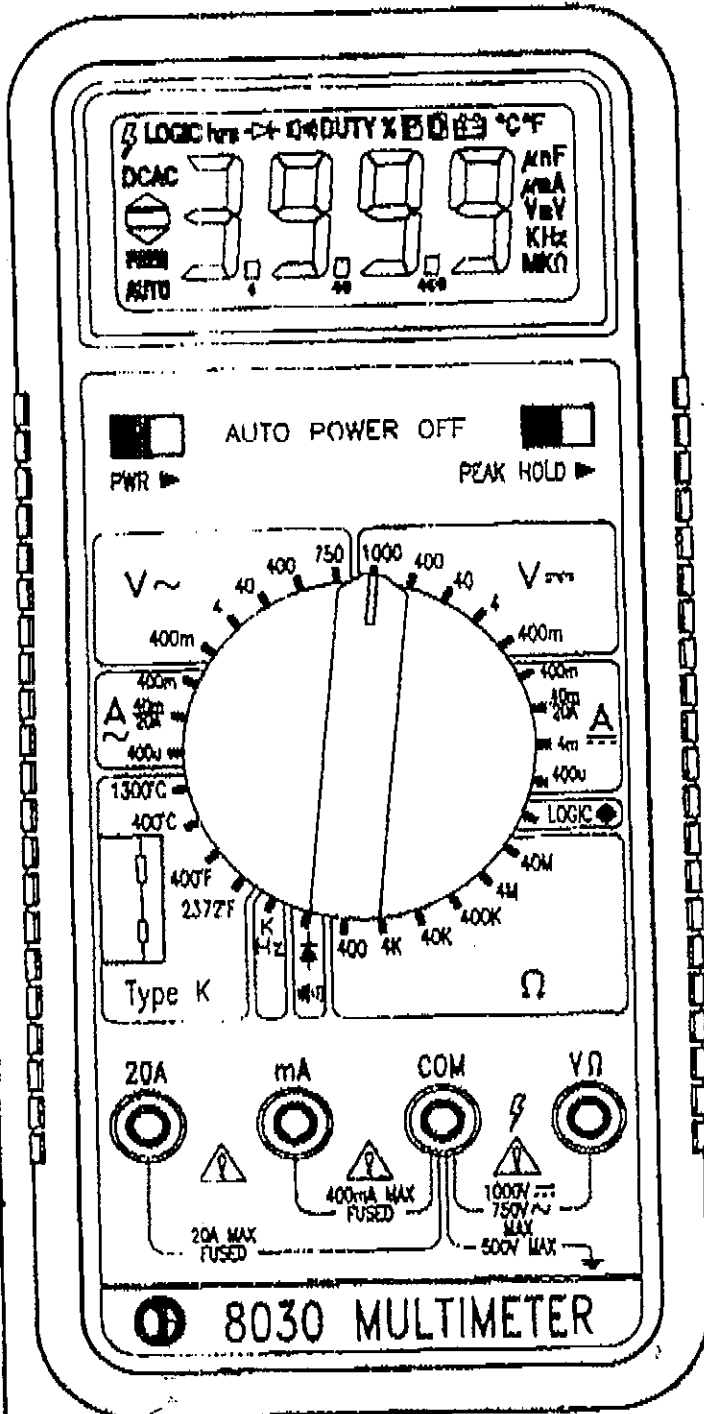


# CVE 8030

## 3-3/4 DMM



## SPECIFICATIONS

### 1. General specifications

- Display: 3-3/4 digits, 17mm large LCD maximum reading 3999 or -3999 with function and units sign annunciators.
- Polarity: automatic, (-) negative polarity indication.
- Overrange: indication of "OL".
- Low battery indication: the "BAT" is displayed when the battery voltage drops below the operation voltage.
- Measurement rate: 2.5 meas./s, nominal.  
1 meas./s, on frequency count.
- Operating Environment: 0°C to 50°C (32° to 122°F) at < 70% RH.
- Power: single standard 9-volt battery, NEDA 1604, JIS006P IEC6F22
- Power Consumption: 14mW typical.
- Battery life: 300 hours typical with zinc carbon.
- Fuse: 20A, 800V 10.3 X 38mm fast acting  
0.5A, 800V 6.3 X 25mm fast acting
- Dimensions: 7.5" H X 3.4" W X 1.5" D  
(189H X 87W X 37D mm)
- Weight: Approx. 12.9 oz. (370g) including battery.

