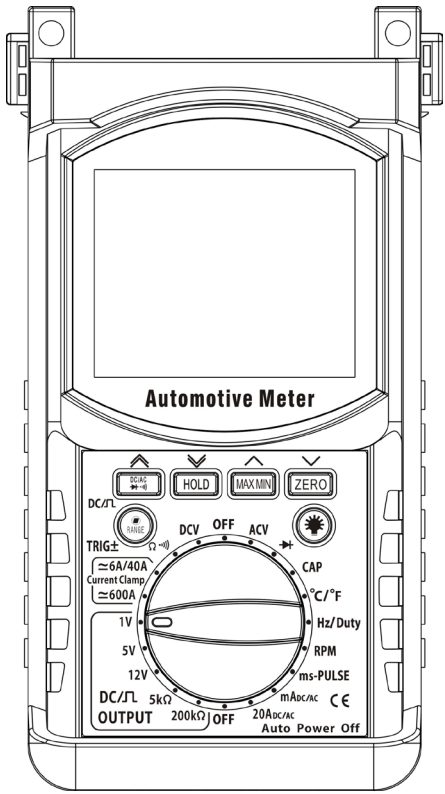
ATF-529000

AUTOMOTIVE MULTIMETER



INSTRUCTION MANUAL

LVD tested

Germany

SM PRODUKTER A/S

ATF-529000
DIGITAL AUTOMOTIVE ENGING ANALYZER MULTIMETER OPERATION MANUAL

This instrument is a compact 、battery operated、handheld with safety protector 、streamline 、 6000 digital automotive engine analyzer multimeter for measuring DC/AC Voltage, DC/ AC Current, Resistance, , Capacitance, Frequency and Duty cycle, Temperature, Diode/Continuity test, Tachometer, Dwell .ms-PULSE,Analog Frequency/Duty/Voltage/Resistance Signal Output ,It is an ideal instrument for all drivers.

Safety

DANGER

Engines produce carbon monoxide which is odorless, causes slower reaction time .and can lead to serious injury .when the engine is operating keep service areas WELL VENTILATED or attach the vehicle exhaust system to the shop exhaust removal system.

Set the parking brake and block the wheels before testing or repairing the vehicle .it is especially important to block the wheels on front-wheel drive vehicles: The parking brake dose not hold the drive wheels.

Wear an eye shield when testing or repairing vehicles .exceeding the limits of this meter is dangerous, it will expose you to serious or possibly fatal injury .carefully read and understand the cautions and the specification limits of this meter.

Voltage between any terminal and ground must not exceed 1000V DC or 750V AC.

Use caution when measuring voltage above 25VAC or DC.

Circuit tested must be protested by a 20A fuse or circuit breaker.

Do not use the meter if it has been damaged
Do not use the test leads if the insulation is damaged or metal is exposed .

Use current clamps to measure circuits exceeding 20A.

Danger

Avoid electrical shock : do not touch the test leads ,tips or the circuit being tested.

Do not try a voltage measurement with the test leads in the 20A or the mA terminal.

*When testing for the presence of voltage or current . make sure the meter is function correctly ,take a reading of a known voltage or current before accepting a zero reading.

*Choose the proper range and function for the measurement . do not try voltage or current measurements that may exceed the ratings marked on the function/range switch or terminal.

*When measuring current. Connect the meter in series with the load.

*Never connect more than one set of test leads to the meter.

*Disconnect the live test lead before disconnecting the common test lead.

*The mA and the 20A terminals are protected by fuses . to avoid possible injury or damage . use only in ciruits limited to 600mA or 20A continuous for 15 seconds .

See also

Fuse Replacement

IMPORTANT

*To maintain accuracy of the meter , replace the discharged battery immediately when the battery symbol  appears on the meter display .

*Avoid measuring error form outside interference : keep the meter away form spark plug or coll wires .

