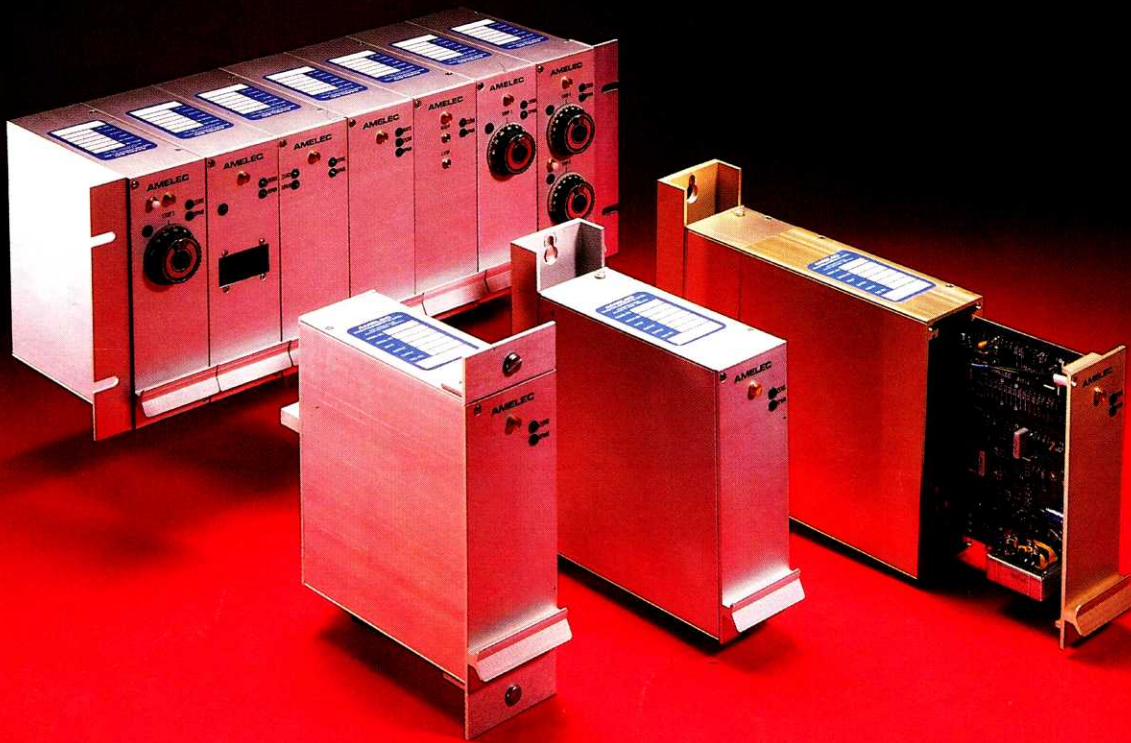


# AMELEC

Signal  Conditioning

## INDUSTRY STANDARD 'A' RANGE ACC SERIES ARITHMETIC UNITS

The range includes AMT signal transmitters, ATA trip amplifiers and AGS special products  
Please see our other catalogues



- Applications include addition, subtraction, multiplication, division, linearisation and many other functions.
- Some models suitable for input from thermocouple, millivolt, RTD, slidewire, single or multiple process sources.
- Supply voltages of 120VAC, 240VAC, or 24VDC available at no additional cost. All units individually fused and front panel supply indicators fitted.
- Digital indication of input may be specified, scaled as a percentage of input span or in engineering units.
- RFI protection to BS6667, Part 3 available for all units.
- Manufactured and tested to BS5750, Part 2.
- AMELEC standard 10 year guarantee.

# A SERIES GENERAL SPECIFICATION

## INPUT DATA

### Input source

For details see individual specification

### Open circuit response

For details see individual specification.

### Input Impedance (Voltage input)

>1Mohm at amplifier input. This will be shunted by burnout drive or input conditioning components.

## SUPPLY DATA

### Power supplies

AC models	115 / 230 VAC ± 20%
DC models	24 VDC ± 2.5V
2 wire	12 – 60 VDC

### Consumption

Single Transmitter	3VA Double Transmitter	4VA
Transmitter / Single Trip	4VA Transmitter / Double Trip	5VA
Dual Channel Transmitter	6VA 2 Wire Transmitter	250mW

## OUTPUT DATA

### Output signals (Each output)

Standard units

Any constant current from 0-100uA to 0-20mA (at up to 20V loop) or any constant voltage from 0-1V to 0-10V (at up to 20mA loading). Double transmitters need not necessarily be specified for similar outputs.

2-wire units

4-20mA or 10-50ma into up to 48V loop when operated from a 60VDC power supply.