### 2. Electrical specifications

Accuracies are  $\pm$  (% reading plus number of digits) at  $23 \pm 5^\circ\text{C}$ , less than 75% RH.

#### (1) DC volts

Range	Resolution	Accuracy	Overshoot protection
400mV	100uV	$\pm(0.5\% \text{ rdg} + 1 \text{ dgt})$	DC 500V AC 350V
4V 40V 400V 1000V	1mV 10mV 100mV 1V		DC 1200V AC 850V

Input impedance: 20 M $\Omega$

NMRR: Greater than 50dB at 50Hz or 60Hz.

CMRR: Greater than 100dB at 50Hz or 60Hz.

**(2) AC volts**

Range	Resolution	Accuracy 50-500Hz	Overvoltage protection
400mV	100uV	±(1.2%rdg +3dgt)	DC 500V AC 350V
4V	1mV		DC 1200V AC 850V
40V	10mV		
400V	100mV		
750V	1V	±(1.5%rdg +3dgt)	

Input impedance: 20 MΩ less than 20 pF  
Response: Average responding calibrated  
in RMS of sine wave.

**(3) DC current**

Range	Resolution	Accuracy	Voltage drop
400uA	0.1uA	±(1.0% rdg + 1 dgt)	600mV max.
4mA	1uA		
40mA	10uA		
400mA	100uA		
20A	10mA	±(2.0% rdg + 3 dgt)	900mV max.

Overload protection: 500mA (600 V)  
fast blow fuse  
20A (600 V)  
fast blow fuse

**(4) AC current**

Range	Resolution	Accuracy 50-500Hz	Voltage drop
400uA	0.1uA	±(1.5% rdg + 4 dgt)	600mV max.
40mA	10uA		
400mA	100uA		
20A	10mA	±(2.5% rdg + 4 dgt)	900mV max.

Overload protection: 500mA (600 V)  
fast blow fuse  
20A (600 V)  
fast blow fuse

**(5) Diode test & Continuity**

Range	Resolution	Accuracy	Max open Ckt V
4V	1mV	±(1.0% rdg + 1 dgt)	3.45V

Continuity Indication: less than 150Ω  
test current: 1.0mA typical

Overload protection: 500V DC/AC RMS

**(5) Resistance**

Range	Resolution	Accuracy	Max open Ckt V
400Ω	0.1Ω	±(1% rdg + 4 dgt)	3.45V
4kΩ	1Ω	±(0.75% rdg + 4 dgt)	0.6V
40kΩ	10Ω		
400kΩ	100Ω		
4MΩ	1kΩ		
40MΩ	10kΩ	±(1.5% rdg + 5 dgt)	3.45V

Max. test current: 2.5mA

Overload protection: 500V DC/AC RMS

**(7) Temperature**

Range	Resolution	Accuracy
-50°C to 400°C	0.1°C	±(0.5%rdg + 2°C)
1300°C	1°C	±(0.8%rdg + 2°C)
-58°F to 400°F	0.1°F	±(0.5%rdg + 4°F)
2372°F	1°F	±(0.8%rdg + 4°F)

Sensor type: Thermocouple K type

**(8) Logic indicator (TTL)**

Threshold		Pulse Width (min.)
Logic Hi ▲	Logic Low ▼	
2.8V±0.8V	0.8V±0.5V	25nsec

Detector: AC coupled  
Impedance: 120K ohms/100pF shunt  
Pulse Rise Time(max.): 10 usec  
Pulse Rep Time(max.): 1 Mpps  
Indication: 40 msec beep at logic low


**(9) Frequency counter (Autorange)**

Range	Resolution	Accuracy
4kHz	1Hz	±(0.2% rdg + 1 dgt)
40kHz	10Hz	
400kHz	100Hz	
4000kHz	1kHz	

Sensitivity: 200mV RMS min on 10Hz to  
1MHz.  
500mV RMS min on 1MHz to  
4MHz.

