

**4 1/2 DIGIT LCD DVM****RESOLUTION 10 $\mu$ V**

- \* LOW POWER
- \* SINGLE RAIL VERSION
- \* BANDGAP REFERENCE



A low profile state-of-the art LCD DPM with 12.5mm 4 1/2 digit display incorporating a wide range of commonly employed symbols. Features auto-zero, auto-polarity, temperature compensated display drive, 200mV or 2V f.s.d. digital hold, programmable decimal points, underrange and overrange signals. Automatic low battery indication and 'continuity' flags. The DPM 300 can be readily scaled by user to indicate many different units, amps, volts, ohms etc. This superb new product sets new standards for accuracy, stability and low cost. It will suit many applications in portable or other measuring instruments. Supplied complete with bezel.

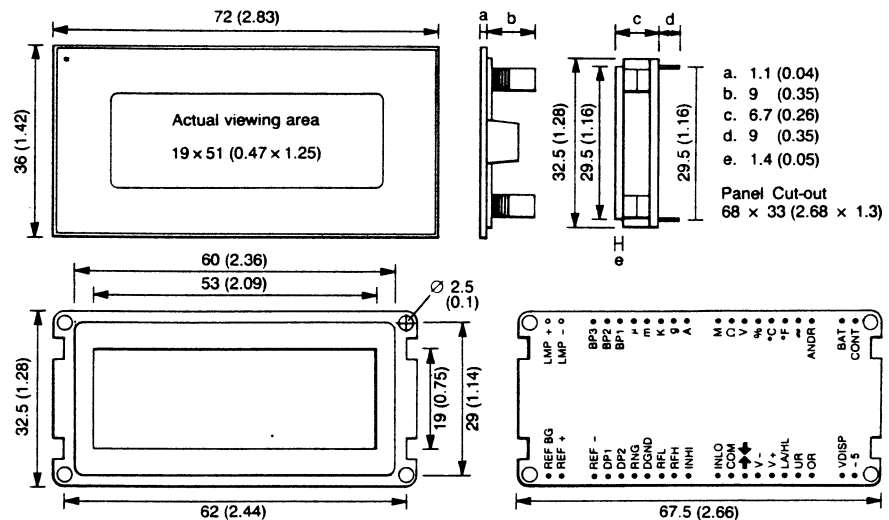
SPECIFICATION		MIN	TYP	MAX	UNIT
Accuracy ( $\pm 1$ count)			0.005	0.01	%
Linearity				$\pm 1$	count
Sample Rate			1.6		per sec
Temp Stability			50		ppm/ $^{\circ}$ C
Temp. Range		0		50	$^{\circ}$ C
Supply Voltage	Normal	7	9	10	V
	S type	3.5	5	6	
Supply Current			1	2	mA
Max DC Input Voltage				$\pm 20$	V
Input Leakage Current			1	10	pA
Low Battery Threshold	Normal	6.3	7.3	7.7	V
	S type	3.2	3.7	3.9	
Continuity Flag 'Threshold'		100	200	400	mV

**ORDER INFORMATION:**

DVM-MODULE DPM 300 WITH BEZEL EA 022  
 DVM-MODULE DPM 300-S WITH BEZEL EA 022

**EA 4031**  
**EA 4031-S**

Dimensions in mm (inch)



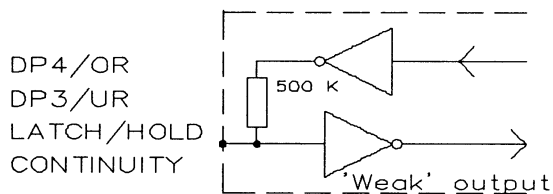
## PIN FUNCTIONS

Note that 'Hi' means V+ (6) and 'Lo' means DGND(14). Four of the pins are inputs/outputs featuring weak outputs (see fig.). To use it as an input, the output can be easily overridden. In order to obtain the output data, the pin must be connected to a high impedance input.

