



AEL.KM.501

**SINGLE-PHASE ACTIVE
ELECTRONIC ELECTRICITY METER
INTRODUCTION AND USER MANUAL**

CE 1783

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0. INTRODUCTION

This manual describes the technical data of the electronic electricity meters produced with advanced technology in compliance with the Technical Specification for Electronic Electricity Meters (TEDAŞ-MLZ/2017-062.B) issued by the Strategy Development Department of Türkiye Elektrik Dağıtım A.Ş. (TEDAŞ) and with Measuring Instruments Directive 2014/32/EU (MID) published by the EU under the new approach legislation. These meters measure active electrical energy and maximum demand, show these data on the LCD display, store the required data and programs in memory and allow them to be accessed on request.

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CAUTION!

READ THIS USER MANUAL CAREFULLY BEFORE INSTALLING THE METER.

- ✓ The meter must be installed only by **qualified expert personnel**.
 - ✓ During installation, **live parts must never be touched**.
 - ✓ During installation and removal of the meter, **the power must always be switched off**.
 - ✓ KÖHLER Electronic Meters are a high-technology product. All technical data and documents are company property and may not be copied, used or shared by third parties.
 - ✓ This booklet provides summary information about the meter.
 - ✓ Expert personnel must check that the meter type to be used suits the network and the installation. Otherwise the wrong meter selection or connection may damage your meter.
- Meters in this condition are not covered by the warranty.**

- ✓ The information shown on the meter display is determined by TEDAŞ.
- ✓ Meter parameter settings and maintenance cannot be carried out by the user. Meter parameter settings and maintenance are performed only by authorised TEDAŞ personnel.

1. METER TECHNICAL SPECIFICATIONS

Model name	AEL.KM.500 AEL.KM.501
Meter Description	Single-phase, 2-wire, 4-tariff, demand-metering, outdoor, Active Electronic Electricity Meter
Accuracy Class (TS EN 50470-3)	Class C or Class B
Connection Type	Current and Voltage: Direct
Reference Voltage (U_n)	230 V
Operating Voltage Range	90 V – 265 V
Reference Frequency (F_n)	50 Hz $\pm$ 5%
Starting Current (I_{st})	0.02 A (0.04.Itr)
Minimum Current (I_{min})	0.15 A
Transitional Current (I_{tr})	0.5 A
Reference Current (I_n)	5 A
Maximum Current (I_{max})	100 A
IP Class	IP54 (Outdoor)
Protection Class	II
Relative Humidity	95%
Operating Temperature	-40 °C, +70 °C (3K7)
Mechanical Environment Class	M1 (according to Directive 2014/32/EU)
Electromagnetic Environment Class	E2 (according to Directive 2014/32/EU)
Operating Environment	Non-condensing humidity
Voltage Circuit Consumption	$\leq$ 1W
Current Circuit Consumption	$\leq$ 1VA
ESD Voltage Withstand	Contact: 8 kV; Air: 15 kV
Impulse Voltage Withstand	6 kV
Meter Constant	1600 imp/kWh
LCD Display	6+3 Digits
Optical Port	Yes (IEC 62056-21)
RS485	Yes (Optional)
Communication Speed	300 - 19,200 Baud
System Battery Life	$\geq$ 10 years
Real-Time Clock Battery Life	$\geq$ 10 years
Meter Shelf Life	$\geq$ 4 years
Clock Accuracy	0.5 s/day (at room temperature) (TS EN 62054-21)
Data Storage Capacity	1 Year
Relevant Standards	TS EN 50470-1, TS EN 50470-3, TS EN 62052-11, TS EN 62053-21

Meter Error Limit under Reference Conditions (Active)

Current Range	Power Factor	Error Limit (%)	
		Class B	Class C
$I_{min} \leq I < I_{tr}$	1	± 1.5	± 1

$I_{tr} \leq I \leq I_{max}$	0.5 ind....1.....cap 0.8	± 1	± 0.5
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2. MAIN FUNCTIONS

2.1. Measurement: The meter measures total active energy and demand across 4 tariffs.

2.2. Programming the Meter: Time zones and tariffs can be programmed. Eight time zones can be defined per day and each can be mapped to one of the 4 tariffs. Separate tariffs can also be set for weekdays, Saturdays and Sundays. Once the terminal cover has been opened, the date, time and tariff data can be changed only by authorised TEDAŞ personnel.

2.3. Reading the Meter: 12 months of billing data, total energy consumed, terminal cover opening data, 12 months of demand data and the main cover first opening date can be read from the meter via the optical port or the RS485 output.

