EN V60
Professional multimeter

SOLIGHT

Thank you for purchasing our equipment. Please read this manual carefully and heed the safety warnings and instructions before installing, using or repairing the equipment. This will ensure not only the protection of persons, but also the long life of the equipment

TECHNICAL PARAMETERS

Display	LCD, 2000 counts update 2/sec
Measurement range	manual and automatic
Operating temperature	0°C to 40°C (< 80% RH)
Storage temperature	-10°C to 50°C (< 85% RH)

This manual contains all safety information, operating instructions, technical data and maintenance of the measuring instrument.
This instrument performs AC/DC voltage, AC/DC current, resistance, continuity test, diode, hFE, frequency, capacitance and temperature measurements. Display parameters - 3 5/6 digits, maximum display 6000, auto range. Has polarity indication, data hold, over range indication and auto shutdown functions. The device is easy to operate.

This digital multimeter has been designed according to EN610101 standard for electronic measuring instruments with overvoltage category s (CAT III 600V,CAT II 1000V).

SAFETY NOTICE

To avoid possible electric shock or personal injury and to prevent possible damage to the meter or equipment under test, observe the following rules.

1. Check the housing before using the Meter. Do not use the Meter if it is damaged or if the case (or part of it) is removed. Look for cracks or missing plastic. Pay attention to the insulation around the connectors.
2. Check the measuring wires for damaged insulation or bare metal. Check the continuity of the test leads.
3. Do not apply a higher voltage between the terminals or between any terminal and earth than the rated voltage marked on the meter.
4. The rotary switch should be placed in the correct position and no range change should be made during measurement to avoid damaging the equipment.
5. If the meter operates with an effective voltage greater than 60 V RMS in DC or 30 V RMS in AC, special care must be taken as there is a risk of electric shock.
6. Use the correct clamps, functions and ranges for measurements.
7. Do not use or store the meter in an environment with high temperature, humidity, explosive, flammable and strong magnetic field. The performance of the Meter may deteriorate when wet.
8. Keep your fingers behind the finger protectors when using the measuring wires.
9. Before testing resistance, continuity, diodes, or hFE, disconnect power to the circuit and discharge all high voltage capacitors.
10. Before opening the meter cover, disconnect the connection between the test leads and the circuit under test and turn off the power to the meter.
11. When servicing the Meter, use only replacement parts of the same model number or identical electrical specifications.
12. The internal circuitry of the Meter must not be arbitrarily altered to prevent damage to the Meter and possible accident.
13. When servicing the device, a soft cloth and mild detergent should be used to clean the surface of the device. Abrasives and solvents must not be used to prevent corrosion, damage and accident to the surface of the Meter.
14. The meter is suitable for indoor use.
15. Turn off the power when not in use and remove the battery when not in use for a long period of time. Keep checking the battery as it may leak with prolonged use, replace the battery as soon as a leak is detected.
16. Replace the battery when the battery indicator "🔋" appears. With a dead battery, the meter may show false readings or injury may occur.

CHARACTERISTICS OF THE DEVICE

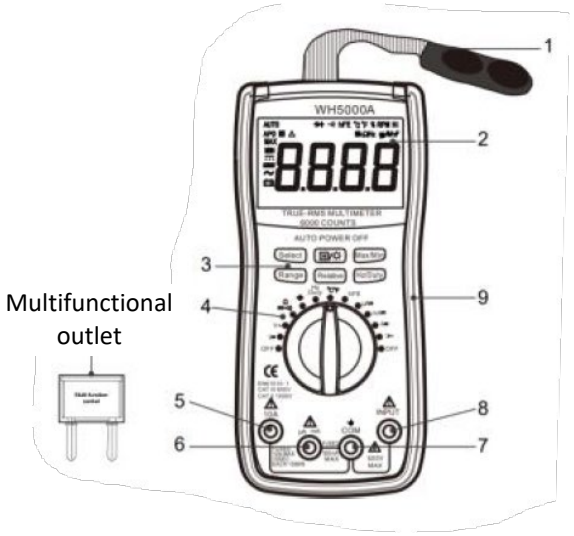
Display: Max. display values
Display size: 64 x 42mm
Polarity indication: '-' is displayed automatically
Overrange indication: "OL" is displayed
Low Battery Indication: displays "🪫 "
Range selection: automatic or manual
Operating temperature: 0°C to 40°C, less than 80%RH
Storage temperature: 10°C to 50°C, less than 85%RH
Battery type: 9V NEDA 1604, equivalent to 6F22
Dimensions: 190×90×35mm