1. -5. Output: DPM 300-S only. Output from negative rail generator circuit. It is a 'mirror' image of the voltage between V+ and V-.
2. VDISP. Output: Drive voltage for L.C.D. Set by R9.
3. DP4/OR. In/Out: Input: When pulled Hi DP 1.999 will be shown. If DP4 is not to be used, connect it Lo. Output: The output will go Hi if the result exceeds +19999.  
Note: If DP4 is to be shown and the O/R signal is to be sensed at the same time, then Pin 3 should be used as an input under normal conditions except during Latch/Hold output when the O/R flag should be sensed.
4. DP3/UR. In/Out: Input: When pulled Hi, DP 19.99 will be shown. If DP3 is not to be used, connect it Lo. Output: The output will go Hi if the result is less than +1000.  
Note: If DP3 is to be shown and the U/R signal is to be sensed, see note on DP4/OR above.
5. LATCH/HOLD. In/Out: Input: When floating, the converter operates in the free-run (normal) mode. When pulled Hi, the last displayed reading is held. Output: A negative pulse occurs when the data in the display latches is updated.
6. V+ (Vdd). Positive power supply. Note: The voltage between V+ and V- must not exceed 15V
7. V- (Vss). Negative power supply. for normal DPM 300 or not exceed 7.5V for the DPM 300-S.
8. CONTINUITY. In/Out: Input: When held Lo, the continuity flag will be disabled. Output: If the analogue input voltage is less than a nominal +200mV, the continuity flag will be shown and the output will be Hi.
9. COM: Ground for the analogue section of the converter, held actively at 3.2V (nom) below V+.  
Note: This pin can sink a large amount of current and care is needed to ensure that it is not overloaded. Max. sink current = 2mA. Max. source current 12µA.
10. IN LO: Negative measuring input.
11. IN HI: Positive measuring input.
12. REF HI: Positive input for external reference voltage. Note: Ref. input pins 12 and 13 are connected via links 1 and 4 to the bandgap ref. circuit.
13. REF LO: Negative input for external reference voltage.
14. DIGITAL GROUND (DGND): This is held at between 4.5 and 5.8 volts below V+ and is the supply voltage for the digital section. If CMOS logic is used to provide or decode DPM 300 digital signals, then it can be powered from V+ and DGND up to a maximum of 1mA.
- 15.\* RANGE: Selects either 200mV or 2V F.S.R. Connect Lo or leave open for 200mV, connect Hi for 2V.
- 16.\* DP2: Input for DP199.99. Connect Hi to operate.
- 17.\* DP1: Input for DP1999.9. Connect Hi to operate.  
\*Note: These pins have an internal 3µA pull-down and need not be connected if not used.
18. REF-: Negative input of bandgap reference circuit. Connected via link 4 to REF LO (13).
19. REF+: Positive output of bandgap reference circuit. Connected via link 1 to REF HI (12).
20. REF BG: Output of bandgap reference circuit (1.22V nom).
- 21, 22, 41. CON, BAT, NEG: These indicators are driven by the continuity, low battery and polarity warning circuits. They are connected via links to their respective signals. To disable them cut the relevant part of the link and apply a solder link to the adjacent backplane pad.

### SPECIAL NOTE: ANNUNCIATORS.

The DPM annunciators (m, V, % etc.) can be illuminated by connection to the annunciator drive ANDR (23). If not required, they are internally connected to their respective backplanes via 1M resistors (R11-22). The resistor does not affect normal operation and the annunciators will still appear when connected to ANDR.



**Input scaling:** Ra and Rb may be fitted in order to alter the full scale reading of the meter.

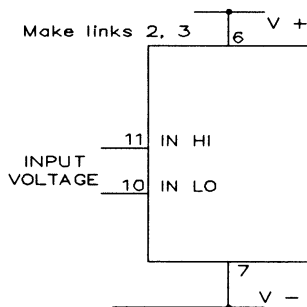
1. Input must not exceed  $\pm 500\text{V}$ .
2. Cut link La.

