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AC scalable digital panel meters . Current & Voltage

ACI-J and ACV-J

Connection details, scaling and general information

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Keep a note of your settings here.

Some time in the future, you or a colleague may need to recalibrate or replace this meter. We suggest you write down all your settings now to avoid panic and confusion in a crisis.

Meter Serial number

Input signal range (for example 4-20mA)

Display range (for example 0 to 100.0 %)

If you change any switch settings, mark your changes in the manual where that switch is described.

Important Introductory Notes

Please contact us if you need help, if you have a complaint, or if you have suggestions to help us improve our products or services for you.

If you contact us about a product you already have, please tell us the full model number and serial number, so that we can give you accurate and fast help.

This product has a 2 year warranty. We will put right or replace any meter which is faulty through bad workmanship or materials. This warranty does not cover damage caused by misuse or accident.

IMPORTANT

If this equipment is important to your process, you may want to buy a spare to cover possible failure or accidental damage in the future.

This is because at some times, for example during our factory shutdown periods, you may have to wait several weeks for an equivalent replacement. Or, we may have no stock at the time you urgently need it.

You may also need to pay extra carriage charges if you want a fast, guaranteed courier service. Warranty repairs or replacements are normally returned with a standard courier service.

We do not offer any compensation for losses caused by failure of this instrument.

If you do not agree with these conditions, please return this item now, in unused, clean condition, in its original packaging and we will refund the purchase price, excluding any carriage paid.

We thought you'd prefer to know about possible delays and extra charges now, rather than during a panic.

We always try to improve our products and services, so these may change over time. You should keep this manual safely, because future manuals, for new designs, may not describe this product accurately.

We believe these instructions are accurate, and that we have competently designed and manufactured the product, but please let us know if you find any errors.

Important Warnings



Carefully read all warnings and ONLY install the meter when you are sure that you have properly covered each point.

- * Connect the meter according to current IEE regulations and separate all wiring according to IEC1010.
- * Power supplies to this equipment must have anti-surge (T) fuses at 125mA for 230V supply, 250mA for 110V supply or 1A for DC supplies in the range 11-30VDC.
- * Check that the model number and supply voltage suit your application before you install the meter.
- * Don't touch any circuitry after you have connected the meter , because there may be lethal voltages on the circuit board.
- * We designed this meter for Installation class II service only. This is because it has exposed electrical and power terminals, so you must install it in an enclosure to protect users from electric shock.
- * We designed this meter for Pollution-Degree 2 environments only. This means you must install it in a clean, dry environment, unless it has extra protection from a splashproof cover, such as our SPC4
- * Only adjust on-board switches or connections with the power turned off
- * Make sure all screw terminals are tight before you switch the meter on.
- * Only clean the meter with a soft damp cloth. Only lightly dampen with water. Do not use any other solvents.

***Safety FirstDon't assume anything..... Always double check.
If in doubt, ask someone who is QUALIFIED to help you in the subject.***

General Description

The ACI-J is a simple AC current indicator with 5 selectable ranges from 0-2mA up to 0-5A

The ACV-J is a simple AC voltage indicator with 5 selectable ranges from 0-200mV up to 0-500V

You have a choice of self-adhesive labels, supplied with every meter, to allow you to identify your reading units as mA, mV, V or AAC.

The standard ACI-J and ACV-J both use a precision rectifier circuit and R-C integrator, followed by a dual slope integration A/D method to give +/- 1999 count resolution. You can include a decimal point within the display. You can select where the decimal point appears with a push-on jumper switch.

Optional features include true RMS detection, remote decimal point selection with remote switching, variable display brightness control, and an extra fixed 0 digit to multiply the reading by 10.

Getting Started

First, check that the meter will suit your application and the available power source (either 110 VAC, 230 VAC or 11-30 VDC).

If you asked us to configure the meter for you, please check that the scaling and settings agree with your requirements.

We fully tested and calibrated your meter for you, but a pre-installation test may be useful to check that everything works as needed.

