

CONDROL

- EN** Infrared thermometer
- DE** Infrarot-Pyrometer
- PL** Pitometr na podczerwień
- RU** Инфракрасный пирометр



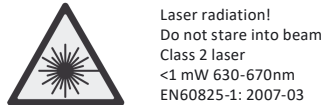
Maxwell 4

- EN** User manual
- DE** Bedienungsanleitung
- PL** Instrukcja obsługi
- RU** Руководство по эксплуатации

EN Infrared thermometer Maxwell 4 User manual

Congratulations on your purchase of infrared thermometer Maxwell4 CONDROL. Safety instructions given in this user manual should be carefully read before you use the product for the first time.

SAFETY REGULATIONS
Attention! This user manual is an essential part of this product. The user manual should be read carefully before you use the product for the first time. If the product is given to someone for temporary use, be sure to enclose user manual to it.
- Do not misuse the product
- Do not remove warning signs and protect them from abrasion, because they contain information about safe operation of the product.



- Do not look into the laser beam or its reflection, with unprotected eye or through an optical instrument. Do not point the laser beam at people or animals without the need. You can dazzle them.
- To protect your eyes close them or look aside.
- Do not let unauthorized people enter the zone of product operation.
- Store the product beyond reach of children and unauthorized people.
- It is prohibited to disassemble or repair the product yourself. Entrust product repair to qualified personnel and use original spare parts only.
- Do not use the product in explosive environment, close to flammable materials.
- Avoid heating the batteries to avoid the risk of explosion and electrolyte leakage. In case of liquid contact with skin, wash it immediately with soap and water. In case of contact with eyes, flush with clean water during 10 minutes and consult the doctor.

APPLICATION
Infrared thermometer Maxwell 4 CONDROL is designed to measure object's surface temperature by non-contact method. It is equipped with temperature and humidity sensors as well as an infrared sensor for object surface temperature measurement, which can detect the «cold bridges» and places where dew point can occur. Pull the trigger once to identify poorly insulated areas in windows or to detect leakage areas in external walls. The function of ultraviolet illumination allows carrying out diagnostics of air conditioning systems.

DELIVERY PACKAGE
Infrared thermometer– 1pc.
Power supply (9V 6F22) - 1 pc.
User manual - 1 pc.