ELECTRICAL SYMBOLS

V⎓	DC (direct current)
V~	AC (alternating current)
⎓~	DC or AC
⚠	Important safety information
⚠	Dangerous voltages may be present
⏚	Earthing
🪫	Low battery
⎯	Fuse
⏩	Diode
•)))	Continuity test
AUTO	Automatic range
CE	Conforms to the European Union Directive
⧈	Double insulated

DESCRIPTION OF EQUIPMENT

1. Magnetic hook for hanging
2. Display
3. Function buttons (Function button)
4. Function switch
5. 10A connector
6. µA/mA connector
7. Com connector
8. Input connector (INPUT connector)
9. Case



FUNCTION button
Press this button to select Ω, , ⏩ •))) , or°C/°F , when the function switch is in the Ω, , ⏩ •))) , or°C/°F position.

Button H \ ✹ hold values and backlight
When this button is pressed, the LCD display will show the last reading and display the "H" symbol. After the next press, the symbol and the value disappear.
For backlighting, press this button for more than 2 seconds, the backlight will turn on, after 15 seconds the backlight will turn off automatically.

MIN/MAX button
When this button is pressed, the meter enters MAX mode and the "MAX" indicator appears on the display, with the current value on the LCD being the maximum value of all readings taken since this mode was activated. Pressing this button again puts the meter into MIN mode and the LCD displays the "MIN" indicator, the current value on the display being the minimum value of all readings taken since this mode was activated.

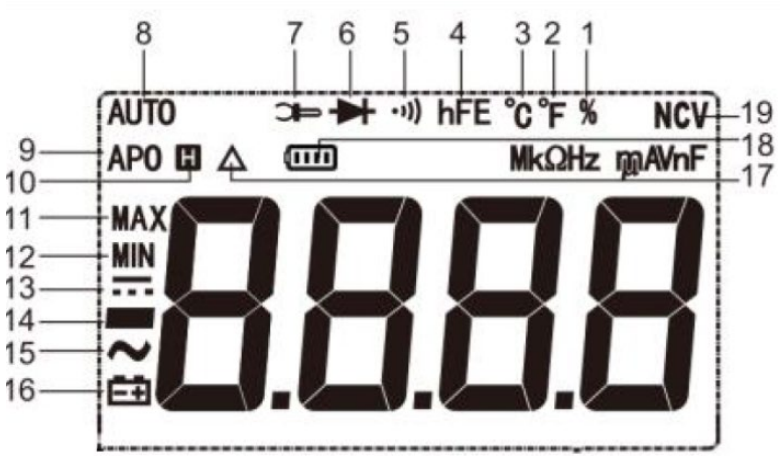
RANGE button
AC/DC voltage, AC current and resistance measurement ranges can be selected manually or automatically by pressing the range control button (RANG). Press this button to select the range control mode and the required ranges as follows.

RELATIVE button
Press this button to set the meter to relative mode and display the indicator. To exit this mode, press this button again and it will disappear.

Hz/DUTY button
Press this button to select the Hz or DUTY CYCLE measurement.

