



KÖHLER

ELEKTRİK SAYAÇLARI SAN.ve TİC. A.Ş.

AEL.KC.055

AEL.KC.056

**THREE-PHASE ACTIVE REACTIVE
ELECTRONIC ELECTRICITY METER
INTRODUCTION AND USER MANUAL**

CE 1783

CONTENTS

Section Name	Page No
0. Introduction.....	2
1. Meter Technical Specifications.....	3
2. Main Functions.....	4
3. Meter Structure and Operating Principle.....	5
4. Operating the Meter.....	5
5. LCD Display Information.....	6
6. Load Profile.....	10
7. Connection Diagram.....	11
8. Dimensions.....	12
9. EU Declaration of Conformity.....	13

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/reactive 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 or used 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 will 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

Meter Description	Three-Phase, Four-Wire, Four-Tariff, Demand-Metering, Outdoor, Active - Reactive Electronic Electricity Meter	
Model Name	AEL.KC.055	AEL.KC.056
Uni- / Bi-directional	Uni-/Bi-directional	Uni-directional
Accuracy Class	Active: B/C, Reactive: 2	Active: B, Reactive: 2
Connection Type	Current: Via transformer Voltage: Direct or via transformer	
Reference Voltage (Un)	3x230/400V - 3x57.7/100V	
Operating Voltage Range	3x50V /86V (Minimum) - 3x270V / 467V (Maximum)	
Reference Frequency (Fn)	50 Hz $\pm$ 5%	
Starting Current (Ist)	0.001A (0.02.Itr)	
Minimum Current (Imin)	0.01A	
Transitional Current (Itr)	0.05A	
Reference Current (In/Ib)	1A	
Maximum Current (Imax)	10A	
IP Class	IP54 (Outdoor)	
Protection Class	II	
Relative Humidity	95%	
Operating Temperature	-40 °C, +70 °C (3K7)	
Mechanical Environment	M1 (according to Directive 2014/32/EU)	
Electromagnetic Environment	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	6 kV	
LED Pulse Output	3 LEDs (Active, Inductive, Capacitive)	
Meter Constant (imp/kWh - imp/kvarh)	10,000 imp.	
LCD Display	6+3 Digits	
Optical Port	Yes (IEC 62056-21)	
RS485	Yes	
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) (IEC-EN 61038)	
Data Storage Capacity	1 Year	
Relevant Standards	TS EN 50470-1, TS EN 50470-3, TS EN 62053-23	

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

Meter Error Limit under Reference Conditions (Reactive)

Current Range		Sin ϕ (Inductive or Capacitive)	Error Limit (%) (Class 2)
Directly connected meters	Transformer- connected meters		
$0.05 I_b \leq I < 0.1 I_b$	$0.02 I_n \leq I < 0.05 I_n$	1	± 2.5
$0.1 I_b \leq I \leq I_{max}$	$0.05 I_n \leq I < I_{max}$	1	± 2.0
$0.1 I_b \leq I < 0.2 I_b$	$0.05 I_n \leq I < 0.1 I_n$	0.5	± 2.5
$0.2 I_b \leq I \leq I_{max}$	$0.1 I_n \leq I \leq I_{max}$	0.5	± 2.0
$0.2 I_b \leq I \leq I_{max}$	$0.1 I_n \leq I \leq I_{max}$	0.25	± 2.5

2. MAIN FUNCTIONS

2.1. Measurement: The meter measures total active and reactive 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 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 and reactive energy consumed. The number of flashes gives the meter's Imp/kWh and Imp/kVarh values.

1,000 Imp/kWh or Imp/kVarh : 1,000 flashes = 1kWh or 1kVarh

10,000 Imp/kWh or Imp/kVarh : 10,000 flashes = 1kWh or 1kVarh

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.