### Response time

<400mSec. Unless otherwise stated. Typical response time for a Trip with 4-20mA input; <150uS for 1% step change and <100mS for 100% step change.

### Relay specification

DP/DT for each trip, unless otherwise stated. Contacts are rated at 250VAC, 5A, 100 VA (Resistive).

### Relay function

Selected by PC Link. Default is normally energised, relay to de-energise on trip (fail safe operation).

### Relay status

Indicated by a red LED for each trip, mounted on the front panel. Lit when relay is energised.

### Controls

ZERO	± 25%
SPAN	± 50%
TRIP (When fitted)	0-100%
DEADBAND (When fitted)	1-20%

## CONDITIONS

### Ambient temperature

Working	-20°C to +60°C
Storage	-40°C to +70°C

### Humidity:

From 5% to 95% RH.

**Vibration:** 1g at 15Hz to 150Hz.

## ELECTRICAL STANDARDS

### Insulation Input-output-contacts

1000V RMS continuous. 2000V for 2OuSec. Derate to 500VDC for option 'K' enclosures.

### Fusing

Power supply fused. Spare fuse mounted on PCB.

## WIRING AND MOUNTING

### Terminals

For conductors up to 2.5mm<sup>2</sup>

### Weight

1.5kg approximately, when mounted in enclosure.

### Position

Any position is acceptable.

### Mounting

Wall, panel, single end access and rack. Precision extruded aluminium construction. Standard units are Anodised, option 'K' units are 'Alochromed'. An IP65 enclosure is also available for 2 wire units only.

### Additional protection

Enclosures are available to NEMA 12 oiltight, NEMA 4 watertight and IP54 for N-protection.

## PERFORMANCE

### Input/output linearity

<±0.1% error, unless otherwise stated

### Series mode rejection

<±01% error for 50Hz input at 5% of span amplitude.

### Common mode rejection

<±01% error for 250V RMS.

### Temperature effect on zero

<0.02% per °C.

### Temperature effect on span

<0.01% of span per °C or <0.1°C per °C, whichever is the greater.

### Temperature effect on suppression/elevation

<0.02% of suppression/elevation per °C.

### Supply voltage effect

<0.01% per % input change.

### Trip Adjustment

Infinitely variable by single turn 260° dial on front panel, calibrated 0-100 and lockable. Alternatively, by multi-turn potentiometer accessible through front panel.

### Deadband

Standard 1%. Also available adjustable from 1 to 20% by single turn 260° dial or by multi-turn potentiometer.

### RFI rejection

Standard enclosures are inherently RFI proof due to their solid aluminium construction. However, for extra protection to BS6667, specify option 'K'.

### Permissible Input overload

mV Input	20V	Resistance Input	6V
AC voltage Input	200%	DC voltage Input	200V
AC current Input	500%	DC current Input	500%



# Arithmetic units

## ACC311, scale and bias transmitter

Models may be specified for input from thermocouple, millivolt, RTD, slidewire or process source.

When RTD or slidewire input is specified, third wire compensation is standard to reduce the effect of lead resistance. Thermocouple units have automatic cold junction compensation.

The output span may represent any portion of the input span, with control of offset and gain being either by multiturn potentiometers, accessible through the front panel, or by calibrated dials - optionally ten turn - mounted on the front panel.

Output may follow input (rising input = rising output) or have a reversed characteristic (rising input = falling output).

Many other combinations are possible since the unit is designed to be customised to suit individual applications. Please consult our Technical Sales Department for further details.

## ACC312, square root extractor

This unit is designed to operate with any standard process voltage or current source.

It regards both input and output span - which need not necessarily be the same - as 0-1 and will convert 0.01 - 1 (1-100%) of input span to 0.1 - 1 (10-100%) of output span, using a square root law.

Since output accuracy is not specified below 1% input (10% output) a zero cut-off is fitted which will operate when the input moves into this region. It is normally preset to 0.5% and, while the input is between 0% and this level, the output will remain at 0%.

ACCURACY: <0.25% while input remains between 1% and 100%

LINEARITY: <0.25% while input remains between 1% and 100%.

RESPONSE TIME: <1Sec for the output to settle within tolerance after an input step change from 5% to 95%.

## ACC313, high/low selector

This will accept up to five process voltage or current sources, which need not necessarily be of the same type but do share a common 0V.

The output span may be configured to be proportional to either the highest or lowest of these inputs; selection being by on-board link.

Input and output wiring is shown to the right. For supply wiring, please turn to page ten.

