

- ± 199.9mV or ± 1.999V Full Scale Inputs
- True Floating Bipolar Differential Input
- Automatic Polarity and Overflow Display
- Up to 200 Readings per Second Using External Trigger
- Includes 2 Samples/Second Internal Trigger Clock
- Operates From Single +5VDC Supply
- Solid State LED Display, Full parallel BCD outputs
- Adjustable Zero Control Compensating For External Offset Voltages
- Priced under \$100 in OEM quantities

Covered by GSA Contract No. GS-00S-27959



**OBSOLETE PRODUCT**  
Not available for sale

Note: The DM-2100 replaces the DM-2000 and is identical except for external timing capacitor wiring and conversion rate and displays. DM-2000 is available by contacting factory.

### DESCRIPTION

Featuring accurate, stable readings with 3½ digit resolution, the DM-2100 digital panel meter has wide acceptance because of its proven record of performance and reliability.

The DM-2100 combines the ease and accuracy of digital readout with high input impedance and noise rejection to provide an inexpensive digital panel meter (digital voltmeter) that will enhance the operation, performance and appearance of any instrumentation system.

The DM-2100 is ideal for new equipment design or may be utilized in updating existing instruments or systems that require a stable, accurate digital readout for voltage. Simple to install, the DM-2100 is supplied complete and ready to operate requiring only a connection of an input signal and power cable. Applications include measuring of any parameter for which a suitable output voltage is available. These include absorption, acceleration, current, displacement, distortion, emission, flow, frequency, Ph, pressure, strain, torque, and many others

The DM-2100 provides a differential input with a 100 MegOhms input impedance and a common mode rejection of 70 db at 60 Hz. The input range is ± 1.999 volts or ± 199.9 millivolts. The display is 3½ digits including automatic polarity and overflow indication. In addition the output is presented to the I/O connector as BCD/TTL information.

High quality computer grade components, superior workmanship and wide-safety margin designs combine to make the DM-2100 a must in your designs.

### CALIBRATION PROCEDURE

(Using Trimpots Shown At Right)

The following adjustment procedure is recommended after allowing for a five minute warm-up.

#### Balance Control

1) Short the analog input terminals to analog common. (See I/O chart for proper pin connection.)

2) Rotate the balance control until the display is flickering between (+) zero and (-) zero.

#### Zero Control

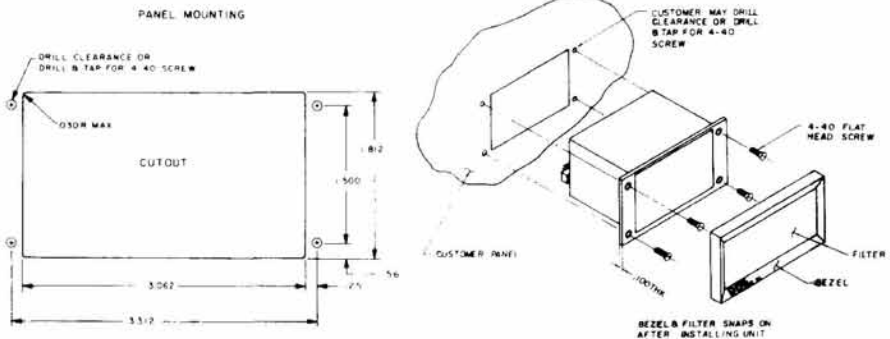
1) Connect a precision voltage reference source to the analog input terminals.

2) Adjust the voltage output from the reference source to 3LSD (30µV Model A, 300µV Model B). Rotate the zero control until the LSD (Least significant digit) flickers between zero and one.

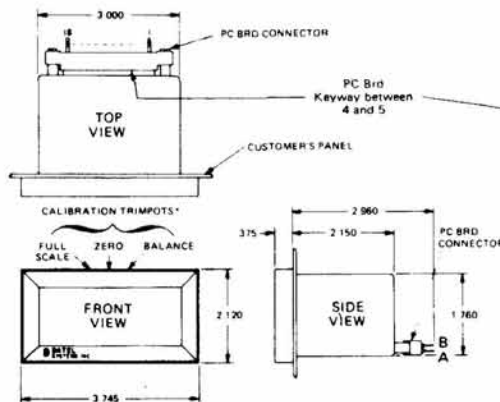
#### Full Scale Control

1) Adjust the output from the reference source to 1.990 volts. Rotate the full scale control of the panel meter until the meter displays 1.990 volts. Recalibration is suggested every 90 days or more often for variable conditions.