Check that your panel cutout is correct, 92mm wide, 45mm high. You must fit the meter in a protective enclosure for installation class II service. Remove the 2 screws holding the U clamp at the rear of the case and all the connectors. Slide the meter into the cutout and re-fit the U clamp and screws. Tighten the screws just enough to hold the meter firmly in place.

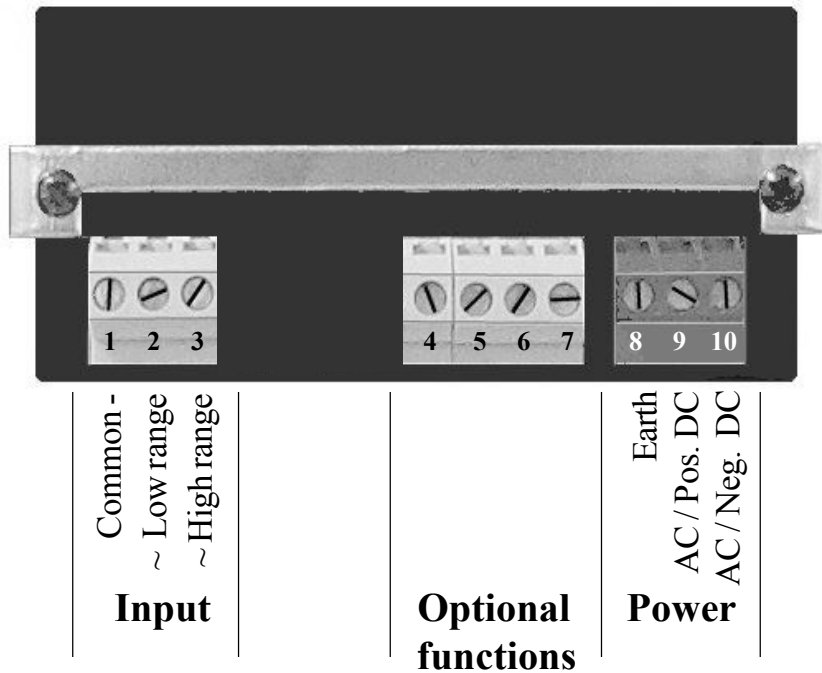
Connect the signal and power cables to the screw terminal connectors. See the connection drawing to be sure that you have used the correct terminals.

Check, before switching on, that the power is suitable for the unit.

The display should then show a steady reading proportional to the input signal. The reading should be linear to within 0.25% of the selected range.

Connections

This meter has detachable screw terminal connectors to make installation as easy as possible for you. You should use multistrand insulated wire with ferrules to DIN46228/1. You can use stripped wire with cross sectional area from 0.5 to 2.5mm². Strip back insulation 7mm.

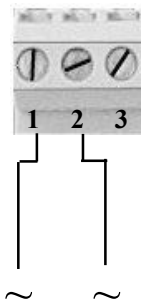


Note for DC Power:
DC powered meters will draw a peak current of up to 1Amp. at switch-on. Your power supply must be able to cope with this surge.

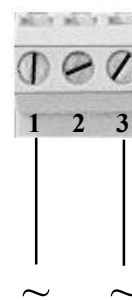
Use screened cable for your input signal and connect the screen to power earth at the meter end of the cable only. For best performance, keep the signal cable well away from power cables, which could interfere with your measurement.

Input Connection Examples:

Low Range inputs
ACV-J = 0-200mV - 0-200V
ACI-J = 0-2mA - 0-2A



High Range inputs
ACV-J = 0-500V
ACI-J = 0-5A

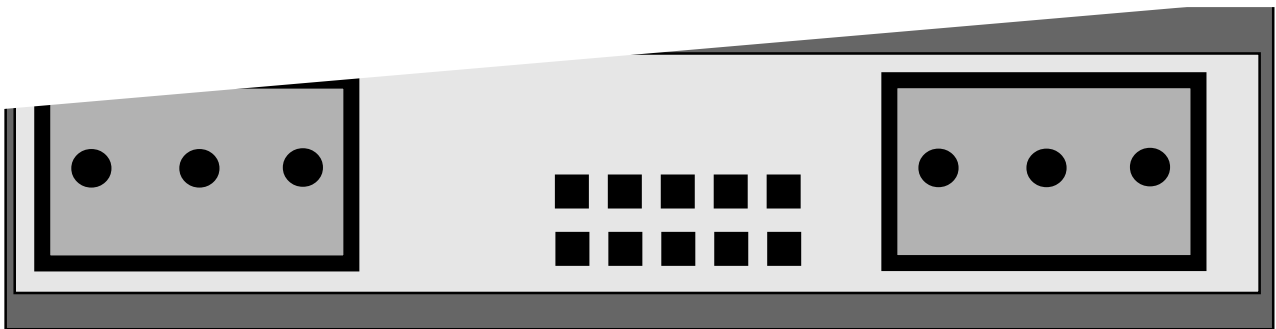


How to select Input Signal range

You can choose from 5 input signal ranges for both meter types. Look on the meter's back panel, where you will see a collection of jumpers.

You must remove power and input signal from the meter whenever you change jumper positions

Use pointed pliers to change the position of jumpers to suit your application.



ACV-J Signal Ranges

■ ■ ■ ■ ■ □ 0-200 mV

■ ■ ■ □ ■ ■ 0-2 V

■ ■ □ ■ ■ ■ 0-20 V

■ □ ■ ■ ■ ■ 0-200 V

■ □ ■ ■ ■ ■ 0-500 V

ACI-J Signal Ranges

■ ■ ■ ■ □ 0-2 mA

■ ■ ■ □ ■ ■ 0-20 mA

■ ■ □ ■ ■ ■ 0-200mA

■ □ ■ ■ ■ ■ 0-2 A

□ ■ ■ ■ □ 0-5 A

How to remove the front lens

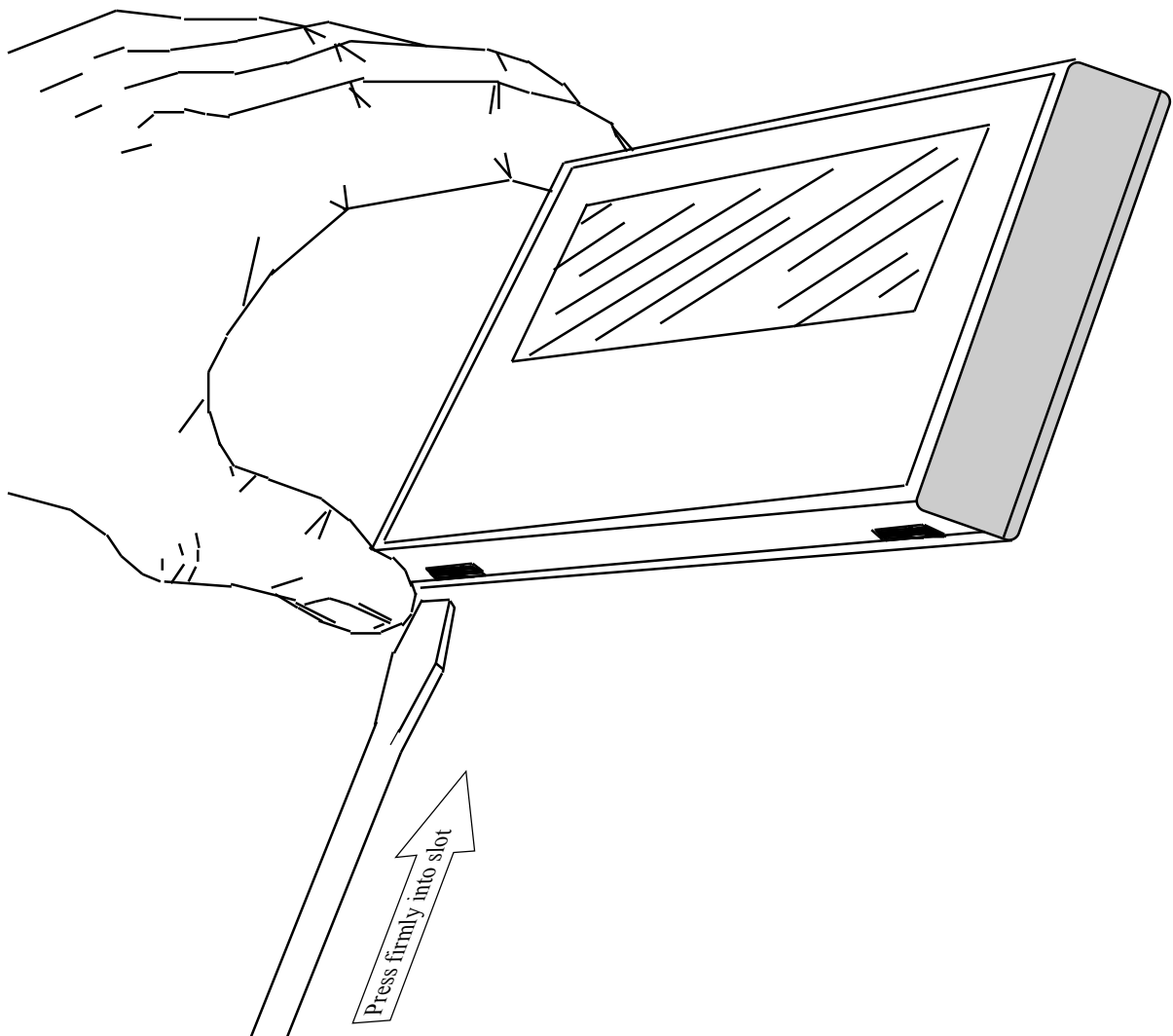
You will need to remove the front lens if you want to calibrate your meter, or if you want to change its power supply voltage or decimal point position.