### INPUT/OUTPUT WIRING

Input 1 +	1	TB1
Input 1 -	2	
Screen	3	

Input 2 +	1	TB2
Input 2 -	2	
Screen	3	

Input 3 +	12	TB3
Input 3 -	11	
Screen	10	
Input 4 +	9	
Input 4 -	8	
Screen	7	
Input 5 +	6	
Input 5 -	5	
Screen	4	
Output +	3	
Output -	2	
Screen	1	

# Arithmetic units

## ACC314, averager/adder/subtractor

These units will accept up to five current or voltage inputs, which need not necessarily be of the same type but do share a common 0V. These inputs may carry any sensible weighting, to suit specific requirements.

The unit may be configured to perform a wide variety of addition and subtraction functions and these are best explained with typical examples:-

- (a)  $O/P = \frac{I/P1 + I/P2 + I/P3}{3}$       (b)  $O/P = \frac{I/P2}{2} + \frac{I/P3}{3} + (5 \times I/P4) - I/P1$
- (c)  $O/P = (.3 \times I/P1) + (.2 \times I/P2) + (.6 \times I/P3) - (.5 \times I/P4) - (.01 \times I/P5)$
- (d)  $O/P = \frac{I/P2}{2} + \frac{I/P4}{4} + 0.5$

Many other combinations are possible since the unit is designed to be customised to suit individual applications. Please consult our Technical Sales Department for details.

Input and output wiring is shown to the right. For supply wiring, please see page ten.

### INPUT/OUTPUT WIRING

Input 1 +	1	TB1
Input 1 -	2	
Screen	3	
Input 2 +	1	TB2
Input 2 -	2	
Screen	3	
Input 3 +	12	TB3
Input 3 -	11	
Screen	10	
Input 4 +	9	
Input 4 -	8	
Screen	7	
Input 5 +	6	
Input 5 -	5	
Screen	4	
Output +	3	
Output -	2	
Screen	1	

## ACC315, multiplier/divider

This will accept up to three standard voltage or current process control signals, which need not necessarily be of the same type but do share a common 0V. To suit specific applications, these inputs may carry any weighting from 10% to 200% or zero offset up to  $\pm 300\%$ .

Assuming equal weighting, the functions carried out by this unit are as follows:

MULTIPLIER =  $A \times B$ .      DIVIDER =  $\frac{A}{B}$  or  $\frac{A}{C}$       MULTIPLIER/DIVIDER =  $\frac{A \times B}{C}$

LINEARITY:

Multiply only.	<0.2% over 20 : 1 range.
Divide only	<0.5% over 3 : 1 range
Multiply/divide	<1% over 30 : 1 range

Input and output wiring is shown to the right. For supply wiring, please see page ten.

### INPUT/OUTPUT WIRING

Input A +	1	TB1
Input A -	2	
Screen	3	
Input B +	1	TB2
Input B -	2	
Screen	3	
Input C +	12	TB3
Input C -	11	
Screen	10	
Output +	9	
Output -	8	
Screen	7	
	6	
	5	
	4	
	3	
	2	
	1	

## ACC316, high/low limiter

Models may be specified for input from thermocouple, millivolt, RTD, slidewire or process source.

When RTD or slidewire input is specified, third wire compensation is standard to reduce the effect of lead resistance. Thermocouple units have automatic cold junction compensation.

Under normal conditions, the output will follow the input. However, two additional controls are fitted to establish upper and lower limits on the output.

The HIGH limit may be adjusted over the range 40% to 100% and the LOW limit over the range 0% to 60%. Both these controls may be either blindset potentiometers accessible through the front panel or calibrated dials, optionally ten turn, mounted on the front panel.



# Arithmetic units

## ACC319, sample/hold transmitter

### INPUT/OUTPUT WIRING

This unit is designed to operate with any standard process voltage or current source.

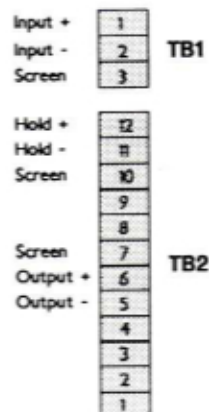
When the unit is in 'SAMPLE' mode, the output will follow the input with little or no delay but, when put into 'HOLD' mode, the output will remain at the level it was at, when put into this mode, indefinitely. Digital techniques are employed to ensure that the held output will not 'droop', no matter how long the unit is kept in this mode.

'SAMPLE'/'HOLD' control may be by normally open or normally closed contact or by normally high or normally low voltage drive of between 5V and 12V.

Control is effected with a single drive, wired to the 'HOLD' input, with the customer specifying which mode is required for which control condition.

This unit may also be supplied as a peak detector, where the output will follow the input all the while it is rising but will remain at the highest level so far attained if the input falls. When used in this mode, the 'HOLD' input acts as a 'RESET', setting the output to zero.

Input and output wiring is shown to the right. For supply wiring, please see page ten.



