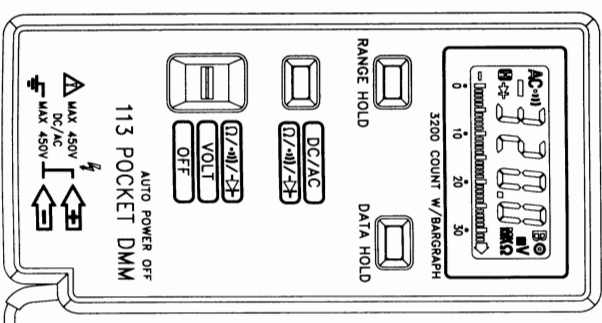


# OPERATING INSTRUCTIONS

## MODEL 113

### POCKET

### DIGITAL MULTIMETER



## SAFETY INFORMATION

The following safety information must be observed to insure maximum personal safety during the operation at this meter:

Do not use the meter if the meter or test leads look damaged, or if you suspect that the meter is not operating properly.

Never ground yourself when taking electrical measurements. Do not touch exposed metal pipes, outlets, fixtures, etc., which might be at ground potential. Keep your body isolated from ground by using dry clothing, rubber shoes, rubber mats, or any approved insulating material.

Turn off power to the circuit under test before cutting, unsoldering, or breaking the circuit. Small amounts of current can be dangerous.

Use caution when working above 60V dc or 30V ac rms. Such voltages pose a shock hazard.

When Using the probes, keep your fingers behind the finger guards on the probes.

Measuring voltage which exceeds the limits of the multimeter may damage the meter and expose the operator to a shock hazard. Always recognize the meter voltage limits as stated on the front of the meter.

## SPECIFICATIONS

**Display:** 3½ digit liquid crystal display (LCD) with a maximum reading of 3200.

**Polarity:** Automatic; (-) negative polarity indication.

**Overrange:** "OL" mark indication.

**Low battery indication:** The "B" is displayed when the battery voltage drops below the operating level.

**Measurement rate:** 2 times per second, nominal.

**Auto power off:** Meter automatically shuts down after approx. 10 minutes of inactivity.

**Operating environment:** 0°C to 40°C (32° to 144°F) at <70% relative humidity.

**Storage temperature:** -20°C to 60°C (-4° to 140°F) at <80% relative humidity.

**Power:** Two 1.5V button-type batteries (IEC # LR-44, NEDA #1166A).

**Power consumption:** 5mW typical.

**Dimensions:** 111.5mm(H) x 56mm(W) x 10.5mm(D).

**Weight:** Approx. 3.0 oz. (86 g) including batteries and case.

	Range	Resolution	Accuracy	Input impedance	Maximum input
DCV	320mV	100µV	± 2.0% rdg + 2dgts	> 1000MΩ	450VDC or 450VAC rms
	3.2V	1mV	± 1.0% rdg + 2dgts	11MΩ	
	32V	10mV	± 2.0% rdg + 2dgts	10MΩ	
	320V	100mV		11MΩ	
ACV (50/60Hz)	3.2V	1mV	± 4.0% rdg + 5dgts	10MΩ	450VDC or 450VAC rms
	32V	10mV			
	320V	100mV			
	450V	1V			
OHM	<b>Range</b>	<b>Resolution</b>	<b>Accuracy</b>	<b>Test current</b>	450VDC or 450VAC rms
	320Ω	100mΩ	± 2.0% rdg + 4dgts	< 0.7mA	
	3.2kΩ	1Ω	± 2.0% rdg + 2dgts	< 0.13mA	
	32kΩ	10Ω		< 1.3µA	
	320kΩ	100Ω	± 6.0% rdg + 2dgts	< 1.3µA	
	3.2MΩ	1kΩ		< 0.13µA	
32MΩ	10kΩ	± 10% rdg + 5dgts			
Diode Test	3.2V	1mV	± 10% rdg + 2dgts	0.6mA (VF = 0.6V)	450V DC or AC rms
Continuity Check	<b>Range</b>	<b>Resolution</b>	<b>Audible indication</b>	<b>Test current</b>	<b>Input protection</b>
	320Ω	100mΩ	< approx. 20Ω	< 0.7mA	450V DC or AC rms

## OPERATION

Before taking any measurements, read the Safety Information Section. Always examine the instrument for damage, contamination (excessive dirt, grease, etc.) and defects. Examine the test leads for cracked or frayed insulation. If any abnormal conditions exist do not attempt to make any measurements.

