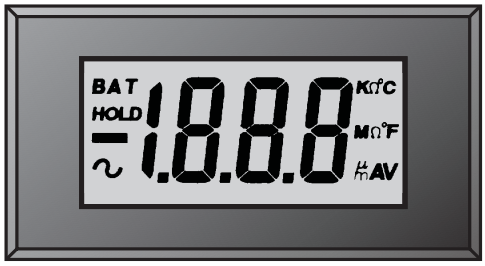
anders electronics

OEM33 & OEM33H 3.5 digit LCD digital voltmeter

features

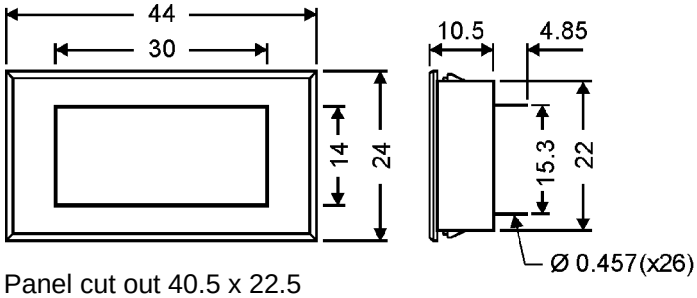


- 3.5 Digit 10mm character height LCD
- 200mV Full Scale sensitivity
- Automatic zeroing and polarity indication
- 11 selectable annunciators
- Easy to use decimal point selection
- Built in snap fastener
- Display on hold option OEM33H

DESCRIPTION

The OEM33 (also known as the VK1000) is one of the world's smallest digital voltmeters. It is an ideal replacement for analogue meters with advantages of accuracy, size and easy mounting. The module includes an A/D converter, LCD display of 10mm character height, and plastic housing with standard dual in line pin terminals for easy insertion into sockets or PC Board.

DIMENSIONS mm



Panel cut out 40.5 x 22.5
Fastening clips accept panel thickness 0.9 to 3.2mm

OPERATING SPECIFICATION

Operating temperature	0 to 50°C
Storage temperature	-20 to 70°C
Operating relative humidity	80%

OEM33H - VERSION WITH DISPLAY HOLD FACILITY

This module is a version of the OEM33 featuring a digital display hold facility. For normal, continuous operation connect the 'Hold 1' pin to the GD pin. To hold the present reading, connect 'Hold 1' to VDD. Do not leave this pin floating or it will drift in and out of hold mode.

ORDERING INFORMATION

OEM33	3.5 digit, 200mV LCD Voltmeter
OEM33H	3.5 digit, 200mV LCD with display hold

ELECTRICAL CHARACTERISTICS T_A=25°C

CHARACTERISTIC	CONDITION	MIN	TYP	MAX	UNITS
Supply voltage (VDD)	9 Volts 5 Volts	7 4.5	9 5	10 6	V V
Supply Current (IDD)	9 Volts 5 Volts		100 2	500 3	μA mA
Full scale				199.9	mV
Input Impedance		100			MΩ
Reference Voltage	9 Volts		100		mV
Overload voltage				20	V
Zero I/P Reading			0	±1	Counts
Accuracy at FSD	9 Volts 5 Volts		±2 ±2	±4 ±4	Counts Counts
Linearity	9 Volts 5 Volts		±1 ±1	±2 ±2	Counts Counts
Resolution			100		μV
CMRR			70		dB
Temp Coefficient			100	150	ppm/°C

PIN FUNCTIONS

VDD	Positive supply terminal
VSS	Negative supply terminal for 9 volts operation
GD	Negative supply terminal for 5 volts operation
IH	Input high terminal
IL	Input low terminal
RH	Reference high input terminal
RL	Reference low input terminal
HOLD1	Connect to VDD for hold and GD for continuous
C	Analogue Common
XBP	For driving annunciator
BP	LCD back plane
D1, D2, D3	Decimal point pins . D1 = .000, D2 = 0.00 D3 = 00.0 The decimal point will appear if the corresponding terminal is connected to XBP.
BAT, °C, °F,~, m, μ, MΩ, KΩ, V, A, HOLD2	Annunciators

All annunciators not in use must be connected to the BP pin for suppression purposes. To light up an annunciator, connect the corresponding pin to XBP.

USER INSTRUCTIONS

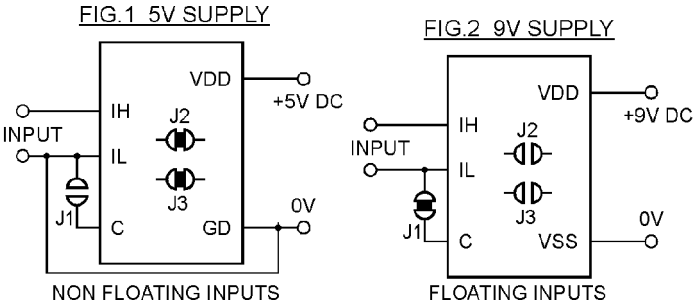
The OEM33 is designed for 5/9V supply. Incorrect supply polarity will destroy the module immediately. It is ready for general use when connected as in fig 1 for 5 volts. For 9 volt supply the module may need calibrating before use as follows. Connect as in fig. 2, apply 100mV to the inputs from a calibrated source and adjust VR1 until the display reads 1000.

The input range is 0-199.9mV . Over-range is indicated by blanking the three least significant digits and displaying a "1" in the most significant digit. If the input voltage is reversed, a minus sign is displayed automatically.

The module has 3 decimal points. D1, D2, D3 and 11 selectable annnunciators.