Required F.S.D.	Range Input	Ra	Rb
2V	HI	link	
20V                    2	HI	9.1M	1M
200V                   2	HI	10M	100K
2KV                    1,2	HI	10M	10K
200μA	LO (o/c)	link	1K
2mA	LO (o/c)	link	100R
20mA	LO (o/c)	link	10R
200mA	LO (o/c)	link	1R

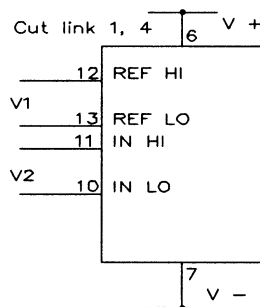
## ANALOGUE INPUTS

IN HI, IN LO, REF HI and REF LO are true differential inputs. That means that they respond to the voltage across them and not to their voltage with respect to the power supply. There is a limit to this however, known as the common mode range. Any input must be no higher than  $V_+ - 0.5V$  and no lower than  $V_- + 1.5V$ . Note that for DPM 300 S, it must be no lower than 1.5V above the -5V output. If the power supply is floating with respect to the circuit being monitored connect IN LO and REF LO to AN COM for best results.

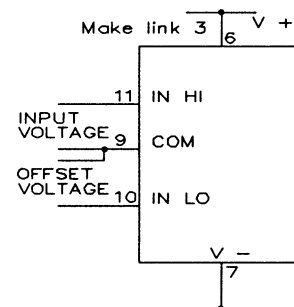
If there is a danger that any input may be taken beyond the power supply rails, a series resistor must be fitted to limit the input current to less than  $100\mu A$ . In all the examples below the meter is on 200mV Full Scale Reading unless otherwise stated.



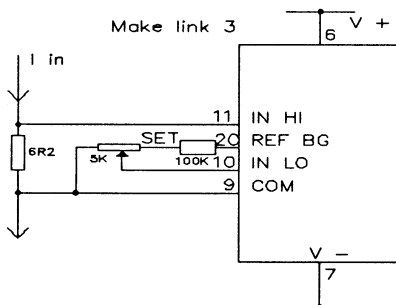
Measuring a floating voltage source of 200mV full scale.



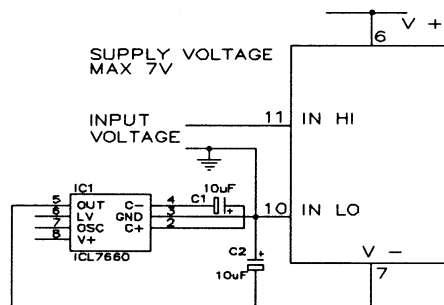
Measuring the ratio of two voltages. Reading =  $10^5 V_2/V_1$  (or  $10^4 V_2/V_1$  for 2V FSR).



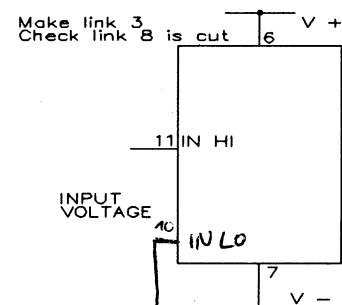
Zero display when the applied input is not zero.



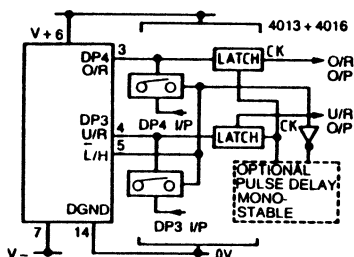
Measuring 4-20mA to read 0-999.



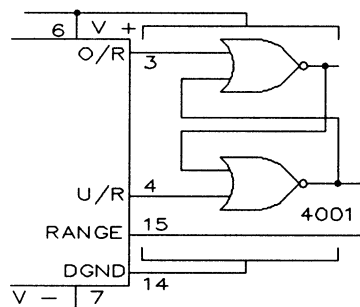
Measuring a single ended input referenced to supply (DPM 300).



Measuring a single ended input referenced to supply (DPM 300S).



Driving DP3 and DP4 inputs while monitoring underrange and overrange outputs.



2 Decade autoranging

## PANEL FITTING

Fit the bezel to the front of the panel and then locate the meter into the bezel from behind. Alternatively the meter and bezel may be assembled before fitting into the front of the panel but do not use excessive force. Finally fit the window to the bezel.

## SOLDER PAD LINKS

Interconnections can be made by applying solder across the appropriate solder pad links provided (see circuit diagram).