



EKF



TECHNICAL MANUAL

Digital clamp meter

MS2016S EKF EXPERT

SAFETY INFORMATION

The digital clamp meter MS2016S 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 by a similar one with the parameters specified herein

SAFETY INSTRUCTIONS:

- Use sockets, functions and measuring ranges as described herein.
- Do not use the device if its housing is damaged. Pay particular attention to the connection sockets.
- Use original probes from this model of device. 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 device 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 measured circuit.
- 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.
- Do not place more than one wire in the clamp meter.
- Replace the battery as soon as the symbol  appears.
- Be careful whenever dealing with voltage over 60 V DC or 30 V 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 clamp meter MS2016S EKF EXPERT is a high-quality measuring instrument with a wide range of functions for everyday use:

- DC voltage measurement DCV ($\overline{V}$);
- AC voltage measurement ACV ($\tilde{V}$);
- AC measurement (no break in circuit) ACA ($\tilde{A}$);
- electrical resistance measurement (Ω);
- frequency measurement (Hz);
- circuit continuity test / buzzer ($\cdot\cdot\cdot$));
- data hold «HOLD» ($\square/\ast$) (H). To hold the measurement result, press the button and the current values will be held on the display. Press the button again to reset the recorded value.
- non-contact voltage detection NCV;
- display backlight ($\square/\ast$) (star). Press and hold the button for over 2 seconds to activate the backlight. The backlight will be automatically turned off after 1 minute. Press the button again for over 2 seconds to reactivate the backlight.
- auto range selection (AUTO);
- auto power off (Apo).



To save battery power, the device will power off automatically after 10 minutes of non-operation. Two minutes before the auto power off, the buzzer will sound at one minute intervals (🔊 symbol on the screen). To repower on the device, press any button.

Press the «Hz/NCV» button when powering on the device to disable the auto power off function.

2 FRONT PANEL ELEMENTS

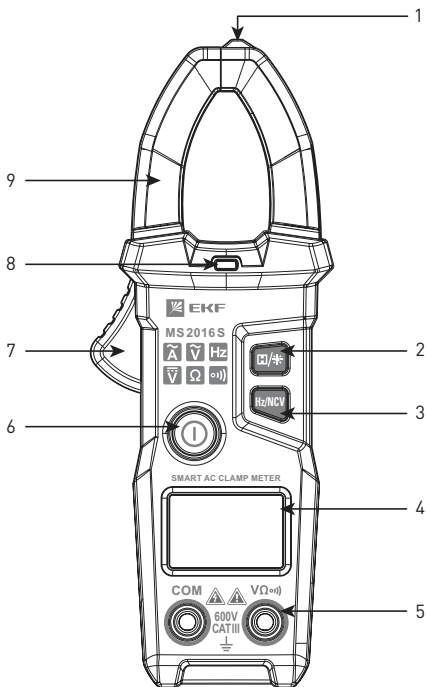


Fig. 1 - front panel elements

- | | |
|--|---|
| 1. Non-contact voltage tester | 6. «ON/OFF» button to power on/off the device |
| 2. «HOLD/» button for data hold / backlight | 7. Clamp opening trigger |
| 3. «Hz/NCV» button for frequency measurement / non-contact voltage detection | 8. NCV LED |
| 4. LCD-display | 9. Transformer clamp meter for non-contact measurement of alternating current that flows through a conductor. |
| 5. «VΩ» socket to connect the probe of positive polarity (red probe) | |
| «COM» socket to connect the probe of negative polarity (black probe) | |

3 TECHNICAL DATA

Table 2

Parameter	Value
Maximum display value	6000 with automatic polarity detection
Measurement method	Double-integrated ADC
Measuring rate	3 measurements per second
Overload indicator	«OL» or «-OL» on LCD-display
Low battery indicator	Symbol  on LCD display
Polarity indicator	symbol « - » for negative polarity
Safety category	600 V CATIII
Housing insulation	double, class II
Degree of protection by IEC 60529	IP20
Operating temperature, °C	from 0 to +40 at relative humidity max. 80%
Altitude above sea level, m	max. 2000
Power supply	2x1.5 V batteries AAA
Dimensions, mm	53x158x28
Weight, g	150 (with battery)
Service life, years	10