The lens will stay firmly in place under normal operating conditions to prevent accidental or casual removal.

Look under the bezel surface and you will see two small slots. Push a terminal screwdriver firmly up into the left slot and gently pull the bezel forward on its lower left corner. Then repeat for the slot on the right side and the lens should come off.

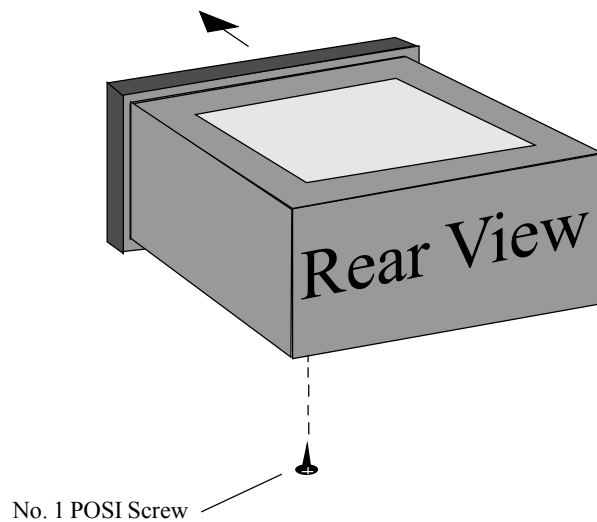
To replace, simply press the lens back into position, and test to ensure it has clipped on firmly.

You should never leave the meter unattended with the lens removed.



