MEASURING TEMPERATURE:

1. Set the Function switch to the "°C" position.
2. Plug a K-Type thermocouple probe (not included, consult distributor for proper model for application) into the socket on the instrument observing the proper polarity
3. Turn the DL187T on NOTE: The DL187T automatically defaults to the Centigrade scale. To measure in Fahrenheit, hold down the "%" push-button before turning on the instrument.
4. Read the temperature on the LCD.

RANGE	RES	ACCURACY
-40 to 2498°F	1°F	± (5.5°F + 1 digit) from -4 to 570°F ± 3.0% of reading for all other temperatures
-40 to 1370°C	1°C	± (3.0°C + 1 digit) from -20 to 300°C ± 3.0% of reading for all other temperatures

BATTERY AND FUSE REPLACEMENT

1. Unplug the test leads and remove the rubber boot from the instrument.
2. Remove the screws in the rear of the instrument and separate the front and rear housing.
3. Replace the battery and/or fuses with the same type and size as the one removed.
4. Snap the front and rear housing back together and reinstall the screws.
5. Reattach the rubber boot.

ACCESSORIES

AB9.....BATTERY, 9 VOLT
AF112.....FUSE: 2A, 600V RMS
AF113.....FUSE: 15A, 600V RMS
ATL140.....TEST LEAD SET
AH180.....RUBBER BOOT

DL187T

INSTRUCTION

MANUAL

8030 SW Nimbus • Beaverton, OR 97008
(503) 644-8723 • Fax: (503) 643-6322

DL187T INSTRUCTION BOOK

CONGRATULATIONS!!!

You have just purchased a state of the art tool to help you to do your job better and more efficiently. Please take time to read this manual to familiarize yourself with its capabilities before using the instrument.

FEATURES OF THE DL187T:

- 4,000 Count LCD with 42 segment bar graph
- True RMS on AC voltage and current ranges
- Auto Power Off
- Min/Max/Ave Recording Mode
- Compare mode
- Relative and % Modes
- Data Hold
- Rubber boot
- Frequency measurement
- Temperature measurement
- Diode Test
- Autoranging
- 5 Year Warranty

SAFETY CONSIDERATIONS:

WARNING!

Observe all safety precautions when measuring higher voltages and/or currents. turn off power to the circuit under test, set the DL187T to the desired function and range, connect the test leads to the DL187T and then to the circuit under test. Reapply power If an erroneous reading is observed, disconnect power immediately and recheck all settings and connections.

INTERNATIONAL SYMBOLS

⚡	DANGEROUS VOLTAGE	⏚	GROUND
~	AC-ALTERNATING CURRENT	⚠	SEE EXPLANATION IN MANUAL
⎓	DC-DIRECT CURRENT	⧈	DOUBLE INSULATION (Protection Class II)
≂	EITHER DC OR AC	⎓	FUSE

SAFETY TIPS

Exceeding the specified limits of this meter is dangerous, and can expose the us to serious and possibly fatal injury. To ensure safe and appropriate use, plea follow the safety guidelines below.

- Do not try to measure any voltage that exceeds 1000 DCV or 750 ACV
- Voltages above 25V AC or DC may constitute a serious shock hazard
- Do not attempt to use this meter if either the meter or the test leads have bee damaged
- Turn off Power, disconnect the battery, and discharge all capacitors befor using the Ω and diode functions.
- Use a current clamp if measuring any current above 10 amps
- When measuring current, turn the power off on the unit under test befor connecting the meter in the circuit.
- Do not exceed the limits shown on each function page.

INPUT JACKS AND PUSH BUTTONS:

"A" Input Jack- The red test lead is plugged into this jack for measuring current on the 10 AC or DC amp functions

"mAμA" Input Jack- The red test lead is plugged into this jack for measuring current on the 4m and 400m AC or DC amp functions.

"COM" Input Jack- The black test lead is plugged into this jack for all measurements except temperature

"VΩHz" Input Jack- The red test lead is plugged into this jack for all ACV, DCV, OHM, Continuity Buzzer and Diode test functions.

NOTE: The following push-button features can be understood more thoroughly if the DL187T is in front of you and you perform the operations on the DL187T while reading the descriptions.