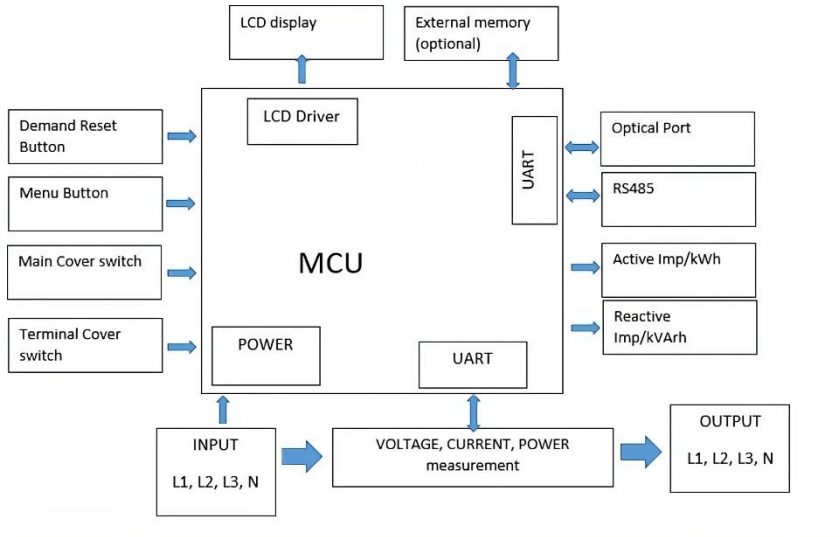
2.8. Communication: Data read through the optical port with an optical reader is transferred to a portable computer (handheld unit). The RS485 output supplied as standard on all combi meters also allows remote access to the meter data. The meter can use the optical port and RS485 output at the same time. 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.



Shows whether phase R (L1), S (L2) and T (L3) are present. For example, if phase R has no voltage, only L2 L3 appears. If the L1 L2 L3 symbols all flash together, the phase sequence is wrong. The arrows above the phase icons show the direction of energy flow.



Magnetic field warning icon.



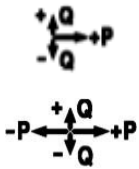
Indicates the current tariff. For example, if the current date/time falls within tariff T2, T2 is shown on the display. In the event of any fault in the meter clock, T1 is always active.



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.



The meter shows the characteristics of energy flow in the system with arrows. For example, if energy:

flows from phase R in the +P and +Q directions,

from phase S only in the +P direction,

and from phase T in the +P and -Q directions

is flowing, the display shows the arrows as +P, +Q, -Q. These indicators represent the combined energy flow directions of all phases.

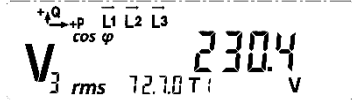
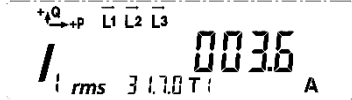
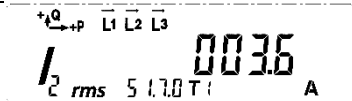
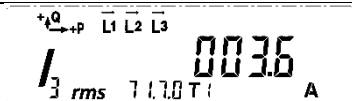
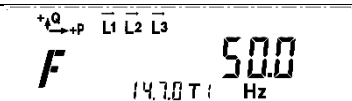
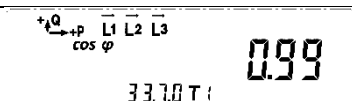
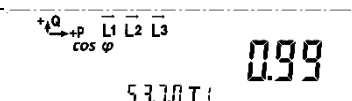
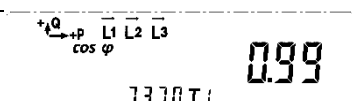


Reset detection icon. If the meter is reset more than once in the same month, or once in each of two consecutive months, the reset warning flashes on the display.

5.1 Display List Example

Meter Date (YYYY-MM-DD)	
Meter Time (HH:MM:ss)	
Imported Active Energy, Total (+T)	
Imported Active Energy, Tariff 1 (+T1)	
Imported Active Energy, Tariff 2 (+T2)	
Imported Active Energy, Tariff 3 (+T3)	
Imported Active Energy, Tariff 4 (+T4)	
Imported Inductive Reactive Energy (+Ri)	