## ACC321, lead/lag transmitter

This unit is designed to operate with any standard process voltage or current source.

When operated in 'LAG' mode, the output will follow the input with a limit on the output rate of change. This limit is digitally derived and is extremely linear.

When operated in 'LEAD' mode, if the input undergoes a step change, the output will also make a step change, in the same direction, then ramp to the new output level at the desired rate. The output step change may be set anywhere in the range 10% - 1000%.

Two separate digital ramp generators are included, each adjustable from 1 Sec to 6000 Secs for a 100% output change. It is therefore possible, in both modes, to have different rates of change for rising and falling outputs; allowing, for instance, a very slow increase of current into an actuator but a very rapid decrease in current, should the input to the unit drop.

The ACC321, in 'LAG' mode, replaces the analogue version of this product, the ACC318.

## ACC322, lineariser

Models may be specified for input from thermocouple, millivolt, RTD, slidewire or process source.

When RTD or slidewire input is specified, third wire compensation is standard to reduce the effect of lead resistance. Thermocouple units have automatic cold junction compensation.

The unit is, however, most notably used to linearise the output of flow transmitters, radiation pyrometers, etc., by means of an eight break point lineariser. This will give a straight-line approximation to correct the input curve.

The same unit will generate mathematical curves, such as Sine, Cosine, square, square root and many others from a linear input drive.

LINEARITY: Better than a 10 : 1 improvement over input curve.

RESPONSE TIME: <500mSec to respond within tolerance to an input 95% step change.

# Arithmetic units

## ACC353, linear integrator

### INPUT/OUTPUT WIRING

This unit is designed to accept input from any standard voltage or current source.

It will provide continuous integration and totalisation of quantities such as; flow, BTU, watt/hours volt/hours, etc.

Output pulses are 24V, 30mSec and are suitable for driving most electro-mechanical counters. If option 'R' is specified, output is also 30mSec pulses from a set of voltage free contacts. When this option is specified, the unit must be mounted with the front panel vertical.

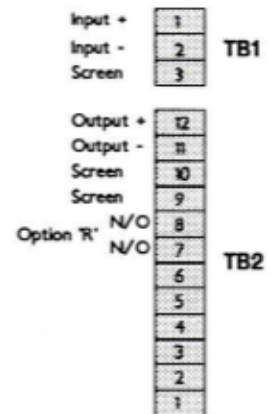
Output pulse rate is continuously adjustable from 0 - 50 to 0 - 50000 pulses per hour.

To ensure that spurious pulses are not generated at very low input levels, a zero cut-off control is fitted. This may be adjusted from 0 - 2% of input but is normally preset to .5%.

Additional options for this product- 'D6'. 6 digit resettable counter on front panel.

'D8'. 8 digit non-resettable counter on front panel.

Input and output wiring is shown to the right. For supply wiring, please see page ten.



## ACC354, square root integrator

### INPUT/OUTPUT WIRING

This unit is designed to accept input from any standard voltage or current source.

It will provide continuous integration and totalisation of the output of devices such as; d/p flow transmitters, etc and, since it uses a square root law, enables total flow to be displayed in engineering units,

Output pulses are 24V, 30mSec and are suitable for driving most electro-mechanical counters. If option 'R' is specified, output is also 30mSec pulses from a set of voltage free contacts. When this option is specified, the unit must be mounted with the front panel vertical.

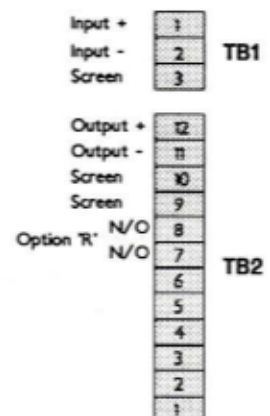
Output pulse rate is continuously adjustable from 0 - 50 to 0 - 50000 pulses per hour.

To ensure that spurious pulses are not generated at very low input levels, a zero cut-off control is fitted. This may be adjusted from 0 - 2% of input but is normally preset to .5%.

Options 'D6' and 'D8' are not available for this product.

LINEARITY: <0.25% for inputs from 1 - 100%. Below 1% input, output is not specified.

Input and output wiring is shown to the right. For supply wiring, please see page ten.



## ACC355, pulse scaler

### INPUT/OUTPUT WIRING

This unit will accept input from any sine, square or triangular waveform from 100Hz to 10000Hz, provided the positive peak level exceeds the threshold level.

The pulses are converted to an analogue level, optimised, then used to generate output pulses.

Output pulses are 24V, 30mSec and are suitable for driving most electro-mechanical counters. If option 'R' is specified, output is also 30mSec pulses from a set of voltage free contacts. When this option is specified, the unit must be mounted with the front panel vertical.

