



KÖHLER

ELEKTRİK SAYAÇLARI SAN.ve TİC. A.Ş.

AEL.KM.401

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

C €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. TECHNICAL SPECIFICATIONS OF THE METER

Model Name	AEL.KM.401
Meter Description	Single-Phase, Two-Wire, Four-Tariff, Demand-Measuring, 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	In non-condensing humidity
Voltage Circuit Power Consumption	$\leq 1W$
Current Circuit Power 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	No
Communication Speed	300 - 19,200 Baud
System Battery Life	≥ 10 years
Real-Time Clock Battery Life	≥ 10 years
Meter Shelf Life	≥ 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

Meter Measurement 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

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.

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: There are LEDs on the meter that indicate the active energy consumed. The number of flashes of these LEDs indicates the Imp/kWh values of the meter.

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.

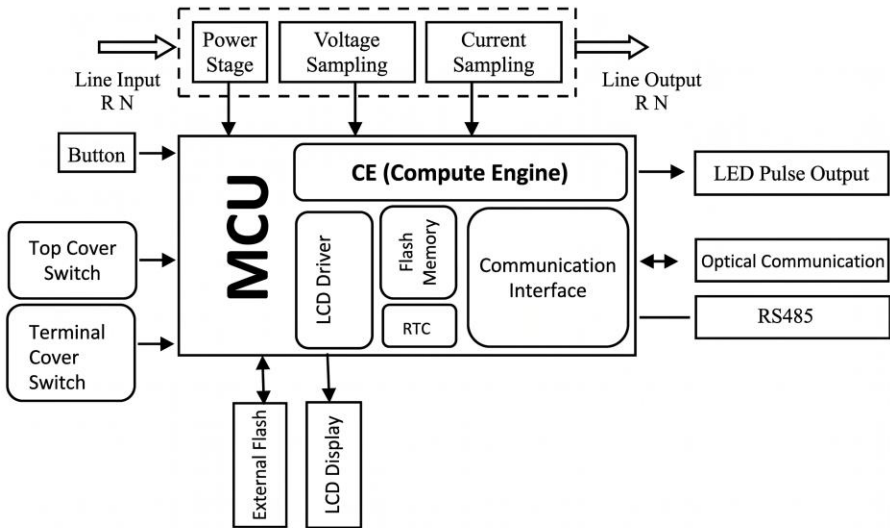
2.8. Communication: Data read through the optical port on the meter with an optical reader is transferred to a portable computer (handheld unit).

3. STRUCTURE AND OPERATING PRINCIPLE OF THE METER

3.1. Structure of the Meter

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

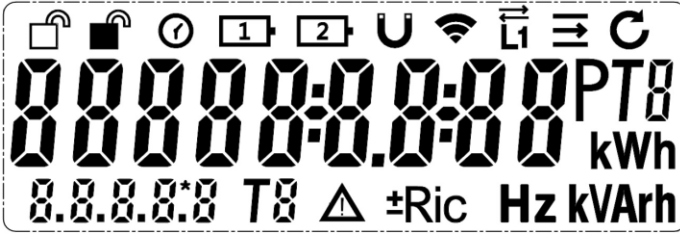
When the meter is installed the electrical connections must be checked for correctness. Once the meter is securely mounted, the terminal cover must be closed properly and its screw fully tightened. A flashing second lock symbol on the LCD shows that the terminal cover is not closed properly or its screw 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 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.



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 in tariff T2, T2 is shown on the display. If the meter clock is faulty, 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. 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)

5.1 Display List Example

Date	20 190 107 0.9.2 T1
Time	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	20 190 102 P 1.6.0 T1
Demand Time	0 7:02 P 1.6.0 T1

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Grid Frequency (Sub-Menu)	
Phase Angle (Sub-Menu)	
Program Version (Sub-Menu)	
Software Check Number (Sub-Menu)	

6. LOAD PROFILE

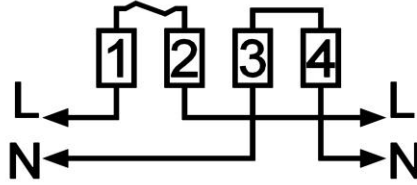
The meter can record a load profile for the past 180 days at 15-minute intervals. The recorded information is as follows.

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

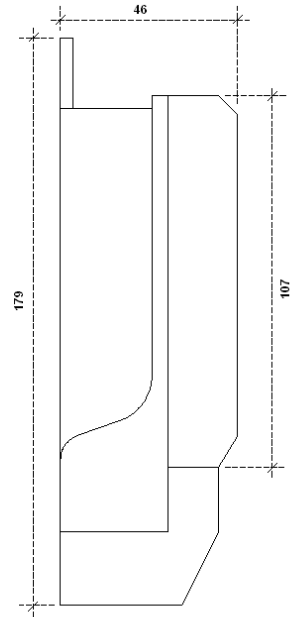
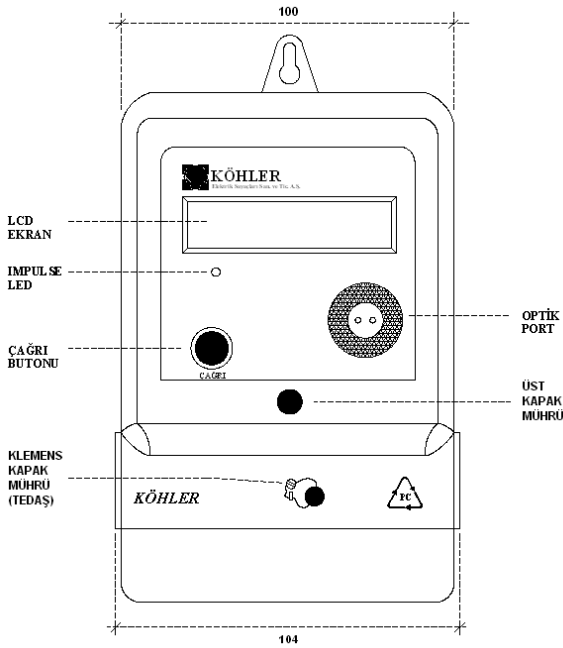
Energy Records of the Meter	Uni-directional	Bi-directional
Imported Active Energy (+T)	1.8.0	1.8.0
Exported Active Energy (-T)	1.8.0	2.8.0

7. CONNECTION DIAGRAM

The phase and neutral terminals of AEL.KM.401 single-phase meters are 6.3 mm in diameter. If this meter is connected to a 100 Ampere line, the copper conductor cross-section of the cable must be at least 25 mm².



8. INSTALLATION DIMENSIONS AND SEALING PLAN



9. EU DECLARATION OF CONFORMITY

DECLARATION OF CONFORMITY



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)** : 1 Phase 2 Wire, 4 Tariff, Demand Measuring, Outdoor, Active Electronic Electric Meter
1 Fazlı, 2 Telli, 4 Tarifeli, Demantmetreli, Bina Dışı, Aktif Elektrik Sayacı
- Model Name (Model Adı)** : AEL.KM.400 / AEL.KM.401 / AEL.KM.480
AEL.KM.400-1 / AEL.KM.401-1
- 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)
EN 62053-23 (TS EN 62053-23)
- EU Approval Number (AB Onay No)** : 1783-MID-0160
TSE
- 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
(10 Ağustos 2026)

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.