DISPLAY DESCRIPTION

%	The duty cycle is selected
°F	Fahrenheit temperature test is selected
°C	The Celsius temperature test is selected
hF	The hFE transistor test is selected
•))	Continuity test is selected
▶|	The diode test is selected
⊃⊢	External current test is selected
AUTO	Auto range mode is selected
APO	Automatic shutdown mode is selected
H	Data hold is active
MAX	The maximum value is displayed
MIN	The minimum is displayed
⎓	DC (Direct Current)
−	Negative sign
~	AC (Alternating Current)
⊟+	Low battery - replace the battery
△	Relative mode is active
▭	Battery test is selected
NCV	Non-contact voltage test is selected



SPECIFICATIONS

Accuracy is guaranteed for 1 year at 23°C±5°C and less than 80% RH

DC Voltage (DC) (auto range)

Scope	Resolution	Accuracy
600mV	0.1mV	±(0.8% of measurement + 5 digits)
6V	1mV	±(0.8% of measurement + 3 digits)
60V	10mV	
600V	100mV	
1000V	1V	±(1.0% of rdg + 5 digits)

Input impedance: 10MΩ
Overload protection: 1000V DC/750V AC RMS
Maximum input voltage: 1000V DC

Temperature

Scope	Resolution	Accuracy
-40 ~ 1000°C	1°C	±(0.8% of measurement + 5 digits
		150°C~1000°C:±(2% + 3°C)
-40 ~ 1832°F	1°F	-40°F~302°F:±(5% + 4°F)
		302°F~1832°F:±(2.5% + 3°F)

Overload protection: 250 V DC/AC rms

AC Voltage (True-RMS and Auto Range)

Scope	Resolution	Accuracy
600mV	0.1mV	±(1.2% of measurement + 8 digits)
6V	1mV	±(1.2% of measurement + 6 digits)
60V	10mV	
600V	100mV	
750V	1V	±(1.2% of measurement + 8 digits)

Input impedance: 10MΩ
Frequency range: 40Hz~400Hz
Overload protection: 1000V DC/750V AC RMS

Direct Current (DC)

Scope	Resolution	Accuracy
600μA	0.1μA	±(0.8% of measurement + 5 digits)
6000μA	1μA	
60mA	10μA	
600μA	100μA	
10A	10mA	±(1.5% of measurement + 3 digits)

Overload protection:
"mA" connector: fuse F0,5A/600V
Connector "10A": F10A/600V fuse
Max. input current:
"mA" connector: 600mA
connector "10A": 10A
(For measurements >5A: duration <10 seconds, interval >15 minutes)

AC True-RMS

Scope	Resolution	Accuracy
600μA	0.1μA	±(1.5% of measurement +8 digits)
6000μA	1μA	
60mA	10μA	
600mA	100μA	
10A	100mA	±(2.0% of measurement +10 digits)

Overload protection:
"mA" connector: fuse F0,5A/600V
"10A" connector: fuse F10A/600V Max.
Input current:
"mA" connector: 600mA
"10A" connector: 10A
(For measurements >5A: duration <10 seconds, interval >15 minutes)
Frequency range: 40Hz~400Hz

Resistance (automatic range)

Scope	Resolution	Accuracy
600Ω	0.1Ω	±(1.5% of measurement + 3 digits)
6KΩ	1Ω	
60KΩ	10Ω	
600KΩ	100Ω	
6MΩ	1KΩ	
60MΩ	10KΩ	±(1.5% of measurement + 5 digits)

No-load voltage: approx. 0.25 V
Overload protection: 250V DC/AC RMS

Diode and continuity

Scope	Resolution	Accuracy
	The approximate forward voltage drop is displayed	No-load voltage: approximately 2.8 V
	The built-in buzzer sounds when the resistance is less than approximately 30 Ω.	No-load voltage: approx. 1.0 V

Overload protection: 250 V DC/AC rms

HFE transistor test (with adapter)

Scope	hFE	Test current	Test voltage
PNP & NPN	0~1000	Ib≈4μA	Vce≈1.2V

Capacity

Scope	Resolution	Accuracy
60nF	10pF	±(8% of data + 5 digits)
600nF	100pF	
6µF	1nF	
60µF	10nF	
600µF	100nF	
60mF	10µF	

Overload protection: 250 V DC/AC RMS.