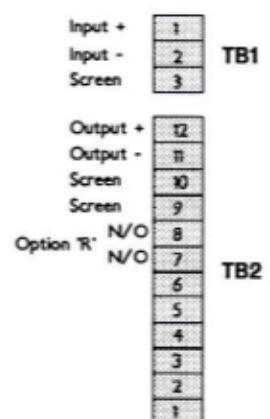
Output pulse rate is continuously adjustable from 0 - 50 to 0 - 50000 pulses per hour.

To ensure that spurious pulses are not generated at very low input levels, a zero cut-off control is fitted. This may be adjusted from 0 - 2% of input but is normally preset to .5%.

Additional options for this product- 'D6'. 6 digit resettable counter on front panel.

'D8'. 8 digit non-resettable counter on front panel.

Input and output wiring is shown to the right. For supply wiring, please see page ten.





# Arithmetic units

## ACC371/ACC372, rate of change

When specified as ACC371, the unit will accept input from any standard process voltage or current source.

When specified as ACC372, the unit will accept input from thermocouple, millivolt source, RTD, slidewire or potentiometer input.

When RTD, slidewire or potentiometer input is specified, third wire compensation is standard, to reduce the effect of lead resistance. Thermocouple units have automatic cold junction compensation.

The unit will monitor the rate of change of a rising or falling input ramp. This ramp may be anywhere in the range 0 - 10 Secs to 0 - 4000 Secs for a 100% change. Response time is dependant on ramp rate; the unit monitoring period being set to 1% of total ramp time.

Output may be proportional to a rising input, a falling input or both. In this latter case, the output is normally set to be 50% with no input change; rising to 100% for a maximum rate rising ramp and falling to 0% for a maximum rate falling ramp.

ACCURACY: <1%

LINEARITY: <1%

## ACC374/ACC375, ramp generators

These will generate a linear output ramp in response to two inputs; one will produce a rising output and one a falling output.

These two inputs may be normally open or normally closed contacts or normally high or normally low voltage drive from TTL to 12V levels. They may also be fitted as 'RAISE' and 'LOWER' pushbuttons on the front panel.

Two modes of operation are possible. In one mode, each individual contact closure or voltage pulse will give an approximate 0.1% increase or decrease in output level. 1018 such input pulses would be required for a 100% output change.

In the second mode, an internal clock provides the individual pulses; the clock being activated and steered to the 'up' or 'down' drive by an appropriate input pulse and remaining in operation only while the input pulse is active. In this mode, the clock speed may be set for a 100% ramp from 1 Sec to 4000 Secs.

In both modes, the output will remain constant, with no 'droop', in the absence of input signals.

The ACC374, upon reaching 100% output, will 'overflow' to 0% upon receipt of a further 'RAISE' input. Similarly if at 0%, it will 'underflow' to 100% upon receipt of a further 'LOWER' input. The ACC375, however, has limits at 0% and 100% which prevents this occurring

## A/D and D/A conversion

### ACC376 A/D conversion

Under this generic heading, Amelec supply a wide range of A/D conversion products, including 3, 3½ and 4 digit BCD or 12, 14 and 16 bit binary. Various models offer latched output or computer interrogation.

### ACC378 D/A conversion

This is also a generic heading which covers a range of 3, 3½ and 4 digit BCD or 12, 14 and 16 bit binary D/A products.

In both ranges, performance is dependant on requirements. Please ask for our A/D, D/A conversion product list.

# Options

## Option 'DI', digital display

This is a 3½ digit indicator which is available in 8mm red or green LED or 12mm LCD. It will display any level from -1999 to +1999 and has its own internal gain and offset controls allowing, for instance, full scale indication over a small portion of actual input span.

When this option is specified, the display will indicate input, output or other variables within the unit; these latter being read by pushbutton.

Under normal conditions, the display will indicate the input to the unit, either as a percentage of total input or in engineering units. When a pushbutton is pressed, the display will indicate that level, in the same units, allowing accurate comparison.

Available with most of the options listed below.

## Option 'M', power supply

When fitted, this allows a standard unit to provide power to an external device, such as a strain gauge, input pre-amplifier or a 2-wire transmitter.

The output is adjustable over the range 2-25V at any current up to 25mA by an internal potentiometer which may, optionally, be fitted to the front panel. Load variation is better than 10mV over the full current range.

Depending on application, the output of this power supply may be wired to terminal block 2 or to unused terminals on terminal block 3. When used to power a 2-wire transmitter, the power supply output is wired internally on the unit in series with the current sensing shunt resistor, allowing full 2-wire operation.

Available with most of the options listed below.