### Autoranging

The meter defaults to autorange when you turn it on. In autorange, the meter selects the range automatically.

### Manually Selecting a Range

The meter also has a manual range mode. In manual range, you select and lock the meter in a range. To manually select a range:

1. Press [RANGE HOLD] button to hold the selected range. Subsequently pressing the [RANGE HOLD] button will select each range in sequence from the lowest to the next range. Hold the button for 2 seconds to return to Autorange Mode.

### Data Hold Feature

The [DATA HOLD] button to toggle in and out of the Hold mode. In the data hold mode, the H annunciator is displayed and the last reading is held on the display. Press [DATA HOLD] button again to release the hold. Current readings are once again displayed.

### Mode Switch (DC/AC), ( $\Omega$ / $\rightarrow$ )

Press this switch to toggle between DC and AC in the voltage measurements. Press this switch to toggle between the continuity/diode and ohms modes, if the function switch is set to  $\Omega$ / $\rightarrow$  position.

### Measuring Voltage

1. Set the Function Switch to "VOLT" position.
2. To toggle between "DC" and "AC", press Mode switch. The "DC" or "AC" mark is displayed.
3. Touch the probes to the test points, the range will change automatically to the level that will display the input voltage with best resolution.
4. The value indicated in the display window is the measured value of voltage with proper decimal point and annunciator indication.

### Measuring Resistance and Testing Continuity

1. Set the function switch to  $\Omega$ / $\rightarrow$  position.
2. Turn off power to the circuit under test. External voltage across the components causes invalid readings.

3. To toggle between the ohms/continuity/diode modes, press Mode Switch.

4. Touch the probes to the test points. In ohms, the value indicated in the display is the measured value of resistance with proper decimal point and annunciator indication. In continuity test, the beeper sounds continuously, if the resistance is less than approximately 20 $\Omega$ .

### Testing Diodes

1. Set the function switch to  $\Omega$ / $\rightarrow$  position.
2. Turn off power to the circuit under test. External voltage across the components causes invalid readings.
3. To toggle between the ohms/continuity/diode modes, press Mode Switch.
4. Touch probes to the diode. A forward-voltage drop is about 0.6V (typical for a silicon diode).
5. Reverse probes. If the diode is good, "OL" is displayed. If the diode is shorted, a value near 0mV will be displayed.
6. If the diode is open, "OL" is displayed in both directions.

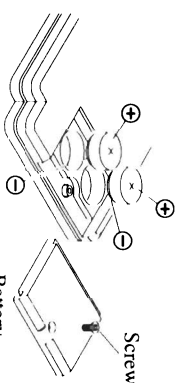
## BATTERY REPLACEMENT

Power is supplied by two button-type batteries (NEDA 1166A, IEC LR-44). "B" appears on the LCD display when replacement is needed.

### WARNING

Before attempting to replace the battery, first disconnect the Test Leads from any energized circuit.