Frequency (automatic measurement)

Scope	Resolution
10Hz~10MHz	±(1.0% of measurement + 5 digits)

Overload protection: 250V DC/AC RMS

Signal class

Scope	Resolution	Accuracy
10 - 95%	0.1%	±(2.0% of measurement + 3 digits)

INSTRUCTIONS FOR USE

Voltage measurement

1. Connect the black test cable to the "COM" connector and the red test cable to the "INPUT " connector.
2. Set the function switch to V~ or V⎓.
3. Use the "Range" button to select automatic or manual range.
4. If the magnitude of the voltage to be measured is not known in advance, select the highest range in the manual range.
5. Connect the measuring leads through the measured source or load.
6. The measured values are shown on the display

COMMENT:

- In the small range, the measuring instrument may display unstable values if the measuring leads are not connected to the load being measured. This is normal and does not affect the measurement.
- In manual range mode, when the meter displays the overrange symbol "OL", a higher range should be selected.
- To avoid damage to the measuring instrument, do not measure voltages that exceed 1000 Vdc (for DC voltage measurement) or 750 Vdc (for AC voltage measurement).

Current measurement

1. Connect the black test lead to the "COM" connector. If the measured current is less than 600 mA, connect the red test lead to the "mA" connector. If the measured current is between 600mA and 10A, connect the red test lead to the "10A" connector instead.
2. Set the function switch to the desired range µA~ mA~ A~.
3. If the magnitude of the current to be measured is not known in advance, set the function switch to the highest position of the range, and then reduce it range by range until satisfactory resolution is achieved.
4. Use the "Select" button to select DC or AC measurement.
5. Read the display. When measuring a DC circuit, the polarity of the connection of the red measuring wire is also displayed.

COMMENT:

If the over range symbol "OL" appears on the display, a higher range must be selected.

Resistance measurement

1. Connect the black test lead to the "COM" connector and the red test lead to the "INPUT" connector (Note: The polarity of the red test lead is positive "+").
2. Set the function switch to the range Ω.
3. Use the "Range" button to select automatic or manual range. If the size of the resistance to be measured is not known in advance, select the highest range in the manual range.
4. Connect the measuring leads across the load to be measured.
5. Read the display.

COMMENT:

- When measuring resistance >1MΩ, it may take a few seconds for the reading to stabilize. This is normal for high resistance measurements.
- If the input is not connected, i.e. it is in a disconnected circuit, the "OL" symbol is displayed as an overrange indicator.
- Before measuring the resistance in the circuit, make sure that the circuit under test is completely disconnected from the power supply and all capacitors are fully discharged.

Continuity test

1. Connect the black test lead to the "COM" connector and the red test lead to the "INPUT" connector (Note: The polarity of the red test lead is positive '+').
2. Set the function switch to the range .
3. Press the "Select" button to select the continuity test mode and the symbol will appear as an indicator.
4. Connect the measuring leads across the load to be measured.
5. If the circuit resistance is less than approximately 30 Ω, the built-in buzzer sounds.

Diode test

1. Connect the black test lead to the "COM" connector and the red test lead to the "INPUT" connector (Note: the polarity of the red test lead is positive "+").
2. Set the function switch to the range .
3. Press the "Select" button to select the continuity test mode and the " " symbol will be displayed as an indicator.
4. Connect the red test lead to the anode of the diode under test and the black test lead to the cathode.
5. The meter will show the approximate value of the forward voltage of the diode. If the connections are reversed, the display will show "OL".

Transistor test

1. Set the function switch to the "hFE" range.
2. Connect the multifunction socket to the "COM" connector and to the "INPUT" connector. Do not reverse the connection.
3. Determine whether the transistor is NPN or PNP and find the Emitter, Base and Collector pins. Insert the pins of the transistor under test into the corresponding holes of the transistor test socket on the adapter.
4. The LCD display will show the approximate hFE value.

Temperature measurement

1. Set the function switch to the "ºC/ºF" range.
2. Press the "Select" button to select the °C or °F mode and the °C or °F symbol will be displayed as an indicator.
3. Insert the black plug of the type K thermocouple into the "COM" connector and the red plug into the "INPUT" connector.
4. Carefully touch the end of the thermocouple to the object to be measured.
5. Wait a moment and read the display.