Imported Capacitive Reactive Energy (+Rc)	$\xrightarrow{+Q} \rightarrow +P$ $\overline{L1} \overline{L2} \overline{L3}$ + R_c 0000000843 58.0 T1 kVArh
Imported Active Maximum Demand (+P)	$\xrightarrow{+Q} \rightarrow +P$ $\overline{L1} \overline{L2} \overline{L3}$ + P 00 1638 16.0 T1 kW
Imported Active Maximum Demand (+P) Date (YYYY-MM-DD)	$\xrightarrow{+Q} \rightarrow +P$ $\overline{L1} \overline{L2} \overline{L3}$ + P 2022-11-11 16.0 T1 kW
Imported Active Maximum Demand (+P) Time (HH:MM)	$\xrightarrow{+Q} \rightarrow +P$ $\overline{L1} \overline{L2} \overline{L3}$ + P 12:06 16.0 T1 kW
Meter Serial Number	$\xrightarrow{+Q} \rightarrow +P$ $\overline{L1} \overline{L2} \overline{L3}$ 0200432 10 00.0 T1
Main Cover Opening Date	$\xrightarrow{+Q} \rightarrow +P$ $\overline{L1} \overline{L2} \overline{L3}$ 20220302 96.70 T1
Main Cover Opening Time	$\xrightarrow{+Q} \rightarrow +P$ $\overline{L1} \overline{L2} \overline{L3}$ 12:08 96.70 T1
Terminal Cover Opening Date	$\xrightarrow{+Q} \rightarrow +P$ $\overline{L1} \overline{L2} \overline{L3}$ 20220302 96.71 T1
Terminal Cover Opening Time	$\xrightarrow{+Q} \rightarrow +P$ $\overline{L1} \overline{L2} \overline{L3}$ 12:08 96.71 T1
Software Version Number	$\xrightarrow{+Q} \rightarrow +P$ $\overline{L1} \overline{L2} \overline{L3}$ 00 100 02.0 T1
Phase L1 Instantaneous Voltage	$\xrightarrow{+Q} \rightarrow +P$ $\overline{L1} \overline{L2} \overline{L3}$ V_{l rms} 230.4 32.70 T1 V
Phase L2 Instantaneous Voltage	$\xrightarrow{+Q} \rightarrow +P$ $\overline{L1} \overline{L2} \overline{L3}$ V_{l rms} 230.4 52.70 T1 V

Phase L3 Instantaneous Voltage	
Phase L1 Instantaneous Current	
Phase L2 Instantaneous Current	
Phase L3 Instantaneous Current	
Grid Frequency	
Phase L1 Cosφ	
Phase L2 Cosφ	
Phase L3 Cosφ	

Manual Demand Reset Procedure:

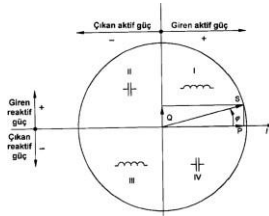
A demand reset is performed by holding the Red Demand Reset Button on the meter for 5 seconds. It can be done only once a month. If successful, the display shows “CLEARed”. If a reset has already been made that month, “rEJECT CL” appears. If no manual reset is made during the month, the meter performs it automatically at month end. The Demand Reset Button is disabled by default; to enable it, the relevant OBIS code must be read with the TEDAŞ password.

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.

- Index (indicates the position of the packet).
- Year-month-day-hour-minute
- Event records
- Imported Active Energy, Exported Active Energy, Imported Inductive Energy, Exported Inductive Energy, Imported Capacitive Energy, Exported Capacitive Energy (for each tariff)
- RMS Voltage (for each phase)
- RMS Current (for each phase)
- $\cos\phi$
- Frequency

Geometric Representation of Active and Reactive Power:



Note 1 – The diagram complies with IEC 60375 Clause 12 and Clause 14.

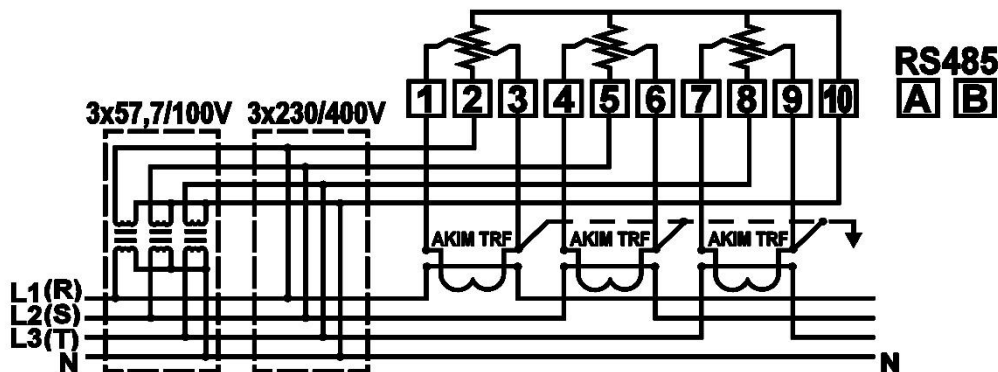
Note 2 – The reference of this diagram is the current vector (shown as the line on the right-hand side).

