

ELPARTS

Manual Digital Multimeter



HERTH+BUSS



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Warranty

This instrument is warranted to be free from defects in material and workmanship for a period of one year. Any instrument found defective within one year from the delivery date and returned to the factory with transportation charges prepaid, will be repaired, adjusted, or replaced at no charge to the original purchaser. This warranty does not cover expandable items such as battery or fuse. If the defect has been caused by a misuse or abnormal operating conditions, the repair will be billed at a nominal cost.

It can be used to measure :

1. RPM of engine
2. Dwell angle
3. Duty cycle
4. DC and AC
5. voltage DC and
6. AC current
7. Resistance
8. Frequency
9. Diode
10. Temperature (C;oF)
11. Capacitance

Introduction

This 3 3/4-digit digital multimeter is an autorange automotive multimeter. Besides the features of a normal multimeter, it can also be used to measure RPM, dwell angle, duty cycle, temperature (C;oF), and etc. It is a useful and ideal measurement tool for automotive repair and service.





Safety information

This meter has been designed according to IEC-61010 concerning electronic measuring instruments with a measurement category (CAT II) and pollution degree 2.

Warning

To avoid possible electric shock or personal injury, follow these guidelines:

1. Do not use the meter if it is damaged. Before you use the meter, inspect the case. Pay particular attention to the insulation surrounding the connectors.
2. Inspect the test leads for damaged insulation or exposed metal. Check the test leads for continuity. Replace damaged test leads before you use the meter.
3. Do not use the meter if it operates abnormally. Protection may be impaired. When in doubt, have the meter serviced.
4. Do not operate the meter around explosive gas, vapor, or dust.
5. Do not apply more than the rated voltage, as marked on the meter, between terminals or between any terminal and earth ground.
6. Before use, verify the meter's operation by measuring a known voltage.
7. When measuring current, turn off circuit power before connecting the meter in the circuit. Remember to place the meter in series with the circuit.
8. When servicing the meter, use only specified replacement parts.
9. Use caution when working above 30V ac rms, 42V peak, or 60V dc. Such voltages pose a shock hazard.
10. When using the probes, keep your fingers behind the finger guards on the probes.
11. When making connections, connect the common test lead before you connect the live test lead. When you disconnect test leads, disconnect the live test lead first.
12. Remove the test leads from the meter before you open the battery cover or the case.
13. Do not operate the meter with the battery cover or portions of the case removed or loosened.
14. To avoid false readings, which could lead to possible electric shock or personal injury, replace the battery as soon as the low battery indicator („“) appears.
15. To avoid electric shock, do not touch any naked conductor with your hand or skin, do not ground yourself while using the meter.
16. When in Relative mode (the symbol „REL“ appears) or in Data Hold mode (the symbol  appears), caution must be used because hazardous voltage may be present.
17. Remaining endangerment:
When an input terminal is connected to dangerous live potential it is to be noted that this potential at all other terminals can occur!
18. CATII - Measurement Category II is for measurements performed on circuits directly connected to low voltage installation. (Examples are measurements on household appliances, portable tools and similar equipments.) Do not use the meter for measurements within Measurement Categories III and IV.



Caution

To avoid possible damage to the meter or to the equipment under test, follow these guidelines:

1. Disconnect circuit power and discharge all capacitors before testing resistance, diode, continuity, capacitance or temperature.
2. Use the proper terminals, function and range for your measurements.
3. Before measuring current, check the meter's fuse and turn off the power to the circuit before connecting the meter to the circuit.
4. Before rotating the range switch to change functions, disconnect test leads from the circuit under test. Remove test leads from the meter before opening the meter case or the battery cover.

Symbols

- ~ AC (Alternating Current)
- ≡ DC (Direct Current)
- ⎓ DC or AC
- ⚠ Important safety information.
Refer to the manual.
- ⚡ Dangerous voltage may be present.
Be cautious.
- ⊕ Earth ground
- ⊖ Fuse
- CE Conforms to European Union directives
- Double insulated
- 🔋 Low battery
- ⚡ Diode

Instruction



1. Display

3 3/4-digit LCD, with a max. reading of 3999

2. „Range“ Button

It can be used to switch the Meter between autorange mode and manual range mode. It can also be used to select desired range.