COMMENT:

The maximum operating temperature of the TP01 Type K thermocouple is 250˚C/482˚F (or 300˚C/572˚F for short periods). The sensor supplied with the instrument is a "bare" ball thermocouple with a very fast response, which is suitable for many general purpose applications.

Capacity measurement

1. Connect the black test lead to the "COM" connector and the red test lead to the "INPUT" connector.
2. Set the function switch to the range (NOTE: the polarity of the red wire is positive "+").
3. Connect the measuring leads across the capacitor to be measured and ensure that the polarity of the connection is maintained. If the measured capacitance is greater than 600 µF, at least 10 seconds are needed to make the readings stable.
4. If the capacity of the outlet is very small, you can also choose to measure with a multi-function socket.

Frequency measurement

1. Set the function switch to the desired position " Hz Duty ".
2. Connect the black test lead to the "COM" connector and the red test lead to the "INPUT" connector (Note: The polarity of the red test lead is positive "+").
3. Read the display

COMMENT:

Do not apply more than 250 V RMS to the input. Indication is possible at voltages greater than 100V rms, but the reading may be out of specification.

AC current measurement (with clamp, optional)

1. If you want to measure AC current with clamps, you need to use an AC clamp adapter. Connect the negative output lead of the selected clamp to the "COM" connector, connect the positive output lead of the clamp to the "INPUT" connector.
2. Set the function switch to .
3. Clamps of the measured circuit with clamps.
4. Only one cable should be clamped each time and the cable should be in the middle of the clamp jaws.
5. The default accessory of the product is the AC clamp.

NOTE

- The clamp cannot be tested for more than 600 A of current.
- Do not touch the tested perimeter with your hands or skin.
- The problem of gauge matching and clamp sensitivity.
- The sensitivity of the matching clamp is 1A/1mV. If you use the matching clamp, the current indicated value is the same as the measured value.
- If you use a clamp whose sensitivity is not equal to 1mV/1A, you should multiply the actual reading by the coefficient determined by the clamp used, resulting in the measured value. To determine the factor, refer to the instruction manual of the clamp you are using.
- For example, if you use a clamp whose sensitivity is equal to 1mV/10A, plus the LCD displayed digits of ten to get the result of the current read.

Automatic shutdown
If you do not operate the meter for approximately 15 minutes, it will automatically switch off. To switch it back on, just turn the function switch. To cancel the auto-off function, press the "Select" button and turn the function switch at the same time and the "APO" symbol on the display will disappear

Battery test
If the display shows "  ", the battery needs to be replaced. Disconnect the test leads before opening the back cover or battery cover.

1. The battery and fuses should only be replaced after the test leads have been disconnected and the power turned off.
2. Loosen the screws with a suitable screwdriver and remove the bottom of the cabinet.
3. The meter is powered by one 9V battery (IEC 6F22, NEDA 1604, JIS006P). Connect the battery connectors to the terminals of the new battery and insert the battery back into the top of the case. Wrap the battery wires so that they are not pinched between the bottom of the case and the top of the case.

Replacing the fuse
The fuse rarely needs to be replaced and almost always blows due to operator error.

This meter uses two fuses:
Fuse 1: 500mA, 600V, Ø6X30mm
Fuse 2: 10A, 600V, Ø6X30mm.

To replace the fuse, unscrew the screws on the support frame, do not remove the meter from the case, do not remove the back cover, and replace the fuse with a new one with the same ratings. Reinstall the support frame and screw in the screws.

Contents of the package
1x Instructions for use
1x Test leads
1x K-type thermocouple
1x Multifunctional socket

The product has been issued with a CE declaration of conformity in accordance with the applicable regulations.
On request from the manufacturer: info@solight.cz, or downloadable from www.solight.cz/en.

SOLIGHT
Solight Holding, s.r.o., Na Brně 1972, Hradec Králové 500 06, Czech Republic.