## Other options

Suffix	Description
/D6	6 Digit resettable counter. (ACC353 and ACC355 only)
/D8	8 Digit non-resettable counter. (ACC53 and ACC355 only)
/DA	Analogue indication of input or output level
/J	Input test injection jack.
/K	RFI protection to BS6667 Part 3.
/P	Calibration test point.
/R	Pulse output from mercury wetted relay. (ACC353, ACC354 and ACC355 only)

Some combinations of options are physically incompatible. If in doubt, please contact our Technical Sales.



# Mounting and wiring

All the units in the range are supplied in an Anodised or Achromed extruded aluminium enclosure which may be surface or panel mounting, single end access or 7 way 19" rack.

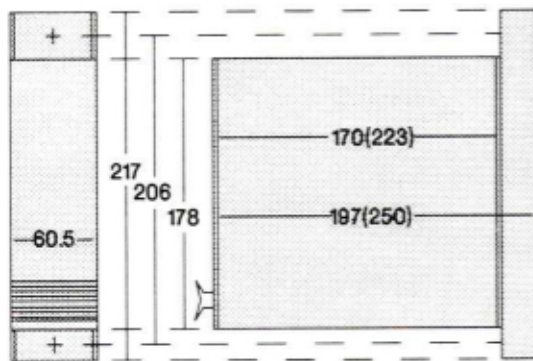
When a unit is fitted into an enclosure, the edge connector at the rear of the main printed circuit board mates with a socket which is wired to the terminal blocks. The unit is retained in the enclosure by two M3 screws which pass through countersunk holes in the front panel and into tapped holes at the front of the enclosure.

The 'U' channel terminal cover is supplied in two sizes to suit different mounting requirements. For surface mounting units, the 217mm length is supplied and includes the fixing holes. For panel, single end access or rack mounting, the 178mm length is supplied but only when options 'K' or 'EXI' are specified. When supplied, they must be replaced after wiring.

Units may be mounted at any orientation although they would normally be mounted with the front panel vertical. Surface or single end access units should not be mounted closer than 61mm horizontally or 218mm vertically. Panel units should not be mounted closer than 70mm horizontally or 234mm vertically and racks should not be mounted closer than 485mm horizontally or 189mm vertically. All types would normally be mounted further apart than this to ease wiring. At least 180mm must be left at the front of all enclosures to allow for unit withdrawal.

In the following drawings, all dimensions are in mm. Figures in brackets show the added depth of the 'K' enclosures to house the RFI protection components.

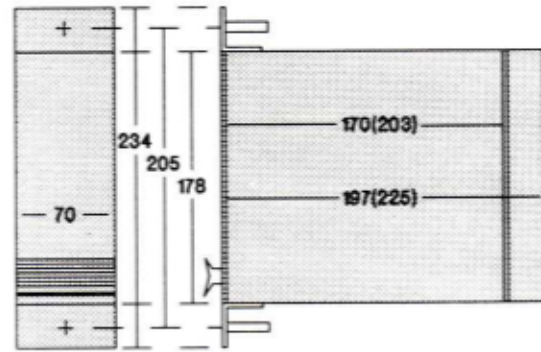
## Surface mounting



Before wiring, the unit must be withdrawn from the case, which may then be removed from the 'U' channel by undoing the M4 screw at the top rear of the case, hinging the case downwards and unhooking it from the fixed peg at the lower rear of the case. This exposes the terminal blocks for wiring.

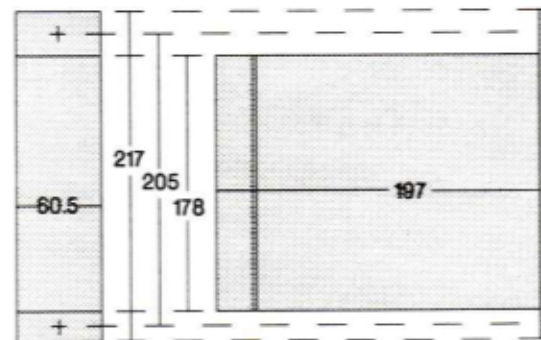
Slots are provided in the terminal plate which allow cables to be passed along the 'U' channel, through the slots and into the terminal blocks. After wiring, the enclosure may be reassembled by reversing these instructions.

## Panel mounting



A 65mm wide by 190mm high aperture must be cut in the front panel with 6mm fixing holes above and below. The brackets and front panel are wider than the aperture to obscure any cut edges.