2.4. Self-Diagnostics Feature: The meter constantly checks its internal circuits and shows fault types on the display. Fault indications are explained under "LCD DISPLAY INFORMATION".

2.5. Terminal Cover and Main Cover Open/Close Recording Feature: The device records the date each time the main or terminal cover is opened. It stores the last 10 openings of the main cover and the last 24 of the terminal cover, with the date and the number of openings of each.

2.6. Signal Output: LEDs on the meter indicate the active energy consumed. The number of flashes gives the meter's Imp/kWh values.

1,600 Imp/kWh: 1,600 flashes = 1kWh

2.7. Operating the Display During a Power Cut: When the power is cut, the required data can be called up on the LCD with the meter call button and read from the optical port.

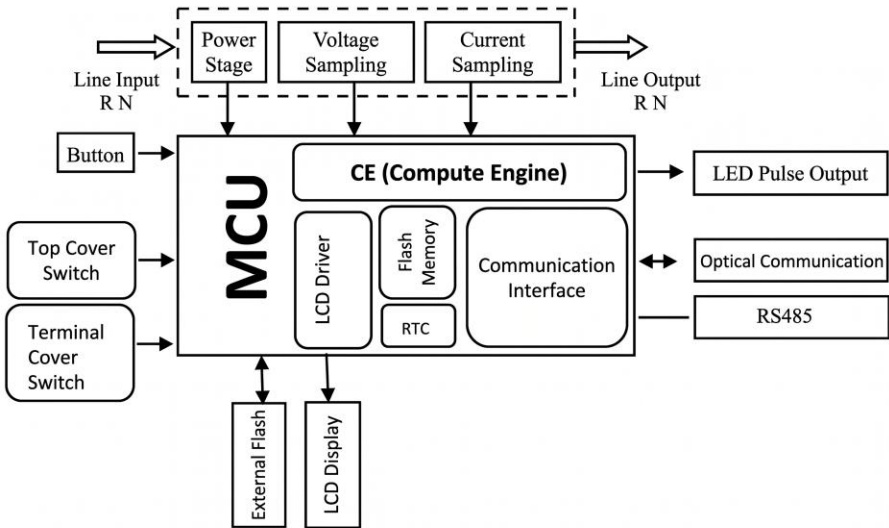
2.8. Communication: Data read through the optical port with an optical reader is transferred to a portable computer (handheld unit). The optional RS485 output also allows remote access to the meter data. The meter can use the optical port and RS485 output at the same time. No reading is possible from RS485 without power.

3. METER STRUCTURE AND OPERATING PRINCIPLE

3.1. Meter Structure

The meter body and covers are fully sealed to the IP54 Outdoor standard and made of high-grade flame-retardant plastic. All electronic components are mounted on a PCB fitted into the meter body. After factory calibration the main cover is screwed down and secured with the main cover seal. The terminal cover is sealed by authorised TEDAŞ personnel after the meter is installed.

3.2. Meter Block Diagram



4. OPERATING THE METER

Once the meter is installed and energised, it operates normally and the LCD display is activated.

4.1. Checking the Functions

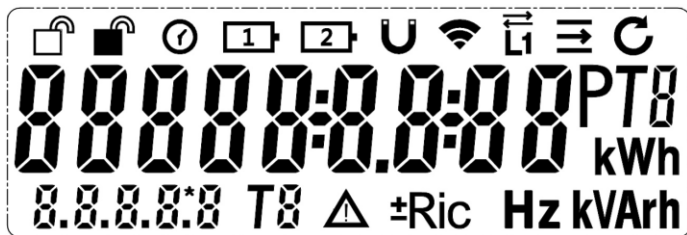
When the meter is installed the electrical connections must be checked for correctness. Once the meter is securely mounted, the terminal cover must be closed properly and its screw fully tightened. A flashing second lock symbol on the LCD shows that the terminal cover is not closed properly or its screw is not fully tightened. This symbol disappears after the first successful reading, confirming that the cover is correctly secured. Each time the terminal cover is opened the terminal cover indicator on the LCD starts flashing to report that the cover has been accessed. If the indicator is still active after the cover has been closed, the related event records must be read via the optical port or RS485 to clear it.

4.2. Operation of the LCD Display

When the meter starts up, automatic menu mode is activated. Each menu of the mode stays on the display for 5 seconds and then moves automatically to the next information menu. When the button on the meter is pressed, button menu mode is activated. If no key is pressed for 30 seconds, the meter returns to automatic menu mode.

Holding the meter call button for 5 seconds activates the sub-menus. This menu generally contains data from previous months. Press the call button for 5 seconds again to return to the button menu.