Overload protection: 500V DC/AC RMS

## SPECIFICATIONS

- Display: 3% digit liquid crystal display (LCD) with a maximum reading of 3200 counts.
- Analog bar graph: 34 segments with measurements 12 times per second.
- Polarity: Automatic, (-) negative polarity indication.
- Overrange indication: "OL" mark indication.
- Low battery indication: The "  " is displayed when the battery voltage drops below the operating level.
- Auto power off: Meter automatically shuts down after approx. 10 minutes of inactivity.
- Measurement rate: 2 times per second, nominal.
- Operating environment: 0°C to 50°C at < 70% R.H.
- Storage temperature: -20°C to 60°C, 0 to 80% R.H. with battery removed from meter.
- Power: Single 9V battery, NEDA 1604, JIS 006P, IEC 6F22.
- Battery life: 200 hours typical with carbon-zinc.
- Dimensions: 189mm (H) x 87mm (W) x 37mm (D).
- Weight: Approx. 320g including battery.

\* Accuracy is given as  $\pm$  [(% of reading) + (number of least significant digits)] at 18°C to 28°C, with relative humidity up to 70%.

### DC Volts

Range	Resolution	Accuracy	Input Impedance
320mV	100 $\mu$ V	$\pm$ (0.5% rdg + 1d)	> 1000M $\Omega$
3.2V	1mV	$\pm$ (0.5% rdg + 1d)	11M $\Omega$
32V	10mV	$\pm$ (0.5% rdg + 1d)	10M $\Omega$
320V	100mV	$\pm$ (0.5% rdg + 1d)	10M $\Omega$
1000V	1V	$\pm$ (0.5% rdg + 1d)	10M $\Omega$

Overload Protection: 1000VDC or 750VAC rms

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### AC Volts (Average sensing RMS indicating)

Range	Resolution	Accuracy	Input Impedance
3.2V	1mV	$\pm$ (1.5% rdg + 4d)	11M $\Omega$ /20pF
32V	10mV	$\pm$ (1.5% rdg + 4d)	10M $\Omega$ /20pF
320V	100mV	$\pm$ (1.5% rdg + 4d)	10M $\Omega$ /20pF
750V	1V	$\pm$ (1.5% rdg + 4d)	10M $\Omega$ /20pF

Frequency Response: 50Hz to 200Hz

Overload Protection: 1000VDC or 750VAC rms

### DC Current

Range	Resolution	Accuracy	Burden Voltage
320 $\mu$ A	0.1 $\mu$ A	$\pm$ (2.0% rdg + 1d)	200mV
3200 $\mu$ A	1 $\mu$ A	$\pm$ (2.0% rdg + 1d)	2V
32mA	10 $\mu$ A	$\pm$ (2.0% rdg + 1d)	200mV
320mA	100 $\mu$ A	$\pm$ (2.0% rdg + 1d)	2V
20A**	10mA	$\pm$ (3.0% rdg + 3d)	600mV

Overload Protection: 500mA/600V fuse on mA inputs (fast blow ceramic fuse), 20A/600V fuse on 20A inputs (fast blow ceramic fuse).

\*\* 20A for 30 seconds maximum.

### AC Current (Average sensing RMS indicating)

Range	Resolution	Accuracy (50Hz-200Hz)	Burden Voltage
320 $\mu$ A	0.1 $\mu$ A	$\pm$ (2.5% rdg + 4d)	200mV
3200 $\mu$ A	1 $\mu$ A	$\pm$ (2.5% rdg + 4d)	2V
32mA	10 $\mu$ A	$\pm$ (2.5% rdg + 4d)	200mV
320mA	100 $\mu$ A	$\pm$ (2.5% rdg + 4d)	2V
20A**	10mA	$\pm$ (3.5% rdg + 4d)	600mV

Overload Protection: 500mA/600V fuse on mA inputs (fast blow ceramic fuse), 20A/600V fuse on 20A inputs (fast blow ceramic fuse).