*Avoid damaging the meter when testing voltage : disconnect the test leads from the test points before changing functions.

*Do not exceed the limits shown in the table below:

Function	Terminal	Input Limit
AC Volts	V/Ω/RPM	750V AC rms
DC Volts		1000V DC
Frequency/Duty	V/Ω/RPM	250V AC/DC
resistance/Diode		
AC/DC 600mA	600mA	600mA AC/DC
Clamp Current		600mV AC/DC
AC/DC 20A	20A	20A AC/DC
RPM,ms-PULSE	V/Ω/RPM	250V AC/DC
Cap, Temperature		
Voltage Output		Over 1kΩ
Resistance Output		±5V

20Amp measurement continuous for 30 seconds maximum.
Ohm can not be measured if voltage is present ,ohms can be measured only in a non-powered circuit .however ,the meter is protected to 250 volts.

SPECIFICATION

GENERAL SPECIFICATION

Display: 6000 digits LCD with 20mm high numerals.
Auto Functions: Auto-zero, Auto-polarity, Auto-range
Auto power off: 15 minutes after stopping the switch or no push button, the meter enter to Power off mode. run switch to OFF position , Auto Power off disable.
Low Battery Indication: " ".
.Overrange Indication: "OL".
Power Supply: single 9V battery (NEDA 1604or IEC 6F22)
Reading Rate Time: 3 reading per sec(approx.).
Maximum Commom Mode Voltage: 500Vdc or ac peak.
Safety Standards: The meter is up to the standards Of IEC1010 Double Insulation, Pollution degree 2 Overvoltage Category Ⅱ.
Operating Environment: 0℃ to 50℃(32℉to 122℉) at ≤70% relative humidity.
Storage Envrionment: -20℃ to 60℃(-4℉ to 140℉) at ≤80% relative humidity .
Temperature Coefficient: 0.1×(specified accuracy)/℃(≤18℃ or≥28℃)
Accessories: One pair test leads, single 9V battery (NEDA 1604or IEC 6F22), operating instructions.
Fuse: 0.8A/250V, 5×20mm fast acting,20A/250V, 6×30mm fast acting.
Dimension : 218mm×122mm×75mm
Weight :Approx. 760g(including battery and holster).

Electrical specifications

*Accuracy is given as ±([% of reading]+[number of leads significant digits]) at 18℃ to 28℃(65℉ to 83℉),with relative humidity up to 70%.

RPM(tach)
Ranges:60-8999RPM
Resolution :1 RPM
Effect reading :>60RPM
Accuracy:±(2.5%rdg+10dgt)
Overload protection:250VDC or RMS AC

Pulse width
Ranges :0.1ms-10.0ms
Accuracy :±(2.5%+0.2ms)
Overload protection:250VDC or RMS AC

% Duty cycle
ranges:1.0-99.0%
resolution:0.1%
pulse width :>100us,<100ms
Accuracy:±(2.5%rdg+10dgt)
Overload protection:250VDC or RMS AC

Temperature
Ranges:-50 to 1100℃,-50 to 2000℉
Resolution:1℃/1℉
Accuracy: -50 to 1100℃ ±(2%rdg+2℃)
-50 to 2000℉ ±(2%rdg+4℉)
sensor: type K thermocouple
input protection:250VDC or 250VAC rms

DC voltage(auto ranging)
Ranges:600mV
Accuracy:± (2.5%rdg+15dgt)
Ranges:6V,60V,600V,1000V
Accuracy:± (0.8%rdg+8dgt)
Resolution:minimum 100uV
input impedance:>10MΩ
Overload protection: 1000VDC or 750VAC rms.

AC VOLTAGE TRUE RMS(Auto ranging)
Ranges:600mV,6V,60V,600V,750V
Resolution:100uV
Accuracy: 400mV ,750V± (3.0%rdg+15dgt) at 50Hz to 100Hz
,4V,40V,400V, ± (1.5%rdg+15dgt) at 50Hz to 1kHz
input impedance:>10MΩ
Overload protection: 1000VDC or 750VAC rms.