Note 3 – The voltage vector V varies in its own direction according to the phase angle ϕ .

Note 4 – The phase angle ϕ between voltage V and current I is taken as positive in the mathematical sense (anticlockwise).

Energy Registers of the Meter	Uni-directional Meter	Bi-directional Meter
Incoming Active Energy (+T)	1.8.0	1.8.0
Outgoing Active Energy (-T)	1.8.0	2.8.0
Quadrant I Incoming Inductive (+Ri)	5.8.0	5.8.0
Quadrant II Incoming Capacitive (+Rc)	8.8.0	6.8.0
Quadrant III Outgoing Inductive (-Ri)	5.8.0	7.8.0
Quadrant IV Outgoing Capacitive (-Rc)	8.8.0	8.8.0

7. CONNECTION DIAGRAM

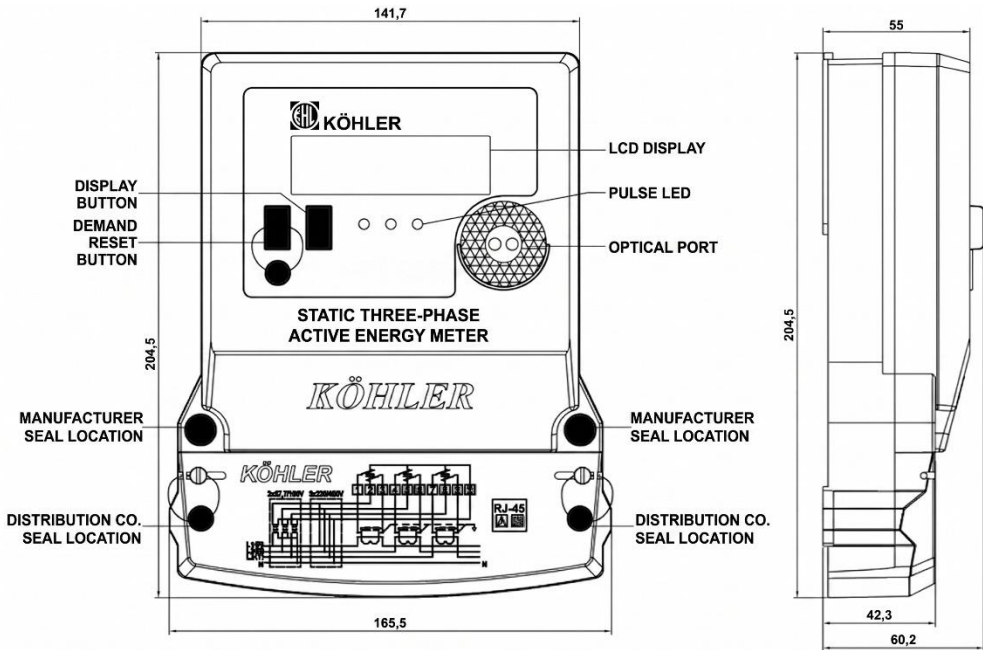


CAUTION: (A) and (B) to the right of the terminal block are the RS485 outputs. Never apply power to them!

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. XXXXXXXXXXX is the nine-digit meter serial number.

8. DIMENSIONS



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)** : Three-Phase, Four-Wire, Four-Tariff, Demand-Measuring, Outdoor, CT Connected Active-Reactive Electronic Energy Meter
Üç Fazlı, Dört Tellî, Dört Tarifeli, Demantmetreli, Bina Dışı, Trafo Bağlı Aktif-Reaktif Elektronik Elektrik Sayacı
- Model Name (Model Adı)** : AEL.KC.055/AEL.KC.056
- Applicable Directives (Uygulanan Yönetmelikler)** : Measuring Instruments Directive (2014/32/EC)
Ölçü Aletleri Yönetmeliği (2014/32/AB)
Electromagnetic Compatibility Directive (2010/30/EC)
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)
- EC Approval Number (AT Onay No)** : MID-3040-3031
- Conformity Assessment Body For Module D (Modül D uygunluk değerlendirme kuruluşu)** : Türk Standartları Enstitüsü
(NoBo ID No: 1783)

Bu uygunluk beyanı imalatçının sorumluluğu altında düzenlenmiştir.

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
May 06, 2026
(06 Mayıs 2026)

Declaration No: KHL/2026-01

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