\*\* 20A for 30 seconds maximum.

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### Resistance

Range	Resolution	Accuracy	Test Current
320Ω	0.1Ω	±(1.0% rdg +3d)	<0.7mA
3.2kΩ	1Ω	±(1.0% rdg +3d)	<0.13mA
32kΩ	10Ω	±(1.0% rdg +3d)	<13μA
320kΩ	100Ω	±(1.0% rdg +3d)	<1.3μA
3.2MΩ	1kΩ	±(1.5% rdg +3d)	<0.13μA
32MΩ	10kΩ	±(2.5% rdg +5d)	<0.13μA

Overload Protection: 500V DC or RMS AC

### Continuity Test

Range	Audible Threshold	Response Time	Test Current
320Ω	Less than 20Ω	Approx. 500ms	<0.7mA

Overload Protection: 500V DC or RMS AC

### Diode Test

Range	Resolution	Accuracy	Test Current	Open Circuit Volts
3.2V	1mV	±(10% rdg +2d)	0.6mA	3.5Vdc typical

Overload Protection: 500V DC or RMS AC

### Logic Test

Thresholds		Pulse Rise (max.)	Pulse Rep (max.)	Pulse Width (min.)
Logic 1 (Hi)	Logic 0 (Lo)	10μSec	1Mpps	25nS
2.8V ±0.8V	0.8V ±0.5V			

Test Voltage: 5VDC

Duty Cycle: > 20% and < 80%

Frequency Response: 20MHz

Indication: 40msec beep at logic 0 (Lo)

Overload Protection: 500VDC or RMS AC

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### Temperature (DM-8300 Only)

Range	Resolution	Accuracy	Sensor type
-20°C to +750°C -4°F to +1400°F	1°C 1°F	±(3.0% rdg +2°C) ±(3.0% rdg +4°F)	K-type Thermocouple

Input Protection: 60VDC or 24VAC rms

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Sec. 11.6 **ALLIGATOR CLIPS - AG-940**  
Two black, Insulated Push-on Alligator Clips.

Sec. 11.7 **K-TYPE THERMOCOUPLE PROBE  
TP-800K**

K-Type Thermocouple Wire Bead Probe 0° to 800°C (32° to 1472°F),  
+2.2°C (4°F) or 0.75% rdg (whichever is greater). Teflon insulated  
wire to max. 260°C (500°F).

### Sec. 12 **CALIBRATION**

Calibration on these meters should be performed every year.  
This can be done by sending the instruments prepaid to:

A. W. Sperry Instruments, Inc.  
Customer Service Department  
245 Marcus Boulevard  
Hauppauge, N. Y. 11788

Specify in writing that calibration is necessary. The instrument will be  
returned to you normally within one week. Estimates will be furnished  
upon request.

