EA 4016

4 1/2 DIGIT MINI DVM

RESOLUTION 10μV

* LOW POWER
* DIGITAL HOLD
* SINGLE RAIL VERSION

A new 4 1/2 digit LCD DPM offering levels of performance, low current consumption and compact size never previously available. The DPM 160 features Auto-zero, Auto-polarity, a logic switched 200mV or 2V fsd, Digital Hold, programmable decimal points and a 1mA current consumption. Automatic low battery indication and 'continuity' flags are built into the 10mm 4 1/2 digit display. The DPM 160 can be readily scaled by user to indicate many different units, amps, volts, ohms etc. A version with an internal negative rail generator (DPM 160S) is also available allowing single rail power supply operation, as input low can then be connected to system ground. Supplied completely with snap-in bezel, the DPM 160 will suit many applications calling for low-cost, high accuracy measurements for portable instruments.

SPECIFICATION		MIN	TYP	MAX	UNIT
Accuracy (±1 count)			0.005	0.01	%
Linearity				±1	count
Sample Rate			1.6		per sec
Temp Stability			30		ppm/°C
Temp Range		0		35	°C
Supply Voltage	Normal	7.5	9	15	V
(V+ - V-)	S type	3.8	5	7	
Supply Current			1		mA
Max DC Input Voltage				±20	V
Input Leakage Current			1	10	pA
Low Battery	Normal	6.3	7.2	7.7	V
Threshold	S type	3.2	3.6	3.9	V
Continuity Flag 'Threshold'		100	200	400	mV

ORDERINFORMATION:

DVM-MODULE DPM 160 WITH BEZEL EA 055	**EA 4016**
DVM-MODULE DPM 160-S WITH BEZEL	**EA 4016-S**

ELECTRONIC ASSEMBLY GMBH

LOCHHAMER SCHLAG 17 · D- 82 166 GRÄFELFING
TELEFON 089/8 54 19 91 · TELEFAX 089/8 54 17 21

EA 4016

BEZEL EA 055

60 (2.36)

30 (1.18)

1.1 (0.04)

8.2 (0.32)

4 (0.16)

6.7 (0.26)

24.8 (0.98)

52 (2.05)

DVM—MODULE DPM 160

DP4/OR
V DISP
DP3/UR
L/H
V −
V +
REF −
REF BG
REF +
COM
CONT
IN LO
IN HI
REF HI
REF LOW
DGND
RANGE
DP2
DP1
CLOCK

0.5 (0.02)   2.54 (0.1)
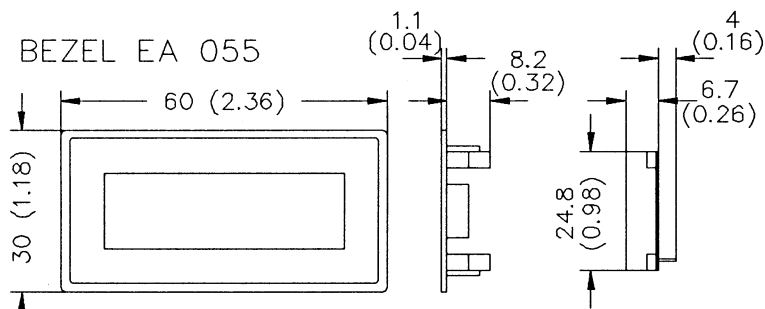
Panel cut-out 57x27 (2.24x1.06)
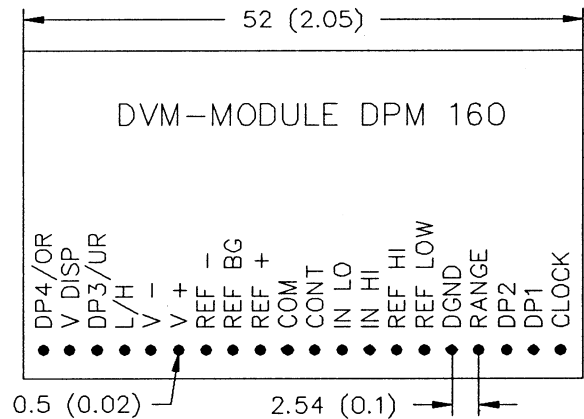
PIN FUNCTIONS

Note that 'Hi' means DGND(16). Four of the pins are inputs/outputs featuring 'weak' outputs. (See figure.) To use it as input, the 'output' is easily overridden. In order to obtain the output data, the pin must be connected to a high impedance input.