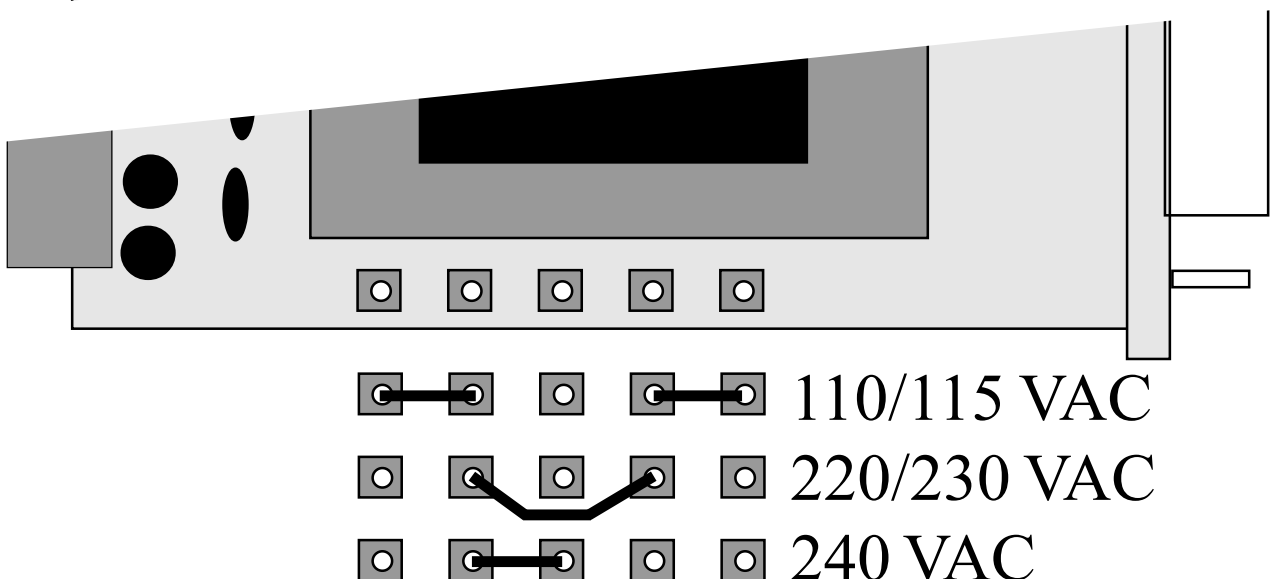
AC Power Voltage Selection

If you need to change the AC power voltage setting, remove the front panel, and the small #1 POSI screw in the bottom surface of the case, near the back.



Withdraw the whole assembly from the front. Cut and solder links in new position, as required, and replace assembly, screw and front cover.

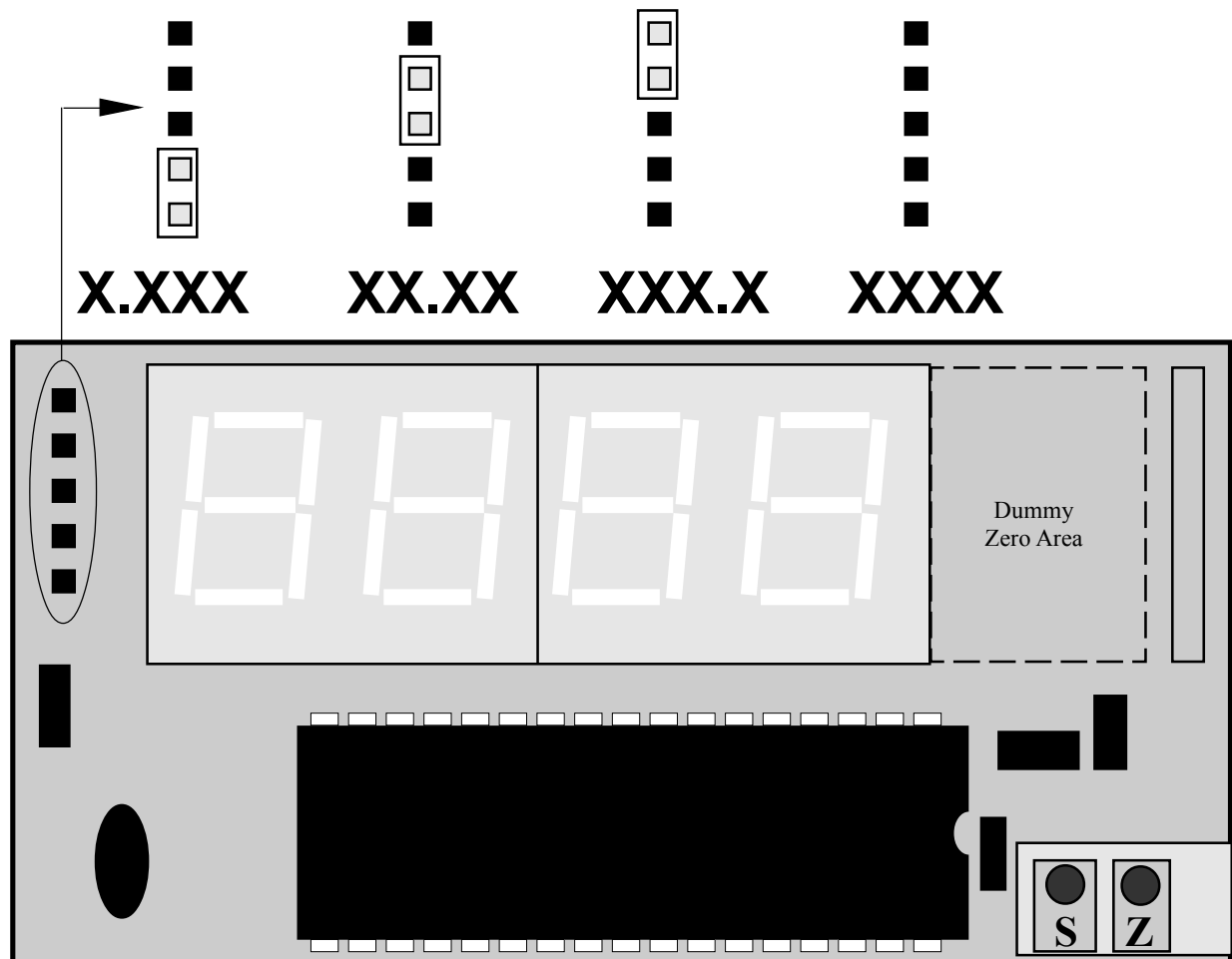
Please remember to change the label on the meter, to show the new power voltage.