3. „CYL“ Button

It can be used to select number of engine cylinders.



4. „FUNC“ Button

In voltage or current measurements, this button can be used to select ac or dc function. When the rotary switch is in „ „ position, this button can be used to select resistance, diode or continuity measurement.

For EM130USB, this button can be used to select frequency or duty cycle measurement when the rotary switch is in Hz Duty position,.

5. Function / Range Switch

It can be used to select the desired function and range as well as to turn on or off the meter.

6. „10A“ Jack

Plug-in connector for the red test lead for current (400mA-10A) measurements.

7. „AmA C F“ Jack

Plug-in connector for the red test lead for temperature and current (< 400mA) measurements.


8. „COM“ Jack

Plug-in connector for black (negative) test lead.

9. $V\Omega Hz$ Jack

Plug-in connector for the red test lead for all measurements except current and temperature measurements.

10. „HOLD“ Button

Press this button momentarily to freeze the present reading, the meter stays in Data Hold mode, and „ appears as an indicator. Press again to exit Data Hold mode,  disappears. Press and hold down the button for about 2 seconds to turn on or off the backlight.

11. Hz/% button.

It can be used to switch the meter between frequency and duty cycle measurements when the rotary switch is in Hz Duty position.

12. „REL“ Button

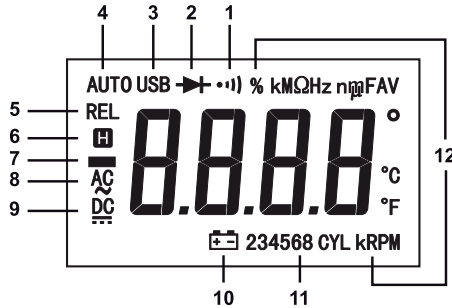
It is used for relative measurement.

Built- in Buzzer

1. When you press a button, the built-in buzzer will give a beep if this press is effective.
2. In continuity test, when the resistance is less than about 50 Ω , the buzzer will sound.



LCD explanation




Nr.	Symbol	Meaning
1		Continuity test is selected.
2		Diode test is selected.
3	USB	USB serial port communication is enabled. (optional)
4	AUTO	Autorange mode is selected.
5	REL	Relative mode is active.
6		Data Hold is enabled.
7		Negative sign
8		AC
9		DC
10		The battery is low and should be replaced immediately. Warning To avoid false readings, which could lead to possible electric shock or personal injury, replace the battery as soon as this low battery indicator appears.
11	234568 CYL	Number of cylinders of the engine to be tested.



Nr.	Symbol	Meaning
12		Units on the LCD
	mV, V	Voltage unit, mV: Millivolt; V: Volt, $1\text{ V} = 10^3\text{ mV}$
	μA , mA, A	Current unit, μA : Microamp, mA: Milliamp; A: Ampere $1\text{ A} = 10^3\text{ mA} = 10^6\text{ }\mu\text{A}$
	Ω , k Ω , M Ω	Resistance unit, Ω : Ohm; k Ω : Kilohm, M Ω : Megohm $1\text{ M}\Omega = 10^3\text{ k}\Omega = 10^6\text{ }\Omega$
	Hz, kHz, MHz	Frequency unit, Hz: Hertz; kHz: Kilohertz, MHz: Megahertz $1\text{ MHz} = 10^3\text{ kHz} = 10^6\text{ Hz}$
	RPM	Rotation speed unit, RPM = Revolutions per minute $1\text{ kRPM} = 1000\text{ RPM}$
	$^{\circ}\text{C}$, $^{\circ}\text{F}$	Temperature unit, $^{\circ}\text{C}$ = Celcius degree; $^{\circ}\text{F}$ = Fahrenheit degree, $a (^{\circ}\text{F}) = 32 + 1,8 \times b (^{\circ}\text{C})$
	$^{\circ}$	Unit of dwell angle $^{\circ}$: Degree
	%	Unit of duty cycle, %: Percent
	nF, μF	Capacitance unit, nF: Nanofarad; μF : Mikrofarad, $1\text{ }\mu\text{F} = 10^3\text{ nF}$