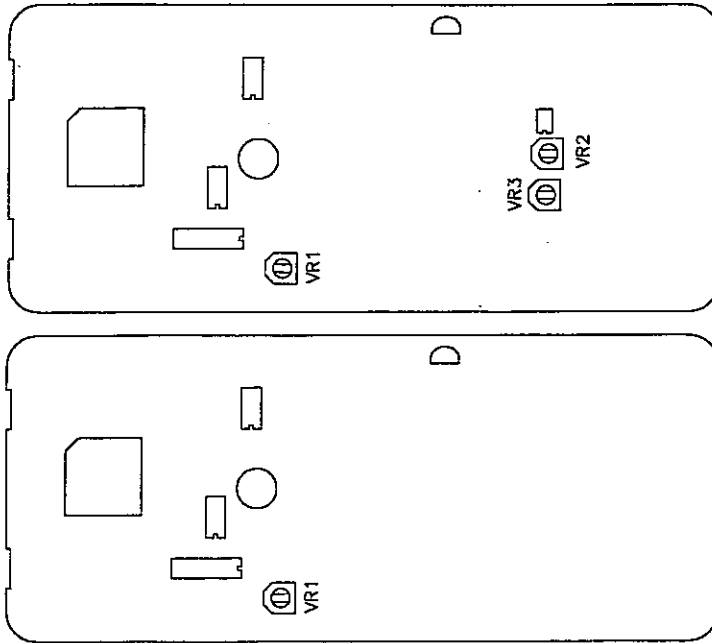
#### **CAUTION**

The following procedure should be performed by persons trained and  
qualified in electronics and electronic equipment service. **DO NOT**  
attempt this procedure if not qualified.

#### **WARNING**

Do not attempt calibration or service unless another person, capable  
of rendering first aid and resuscitation is present.

### Calibration Parts Locator Drawing



DM-8200

DM-8300

Sec. 12.1 **CALIBRATION OF AVERAGING MODELS**  
The procedure should be performed at an ambient temperature of  
25°C ± 2°C, and at a relative humidity of less than 80%. Allow the  
instrument to stabilize at this temperature for a minimum of 30 minutes.

## Sec. 13 RETURN FOR REPAIRS

Before returning your digital multimeter for repair be sure to check that the failure to operate properly is not due to the following:

1. Weak battery.
  2. Open fuse.
  3. Open, loose or intermittent test leads.
- If these conditions do not exist and the instrument fails to operate properly, return the instrument and accessories prepaid to:

A. W. Sperry Instruments, Inc.  
Customer Service Department  
245 Marcus Blvd.  
Hauppauge, N. Y. 11788

**State in writing what is wrong with the instrument.** All warranty repairs must include proof of purchase in the form of a legible or original copy of the sales receipt clearly identifying the distributor, model number and date of purchase and must have a warranty card on file. See warranty statement on page 1 for full warranty disclosure. Repair estimate will be furnished if requested for out of warranty instruments. Be sure to include all accessories which may be related to the problem, and a note describing the malfunction you observed.

1. Remove the back case screw, and carefully pry up the back case.
2. Set the Function / Range switch to the "400m Vdc" position.
3. Set the output of the DC calibrator for  $390.0\text{mV} \pm 0.02\%$  and connect it to the "V- $\Omega$ " and "COM" input terminals.
4. Adjust VR1 until the display reads  $390.0\text{mV} \pm 1$  digit.
5. Carefully inspect the other DCV ranges. Your readings should be within specification  $\pm(0.5\% \text{rdg} + 1 \text{digit})$ .
6. There is no adjustment for ACV. Calibrate DCV first.
7. Carefully inspect the ACV ranges. Your readings should be within  $\pm(1.2\% \text{rdg} + 3 \text{digits})$  of the ACV calibration source.
8. Set the output of the DC calibrator for  $10.0\text{A} \pm 0.02\%$  and connect it to the "20A" and "COM" input terminals.
9. Adjust R17 (shunt resistor) until the display reads 10.00A.
10. If the reading is over 10A, add solder to R17. If the reading is under 10A, shave away lightly some of the solder and metal from R17.
11. Carefully inspect the other DCA ranges. Your readings should be within specification  $\pm(1.0\% \text{rdg} + 1 \text{digit})$ .
12. Turn off calibrator and disconnect from the DMM.
13. Install the back case and insert the back case screw.

## Sec. 12.2 CALIBRATION OF DM-8300

1. Use the procedure of section 12.1 through step 12, and then proceed as follows.
2. Set the Range selector switch to the "°C" position.
3. Connect a K-type T/C probe to the temperature jack, then immerse the probe tip into ice reference cell for 30 seconds.
4. Adjust VR2 until the display reads  $00.0^\circ\text{C}$ .
5. Set the Range selector switch to the "°F" position.
6. Adjust VR3 until the display reads  $32.0^\circ\text{F}$ .
7. Disconnect T/C probe from ice reference cell.
8. Reassemble the back case and secure with three screws.