Decimal Point Selection and calibration

Remove input signal and power before making changes to jumper positions !
You can select the decimal point position by removing the front lens, which reveals a set of push-on jumpers .. see below. An add-on connector option allows the decimal point to be selected remotely with contact closures. Please see the 'Connection Details' page.

Before you start to calibrate your meter, please check that the input range and excitation voltage jumpers are correctly positioned for your application.



VERY IMPORTANT !

Use an insulated screwdriver when you adjust the potentiometers and do not touch any circuitry - there could be lethal voltages present.

- 1) Apply 0% input and adjust the zero pot “ Z ” for 0% of display range.
- 2) Apply 100% input and adjust the span pot “ S “ for 100% of display range.
- 3) Repeat steps 1) and 2) until you are happy with the calibration.
- 4) Apply 50% input and you should see the display shows 50% range.

If the dummy zero option is fitted, this will be added to the RIGHT of the digits shown.

Specifications

Bezel size	48mm high by 96 mm wide (1/8 DIN)
Panel Cutout	45 mm high by 92 mm wide
Case Depth	93 mm behind panel, including connectors
Weight	300 grammes
Case Material	Black polycarbonate
Connectors	Detachable Screw Terminal connectors
Operating Temp.	0 to 50 degrees C, non condensing humidity
Storage Temp.	-25 to 70 degrees C
Power supply	110 or 240 VAC or 11-30 VDC with optional inverter
Power consumption	4 watts maximum

Input Signal Range	Max. Overload	Input Resistance
0-2mA	50mA	100 Ohms
0-20mA	200mA	10 Ohms
0-200mA	600mA	1 Ohm
0-2A	3A	0.1 Ohm
0-5A	6A	0.04 Ohm
0-200mV	5V	1 Megohms
0-2V	50V	1 Megohm
0-20V	200V	1 Megohm
0-200V	400V	10 Megohm
0-500V	600V	10 Megohms

Display type	High efficiency LED, red or green
Accuracy	+/-0.25% of range +/-1 counts, for i/p >1% of range
Span tempco	100ppm/Degree Celsius max
Zero Tempco	50ppm/Degree Celsius