For 5V operation, IL must be connected to GD for non-floating inputs (as fig. 1) and to the analogue

CONNECTION DIAGRAM BASIC CONFIGURATION

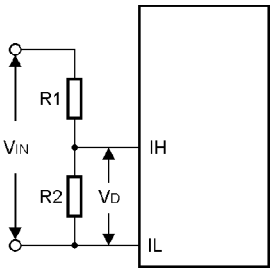


For 9V operation it is recommended to power from a 9V battery. The inputs are intended to float with respect to the supply but if they do not float they must be no closer than 1.5V from either VDD or VSS (VDD-1.5V and VSS+1.5V)

see the circuits for non-floating inputs below.

APPLICATION CIRCUITS

DC VOLTAGE MEASUREMENT



To measure voltages greater than 200mV an attenuator is required.

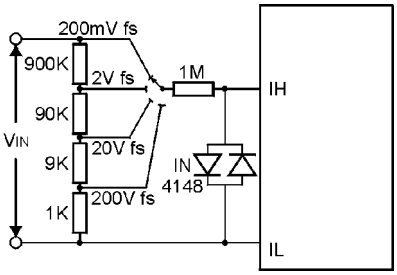
$V_{IN}=V_D \times \frac{R1+R2}{R2}$ V_D max. is 199.99mV

EXAMPLES

V_{IN}	Display	V_D	R1	R2
2V	1.999V	199.9mV	1MΩ	110KΩ
10V	1500rpm	150mV	1MΩ	15KΩ

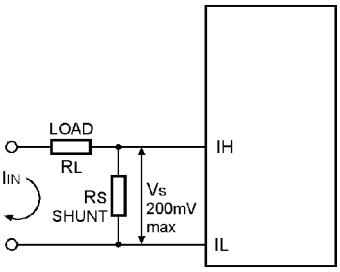
The input impedance becomes R1+R2. Choose accurate stable resistors. Typically, R1=1MΩ. 9MΩ is a practical upper limit.

DC MULTI-RANGE VOLTAGE MEASUREMENT



For multi-range, use a 2 pole, 4 way rotary switch. 1 pole for range select and the other to connect the appropriate decimal point to XBP.

DC CURRENT MEASUREMENT



Shunt resistance $R_S = \frac{V_S}{I_{IN}} \Omega$

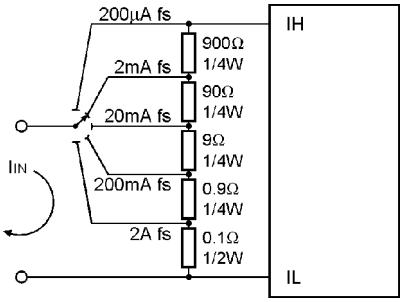
It is important to note the power dissipation in the shunt and choose resistor rating accordingly

$P_S = \frac{V_S^2}{I_{IN}} = I_{IN}^2 R_S \ \Omega$

EXAMPLES

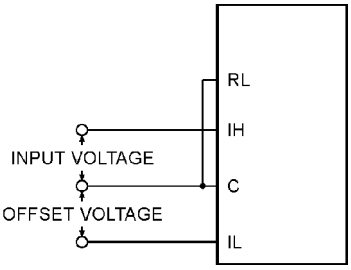
Current	R_S	P_S
200mV	1Ω	0.04W
2A	0.1Ω	0.4W

DC MULTI-RANGE CURRENT MEASUREMENT



For multi-range, use, a 2 pole, 5 way rotary switch. 1 pole for range select and the other to connect the appropriate decimal point to XBP

DC VOLTAGE OFFSET



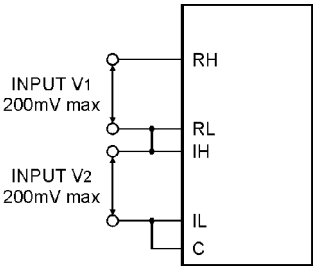
To achieve a zero display reading for a non-zero voltage input, apply the offset voltage between C and IL.

For a positive offset apply a Positive signal to IL w.r.t. C.

Apply the input signal between IH and C

Note jumper J1 must be open

DC VOLTAGE RATIO MEASUREMENT



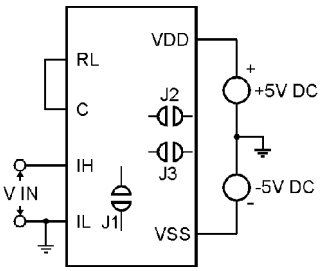
To determine the ratio between two voltages apply the inputs as shown.

Displayed reading = $\frac{V2}{V1}$ X 1000

Over range occurs when $\frac{V2}{V1} \geq 2$

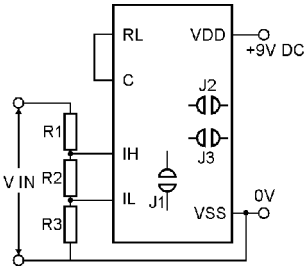
Note Jumper J1 must be closed

NON FLOATING INPUTS (a)



Where a single 5V supply is not suitable but you must connect your input signal ground to the module supply ground then either of the two non-floating input circuits can be used. Note that the module is set in 9V supply mode BUT jumper J1 is left open.

NON FLOATING INPUTS (b)



Using the formulae choose resistors to ensure the analogue inputs are no closer than 1.5V from either VDD or VSS (VDD-1.5V or VSS+1.5V)

$\frac{VIN(Max)(R2)}{R1+R2+R3} \leq 200mV$

$\frac{VIN(Max)(R2+R3)}{R1+R2+R3} \leq VDD-1.5V$

$\frac{VIN(Min)(R3)}{R1+R2+R3} \geq VDD+1.5V$

anders electronics plc Bayham Place, London NW1 OEU UK
Tel: +44 (0)20 7380 8167 Fax: +44 (0)20 7874 1908 http://www.meters.anders.co.uk