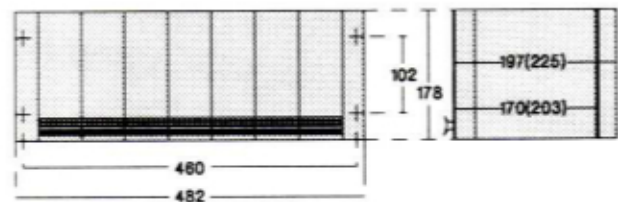
## Single end access



This enclosure is not recommended for use with option 'K'

In this arrangement the terminal blocks are mounted on the front panel, although the enclosure is surface mounted. Since the terminals are on the removable part of the unit, allowance must be made, when wiring, to allow for unit withdrawal without disturbing the wiring to adjacent units or the main loom.

## 19" Rack mounting



Up to seven units may be mounted in a 19" rack, although other widths may be supplied to suit special requirements.

The rack is normally supplied with fixing brackets to suit panel mounting (as shown above) but may also be supplied for single end access if required.

A 179mm high by 440mm wide aperture must be cut in the panel with fixing holes on 102mm by 460mm centres.

# Mounting and wiring

## WIRING

Input, output and supply connections are made via leaf type terminal blocks which are mounted on the front of single end access enclosures and at the rear on all other 'A' series types. These terminal blocks will accept cables up to 2.5mm<sup>2</sup>.

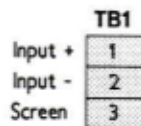
On most enclosures, other than panel mount, the terminals are separated into two groups by an earthed barrier which is part of the terminal mounting plate.

This barrier, together with the 'U' section terminal cover, ensures that input cables must enter from the top of the unit and supply/output cables from below. This helps meet the requirements of 'N' protection for intrinsically safe installations.

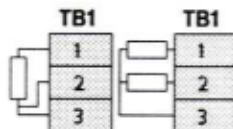
### Input wiring

In many cases, particularly with multiple input units, input wiring details are given in the individual instrument specification sheets. However, many units are specified for single input from process, millivolt, RTD or thermocouple sources. Details of all types of connector are given below.

#### Thermocouple, millivolts, process.

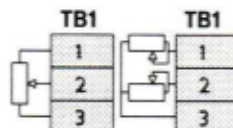


#### Resistance temperature sensor (RTD)



The above drawing shows the alternative wiring for single and differential input.

#### Slidewire or potentiometer



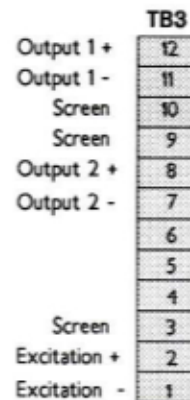
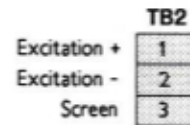
The above drawing shows the alternative wiring for single and differential input.

### Input access

No matter what type of mounting is used, input wiring access is almost invariably from the left and this convention has been followed on the input drawings.

## Output/excitation wiring

Where output wiring is specific to a particular product, wiring details are given in the individual instrument specification sheets. Standard output wiring is shown below.



The second output shown above is available only if specified at time of order.

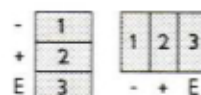
When option 'M' is specified, the excitation output may appear at either of the two alternative positions shown above.

### Output access

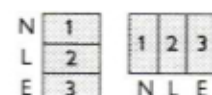
For panel, single end access or rack mounting units, output wiring access is from the right. For surface mounting units, wiring access is from the left, as shown above.

## Supply wiring

#### DC Supply



#### AC Supply



### Supply access

For panel, single end access or rack mounting units, output wiring access is from below. For surface mounting units, wiring access is from the left.



## Client Feedback

*"I recently had one of your trip amplifiers go faulty on me. The said item is at least 21 years old, and had been in service for all this time. I was really pleased when you told me that you could supply me with a direct replacement that would not need any modifications done to make it fit. It is very rare for electronic equipment not to be obsolete after a couple of years, never mind 21 years!"*

*In all my dealings with your company I have always been impressed with the quality of your products. The manuals provided with each item are excellent, as is your after sales technical help. I think that your 10 years warranty speaks volumes about your faith in your products. I would never hesitate I recommending your company to anyone"*



### Balfour Beatty

*"David...Many thanks for your help...looks to be exactly what I was looking for"*



*"Thanks for the fast response."*



*"Thank you for the great service."*



*"Thanks again for the prompt response."*



*"I just want to say thanks to you and your staff for your speedy response and efforts...received the unit yesterday and works a treat!"*



*"This is just what we needed, so many many thanks."*



*"Many thanks for your very prompt service...we thank you for helping us on this urgent request, it is much appreciated."*



*"Thank you very much...please say thanks to Oscar & David."*



*"I'd like to thank you for your quick response to our request, and for getting the item to us on time"*

