






SAFETY INFORMATION


The digital multimeter MAS830B / MAS830L / MAS838 EKF EXPERT complies with IEC 61010-1:2001 in terms of safety requirements, and IEC 61326-2-1:2005 and IEC 61326-2-2:2005 in terms of electromagnetic compatibility. To ensure safe operation of the device, follow the instructions herein.

The safety symbols used herein are listed in Table 1.

Table 1

	Important safety information
	High voltage may be present
	Grounding
	Double insulation
	The fuse can be replaced with a similar one with the parameters specified herein

SAFETY INSTRUCTIONS

- Use sockets, functions and measuring ranges as described herein.
- Do not use the multimeter if its housing is damaged. Pay particular attention to the connection sockets.
- Use original probes from this model of multimeter. Do not use defective probes. Check the insulation of the probes on the regular basis. When measuring, keep your fingers behind the barrier edge of the probes.
- Do not use the multimeter with the back lid open or the housing loosely closed.
- Never exceed the overload capacity value specified for each measuring range.
- Do not touch any unused sockets when the device is connected to the circuit to be tested.
- If you do not know the measured value order before measuring, set the range switch to the maximum value.
- Before changing the position of the range switch, disconnect the probe from the circuit to be measured.
- When measuring in TV sets and static power supplies, be aware that high voltage pulses may be present at the measured points, which can damage the device.
- Disconnect power and discharge high voltage capacitors when measuring electrical resistance, testing circuit continuity and diodes.
- Never measure resistance in a closed circuit.
- Do not use the product in explosive or high-humid environment.
- Replace the battery as soon as the symbol  appears.



- Be careful whenever dealing with voltage over 60V DC or 30V AC. If you fail to observe the manufacturer's operating instructions, the protection of the device may be degraded.

Stop using the device immediately if any malfunctions or faults occur. The device shall be serviced and repaired only by authorized service companies.

For cleaning of the product, use a soft cloth; do not use abrasives or solvents.

1 DESCRIPTION

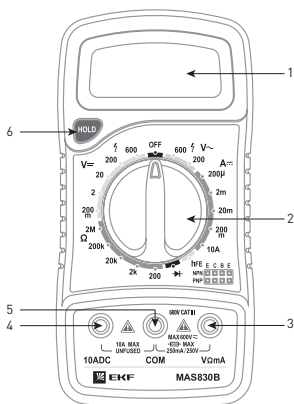
The digital multimeters MAS830B, MAS830L, MAS838 EKF EXPERT are high-quality measuring instruments with a wide range of functions for everyday use (for details refer to Table 2):

- DC voltage measurement DCV (V_{DC})
- AC voltage measurement ACV (V_{AC})
- DC measurement DCA (A_{DC})
- electrical resistance measurement (Ω)
- diode test ($\rightarrow|$)
- transistor test (h_{FE})
- circuit continuity test / buzzer ($\bullet|||$)
- temperature measurement ($^{\circ}\text{C}$)
- data hold (**HOLD**)
- display backlight (**BACKLIGHT**)

Table 2

Model	V_{DC}	V_{AC}	A_{DC}	Ω	$\rightarrow $	h_{FE}	$\bullet $	$^{\circ}\text{C}$	HOLD	BACKLIGHT
MAS830B	+	+	+	+	+	+			+	
MAS830L	+	+	+	+	+	+	+		+	+
MAS838	+	+	+	+	+	+	+	+	+	

2 FRONT PANEL ELEMENTS



1. LCD display 3 1/2 digits, symbol height is 15 mm

Rotary switch to select function/ measuring range and switch on/off the multimeter (**OFF**)

2. Socket «**VΩmA**» to connect the probe of positive polarity (red probe)

3. Socket «**10A**» to connect the probe of positive polarity (red probe)

4. Socket «**COM**» to connect the probe of negative polarity (black probe)

5. Button «**HOLD**»


Figure 1 - Front panel elements, MAS830B

Table 3

Button	Function
HOLD	Current value hold (indicator « HOLD » appears). Press the button again to reset and return to measurement mode
BACKLIGHT	Press the button to backlight the display. The backlight stops after 5 seconds. Press the button again to restart the backlight

3 TECHNICAL DATA

Table 4

Parameter	Value
Maximum display value	1999
Measurement method	Double-integrated ADC
Measuring rate	3 measurements per second
Overload indicator	"1" on LCD display
Low battery indicator	symbol  on LCD display
Polarity indicator	symbol " - " for negative polarity
Safety category	600V CATIII
Housing insulation	double, class II
Degree of protection by IEC 60529	IP20
Operating temperature, °C	from 0 to +40 at at relative humidity of max. 80%
Altitude above sea level, m	max. 2000
Power supply	9 V Battery type 6F22, 1604
Dimensions, mm	69x138x31
Weight, g	170 (with battery)
Service life, years	10

DC VOLTAGE

Table 5

Range	Resolution	Accuracy
200 mV	0,1 mV	± 0,5% ± 3D
2 V	0,001 V	
20 V	0,01 V	
200 V	0,1 V	
600 V	1 V	± 0,8% ± 5D

*D - least significant digit value
 Overload protection: 250 V DC
 or root-mean-square value (RMS)
 for range 200 mV or 600 V DC or (RMS)
 for other ranges.