General specification

Display:	3 3/4-digit LCD, with a max. reading of 3999.
Overrange Indication:	„ OL „ shown on the LCD.
Negative Polarity Indication:	„ ■■■ „ displayed automatically.
Sampling Rate:	About 2-3 times/sec.
Operating Temperature:	$0^{\circ}\text{C} - 40^{\circ}\text{C}$, <75%RH.
Storage Temperature:	$-20^{\circ}\text{C} - 60^{\circ}\text{C}$, <85%RH.
Operating Altitude:	0 to 2000 meters.
Battery:	9V, 6F22 or equivalent 
Dimensions:	165 x 83 x 47mm.
Weight:	About 340g (including battery and holster)



Specification

Accuracy is specified for a period of one year after calibration and at 18°C to 28°C, with relative humidity < 75%. Accuracy specifications take the form of: $\pm([\% \text{ of Reading}] + [\text{number of Least Significant Digits}])$

DC Voltage

Range	Resolution	Accuracy
400 mV	0,1 mV	$\pm (1,0 \% + 5)$
4 V	1 mV	$\pm (0,8 \% + 3)$
40 V	10 mV	$\pm (0,8 \% + 3)$
250 V	100 mV	$\pm (0,8 \% + 3)$

Input Impedance: range 400 mV: >1000 M Ω
the other ranges: 10 M Ω

Max. Permitted

Input Voltage: 250 V DC/AC

AC Voltage

Range	Resolution	Accuracy
4 V	0,001 V	$\pm (1,0 \% + 5)$
40 V	0,01 V	$\pm (1,0 \% + 5)$
250 V	0,1 V	$\pm (1,0 \% + 5)$

Input Impedance: 10 M Ω

Max. Permitted

Input Voltage: 250 V DC/AC

Frequency Range: 40 – 400 Hz

Response: Average, calibrated in rms of sine wave

**DC Current**

Range	Resolution	Accuracy
400 μ A	0,1 μ A	$\pm (1,2 \% + 3)$
4000 μ A	1 μ A	$\pm (1,2 \% + 3)$
40 mA	10 μ A	$\pm (1,2 \% + 3)$
400 mA	100 μ A	$\pm (1,2 \% + 3)$
4 A	1 mA	$\pm (1,8 \% + 3)$
10 A	10 mA	$\pm (2,0 \% + 5)$

Overload Protection:

For μ AmA°C°F jack inputs: Fuse, 500 mA/250 V, fast action

For 10A jack inputs: no fuse protection

For inputs > 5A : measurement duration < 15 secs, interval > 15 minutes

Maximum Voltage Drop: 400 mV

AC Current

Range	Resolution	Accuracy
400 μ A	0,1 μ A	$\pm (1,5 \% + 5)$
4000 μ A	1 μ A	$\pm (1,5 \% + 5)$
40 mA	10 μ A	$\pm (1,5 \% + 5)$
400 mA	100 μ A	$\pm (1,5 \% + 5)$
4 A	1 mA	$\pm (2,0 \% + 5)$
10 A	10 mA	$\pm (3,0 \% + 10)$

Overload Protection:

For μ AmA°C°F jack inputs: Fuse, 500 mA/250 V, fast action

For 10A jack inputs: no fuse protection

For inputs > 5A : measurement duration < 15 secs, interval > 15 minutes

Maximum Voltage Drop: 400 mV

Frequency Range: 40 – 400 Hz

Response: Average, calibrated in rms of sine wave.



Resistance

Range	Resolution	Accuracy
400 Ω	0,1 Ω	± (1,0 % + 5)
4 kΩ	1 Ω	± (1,0 % + 3)
40 kΩ	10 Ω	± (1,0 % + 3)
400 kΩ	100 Ω	± (1,0 % + 3)
4 MΩ	1 kΩ	± (1,0 % + 3)
40 MΩ	0,01 MΩ	± (2,0 % + 5)

Open Circuit Voltage: about 0.45Vdc

Overload Protection: 250V DC/AC

Frequency

Range	Resolution	Accuracy
5 Hz	0,001 kHz	± (1,0 % + 3)
50 Hz	0,01 kHz	± (0,8 % + 3)
500 Hz	0,1 Hz	± (0,8 % + 3)
5 kHz	1 Hz	± (0,8 % + 3)
50 kHz	10 Hz	± (1,0 % + 3)
200 kHz	100 Hz	± (1,0 % + 3)
>200 kHz		Not Specified