1. **"ON/OFF" push-button-** Turns the DL187T on and off. If the rotary switch or a push-button is not activated in 30 minutes, the instrument automatically turns itself off.

   a. **Disabling the Auto Power Off Function:**
   To disable the auto power off function for long term measurements, turn the DL187T on while holding down the "HOLD" push-button. Auto Power Off will be disabled until the DL187T is manually turned off.

2. **"CMP", "REL" and "%" push-buttons-** These three functions allow you to evaluate a stored reference value(s) in the DL187T by comparing "CMP" or in relation to "REL" or as a percentage "%".

   a. **"CMP" mode:** Set the DL187T to the function and range you want the readings compared on and turn the DL187T on. Depress the "CMP" push-button. You are now in the compare mode.

      Now press the "EDIT" push-button. The "1" at the right side of the LCD will begin to blink and the arrow at the right of the bar graph will come on. This indicates that the value you will put in will be the highest acceptable reading. Using the arrow push-buttons found on "CMP, REL, % and REC" enter the HI value that you want your readings to be compared to.

      Once the value is entered, press the "HI/LO" push-button. Now the arrow at the left of the bar graph will come on. This indicates that the value you put in will be the lowest acceptable reading. Using the arrow push-buttons found on "CMP, REL, % and REC" enter the LO value that you want your readings compared to.

      Press the "EDIT" push-button to exit the mode. From this point on all readings will be compared to the stored values and displayed on the LCD in one of three ways: "LO" (the reading is lower than the LO stored value), "PASS" (the reading is between the stored values), or "HI" (the reading is higher than the HI stored value)

   b. **"REL" mode:** Set the DL187T to the Function and Range you want the reading displayed in relation to In the "REL" mode, the DL187T displays the difference between the stored value and the measured value.

      Turn the DL187T on and press the "REL" push-button. REL will come on the LCD and the bar graph pointer will be at the center of the scale.

      Press the "EDIT" push-button. Using the arrow buttons, enter the value you want the readings displayed in relation to. Once the value is entered, press the "EDIT" push-button to exit the mode.

      All measurements will be displayed as the difference between the stored value and the measured value Negative readings are lower than the stored value, Positive readings are higher than the stored value Pushing the "REL" button again exits the mode.

   c. **"%" mode:** Set the DL187T to the Function and Range you want t reading displayed as a percentage of.. In the "%" mode, the DL187T displays the difference in percentage between the stored value and the measured value.

      Turn the DL187T on and press the "%" push-button % will co on the LCD and the bar graph pointer will be at the zero on scale.

      Press the "EDIT" push-button Using the arrow buttons, enter value you want the readings displayed as a percentage of Once value is entered, press the "EDIT" push-button to exit the mode

      All measurements will be displayed as the difference in percenta between the stored value and the measured value Negat readings are lower than the stored value, Positive readings higher than the stored value. Pushing the "%" button again ex the mode.

3. **"REC" push-button:** This functions allows you to record Minimum, Maximum and Average values for a series of measurements on the same function and range.

   Set the function and range switch to the desired location and t the DL187T on. Press the "REC" push-button, REC will displayed on the LCD

   The DL187T will beep every time a new maximum or minimu value is recorded. Press the "REC" button to scroll through t stored MIN, MAX and AVE values. The DL187T can only reco in this mode for 24 hours.

   Hold the "REC" push-button down for 2 seconds to exit this mod

4. **"HOLD" push-button:** Pushing this button freezes the reading on the LCD for all functions and ranges

5. **"RANGE" push-button:** Pushing this sets the DL187T in manual range Holding it down for 2 seconds exits this mode.

6. **Disabling the DL187T beeper:** To disable (turn off) the beeper on the DL187T, hold down the "REC" push-button while turning the instrument on.

7. **Changing the Temperature function from °C to °F:** Set the DL187T to the °C mode. Hold down the "%" push-button while turning the instrument on "°F" will be on the LCD

GENERAL SPECIFICATIONS:

Operating Temperature	32° to 104°F (0° to 40°C)
Storage Temperature	-4° to 140°F (-20° to 60°C)
Relative Humidity	0% to 80% RH
Battery Type	9V, NEDA 1604 or 6F22 or 006P
Battery Life	200 hrs typical, alkaline battery
Size (with boot)	1 85" x 3 94" x 7.99"
Weight (with boot)	21 5 oz.
Safety	Meets or exceeds IEC 348, CSA C22.2 NO 231, ISA-DS82 AND UL1244

MEASURING DC VOLTS

WARNING!!!