1. DP4/OVER RANGE: Input: When pulled Hi, DP 1.9999 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 not to be shown and the O/R signal is to be sensed at the same time, then Pin(1) should be used as an input under normal conditions except during latch/hold output when the O/R flag should be sensed.

2. VDISP: This input sets the drive voltage for the display. It is internally linked to DGND.

3. DP3/UNDER RANGE: Input: When pulled Hi, DP 19.999 will be shown. If DP3 is not to be used, connect it to 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 at the same time, then Pin(3) should be gated with the latch/hold as described above.

4. LATCH/HOLD: Input: When floating, the converter operates in 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.

5. V-: Negative power supply.

6. V+: Positive power supply.

7. REF-: Negative supply for the internal reference.

8. REF BG: Output of bandgap reference (1.22V nom).

9. REF+: Positive output from internal reference.

10. COM: The ground for the analogue section of the converter. Held actively at 3.2V (nom) below V+.

11. CONTINUITY: If the coverter input voltage drops below nominal 200mV, the continuity annunciator will be shown and the output will be high. To disable the continuity indicator, Pin11 should be held Lo.

12. IN LO: Negative measuring input.

13. IN HI: Positive measuring input.

14. REF HI: Positive input for reference voltage.

15. REF LO: Negative input for reference voltage.

16. DIGITAL GROUND: (DGND) is held at between 4.5 and 6 volts below V+. This is the supply voltage for the digital section. If CMOS logic is used to provide or decode DPM60 digital signals, it can be powered from V+ and DGND up to a maximum of 1mA.

17. RANGE: This pin has an internal 3µA pull down and needs not to be connected for a 200mV full scale. For 2V full scale connect Hi.

18.* DP2: Input for DP199.99.

19.* DP1: Input for DP1999.9.
   *These pins have an internal 3µA pull down and need not to be connected if the decimal points are not to be shown. To show the point, connect Hi.

20. CLOCK: This input can be used to override the internal clock in order to synchronise DPM 60 with external systems.

Note: It is possible to disable the CONT, LO BAT and POL indicators by cutting their link to IC1 and applying a solder blob link to BP3 (see circuit diagram).
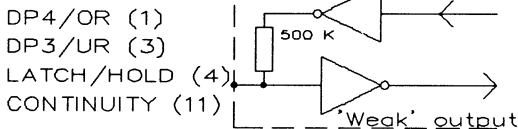
ELECTRONIC ASSEMBLY