Measurement Range: 1Vrms - 20Vrms

Overload Protection: 250V DC/AC



Diode and Continuity

Range	Resolution	Test Condition
	The approx. forward voltage drop of diode will be displayed.	Open Circuit Voltage: about 1,5 V
	The built-in buzzer will sound if the resistance is less than about 50Ω. The buzzer will not sound if the resistance is more than 120Ω.	Open Circuit Voltage: about 0,45 V

Overload Protection: 250V DC/AC

Capacitance (use Relative mode)

Range	Resolution	Accuracy
50 nF	0,01 nF	± (4,0 % + 5)
500 nF	0,1 nF	
5 μF	0,001 μF	
50 μF	0,01 μF	
100 μF	0,1 μF	± (8,0 % + 5)

Overload Protection: 250V DC/AC

Duty Cycle

Range	Resolution	Accuracy
5 – 95 %	0,1 %	1 Hz bis 10 kHz: ± (2 % + 5)
5 – 95 %	0,1 %	>10 kHz: not specified

Measurement Range: 3 – 10 V_{p-p}

Overload Protection: 250 V DC/AC



Temperature

Range	Resolution	Accuracy
-20 – 1000 °C	1 °C	-20 – 0 °C: ± (6,0 % + 5)
	1 °C	0 bis 400 °C: ± (1,5 % + 5)
	1 °C	>400 °C: ± (1,8 % + 5)
-4 – 1832 °F	1 °F	-4 bis 32 °F: ± (6,0 % + 9)
	1 °F	32 – 752 °F: ± (1,5 % + 9)
	1 °F	>752 °C: ± (1,8 % + 9)

Overload Protection: Fuse, 500mA / 250V, fast action.

Note:

1. Accuracy does not include error of the thermocouple probe. temperature changes of ± 5°C, rated accuracy applies 1 hour later after the temperature change.
2. Accuracy specification assumes ambient temperature is stable to ± 1°C. For ambient

Dwell Angle

Cylinders	Range	Resolution	Accuracy
2	0 – 180°	0,1°	± (2,5 % + 5)
3	0 – 120°	0,1°	± (2,5 % + 5)
4	0 – 90°	0,1°	± (2,5 % + 5)
5	0 – 72°	0,1°	± (2,5 % + 5)
6	0 – 60°	0,1°	± (2,5 % + 5)
8	0 – 45°	0,1°	± (2,5 % + 5)

Input Voltage: 3 – 50 Vp

Required Engine Rotation Speed: 250 RPM – 40 kRPM

Overload Protection: 250 V DC/AC



Tach (rotation speed)

Cylinders	Range	Resolution	Accuracy
2	250 RPM – 40 kRPM	1 RPM	$\pm (2,5 \% + 5)$
3	250 RPM – 40 kRPM	1 RPM	$\pm (2,5 \% + 5)$
4	250 RPM – 40 kRPM	1 RPM	$\pm (2,5 \% + 5)$
5	250 RPM – 40 kRPM	1 RPM	$\pm (2,5 \% + 5)$
6	250 RPM – 40 kRPM	1 RPM	$\pm (2,5 \% + 5)$
8	250 RPM – 40 kRPM	1 RPM	$\pm (2,5 \% + 5)$

Input Voltage: 3 – 50 Vp

Overload Protection: 250 V DC/AC

Note:

For measurements of 4-stroke engine, the reading on the display equals the actual rotation speed of the engine.

For measurements of 2-stroke engine, the actual rotation speed is one half of the reading on the display.



Operation Introduction

Using Relative Mode

Selecting relative mode causes the meter to store the present reading as a reference for subsequent measurements.

1. Press **REL** button, the meter enters the Relative mode and stores the present reading as a reference for subsequent measurements, and „REL“ appears on the display as an indicator. The display reads zero.
2. When you perform a new measurement, the display shows the difference between the reference and the new measurement.
3. Press **REL** button again, the meter exits Relative mode, „REL“ disappears.