DC/AC CURRENT
Ranges: 60mA,600mA,20A.
Resolution:10 uA
Accuracy:

DCA:	60mA,600mA	±(1.5%rdg+10dgt)
ACA:	60mA,600mA	±(1.8%rdg+15dgt)
DCA:	20A	±(2.0%rdg+15dgt)
ACA:	20A	±(2.5%rdg+15dgt)

Input protection: 0.8A/250V fuse on 600mA range
20A/250V high energy fuse on 20A range

DC/AC CURRENT TEST with Current Clamp Adapter
Ranges: 6A,40A,600A.
Resolution: minimum 1mA
ACA Test Frequency response:50Hz to 400Hz
Accuracy:
6A/40A ±(3.0%rdg+15dgtt)
600A ±(3.5%rdg+10dgt)
input protection:250VDC or 250VAC rms

RESISTANCE(Auto ranging)
Ranges:600Ω,6KΩ,60KΩ,600KΩ,6MΩ,60MΩ
Accuracy:±(1.5%rdg+15dgts) on 600Ω range
±(1.0%rdg+10dgts) on 6kΩ to 600kΩ ranges
±(3.5%rdg+15dgts) on 6MΩ to 60MΩ ranges
open circuit voltage: 0.4VDC
overload prctection: 250VDC or RMS AC.

FREQUENCY(Auto ranging)
Ranges:9.999kHz,99.99kHz,999.9kHz,9.999MHz
Resolution:0.001Hz
Accuracy: ±(0.1%rdg+5dgts)
Sensitivity:1V
Overload protection:250VDC or RMS AC

CAPACITANCE(Auto ranging)
Ranges:9.999nF,99.99nF,999.9nF,9.999uF,99.99uF,999.9uF,9.999mF,99.99mF.
Resolution:1pF
Accuracy:±(3.0%rdg+20dgts) on 9.999nF range
±(2.5%rdg+10dgts) on 99.99nF to 9.999uF ranges
±(3.0%rdg+25dgts) on 99.99uF to999.9uF ranges
±(10%rdg+15dgts) on 9.999mF to99.99mF ranges
overload protection:250VDC or RMS AC

DIODE TEST
Test condition: Forward DC current approx. 1.5mA
Reversed DC voltage approx. 1.5V
Overload protection:250VDC or RMS AC.

AUDIBLE CONTINUITY
Open circuit voltage:0.4Vdc
≤50Ω Buzzer sounds
Overload protectio n:250VDC or RMS AC.

Signal analog Output(Analog Frequency/Duty/DC and AC Voltage/RESISTANCE Signal Output)
% Duty cycle:10%-90%
DC VOLTAGE:0-1V、0-5V、0-12V(±1%)
AC VOLTAGE: 0-1V、0-5V、0-12V(±1.5%)
RESISTANCE: 5KΩ Range:200Ω-2KΩ (±3.5%±0.1 KΩ)
2KΩ-5KΩ (±3.5%±0.2 KΩ)
200KΩ Range: 4KΩ-200KΩ(±3.5%±0.5 KΩ)
"≪" "≫" Button quickly adjust output signal value
"∧" "∨" Button fine adjust output signal value

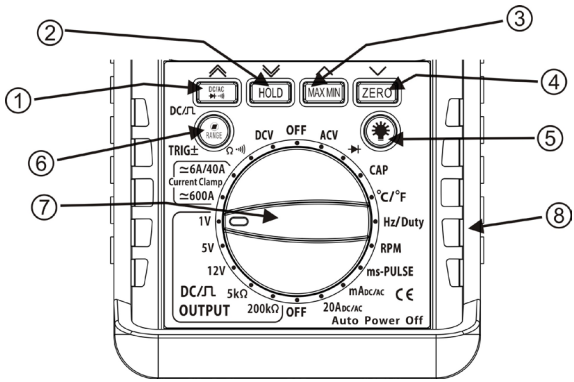
Standard accessories

1 Test pen	2PCS
2 Crocodile clip	4PCS
3 English manual	1PCS
4 Soft set	1PCS
5 The color box	1PCS
6 Temperature probe	1PCS
7 Battery(9V)	1PCS