5. LCD DISPLAY INFORMATION



The symbols and information on the LCD display are defined as follows:



Main Cover Open (lock no. 1)

This symbol shows that the main cover is open. If it is flashing, the cover has been opened before.



Terminal Cover Open (lock no. 2)

When this symbol flashes, the terminal cover is currently open. If it is shown steadily while the cover is closed, the terminal cover has been opened before. The symbol is cleared once the meter has been read via the optical port or the RS485 interface.



Clock Error: This symbol appears if the clock is not working normally.



System Battery: This symbol appears if the system battery voltage is low.



Clock Battery: This symbol appears if the clock battery voltage is low.



Indicates whether phase L1 is present. The arrows above the phase icons indicate the direction of energy flow.



Magnetic field warning icon.



Indicates the current tariff. For example, if the current date/time falls within tariff T2, T2 is shown on the display. In the event of any fault in the meter clock, T1 is always active.



Used to indicate different warnings.



Lights up to show data transfer while the meter is being read via the optical port or RS485. The indicator disappears when the reading ends.



Reset detection icon. If the meter is reset more than once in the same month, or once in each of two consecutive months, the reset warning flashes on the display.

5.1 Display List Example

Date Menu	20 190 10 7 0.9.2 T1
Time Menu	10:03:16 0.9.1 T1
Total Active Energy	0 14538.968 T 1.8.0 T1 kWh
Active Energy in Tariff T1	005532.757 T1 1.8.1 T1 kWh
Active Energy in Tariff T2	0045 19.563 T2 1.8.2 T1 kWh
Active Energy in Tariff T3	004486.638 T3 1.8.3 T1 kWh
Active Energy in Tariff T4	000000.000 T4 1.8.4 T1 kWh
Maximum Demand within the Month	008.357 P 1.6.0 T1 kW
Demand Date	20 190 10 2 P 1.6.0 T1

Instantaneous Current	005.223 31.0 T1 A
Grid Frequency (Sub-Menu)	50.0 14.0 T1 Hz
Phase Angle (Sub-Menu)	0.99 33.0 T1
Program Version (Sub-Menu)	v12.345 0.2.0 T1
Software Check Number (Sub-Menu)	12345678 0.2.1 T1

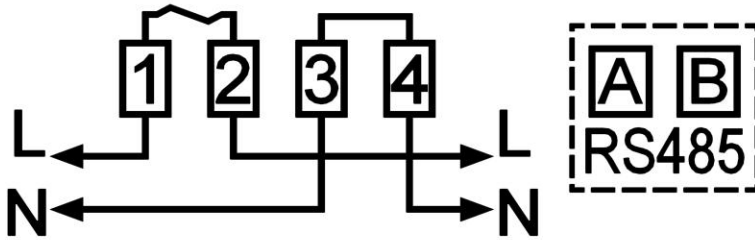
6. LOAD PROFILE

The meter can record a load profile for the past 180 days at 15-minute intervals. The recorded information is as follows.

- Year-month-day-hour-minute
- Event records
- Imported Active Energy, Exported Active Energy (for each tariff)
- RMS Voltage
- RMS Current
- Cosφ
- Frequency

Energy Records of the Meter	Uni-directional	Bi-directional
Imported Active Energy (+T)	1.8.0	1.8.0
Exported Active Energy (-T)	1.8.0	2.8.0

7. CONNECTION DIAGRAM



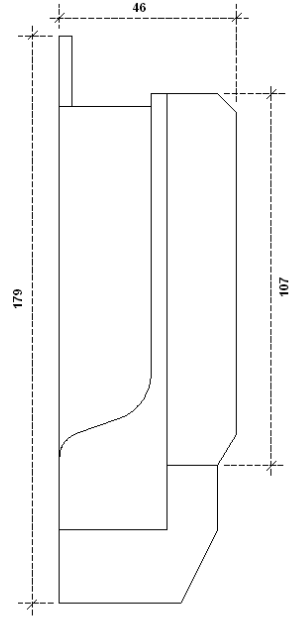
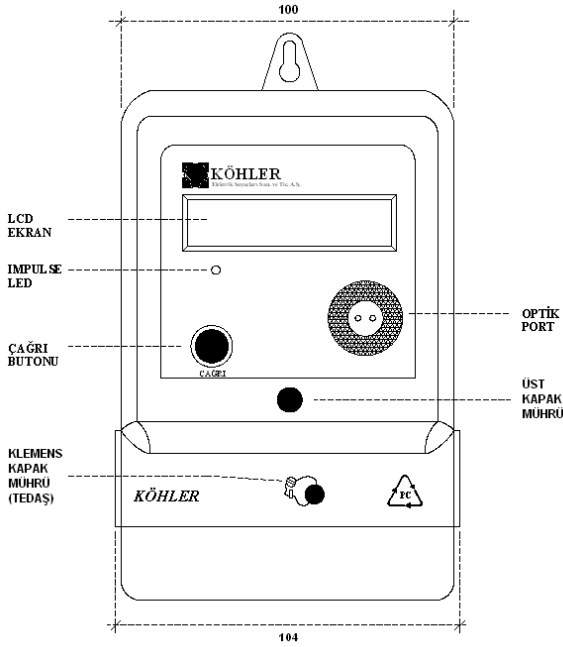
CAUTION: (A) and (B) to the right of the terminal block are the RS485 outputs. Never apply power to them!

