

DP-176 Series

Flatpack LCD Panel Meters for 9V or 5V Power



Features

- Convenient flat panel package
- Shallow depth (0.32")
- Ideal for battery operation
- Very low power consumption (9VDC @ 180 μ A)
- 9V version for differential inputs
- 5V version for differential or single-ended inputs
- 0.1% typical accuracy
- User-selectable decimal point
- Overvoltage protection
- Quantity discounts

Applications

- Battery-powered equipment
- Handheld devices
- Field service instruments
- Marine equipment
- Power supply monitoring
- Automotive equipment

Description

The DP-176 Series is an ultra-thin, low-power DPM well suited to portable or battery-powered applications. The DP-176 meter uses 9V power (only 1.6mW) and accepts only differential inputs that are isolated from the meter's power source. The DP-176S meter has the same features, but uses 5V power (15mW) and is used for either differential or single-ended signal.

The input voltage range is ± 200 mV. Usage with higher voltage ranges requires external scaling resistors. Automatic polarity, overrange indication, and user selectable decimal point are standard features. The 9V version includes a BAT indicator in the lower-left corner of the LCD, which illuminates when the supply voltage drops below 7.2V.

The DP-176 Series employs a dual slope integrating A/D converter and operates from an internal 100mV reference via a precision DC-to-DC converter. Typical accuracy is $\pm 0.1\%$. Both versions use an internal bandgap reference for temperature stability. Reference voltage pins enable ratiometric measurements or input offset adjustments.

The flatpack package provides 15-pin solder pads for easy connection to the meter. An optional connector kit (requires soldering pins to the meter) and bezel are also available.

Technical Notes

1. Note: Operating with a +9VDC battery requires that the signal inputs be isolated from the battery (no common ground).
2. Decimal point selection is by connecting DP1, DP2, or DP3 to VDD (pin 1).
3. With differential inputs, common-mode voltage between INLO and GND (5V power supply common) must be less than ± 1 VDC.

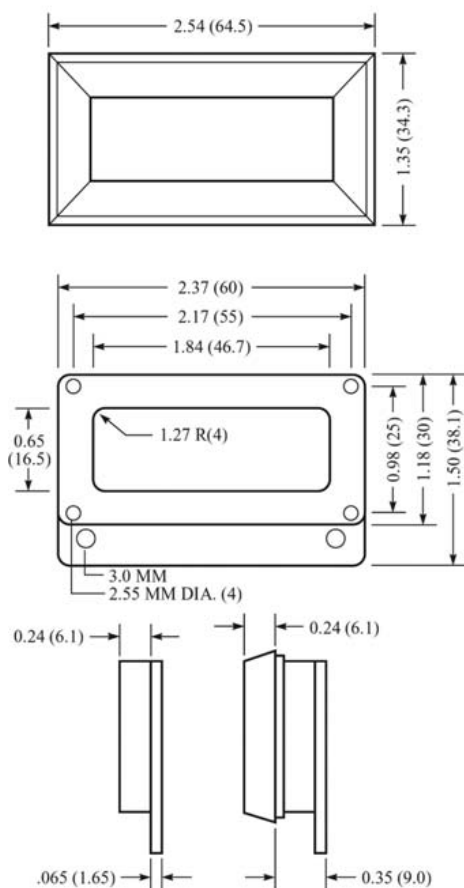
Ordering Information

Model	Description
DP-176	Flatpack DPM LCD 9V diff ± 200 mV
DP-176S	Flatpack DPM LCD 5V SE ± 200 mV
B-1B	Bezel
APS-5	120V AC to 5V DC Power Supply

DP-176 Series

Dimensions

Bezel Option

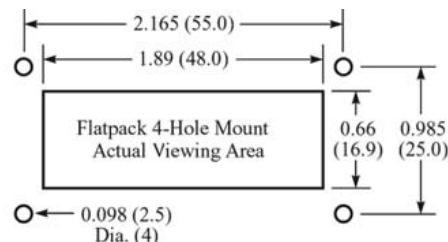


inches (mm)

Connections

Pin No.	Pin Name	Description
1	VDD	Power supply (+5V or +9V)
2	TST	Digits test (connect to pin 1)
3	INHI(+)	Positive input signal
4	INLO(-)	Negative input signal (see Technical Note 1)
5	GND	Power supply ground
6	RFL	External reference low
7	RFH	External reference high
8	COM	Analog Common
9	ROL	Internal reference low
10	ROH	Internal reference high
11	DP3	1.XXX (connect to +VDD to turn on)
12	DP2	1X.XX (connect to +VDD to turn on)
13	DP1	1XX.X (connect to +VDD to turn on)
14	NC	No connection required
15	NC	No connection required

Panel Cutout



Specifications

	DP-176 Series	DP-176S Series
Display		
Digits	3 ½ (±1999 count)	3 ½ (±1999 count)
Type	7-segment LCD	7-segment LCD
Digit Height	.50in (12.7mm)	.50in (12.7mm)
Polarity Indication	Automatic "—" for neg input	Automatic "—" for neg input
Decimal Point	3 position selectable	3 position selectable
Overrange Indication	1--- for positive, -1--- for negative	1--- for positive, -1--- for negative
Other Features/Options	Low BAT annunciator	
Signal Inputs		
Configuration	Bipolar, differential	Bipolar, differential
Full-Scale Input	±200mV	±200mV
Input Offset Adjustment	Auto zero	Auto zero
Input Impedance	10MΩ	10MΩ
Common Mode Range	±1VDC	±1VDC
Common Mode Rejection	>86dB	>86dB
Overrange Protection	±200VDC continuous ±300VDC intermittent	±200VDC continuous, ±300VDC intermittent
Input Bias Current	1pA typical, 100pA max	1pA typical, 100pA max
Control Inputs	Decimal point select test functions	Decimal point select test functions
Performance		
Sampling Rate	2.5 readings/s	2.5 readings/s
Accuracy	±(0.1% + 1 count) typ ±(0.2% + 2 counts) max	±(0.1% + 2 counts) typ ±(0.2% + 2 counts) max
Warmup, typical	10 min	10 min
Temperature Drift, typical	100ppm/°C	100ppm/°C
Power Supply Requirements		
Supply Voltage	7.2-14VDC (9VDC typ)	5VDC ±5%
Supply Current, typical	180μA	3mA
Physical		
Package Style	Flatpack w/ solder pads	Flatpack w/ solder pads
Dimensions	2.37 x 1.50 x .32	2.37 x 1.50 x .32
Panel Cutout	1.89 x .66	1.89 x .66
Weight	0.9 oz (25g)	0.9 oz (25g)
Bezel	B-1B (optional)	B-1B (optional)
Environmental Requirements		
Operating Temperature	0 to 50°C	0 to 50°C
Storage Temperature	-10 to 60°C	-10 to 60°C
Relative Humidity	0 to 95% non-condensing	0 to 95% non-condensing