AC VOLTAGE

Table 6

Range	Resolution	Accuracy
200 V	0,1 V	±1,2% ± 10D
600 V	1 V	

Overload protection: 1000 V DC
 or 750 V AC (RMS).
 Frequency range:
 40 Hz - 1 kHz True RMS.

TEMPERATURE

Table 7

Range	Reso- lution	Accuracy
from -20°C to 0°C	1°C	±10% ± 2D
from 0°C to 400°C		±1,0% ± 3D
from 400°C to 1000°C		±2,0% ± 3D

DIRECT CURRENT

Table 8

Range	Resolution	Accuracy	Model
200 μ A	0,1 μ A	$\pm 1,0\% \pm 3D$	MAS830B, MAS830L
2 mA	0,001 mA		
20 mA	0,01 mA	$\pm 1,0\% \pm 5D$	MAS830B MAS830L MAS838
200 mA	0,1 mA	$\pm 1,5\% \pm 5D$	
10 A	0,01 A	$\pm 3,0\% \pm 10D$	

Overload protection: 250 mA/250 V fuse.
10 A range is not protected against overload.

RESISTANCE

Table 9

Range	Resolution	Accuracy
200 Ohm	0,1 Ohm	$\pm 0,8\% \pm 5D$
2 kOhm	0,001 kOhm	$\pm 0,8\% \pm 2D$
20 kOhm	0,01 kOhm	
200 kOhm	0,1 kOhm	
2 MOhm	0,001 MOhm	$\pm 1,0 \pm 5D$

Maximum open circuit voltage: 3,2 V. Overload protection: 250 V DC or RMS.

4 MEASUREMENTS



Never exceed the overload capacity value given for each measuring range.

DC AND AC VOLTAGE MEASUREMENT ($V_{\Omega A}$ and V_{\sim})

1. Connect the red probe to the « $V_{\Omega A}$ » socket and the black probe to the «COM» socket. The polarity of the red probe is considered positive.
2. Use the rotary switch to select the desired DCV ($V_{\Omega A}$) or ACV (V_{\sim}) voltage measuring range. If you do not know the measured value before measuring, set the range switch to the maximum voltage position and switch to lower values to achieve the required measurement accuracy.
3. Connect the probes to the circuit under test.
4. Read the value and polarity of the tested voltage on the display.
5. If the display shows only "1" in the left digit, overload has occurred. Set the range switch to a higher value.
6. When the work is finished, put the rotary switch to the «OFF» position.

DIRECT CURRENT MEASUREMENT (A $\overline{\cdot}$)

1. Connect the red probe to the «**V Ω mA**» socket and the black probe to the «**COM**» socket. The polarity of the red probe is considered positive. (For current measurements from 200 mA to 10 A, move the red probe to the «**10ADC**» socket).
2. Use the rotary switch to select the desired DCA current measurement range (A $\overline{\cdot}$). If you do not know the measured value before measuring, set the range switch to the «**200 mA**» position and switch to lower values to achieve the required measurement accuracy.
3. Open the circuit to be measured and connect the probes in series with the load to be measured.
4. Read the current value and polarity on the display.
5. If the display only shows "1" on the left digit, overload has occurred. Set the range switch to a higher value.
6. When the work is finished, put the rotary switch to the «**OFF**» position.

RESISTANCE MEASUREMENT (Ω)

1. Connect the red probe to the «**V Ω mA**» socket and the black probe to the «**COM**» socket. The polarity of the red probe is considered positive.
2. Use the rotary switch to select the required resistance measuring range (Ω).
3. Connect the probes to the resistance to be measured and read the values on the display.
4. If the measured resistance value exceeds the maximum value of the selected measurement range, the number "1" will appear in the left digit, overload has occurred. Set the range switch to a higher value.
5. When the work is finished, put the rotary switch to the «**OFF**» position.



If the resistance to be measured is set in the circuit, switch off the power supply and discharge all capacitances in the circuit before carrying out the measurements.