### MOUNTING DETAILS



### MECHANICAL DIMENSIONS (INCHES)



### INPUT/OUTPUT CONNECTIONS

BOTTOM		TOP			
A	B	A	B		
1	1	1	1	ANALOG INPUT (LO)	ANALOG INPUT (HI)
2	2	2	2	SHIELD GROUND	SHIELD GROUND
3	3	3	3	NOT USED	NOT USED
4	4	4	4	NOT USED	LOGIC GROUND
5	5	5	5	DECIMAL POINT 100	BIT 1 OUT
6	6	6	6	DECIMAL POINT 10	BIT 2 OUT
7	7	7	7	DECIMAL POINT 1	BIT 4 OUT
8	8	8	8	E.O.C. (STATUS)	BIT 8 OUT
9	9	9	9	OVERLOAD SCALE OUT	BIT 10 OUT
10	10	10	10	INT START GATE	BIT 20 OUT
11	11	11	11	INT START ADJ	BIT 40 OUT
12	12	12	12	INT START OUT	BIT 80 OUT
13	13	13	13	START INPUT	BIT 100 OUT
14	14	14	14	LAMP TEST	BIT 200 OUT
15	15	15	15	1000 OUT	BIT 400 OUT
16	16	16	16	SIGN OUT	BIT 800 OUT
17	17	17	17	NOT USED	NOT USED
18	18	18	18	POWER COMMON	POWER INPUT, +5VDC

Edge board PC contacts are on 0.1" centers

SPECIFICATIONS Typical @ 25°C, 5 minutes warm up	
<b>INPUT</b>	
Input Voltage Range	±199.9mV DM-2100A } ±15V max. ±1.999V DM-2100B } (no damage)
Input Impedance	> 100 MEGOHMS
Input Bias Current	20 nA
Input Configuration	Differential
Input Polarity	Bipolar - Automatic
Common Mode Rejection	70dB @ 60Hz
Common Mode Voltage	±2V max. to digital output common
<b>PERFORMANCE</b>	
Accuracy @ 25°C	±0.05% of Reading ±1 Count
Resolution	100µ Volts (DM-2100-A), 1m Volt (DM-2100-B)
Temperature Coefficient	50ppm/°C
Max Conversion Speed (1)	0 to 200 Conversions/Second. See Diagrams below
Input Settling Time	50 µsec for a F.S. Change
Operating Temperature Range	0°C to +50°C
Storage Temperature Range	-20°C to +85°C
Warm Up Time	5 Minutes to Specified Accuracy
Adjustments	Zero, Balance, Full Scale Located Behind Snap On Front Bezel
Input Power	5 VDC ± 0.25 VDC @ 650mA max (3)
<b>DISPLAY OUTPUT</b>	
Display Type	Solid State LED for Data Digits, 100% Overrange, Overflow, Decimal point and Polarity - Character Height .3 in.
Overflow	Indicated by the Letters "OF"
Decimal Points	Selectable at rear Connector
<b>DATA OUTPUTS (1) (2)</b>	
BCD Outputs	12 Parallel Lines, BCD (8-4-2-1) Positive Logic Loading: 2TTL loads
Overrange (Connection A 15)	1000 to 1999 counts only indicated with a HIGH. Loading: 2TTL loads LOW on overflow.
Polarity (Connection A 16)	Input signal polarity indicated with a HIGH-positive LOW-negative. Loading: 2TTL loads
Overflow (OF)(A9)	HIGH-input signal within range. LOW-input signal outside range. Loading: 2TTL loads
End of Conversion (EOC) (Connection A8)	HIGH - During the conversion period. Output invalid, display blanked. LOW - Conversion complete. Output valid Loading: 2TTL loads Period: 4.5 mSec typ. at full scale 1.5 mSec typ. at zero input
<b>INPUT/OUTPUT CONTROL (3)</b>	
External Start Conversion Command (Connection A 13)	Positive pulse 100 nsec min. Transition from "LOW" to "HIGH" resets output register and blanks readout. The conversion process is initiated upon return from "HIGH" to "LOW". Loading: 1 TTL load. Max. Input 5.5V
Internal Start Gate (Connection A 10)	Controls internal start clock "HIGH" - Run loading: 1 TTL load "LOW" - Stop
Internal Start Adjust (Connection A 11)	Controls Rate of Internal Start Clock - see Applications Section.
Internal Start Out (Connection A 12)	Positive Pulse Output of Internal Start Clock - see Applications Section.
Lamp Test Input (Connection A 14)	Grounding this input displays +1888 for testing all display segments. Loading: Sink 35mA
Decimal Point Inputs (DP1, DP10, DP100)	Grounding inputs illuminates corresponding decimal points on the display. Loading: Sink 15mA
<b>PHYSICAL</b>	
Case Size	3"W x 1.75"H x 2.25"D
Case Material	Black LEXAN
Weight	6 oz. Approx.
Mounting	Through a 1.812" x 3.062" Cut-Out and Secured with Four 4-40 Tapped Holes
<b>NOTES:</b>	
Digital Inputs: "0" < +0.8V, "1" > +2.0V Digital Outputs: "0" < +0.4V, "1" > +2.4V (TTL Compatible)	
DPM is fully repairable and features snap-together PC Boards.	
(1) 200 conv/sec requires external trigger. DM-2100 includes 2 conv/sec adjustable internal clock.	
(2) BCD Data outputs are counting while the EOC is high. BCD outputs are valid only when the EOC goes low. Display is blanked during HI EOC.	
(3) Avoid logic spikes entering the DPM on the +5V power input. Use external filtering if required. Recommended power supply is a Datel UPM-5/1000B or equivalent highly regulated type. Power current is 350 to 650 mA depending on digits displayed and conversion rate.	