CAUTION: The current terminals of these meters are 6.3 mm in diameter. Use at least 25 mm² copper cable on a 100A line.

The RS485 outputs of the meter allow it to be read in parallel. Up to 32 meters can be connected in parallel to an RS485 converter attached to a computer and read. Parallel connection is made by joining the A terminals together and the B terminals together.

The serial numbers of the meters are used to reach more than one meter on the RS485 output. The structure `/?XXXXXXXXX! (CR) (LF)` is used for the query. XXXXXXXXXX is the nine-digit meter serial number.

8. INSTALLATION DIMENSIONS AND SEALING PLAN



9. EU DECLARATION OF CONFORMITY

DECLARATION OF CONFORMITY



KÖHLER
ELEKTRİK SAYAÇLARI SAN.VE TİC. A.Ş.

EU DECLARATION OF CONFORMITY (AB UYGUNLUK BEYANI)

- Manufacturer (Üretici)** : **KÖHLER ELEKTRİK SAYAÇLARI SAN. VE TİC. A.Ş.**
Akçaburgaz Mahallesi 3055.Sokak No:3
Esenyurt – İstanbul / TÜRKİYE
- Product Description (Ürün Tanımı)** : Single-Phase, Two-Wire, Four-Tariff, Demand-Measuring, Outdoor, Active Electronic Energy Meter
Bir Fazlı, İki Telli, 4 Tarifeli, Demantmetreli, Bina Dışı, Aktif Elektronik Elektrik Sayacı
- Model Name (Model Adı)** : AEL.KM.500 / AEL.KM.501 / AEL.KM.500-1 / AEL.KM.501-1 / AEL.KM.560 / AEL.KM.580
- Applicable Directives (Uygulanan Yönetmelikler)** : Measuring Instruments Directive (2014/32/EU)
Ölçü Aletleri Yönetmeliği (2014/32/AB)
Electromagnetic Compatibility Directive (2014/30/EU)
Elektromanyetik Uyumluluk Yönetmeliği (2014/30/AB)
- Applicable Standards (Uygulanan Standartlar)** : EN 50470-1 (TS EN 50470-1)
EN 50470-3 (TS EN 50470-3)
EN 62052-11 (TS EN 62052-11)
EN 62053-21 (TS EN 62053-21)
- EU Approval Number (AB Onay No)** : 1783-MID-0216
- Conformity Assessment Body For Module D (Modül D uygunluk değerlendirme kuruluşu)** : Türk Standartları Enstitüsü
(NoBo ID No: 1783)

We declare that the product stated above complies with the requirements of the standards and directives stated above.

(Yukarıda adı geçen ürünün yukarıda belirtilen yönetmelik ve standart hükümlerinin gereksinimlerini karşıladığını beyan ederiz).

CE 1783



İstanbul/TÜRKİYE
August 10, 2026
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Declaration No: KHL/2026-08

KÖHLER ELEKTRİK SAYAÇLARI SAN. VE TİC. A.Ş.
ADDRESSES AND TELEPHONE NUMBERS

FACTORY / HEAD OFFICE:

Akçaburgaz Mah. 3055. Sok. No:3
Esenyurt – İSTANBUL / TÜRKİYE

Tel: +90 212 886 26 39 (Pbx)

Fax: +90 212 886 86 94

www.kohlersayac.com.tr

e-mail: kohler@kohlersayac.com.tr

KARAKÖY BRANCH:

Bereketzade Mah. Şair Ziya Paşa Cad.

Küçük Yeni Han No:21A

Beyoğlu – İSTANBUL / TÜRKİYE

Tel: +90 212 243 05 40

Toll-Free Helpline

+90 800 211 00 64



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ELEKTRİK SAYAÇLARI SAN.ve TİC. A.Ş.