DPM CIRCUIT
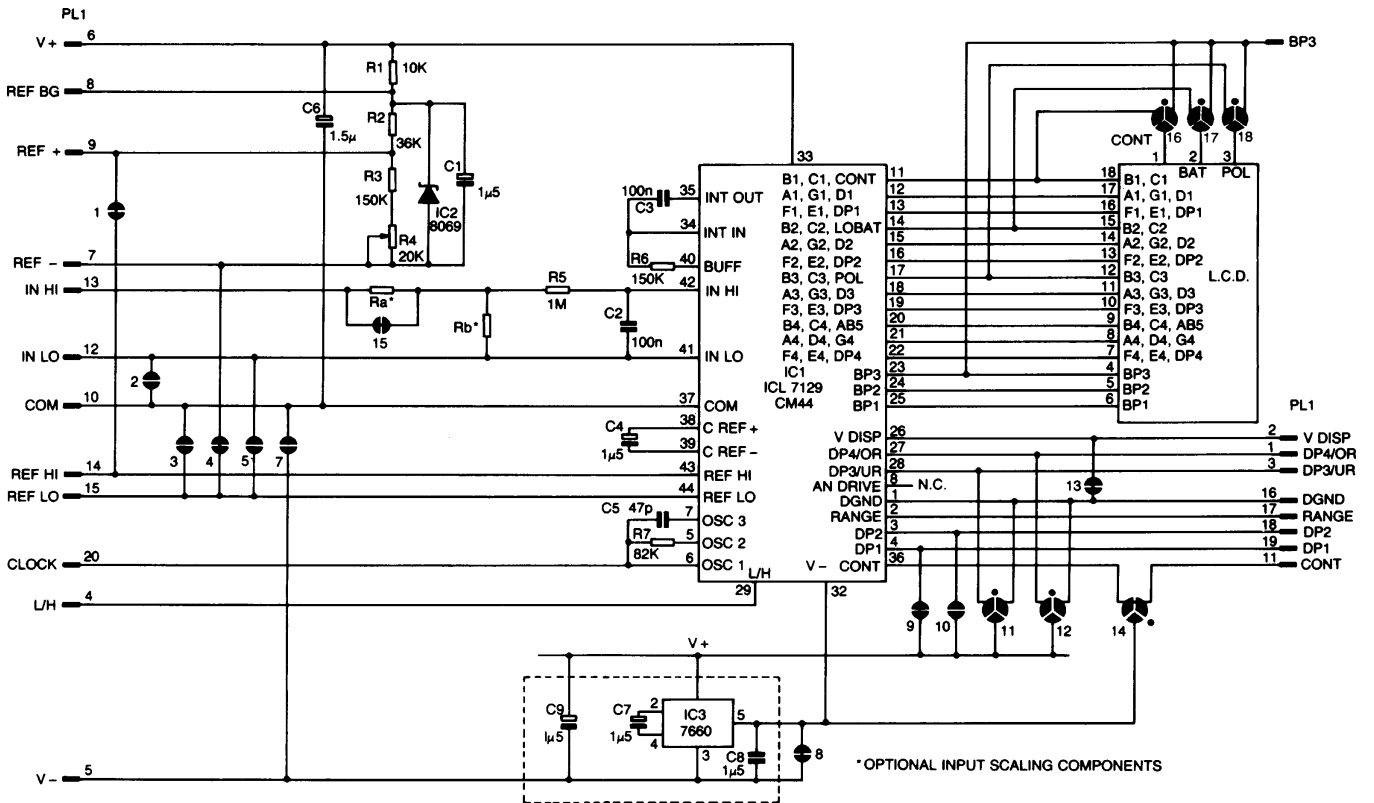
APPLICATIONS

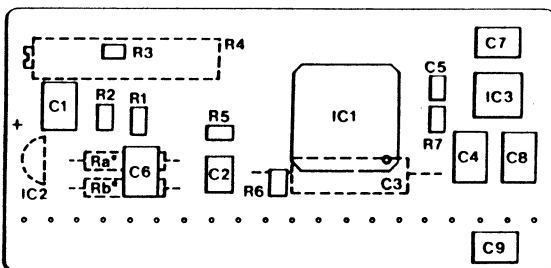Input scaling: Two resistors Ra and Rb may be fitted in order to alter the full scale reading of the meter.

NOTES

1. Input must not exceed ±500V.
2. Ensure link 15 is cut if fitting Ra.
   Note that the meter will have to be re-calibrated.

COMPONENT LAYOUT

* optional components.