### APPLICATIONS

#### SINGLE ENDED INPUT

FOR SINGLE ENDED INPUT, CONNECT "LO" AND "SHIELD" TOGETHER AT THE CONNECTOR (A1 TO A2)

#### DIFFERENTIAL INPUT

EXT. RESISTORS R<sub>1</sub> ARE TYPICALLY REQUIRED TO ELIMINATE EXCESSIVE COMMON VOLTAGE V<sub>CM</sub> DUE TO STRAY INPUT BIAS CURRENT. TOTAL IMPEDANCE TO ANALOG GROUND FROM BOTH INPUTS SHOULD BE EQUAL. USE DIFFERENTIAL CONFIGURATION ONLY IF SINGLE ENDED CONFIGURATION CAN'T BE USED

CANNOT EXCEED THE INPUT RANGE (±2V OR ±200mV) OF THE DPM  
V<sub>BIAS</sub> + V<sub>CM</sub> CANNOT EXCEED ±4 VOLTS  
IMPORTANT !!

#### USING THE METER WITH THE INTERNAL "START" CLOCK

FOR APPLICATIONS FASTER THAN 2 SAMPLES/SECOND, USE AN EXTERNAL START TRIGGER

NOTE: JUMPER A12/A13 MUST BE USED IF EXT. START TRIGGER IS NOT SUPPLIED

- CONNECT JUMPER A12 TO A13 LEAVE PIN A10 OPEN. CONNECT "C" FROM A11 TO A12, AS SHOWN
- FOR HOLD & READ OPERATION GROUND PIN A10

C (pF) =  $\frac{2}{\text{CONV/SEC}} - 1$

#### USING THE METER WITH AN EXTERNAL "START"

USE LOW DUTY CYCLE START TRIGGER TO AVOID DISPLAY BLANKING AND FLICKER

APPLY AN EXTERNAL START PULSE TO A13 100 nsec MIN WIDTH TRANSITION FROM "LOW" TO "HIGH" RESETS OUTPUT REGISTER AND BLANKS READOUT. THE CONVERSION PROCESS IS INITIATED UPON RETURN FROM "HIGH" TO "LOW". MAX PULSE REPETITION RATE 200 PPS

#### ORDERING INFORMATION

DM-2100	
INPUT RANGE	
A	± 199.9mV INPUT
B	± 1.999V INPUT

#### PRICES (1-9) MODEL DM-2100A (less connectors\*) ... \$129.00 ea.

MODEL DM-2100B (less connectors*)	\$129.00 ea.
(SOLDER TAB) I/O CONNECTOR # 2335-1	\$ 4.95 ea.
(WIRE WRAP) I/O CONNECTOR # 2335-2	\$ 4.95 ea.
UPM-5/1000B, +5VDC, 1A POWER SUPPLY	\$ 49.00 ea.
POWER SUPPLY SOCKET, MS-7	\$ 3.50 ea.

\*Note-Connectors are not included in the basic price. Be sure to include connectors with your order.