DC VOLTAGE

Range	Resolution	Accuracy
600 B	0,1 B	± 0,5% ± 3D

Minimum input voltage: 0,5 V DC
Maximum input voltage: 600 V DC

AC VOLTAGE

Range	Resolution	Accuracy
600 B	0,1 B	± 0,8% ± 5D

Minimum input voltage: 1,0V AC
Maximum input voltage: 600V AC
Frequency range: 45 Hz – 65 Hz

ALTERNATING CURRENT

Range	Resolution	Accuracy
6 A	0,001 A	$\pm 2,5\% \pm 8D$
60 A	0,01 A	
200 A	0,1 A	

Minimum input current: 0,01 A AC

Maximum input current: 200 A AC

Frequency range: 45 Hz – 65 Hz

FREQUENCY

Range	Resolution	Accuracy
60 Hz	0,1 Hz	$\pm 1,0\% \pm 5D$
1000 Hz	1 Hz	

Frequency range: 40 Hz – 1000 Hz

Range for input signal $\geq 0,2$ A AC

RESISTANCE

Range	Resolution	Accuracy
6 kOhm	0,001 kOhm	$\pm 0,8\% \pm 3D$

Overload protection: 600 V DC or AC

4 MEASUREMENTS



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

PREPARATION FOR MEASUREMENT

Press and hold the power button for 2 seconds to power on the device. Press the button again to power off the device.

DC VOLTAGE MEASUREMENT ($\bar{V}$)

When the measuring probes are connected to the tested voltage source and the voltage is at least 0,5 V, the display will show the measured DC voltage value. If the voltage is less than 0,5 V, the device operates in the resistance measurement mode and displays the resistance value (Ω) of the tested circuit.

AC VOLTAGE MEASUREMENT ($\tilde{V}$)

When the measuring probes are connected to the tested voltage source and the voltage is at least 1,0 V, the display will show the AC voltage measurement value. If you press the button «Hz/NCV», the display will show the frequency value (Hz) of the measured current. If the voltage is less than 1,0 V, the device operates in the resistance measurement mode and displays the resistance value (Ω) of the tested circuit.

ALTERNATING CURRENT (A) / FREQUENCY (Hz) MEASUREMENT

1. Press the clamp opening trigger, and place the target between clamps.
2. If the measured current is 0,01 A or more, the display shows the measured current value. Press the button «Hz/NCV» to display the frequency value (Hz) of the measured current.



Note: The device can measure frequency only if the current exceeds 0,2 A.

Only one wire can be measured at once.

RESISTANCE MEASUREMENT (Ω) / CIRCUIT CONTINUITY TEST (BUZZER) (•••••)

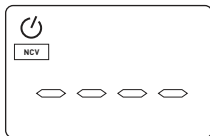
Connect the measuring wires to the resistance to be measured. If the measured resistance exceeds 6 k Ω , the display will show the symbols « - - - - ». If the measured resistance is less than 50 Ohm, the buzzer will sound, and indicator will light up.

If the resistance to be measured is set in the circuit, turn off the power and discharge all capacitance of the circuit before performing the measurements.

NON-CONTACT VOLTAGE DETECTION

- 1) Press and hold the «Hz/NCV» button for two seconds to activate the non-contact voltage detection function.

The following image appears on the display:



- 2) Press the «Hz/NCV» button and move the non-contact voltage tester to the conductor to be tested. If the AC voltage exceeds 90 V, the device will detect the presence of voltage. The backlight will flash and the buzzer will sound.



Even if voltage is not detected, it may be present. Do not rely solely on a non-contact voltage tester to check the voltage in a conductor. The measurement result can be distorted by socket design, insulation type, and other external factors.



In non-contact voltage detection mode, you cannot measure voltage, resistance and current.

BATTERY REPLACEMENT

If the symbol  appears on the display, the battery needs to be replaced. To replace the battery, unscrew the screws on the rear side of the device. Remove the failed element and replace it with a new one. Close the housing and tighten the screws.

Before replacing the battery, make sure that the measuring probes are disconnected and the device is in the off position.

5 SCOPE OF DELIVERY

1. Clamp meter – 1 pc.;
2. Set of probes (red/black)- 1pc.;
3. Battery 1.5 V – 2 pcs.;
4. Case – 1 pc.;
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 clamp meter MS2016S 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: For information, refer to the product package.



10 NOTE OF SALE

Date of sale

Seller's signature

Seller's seal



www.ekfgroup.com