### Network Rail

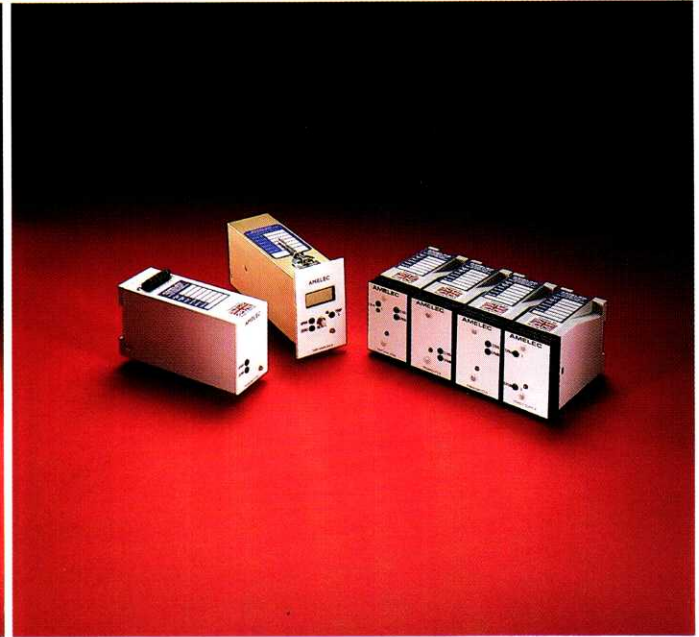
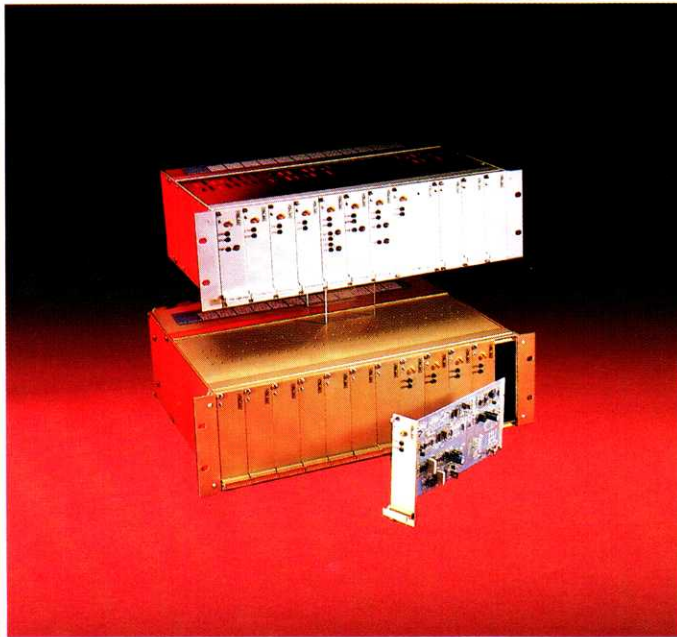
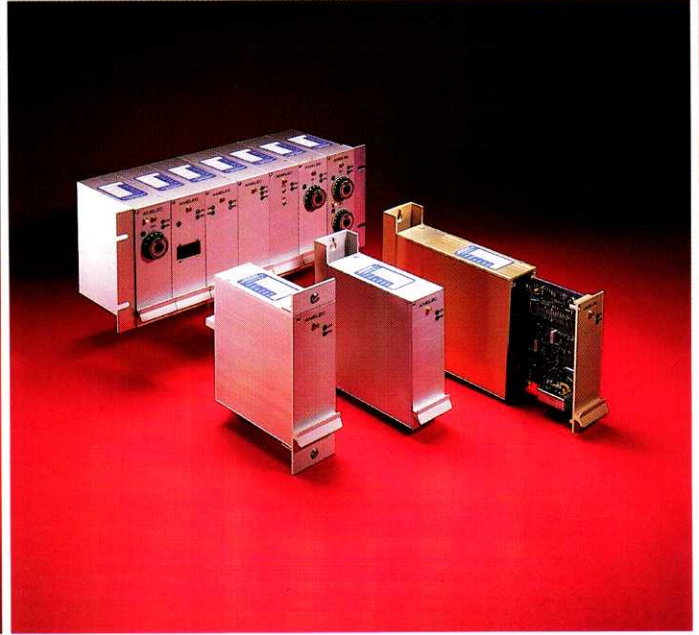


*"Good quality...They kept their promised delivery dates & easy to deal with"*

A complete range of Trip amplifiers, Signal conditioners and Arithmetic units are also available in these complementary ranges:-

**A** 4U X 12E Surface, Panel, SEA and Rack **AB** 3U X 7E Rack. **AD** DIN rail and Surface. **AH** 3U X 4E Rack

Please ask for our other catalogues



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