Accessory optional
1. RPM INDUCTIVE PICK-UP PROBE
2. Clamp
3. Test Lead

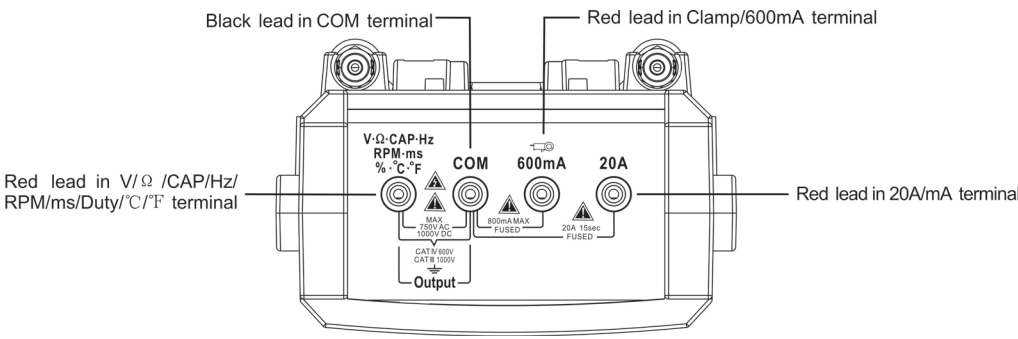
Getting Started
This chapter will help you get started.
It describes the basic functions of the meter.

Front Panel



① AC/DC & and °C/°F switch
② Hold switch
③ MAX/MIN switch
④ ZERO switch
⑤ Back Light switch
⑥ RANGE & STROKE 4/2(DIS) & DC OUTPUT/ Square wave output
⑦ Function/Range switch: Turn this switch to select a function or turn the meter OFF.
⑧ Safety protector

Connection panel



1.Black lead in COM terminal
Red lead in V/Ω/CAP/Hz/RPM/ms/Duty/℃/℉ terminal
2.Black lead in COM terminal
Red lead in Clamp/600mA terminal
3.Black lead in COM terminal
Red lead in 20A/mA terminal

Function and select
Turn the rotary switch in either direction to select a function.

The range is automatically selected by the meter. But you can also select a range within a function by by pressing the range button. Always select a range higher than you expect the function . then select a lower range if better accuracy is needed
*if the range is too high ,the reading are less accurate.
*if the range is too low ,the meter shows OL(over limit)

Push-button Functions

DC/AC Ω ⊣◀ ·))) BUTTON
Press this button to select the following functions:
DC/AC Voltage & Current Diode/Continuity °C/°F.

RANGE & Stroke 4/2(DIS) ms TRIGGER ±
DC OUTPUT/ Square wave output BUTTON
Press this button to select:

RPM ×10RPM position	STROKE 4 2 DIS
ms-PULSE	TRIGGER±
Signal Output	DC output / Square wave output
V/A Resistance position	Manual Range

MANUAL RANGING
The meter turns on in the autoranging mode. Press the Range button to go to manual ranging. The display icon " ▰ " will appear. Each press of the range button will step to the next range as indicated by the units and decimal point location. Press and hold the Range button for two seconds to return to autoranging.
NOTE:
*If the range is too high .the readings are less aceurate.
*If the range is too low . the meter shows **OL**(over limit)

Date Hold
The **Date Hold** feature stores the last reading in memory
*Press the **HOLD** button once to hold the present reading.
*Press the **HOLD** button again to exit and resume readings.
Always select a range higher than you expect the function . then select a lower

range if better accuracy is needed
*if the range is too high ,the reading are less accurate.
*if the range is too low ,the meter shows OL(over limit)