To avoid the risk of electrical shock, instrument damage and/or equipment damage input voltages must not exceed 1000 volts DC. Do not attempt to take any unknown voltage measurements that may be in excess of 1000 DCV.

1. Set function and range switch to the desired DCV range. If you do not know the value of the voltage to be measured, always start with the highest range and reduce the setting as required to obtain a satisfactory reading.
2. Plug the red test lead into the "V/Ω" input jack and the black lead into the "COM" input jack of the instrument.
3. Disconnect the power from the circuit to be tested.
4. Connect the test leads to the circuit to be tested.
5. Reapply power to the circuit, the measured voltage will appear on the display of the instrument.
6. If the red test lead is connected to the negative (or lower voltage) side of the circuit, a minus sign will appear on the display, at the left.
7. Disconnect power to the circuit before removing the test leads from the circuit.

FUNCTION	RANGE	RESOLUTION	ACCURACY
V	400mV	100µA	± 0 3% of reading, ± 2 digits
	4V	1mV	± 0.3% of reading, ± 1 digit
	40V	10mV	
	400V	0.1V	
	1000V	1V	± 0.75% of reading, ± 3 digits

MAX INPUT VOLTAGE = 1000DCV

MEASURING AC VOLTS

WARNING!!!

To avoid the risk of electrical shock, instrument damage and/or equipm damage input voltages must not exceed 750 volts peak AC. Do not attemp take any unknown voltage measurements that may be in excess of 750 A peak.

1. Set function and range switch to the desired ACV range. If you do not kn the value of the voltage to be measured, always start with the highest ra and reduce the setting as required to obtain a satisfactory reading.
2. Plug the red test lead into the "V/Ω" input jack and the black lead into "COM" input jack of the instrument.
3. Disconnect the power from the circuit to be tested.
4. Connect the test leads to the circuit to be tested
5. Reapply power to the circuit, the measured voltage will appear on the disp of the instrument.
6. Disconnect power to the circuit before removing the test leads from the circu

FUNCTION	RANGE	RESOLUTION	50Hz-60Hz	45Hz-1KHz	1K-10KHz	10K-30
V	4V	1mV	±0.5% of reading. ± 3 digits	±2.5% of reading. ± 5 digits		
	40V	10mV				
	400V	0.1V				
	750V	1V	±0.75% of reading. ± 5 digits		±2 5% of reading. ± 5 digits	±2.5% reading 5 digi

MAX INPUT = 750 ACV PEAK

MEASURING DC CURRENT (AMPS)

CAUTION!!!

The current functions are protected by a fuse of 600 volt rating. To avoid damage to the instrument, current sources having open circuit voltages greater than 600 volts DC or Peak AC must not be measured.

NOTE: **When taking current measurements, the DL187T must be connected in SERIES with the circuit, or circuit element under test. Never connect the test leads across a voltage source (in parallel). This can cause damage to the circuit under test or the DL187T.**

1. Set function and range switch to the desired DCA range. If you do not know the value of the current to be measured, always start with the highest range and reduce the setting as required to obtain a satisfactory reading
2. Plug the red test lead into the "A" input jack and the black lead into the "COM" input jack of the instrument.
3. Disconnect the power from the circuit to be tested.
4. Connect the test leads in series to the circuit to be tested.
5. Reapply power to the circuit, the measured current will appear on the display of the instrument
6. Disconnect power to the circuit before removing the test leads from the circuit.

FUNCTION	RANGE	RESOLUTION	ACCURACY
μA	400	0.1μA	± 0.5% of reading, ± 1 digit
	4000	1μA	
mA	40	0.01mA	
	4000	0.001A	± 1.0% of reading, ± 5 digits
A	10	0.01A	

NOTE: **"μA" and "mA" ranges are protected by a 2 amp, 600 volt fuse**
"A" range is protected by a 15 amp, 600 volt fuse

MEASURING AC CURRENT (AMPS)

CAUTION!!!

The current functions are protected by a fuse of 600 volt rating. To avo damage to the instrument, current sources having open circuit voltage greater than 600 volts DC or Peak AC must not be measured.