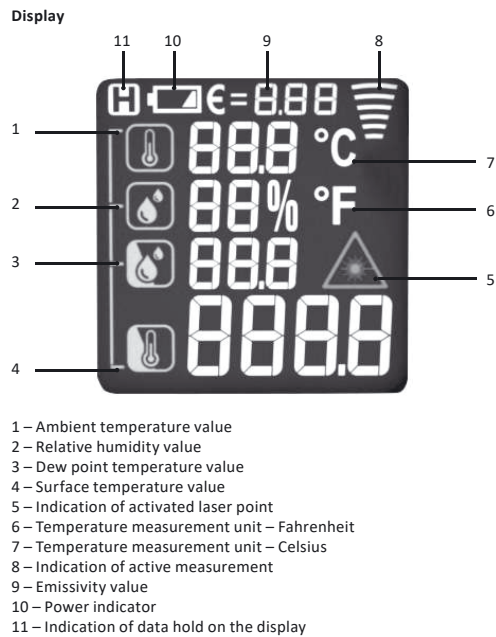
TECHNICAL SPECIFICATIONS

Measuring range of object temperature	-50 °C...800 °C -58 °F...1472 °F	
Accuracy of surface temperature measurement	-50°C...0°C / -58°F...32°F:	±3 °C
	0°C...800°C / 32°F...1472°F:	±2.0% or ±2°C
Measuring range of ambient temperature	-10 °C...60 °C / 14 °F...140 °F	
	-10 °C...0 °C (14 °F...32 °F):	±1.5 °C/3 °F
	0 °C...40°C (32 °F...113 °F):	±1.0 °C/2 °F
	40 °C...60°C (113 °F...140 °F):	±1.5 °C/3 °F
Measuring range of relative humidity	0% ...100%	
	0%...20%:	±5.0%
	20%...80%:	±4.0%
	80%...100%:	±5.0%
Measuring range of dew point	-10°C...50°C / 14°F...122°F	
Accuracy of dew point measurement	±1.5°C / 3°F	
Optical resolution	12:1	
Response time	<0.5 sec	
Automatic shutdown	30 sec	
Spectral sensitivity	8...14 μm	
Emissivity	0.1...1.0 adjustable	
Working temperature	0°C ...40°C	
Storage temperature	-10°C...60°C	
Relative humidity	10...95% for operation < 80% for storage	
Power supply	1 x 9V 6F22	
Laser	Class II, 630-670 nm, <1 mW	
Dimensions	104x164x47 mm	
Weight	155 g	

PRODUCT DESCRIPTION



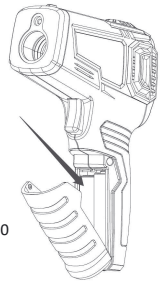
- 1 – LED indicator
- 2 – Display
- 3 – Activate/deactivate the laser point/adjust emissivity (decrease value)
- 4 – Select the operation mode
- 5 – Switch on/off ultraviolet light/ adjust emissivity (increase value)
- 6 – Laser point exit window
- 7 – Ultraviolet light exit window
- 8 – Infrared sensor
- 9 – Trigger
- 10 – Battery cover



- 1 – Ambient temperature value
- 2 – Relative humidity value
- 3 – Dew point temperature value
- 4 – Surface temperature value
- 5 – Indication of activated laser point
- 6 – Temperature measurement unit – Fahrenheit
- 7 – Temperature measurement unit – Celsius
- 8 – Indication of active measurement
- 9 – Emissivity value
- 10 – Power indicator
- 11 – Indication of data hold on the display

INSTALL/REPLACE THE BATTERY

Open the battery cover. Install the battery observing correct polarity. Put the battery cover back and push it until a click is heard. If the symbol of low battery appears on the display, replace the battery.



Switch on/off

Short pull the trigger to switch the device on. The device is ready to work. The device switches off automatically in 30 seconds after the last press on any button.

SETTINGS

1) Laser point

Short press button to activate laser point*. Symbol will appear on the display. Short press button to deactivate laser point. Symbol will disappear from the display. Laser point is only used for aiming and can be switched off when working at short distance to save battery power.
*Laser pointer is on as long as the trigger is pulled.

2) Emissivity

All objects emit thermal energy. The volume of radiated energy depends on the surface temperature and emissivity of the object. The IR-thermometer measures the intensity of radiation and uses it to calculate the temperature of the object. Objects with different surfaces but equal temperature emit different amount of thermal energy. Most of the objects and materials, for example, painted metals, wood, water, leather, fabric have a high emissivity (0.9 and more) and emit more energy than shiny surfaces and unpainted metals with emissivity less than 0.6. Adjustment of emissivity allows the device to take it into account and to minimize the measurement error.

Table 1. Emissivity of materials

Measured surface		radiation
Aluminum	Oxidized	0.2~0.4
	A3003 alloy (oxidized)	0.3
	A3003 alloy (coarse)	0.1~0.3
Brass	Polished	0.3
	Oxidized	0.5
Copper	Oxidized	0.4~0.8
	Electronic terminal board	0.6
Hastelloy		0.3~0.8
Ferro-nickel	Oxidized	0.7~0.95
	Abrasive blasting	0.3~0.6
	Electropolishing	0.15
Iron	Oxidized	0.5~0.9
	Rust	0.5~0.7
Iron (casting)	Oxidized	0.6~0.95
	Unoxidized	0.2
	Fusion cast	0.2~0.3
Iron (casting) passivation		0.9
Lead	Rough	0.4
	Oxidized	0.2~0.6
Molybdenum oxidation		0.2~0.6
Nickel oxidation		0.2~0.5
Platinum black		0.9
Steel	Cold rolling	0.7~0.9
	Grinding steel plate	0.4~0.6
	Polished steel plate	0.1