A/D conversion	Dual slope +/-1999 count maximum resolution
AC detection	Precision full wave rectifier followed by RC filter
RMS sensing (option)	True RMS converter. Crest factors <3 [40-5000Hz.]
CMRR	100dB 0-60Hz. 250V max.
Display update rate	2.5 readings per second

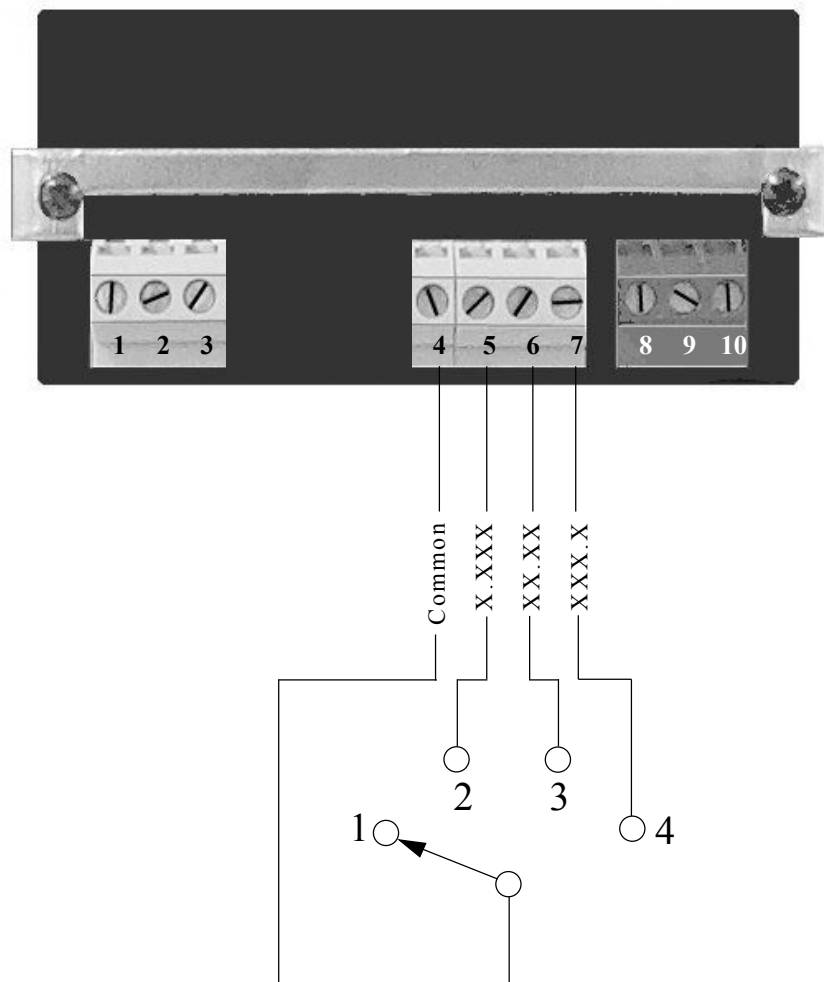
Remote Decimal Point selection option

If you ordered your display with the Remote Decimal point selection option you can change the decimal point position with external contact closures.

You'll see a suffix a suffix 'DPCC' on the model number text, if this option is fitted.

WARNING !

The decimal point selection connector will be at the same potential above ground as the input signal and could present a shock hazard if accessible to users.



In the example shown, a 4 way rotary switch allows 4 decimal point choices to be selected, 1] XXXX 2] X.XXX 3] XX.XX 4] XXX.X

The switched signals are 5V DC at approximately 1mA switched current.