Required F.S.D.		Range Input	Ra	Rb
200mV		LO (o/c)	link	(o/c)
2V		HI	link	(o/c)
20V	2	HI	910KΩ	100KΩ
200V	2	HI	1MΩ	10KΩ
2KV	1,2	HI	1MΩ	1KΩ
200μA		LO (o/c)	link	1KΩ
2mA		LO (o/c)	link	100Ω
20mA		LO (o/c)	link	10Ω
200mA		LO (o/c)	link	1Ω

DP4/OR (1)
DP3/UR (3)
LATCH/HOLD (4)
CONTINUITY (11)

* OPTIONAL INPUT SCALING COMPONENTS

EA 4016

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 in the case of the DPM 160 S, it must be no lower than 1.5V above the -5V supply. 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 100µA. In all examples below the meter is on 200mV Full Scale Reading unless otherwise stated.
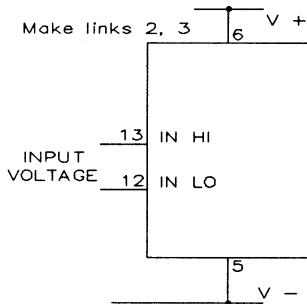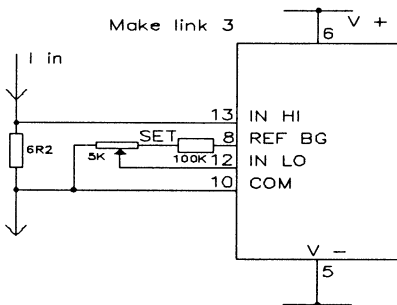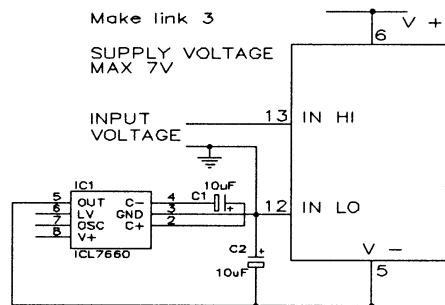
Measuring a floating voltage source of 200mV full scale.
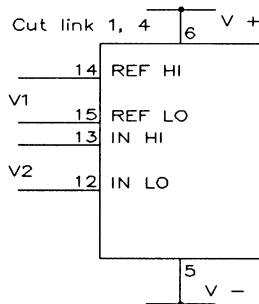
Measuring the ratio of two voltages. Reading = 10^5 V_2/V_1 (or $10^4 V_2/V_1$ for 2V FSR).
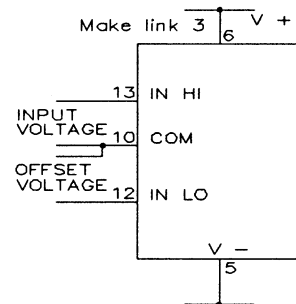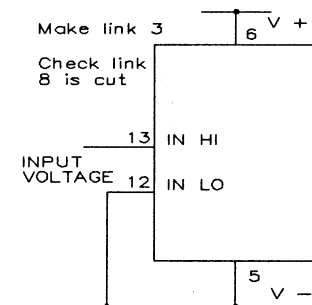
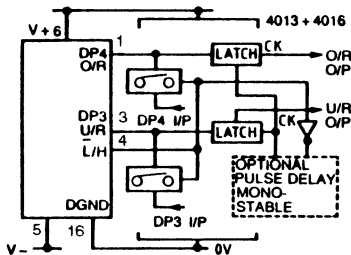Zero display when the applied input is not zero.
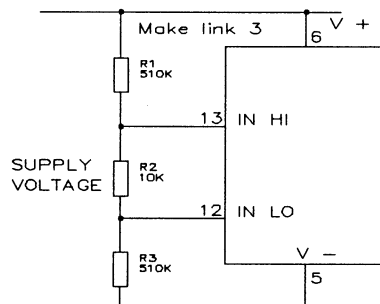
Measuring 4-20mA to read 0-9999.

Measuring a single ended input referenced to supply (DPM 160).

Measuring a single ended input referenced to supply (DPM 160S).

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

Measuring a supply voltage (min 5V, max 15V) DPM 160.

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).