Zinc	Oxidized	0.1
Asbestos		0.95
Asphalt		0.95
Basalt		0.7
Carbon (unoxidized)		0.8~0.9
Graphite		0.7~0.8
Silicon carbide		0.9
Ceramics		0.95
Clay		0.95
Concrete		0.95
Cloth		0.95
Glass plate		0.85
Gravel		0.95
Plaster		0.8~0.95
Ice		0.98
Limestone		0.98
Paper		0.95
Plastics		0.95
Soil		0.9~0.98
Water		0.93
Timber		0.9~0.95

Press and hold **MODE** for 2 seconds to enter the menu of settings.

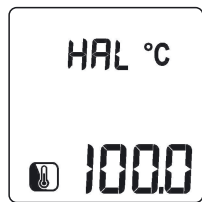
Symbol will appear on the display.

Use buttons and to adjust the emissivity value. To exit the menu of settings pull the trigger or press and hold **MODE** for 2 seconds.

3) Setting of the measuring range

High alarm

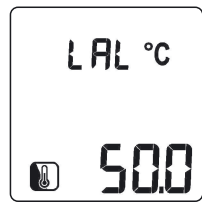
Press and hold **MODE** during 2 seconds to enter the menu of settings. Short press **MODE** 1 time to select the setting of the upper temperature limit. Symbol **HAL** will appear on the display.



Use buttons and to adjust the value of the upper temperature limit. To exit the menu of settings pull the trigger or press and hold **MODE** during 2 seconds.

Low alarm

Press and hold **MODE** during 2 seconds to enter the menu of settings. Press and hold **MODE** 2 times to select the setting of the bottom temperature limit. Symbol **LAL** will appear on the display.



Use buttons and to adjust the value of bottom temperature limit. To exit the menu of settings pull the trigger or press and hold **MODE** during 2 seconds.

4) Measuring unit

Press and hold **MODE** during 2 seconds to enter the menu of settings. Press the button **MODE** 3 times. Symbol **°C** will appear on the display. Use buttons and to select the measuring unit (°C – degrees Celsius / °F – Fahrenheit degree). To exit the menu of settings pull the trigger or press and hold **MODE** during 2 seconds.

OPERATION MODES

1) Dew point mode

Dew point indicates the temperature at which the water vapor contained in the air starts to condense. Dew point depends on relative humidity and ambient temperature. If the surface temperature is below the dew point, then water begins to condense on this surface. The greater the difference between both temperatures and the higher the relative humidity, the stronger the condensation. The condensate water formed on the surface is the main cause of mould formation. In the dew point mode, ambient temperature and relative humidity of the air are measured. Based on these two values, the temperature of the dew point is calculated. In addition, the surface temperature is measured. The dew point is compared with the surface temperature, and the result allows to estimate the probability of mould formation. The dew point is compared with the surface temperature and the result allows to estimate the probability of mould formation. Dew point indicates the temperature at which the water vapor contained in the air starts to condense. Dew point depends on relative humidity and ambient temperature. If the surface temperature is below the dew point, then water begins to condense on this surface. The greater the difference between both temperatures and the higher the relative humidity, the stronger the condensation. The condensate water formed on the surface is the main cause of mould formation. In the dew point mode ambient temperature and relative humidity of the air are measured. Based on these 2 values, the temperature of the dew point is calculated. In addition, the surface temperature is measured. The dew point is compared with the surface temperature, and the result allows to estimate the probability of mould formation. Switch on the device. Aim the device at the object of measurement and pull the trigger. Keep the trigger pulled to enter continuous measurement. Symbol will appear on

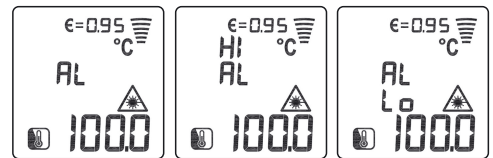
the display. Measurement results will appear on the display in real time mode.