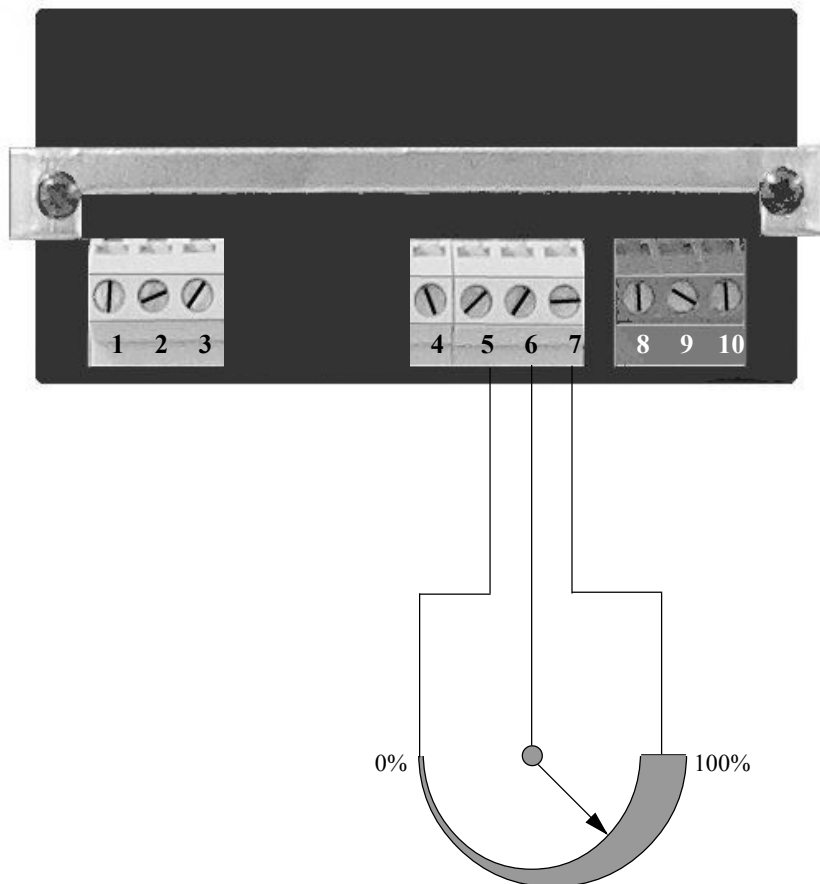
Variable Brightness option

If you ordered your display with the Variable Brightness option you can change the display brightness with an external potentiometer.

On the unit's model number, a suffix 'VB' will be present, if this option is fitted.

WARNING !

The variable brightness connector will be at the same potential above ground as the input signal and could, therefore present a shock hazard if accessible to users



In this example , a 1Kilohm linear potentiomer allows adjustment from 0% to 100 % brightness.

The adjusted signal is 5VDC across the potentiometer.

Record of Revisions

27 February 2002	Manual re-formatted from fanfold to bound
13 February 2003	Text changed to plain English to improve clarity

Declaration of Conformity

Declaration Reference : ACVI-J
Issue Date : 18 October 1995
Products Covered : ACVI-J
Title : Low Cost DC Meter

This is to confirm that the Products covered by this declaration have been designed and manufactured to meet the following limits :

EN55011:1998 Conducted Emissions: Class B
EN55011:1998 Radiated Emissions : Class B
IEC50082-1:1992 Electro-Static Discharge Immunity: 8kV Air
IEC50082-1:1992 Radiated ElectroMagnetic field Immunity: 3V/m
IEC50082-1:1992 Fast Transient Immunity : AC 1kV, cable 500V

The product is designed to conform with the applicable sections of the following standards:

EN 61010-1:1995

and comply with the requirements of Council Directive 89/336/EEC relating to Electro-Magnetic Compatibility, & are designed to meet 73/23/EEC Low voltage Directive.

Conditions

The meters are allowed a worst case error of 1% of A/D range during electro-magnetic disturbance, and must recover automatically when disturbance ceases without the need for human intervention, such as resetting, power-down etc.

The meters covered by this Declaration must be installed in adherence to the following conditions :-

Signal cabling shall be routed separately to power carrying cabling (includes relay output wiring)
All signal cabling shall be screened. The screen shall only be terminated to the power earth terminal

Signed as true and correct, for and on behalf of London Electronics Ltd.

J.R.Lees Director