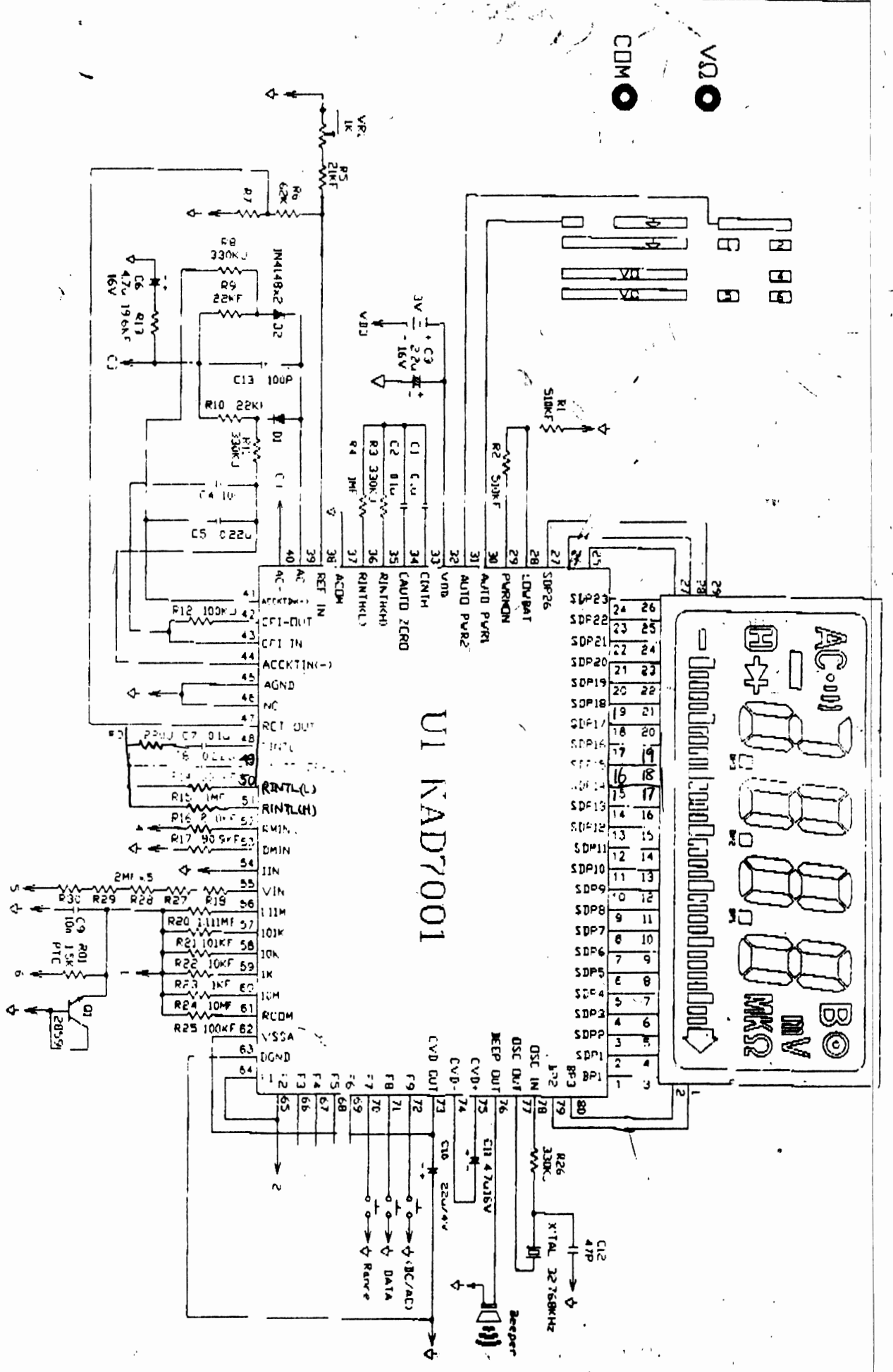
1. Disconnect the test leads from any energized circuit.
2. Set the Function Switch to OFF.
3. Remove battery cover screw.
4. Slide off battery cover and change batteries.
5. Replace battery cover and screw.



Battery Replacement

C. I. E.

MODEL	NAME	DWG	SHEET	OF	REV	DSCN	DWN	CKD	APPVD
113		113	DATE	10					
			CHK						



U1 NAD7001