Manual Ranging and Autoranging





The meter defaults to autorange mode in measurement functions which have both autorange mode and manual range mode. When the meter is in autorange mode, „AUTO“ is displayed.

1. To enter the manual range mode, press „**RANGE**“ button, the meter enters the manual range mode, „AUTO“ turns off. Each press of the „**RANGE**“ button increases the range. When the highest range is reached, the meter wraps to the lowest range.
2. To exit the manual range mode, press and hold down the „**RANGE**“ button for more than 2 seconds, the meter returns to the autorange mode.

Data Hold Mode

Press the „**HOLD**“ button to hold the present reading on the display, „**H**“ appears on the display as an indicator. To exit the Data Hold mode, press the button again, „**H**“ disappears.

Measuring Voltage

1. Connect the black test lead to the **COM** jack, and the red test lead to the **VΩHz**  jack.
2. Set the range switch to the **V**  range. Select ac voltage or dc voltage measurement with the **FUNC** button, the display shows the relevant symbol ( bzw. ).
3. Select autorange mode or manual range mode with the „**RANG**“ button.

If you use manual range mode and don't know the magnitude of the voltage to be measured beforehand, select the highest range and then reduce it range by range until satisfactory resolution is obtained.

4. Connect the test leads across the load to be measured.
5. Read LCD display. For dc voltage measurement, the polarity of the red lead connection will be indicated as well.

Note:

To avoid electric shock to you or damages to the meter, do not attempt to measure dc voltage higher than 250 V or ac voltage higher than 250 V rms although readings may be obtained.



Measuring Current

1. Connect the black test lead to the **COM** jack. If the current to be measured is less than 400mA, connect the red test lead to the **μA mA °C °F** jack. If the current is between 400 mA and 10 A, connect the red test lead to the „10 A“ jack instead.
2. Set the range switch to desired „μA~“, or „mA~“ range.
3. Select ac current or dc current measurement with the „**FUNC**„ button, the display shows the relevant symbol (\tilde{A} bzw. $\overset{\sim}{DC}$).
4. Turn off power to the circuit which you want to measured. Discharge all capacitors.
5. Break the circuit path to be measured, connect the test leads in series with the circuit.
6. Turn on power to the circuit, then read the display. For dc current measurement, the polarity of the red test lead connection will be indicated as well.

Note:

If you don't know the magnitude of the current to be measured beforehand, select the highest range and then reduce it range by range until satisfactory resolution is obtained.

Measuring Resistance

1. Connect the black test lead to the **COM** jack, and the red test lead to the **VΩHz** $\overset{\sim}{\Omega}$ jack. (Note: The polarity of the red lead is positive „+“.)
2. Set the range switch to Ω range, „ Ω “ appears on the display.
3. Connect the test leads across the load to be measured.
4. Read the reading on the display.

Note:

1. For resistance above 1MΩ, the meter may take a few seconds to stabilize reading. This is normal for high resistance measurements.
2. When the input is not connected, i.e. at open circuit, „OL“ will be displayed as over-range indication.
3. Before measuring in-circuit resistance, make sure that the circuit under test has all power removed and all capacitors are fully discharged.

Continuity Test

1. Connect the black test lead to the **COM** jack, and the red test lead to the **VΩHz** $\overset{\sim}{\Omega}$ jack. (Note: The polarity of the red lead is positive „+“.)
2. Set the range switch to $\bullet||$ position, press the **FUNC** button until the symbol $\bullet||$ appears on the display.

Note:

Before performing in-circuit continuity test, make sure that the circuit under test has all power removed and all capacitors are fully discharged.


Diode

1. Connect the black test lead to the **COM** jack, and the red test lead to the **VΩHz** $\overset{\sim}{\Omega}$ jack. (Note: The polarity of the red lead is positive „+“.)
Set the range switch to \rightarrow position, press the **FUNC** button until the symbol \rightarrow appears on the display.
3. Connect the red test lead to the anode of the diode to be tested, and the black test lead to the cathode.



4. The display will show the approximate forward voltage drop of the diode. If the connection is reversed, „OL“ will be shown on the display.