DIODE TEST ($\rightarrow|$)

1. Connect the red probe to the «**V Ω mA**» socket and the black probe to the «**COM**» socket. The polarity of the red probe is considered positive.
2. Set the rotary switch to « $\rightarrow|$ » position.
3. Connect the red probe to the anode and the black probe to the cathode of the diode to be tested. The display will show the approximate voltage drop in the diode when direct current is flowing through it. When the probes are reverse connected to the diode, the display will show "1".
4. When the work is completed, put the rotary switch to the «**OFF**» position.

CIRCUIT CONTINUITY TEST / BUZZER ($\bullet||$) for models MAS838, MAS830L

1. Connect the red probe to the «**V Ω mA**» socket and the black probe to the «**COM**» socket.
2. Put the rotary switch to « $\bullet||$ » position.
3. Connect the probes to two points of the circuit to be tested. If there is electrical contact between the points (less than 70 ± 30 Ohm resistance), the buzzer sounds.
4. When the work is completed, put the rotary switch to the «**OFF**» position.

TRANSISTOR TEST (hFE)

1. Put the rotary switch to the «hFE» position.
2. Determine whether the transistor is NPN or PNP and identify the emitter terminals, bases and collector. Insert the transistor into the corresponding holes on the front panel connector: "E" – emitter, "B" – base, "C" – collector of the transistor.
3. Read the hFE value on the display at the base current of 10 μ A and collector-emitter voltage Vce of 3 V.
4. When the work is completed, put the rotary switch to the «OFF» position.



Remove the probes from the multimeter sockets before testing the transistor.

TEMPERATURE MEASUREMENT (°C) for model MAS838

1. Set the rotary switch to °C. The ambient temperature is shown on the display.
2. Connect the thermocouple, type "K" to the appropriate sockets (connect the red thermocouple wire to the «V Ω mA» socket and the black thermocouple wire to the «COM» socket) on the front panel and attach the thermocouple to the object to be tested.
3. Read the temperature on the display.
4. When the work is completed, put the rotary switch to the «OFF» position.




Before carrying out any other actions, remove the thermocouple, type "K" from the sockets to avoid electric shock.



Maximum operating temperature, thermocouple type "K" is 250 °C (300 °C in short-time operating mode).

BATTERY AND FUSE REPLACEMENT

If the symbol  is displayed, the battery needs to be replaced. The fuse rarely needs to be replaced and frequently blows due to user's error. To replace the battery and fuse (250 mA/250 V), unscrew 2 screws on the back lid. Remove the failed element and replace it with a new one. Observe polarity of the battery. Close the housing and tighten the screws.



Before replacing the battery, ensure that the probes and thermocouple are disconnected from the devices to be tested and the rotary switch is in the «OFF» position.

5 SCOPE OF DELIVERY

1. Multimeter – 1 pc.
2. Set of probes (red/black) – 1 pc.
3. Battery 9 V – 1 pc.
4. Thermocouple, type "K" – 1 pc. (only for MAS838).
5. Technical and operation manual – 1 pc.

6 TRANSPORTATION AND STORAGE

The product shall be transported in compliance with the transportation regulations applicable to each means of transport. The product shall be protected against mechanical impact during storage and transportation. The product shall be stored in heated and ventilated space at the ambient temperature from -25 to +35 °C and relative humidity of max. 70%. Do not expose to direct sunlight and precipitations. Do not store near acid and alkali.

7 DISPOSAL



Life-expired and failed products shall be disposed of in compliance with the national and local laws and regulations in force. To dispose of the product, send it to an authorized company for recycling in compliance with the national and local laws and regulations in force.

8 MANUFACTURER'S WARRANTY

The manufacturer guarantees the products comply with the declared characteristics, provided that the consumer follows the operation, transportation and storage conditions.

Service life: 10 years.

Shelf life: 10 years from the date of manufacture.

Warranty period: 12 months from the date of sale.

Manufacturer: For information, refer to the product package.

Importer and EKF trademark service representative: EKF ELECTRICAL SOLUTION – FZCO, Dubai Silicon Oasis, DDP, Building A2, Dubai, United Arab Emirates.

Importer and EKF trademark service representative on the territory of the Russian Federation: OOO «Electroresheniya», Otradnaya st., 2b bld. 9, 5th floor, 127273, Moscow, Russia. Tel.: +7 (495) 788-88-15.

Importer and EKF trademark service representative on the territory of the Republic of Kazakhstan: TOO «Energoresheniya Kazakhstan», Kazakhstan, Almaty, Bostandyk district, Turgut Ozal st., 247, apt 4.

9 CERTIFICATE OF ACCEPTANCE

The digital multimeter MAS830B/MAS830L/ MAS838 EKF EXPERT has been manufactured in compliance with laws and regulations in force and has been approved for operation.

Quality control stamp

Date of manufacture



10 NOTE OF SALE

Date of sale

Seller's signature

Seller's seal



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