If LED indicator is green during the measurement, there is no risk of mould. If the indicator light is yellow during the measurement, there is a possibility of mould appearance. If the indicator light is red during the measurement, there is a high risk of mould appearance. When the trigger is released, the device keeps the last measured values on the display. The symbol appears on the display.

2) Out of the temperature range

In this mode the device measures surface temperature only. Switch on the device. Press **MODE** 1 time. Aim the device at the object of measurement and pull the trigger. Keep the trigger pulled to enter continuous measurement. Symbol of active measurement will appear on the display. Measurement results will appear on the display in real time mode.

If the surface temperature exceeds the upper temperature limit, a symbol **Hi** will appear on the display. If the surface temperature is below the bottom temperature limit, a symbol **Lo** will appear on the display.

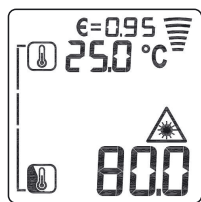


3) Thermal bridge mode

Thermal bridge is a localized area in thermal insulation of buildings where intensive heat transfer from the warmer side to the colder side occurs. Existence of thermal bridges causes increased heat loss. The lower temperature of internal surface in the area of the thermal bridge compared to the surface temperature of undamaged areas causes the risk of condensation and, as a result, mould formation.

Switch on the device. Short press button **MODE** 2 times to select thermal bridge mode. Aim the device at the object of measurement and pull the trigger. Keep the trigger pulled to enter continuous measurement. Symbol of active measurement will appear on the display. Measurement results will appear on the display in real time mode.

If there is no thermal bridge on area of measurement, the LED indicator turns green. If there may be a thermal bridge in the area of measurement, the LED indicator turns yellow. If there is a thermal bridge in the area of measurement, the LED indicator turns red, which is the evidence of poor insulation. When the trigger is released, the device keeps the last measured values on the display. The symbol appears on the display.



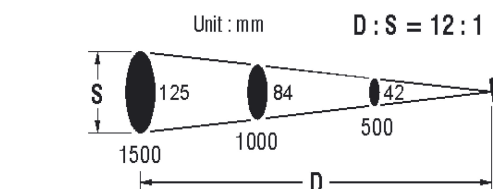
4) Ultraviolet (UV) light mode

IR-thermometer Maxwell 4 has the function of ultraviolet illumination, which allows you to diagnose the air conditioning system of the car for refrigerant leaks. The main advantage of this method is the maximum simplicity of diagnostics. It is based on the use of a paint, which is mixed with freon and pumped into the air conditioning system. Before starting the diagnostics, it is necessary to perform a full refueling of the system. After refueling, the air conditioning system can be used at full capacity. In case of air conditioning system performance deterioration diagnostics should be carried out, it is highly recommended to perform diagnostics in a dark room to obtain the most accurate result.

Start the engine and switch on the air conditioner. Switch on the device. Short press to switch on UV light and examine all components of the air conditioning system. The places where refrigerant leak occurs can easily be seen. They will glow with yellow-green color. As soon as diagnostics is finished, short press to switch off the UV light.

OPTICAL RESOLUTION

As the distance from the device to the object increases, the size of the measured spot on object surface increases as well. To determine the size of the spot (S) you need to divide the distance from the device to the target (D) by 12. Laser points serve as the reference to determine the size and position of measured spot.



CARE AND MAINTENANCE

Attention! The product is an accurate optical mechanic device and requires careful handling. Maintenance of the following recommendations will extend the life of the device:
- Keep the product clean and protected from any bumps, dust and dampness; do not allow getting moisture, dust or other dirt inside of the product.
- Do not expose the product to extreme temperatures.