Measuring Frequency

1. Connect the black test lead to the **COM** jack, and the red test lead to the **VΩHz**  jack.
2. Set the range switch to **Hz Duty** position.
3. For EM130USB, press the **FUNC** button until the display shows **Hz**. For EM130, press the **Hz/%** button until the display shows **Hz**.
4. Connect the test leads across the source or load to be measured.
5. Read the reading.

Note:

The voltage of the input signal should be between 1V rms and 20V rms. If the voltage exceeds 20V rms, the accuracy of reading may be out of the specified accuracy range.

Measuring Duty Cycle

1. Connect the black test lead to the **COM** jack, and the red test lead to the **VΩHz**  jack.
2. Set the range switch to **Hz Duty** position.
3. For EM130USB, press the **FUNC** button until the display shows „%„. For EM130, press the „ **Hz/%** „ button until the display shows „%„.
4. Connect the test leads across the signal source to be measured.
5. Read the reading.

Note:

1. The voltage of input signal must be between 3Vp-p and 10Vp-p, and the frequency of the input signal must be less than 10kHz. If the voltage exceeds 10Vp-p or the frequency exceeds 10kHz, the accuracy of the reading may be out of the specified accuracy range.

Measuring Temperature

Note:


To avoid possible damage to the meter or other equipment, remember that while the meter is rated for -20°C to +1000°C and -4°F to 1832°F, the KType Thermocouple provided with the meter is rated to 250°C. For temperatures out of that range, use a higher rated thermocouple.

The KType Thermocouple provided with the meter is a present, it is not professional and can only be used for non-critical measurements. For accurate measurements, use a professional thermocouple.

1. Connect the negative „ - „ plug of the K type thermocouple to the **COM** jack, and the positive „ + „ plug to the **μAmA°C°F** jack.
2. Set the range switch to „ **°C** „ or „ **°F** „ position.
3. Connect the end of the thermocouple to the object to be measured.
4. Wait until the reading is stable, read the reading on the display.



Measuring Capacitance

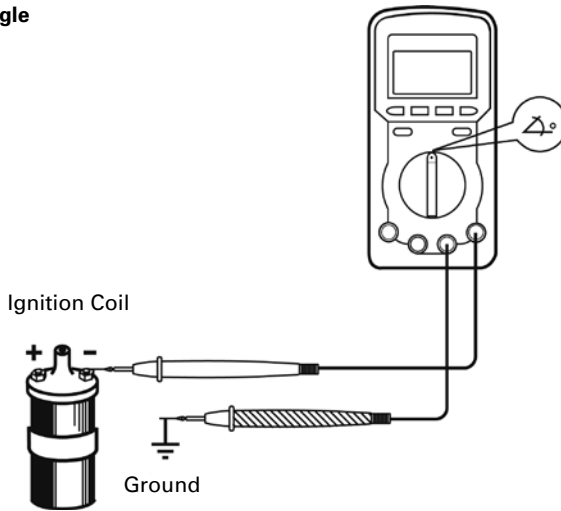
1. Connect the black test lead to the **COM** jack, the red test lead to the **VΩHz**  jack. (Note: The polarity of the red lead is positive „+“.)
2. Set the range switch to **1F** position.
3. Connect the test leads across the capacitor to be measured.
4. Wait until the reading is stable, then read the reading. (For high-capacitance measurements, it may take about 30 seconds for the reading to be stable.)

Note:

Before measurement, make sure that the capacitor to be measured has been discharged thoroughly. To improve the accuracy of low capacitance measurement, subtract the residual capacitance of the meter and test leads by using relative measurement. For the measurements $\geq 100 \mu\text{F}$, the display will show „OL“ as overrange indication.