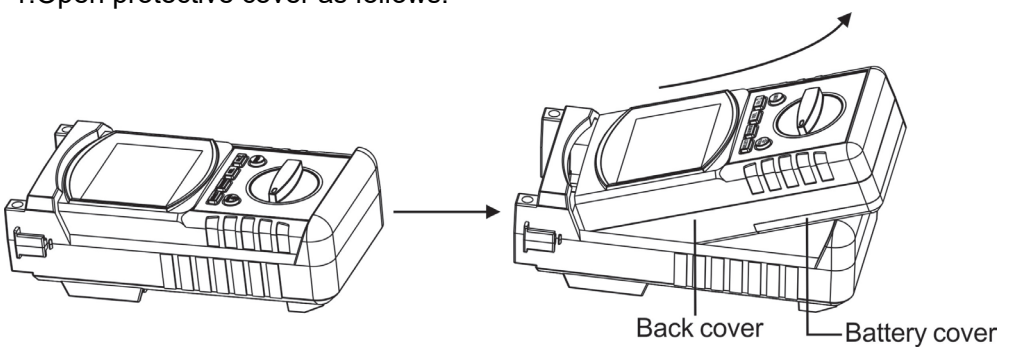
max/min button
Press the MAX/MIN button to activate the MAX/MIN recording mode. The display icon "MAX or MIN" will appear. The meter will go to manual ranging & display and hold the maximum or minimum reading and will update only when a new “max or min” occurs.
4.5.2. Press the MAX/MIN key and a blinking “MAX MIN” will appear. The meter will display the present reading, but will continue to update and store the max and min readings.
To exit MAX/MINmode press and hold the MAX/MIN key for 2 seconds.

ZERO button
When testing small capacitance（≤9.999nF）, to assure the measurement accuracy, first press "ZERO", then go on measureing.
Push the key, the present display value will be stored in memory, then the new display value is the difference between input value and stored data

Backligh button
1. Press the BACKLIGHT button to turn the backlighting ON.
2. Press the BACKLIGHTbutton again to turn the backlighting OFF.

Maintenance Fuse and Battery Replacement
⚠**WARNING:**
- Avoid electrical shock; remove test leads before opening case.
- Do not operate the meter or rotate the meter switch when the case is open.

1.Open protective cover as follows.



2.Replace the battery, loosen the 3 screws of the battery cover, open the battery

cover,replace the battery with 9 volt alkaline battery.
3.Replace the fuse, loosen the 6 screws on the rear lid, open the rear cover,replace the damaged fuse with the same specification.
4.Install back in accordance with the reverse operation of the first step.

IMPORTANT:

• To prevent contamination of the circuits, your hands must be clean and the printed circuit board must be help by the edges.
• Replace the fuse with the same type of fuse.
◎10A is a F10A ,250V high energy, fast acting fuse.
◎ mA is a F500mA, 250v high energy, fast acting fuse.
• Mark sure the replacement fuse is centered in the fuse holder.
3.Carefully re-insert the PC boards into the case. Re-assemble the case, then fasten the four screws.

Trouble Shooting

1.Meter will not turn ON.
• Check the battery contacts for a tight fit.
• Check for a minimum battery voltage of 8.0 volts.
• Mark sure the battery wire, are not pinched in the cafe.
2. Ampere reading is erratic or there is no reading at all.
• Disassemble the meter back cover and test the fuses for continuity.
3. Meter reading is erratic.
• Printed circuit board contaminated from handling with hands.
• Low battery.
• Open circuit in a test lead (frayed or broken wire).
• Wrong range selected.
• For frequencies below 1Hz, the display will show 00.00Hz.
• “Blown” fuse.
4. Meter reading do not change.
• “Hold” feature is still toggled ON.