NOTE: **When taking current measurements, the DL185 must be connected in SERIES with the circuit, or circuit element under tes Never connect the test leads across a voltage source (in parallel). T can cause damage to the circuit under test or the DL185.**

1. Set function and range switch to the desired ACA range If you do not k the value of the current to be measured, always start with the highest range reduce the setting as required to obtain a satisfactory reading
2. Plug the red test lead into the "A" input jack and the black lead into "COM" input jack of the instrument.
3. Disconnect the power from the circuit to be tested
4. Connect the test leads in series to the circuit to be tested
5. Reapply power to the circuit, the measured current will appear on the dis of the instrument.
6. Disconnect power to the circuit before removing the test leads from the circ

FUNCTION	RANGE	RESOLUTION	ACCURACY
μÃ	400	0.1μA	45Hz to 2KHz
	4000	1μA	± 1.0% of reading, ± 5 digits
mÃ	40	0.01mA	
	4000	0.001A	
Ã	10	0.01A	

NOTE: **"μA" and "mA" ranges are protected by a 2 amp, 600 volt fuse**
"A" range is protected by a 15 amp, 600 volt fuse

MEASURING RESISTANCE (OHMS, CONTINUITY)

CAUTION!

Turn off power and discharge all capacitors on circuit to be tested before attempting in-circuit resistance measurements. Failure to do so may end up in equipment and or instrument damage.

The resistance measuring circuit applies a known value of constant current through the unknown resistance and then measures the voltage developed across it. Therefore, remove all power to the circuit under test when making resistance measurements. If any voltage is present in the test circuit and erroneous reading will result. The DL187T may be damaged if voltage in excess of 600 VAC is present.

NOTE: When measuring critical low ohm values, touch tips of test leads together and press the "REL" button on the DL187T. The resistance measured when the leads were touched together will be automatically subtracted from the reading.

1. Set the Function switch to the "Ω" position.
2. Insert the black test lead into the "COM" input jack and the red test lead into the "VΩHz" input jack.
3. Connect the test leads to the circuit to be measured.
4. The measured resistance will be on the DL187T display.

FUNCTION	RANGE	RESOLUTION	ACCURACY
Ω	400	0.1Ω	± 0.5% of reading, ± 10 digits
	4K	1Ω	± 0.5% of reading, ± 3 digits
	40K	10Ω	
	400K	0.1KΩ	
	4M	1KΩ	
	40M	10KΩ	± 1.0% of reading, ± 10 digits

AUDIBLE CONTINUITY BUZZER:

1. Set the Function switch to the "•))" position.
2. Insert the black test lead into the "COM" input jack and the red test lead into the "VΩHz" input jack.
3. Connect the test leads to the circuit to be measured.
4. The DL187T will emit a continuous tone for resistance's of less than 100 ohms.

DIODE TEST:

1. Set the Function switch to the "⊣⊢" position.
2. Insert the black test lead into the "COM" input jack and the red test lead in the "VΩHz" input jack
3. Touch the red test lead to the Anode (+ side, non-banded end) and the blac test lead to the Cathode (- side, banded end)
4. If the diode is good, the reading should indicate 0.3 to 0.8 on the LCD
5. Reverse the red and black leads on the diode, if the LCD reads OFL (the overload sign) the diode is good.

NOTE: A defective diode will read OFL (the overload sign) or 0.00 no matter how the test leads are connected.

MICROWAVE DIODES:

Most microwave diodes can not be tested by a DMM with a diode test function. This is because the DMM does not supply enough power to turn these diode on. UEI offers an accessory test lead, model ATL60, that boos the power output so that microwave diodes can be adequately tested. Consult your distributor for more details.

MEASURING FREQUENCY:

1. Set the Function switch to the "Hz" position.
2. Insert the black test lead into the "COM" input jack and the red test lead int the "VΩHz" input jack.
3. Connect the test leads to the circuit to be measured.
4. The measured frequency will be on the DL187T display.

FUNCTION	RANGE	RESOLUTION	ACCURACY
Hz	20KHz	1Hz	± 0.2% of reading, ± 2 digits (2,000 counts)
	200KHz	10Hz	

Max. input voltage is 500 DCV or 500 ACV RMS