inputs	1	Transducer supply (+)		
	2	Input Signal (+)		
	3	Input (-)		
	4	- reserved		
	5	- no internal connection		
	6	- no internal connection		
Outputs	7	mA Output (+)	Current Sink	
	8	mA Output (-)	8 (+)	
		Voltage Output (+)	9 (-)	
	9	Voltage Output (-)		
Supply	10	Earth AC	Earth	DC
	11	Neutral Mains	Negative (-)	Supply
	12	Line Supply	Positive (+)	Option



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

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