Measuring Dwell Angle



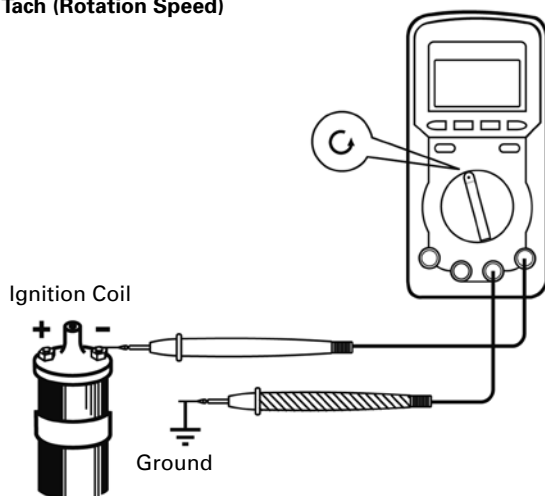
1. Connect the black test lead to the **COM** jack, and the red test lead to the **VΩHz Δ°** jack. (Note: The polarity of the red lead is positive „+“.)
2. Set the range switch to Δ° position.
3. Press the **CYL** button until the number of cylinders of the engine to be tested appears on the display. (The meter displays the number of cylinders followed by „CYL“)
4. Connect the black test lead to ground or the negative terminal of the battery, and the red test lead to the low voltage terminal of the distributor or the negative terminal of the ignition coil.
5. Start the engine and read the reading on the display.

Note:

1. The input voltage must be between 3Vp and 50Vp. If the voltage is too low, it will be impossible to perform dwell measurement.
2. Reading's stability will decrease if the rotation speed of the engine is too low.
3. The polarity of the input voltage must be correct, otherwise it will be impossible to perform measurement.



Measuring Engine Tach (Rotation Speed)



1. Connect the black test lead to the **COM** jack, and the red test lead to the **VΩHz** jack. (Note: The polarity of the red lead is positive „+“.)
2. Set the range switch to **C** position.
3. Press the **CYL** button until the number of cylinders of the engine to be tested appears.
4. Connect the black test lead to ground or the negative terminal of the battery, and the red test lead to the low voltage terminal of the distributor or the negative terminal of the ignition coil.
5. Start the engine and read the reading on the display.

Note:

1. The input voltage must be between 3Vp and 50Vp. If the voltage is too low, it will be impossible to perform dwell measurement.
2. Reading's stability will decrease if the rotation speed of the engine is too low.
3. The polarity of the input voltage must be correct, otherwise it will be impossible to perform the measurement.



Auto Power Off

The display will blank and the meter will go into „Sleep“ mode if you do not operate the meter for about 30 minutes. To arouse the meter from Sleep, rotate the range switch.

To disable the automatic power-off feature, turn on or arouse the meter while pressing and holding down the **FUNC** button.

Maintenance

Warning

Except replacing battery and fuse, never attempt to repair or service the meter unless you are qualified to do so and have the relevant calibration, performance test, and service instructions. Store the meter in dry place if you don't use it.


General Maintenance

Periodically wipe the case with a damp cloth and mild detergent. Do not use abrasives or solvents. Dirt or moisture in the terminals can affect readings. Clean the terminals as follows:

1. Set the range switch to OFF position and remove the test leads from the meter.
2. Shake out any dirt which may exist in the terminals.
3. Soak a new swab with alcohol.
4. Work the swab around in every terminal.

Replacing the Battery and Fuse

Warning

To avoid false readings, which could lead to possible electric shock or personal injury, replace the battery as soon as the battery indicator () appears.

To prevent damage or injury, install only replacement fuse of the same ratings. Disconnect the test leads before opening the back cover or the battery cover.

To replace the battery, remove the screws on the battery cover and remove the battery cover, replace the exhausted battery with a new battery of the same type (9V, 6F22 or equivalent). Reinstall the battery cover and the screws.

This meter uses one fuse: 500mA, 250V, \varnothing 5x20mm, Fast action. To replace the fuse, open the battery cover, take the meter out of the holster, open the back cover, replace the fuse with a new one of the same ratings. Reinstall the back cover and its screws. Then reinstall the holster, the battery cover and the battery cover's screws sequentially.

Accessories

Users Manual:	1 piece
Test Lead:	1 pair
Thermocouple KType:	1 piece

Note

1. This users manual is subject to change without notice.
2. Our company will not take the other responsibilities.
3. The content of this manual can not be used as the reason to use the meter for any other applications.



Disposal of this article

Dear Customer,

If you at some point intend to dispose of this article, then please keep in mind that many of its components consist of valuable materials, which can be recycled.

Please do not discharge it in the garbage bin, but check with your local council for recycling facilities in your area.





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