



KÖHLER

ELEKTRİK SAYAÇLARI SAN.ve TİC. A.Ş.

AEL.MF.15
INTRODUCTORY AND OPERATING MANUAL
SINGLE-PHASE ACTIVE PREPAID
ELECTRONIC WATTHOUR METERS

CE 0122

TS EN ISO 9001

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0. INTRODUCTION

This manual describes the technical specifications of electronic electricity meters measuring active electric energy and maximum energy absorbed, showing these data on LCD screen, automatically performing summer-winter hour applications, keeping desired information and programs in its memory, accessing these information when desired, which have been manufactured with advanced technology, and which comply with the specifications issued by Turkish Electricity Distribution Company (TEDAŞ) in order to promote electricity saving and to regulate multi-tariff electricity selling, and which comply with Regulation 2004/22/EC on Measurement Devices covered under the new approach statutes issued by EU.

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WARNING!

BEFORE ASSEMBLY OF THE ELECTRICITY METER READ THIS MANUAL CAREFULLY.

- The electricity meter should be mounted only by **licensed qualified personnel**.
- During mounting, avoid contact with the **parts with voltage**.
- During mounting and dismounting the electricity meter, **the power should be cut off**.
- KÖHLER Electronic electricity meters are high-tech products. Any and all technical data and documents are under intellectual property of the Company; they may neither be reproduced nor used by third parties.
- This booklet provides summarized information about the electricity meter.
- Prior to assembly, qualified personnel should check whether the electricity meter type to be mounted is or is not in compliance with the electric supply system and electrical installation. Otherwise, the mounted electricity meter may be damaged because of faulty selection and connection of electricity meter. **Such electricity meters shall not be assessed under the guarantee.**
- The data displayed on the LCD monitor of the electricity meter are determined by TEDAŞ.
- Meter parameter settings and maintenance can not be done by user. Meter setting and maintenance process are done by only TEDAS personnel.

TECHNICAL SPECIFICATIONS OF THE ELECTRIC METER

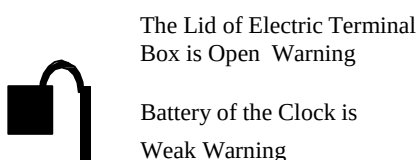
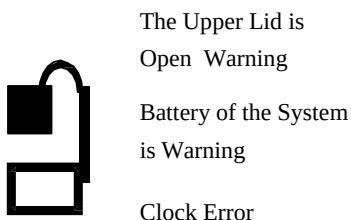
Type	AEL.MF.15
Name	1 Phase 2 Wire, 4 Tariff, Demand Measuring, Direct Connected, Outdoor, Prepaid, Active Electronic Watthour Meter
Class	B
Reference Voltage (Un)	230 V
Operating Voltage Range	50 V (Minimum) – 330V (Maksimum)
Reference Frequency (Fn)	50 Hz $\pm 5\%$
Starting Current (Ist)	0,02 A (0,04.Itr)
Minimum Current (Imin)	0,25 A
Transition Current (Itr)	0,5 A
Reference Current (In)	5 A
Maximum Current (Imax)	80 A
Protection Class	IP54
Relative Humidity Ratio	%95
Operating Temperature	-40 °C, +70 °C (3K7)
Mechanical Environment	M1 (2004/22/EC Directive)
Electromagnetic Environment	E2 (2004/22/EC Directive)
User Environment	For Non-Condensing Humidity Environment
Power Consumption	Voltage Circuit $\leq 2W$, $\leq 10 VA$ Current Circuit $\leq 4 VA$
Power Factor	From 0 to ± 1
ESD Voltage Resistance	Contact Discharge : 8 kV Air Discharge : 15 kV
Pulse Voltage	6 kV
Meter Constant	1600 imp/kWh
LCD Display	6+3 Digit
Communication Speed	300-4800 Baud (IEC 62056-21)
Interface Unit	Optical Port (IEC 62056-21)
Battery Life of the System	≥ 10 year
Real Time Clock Battery Life	≥ 10 year
Shelf Life of the Electricity Meter	≥ 4 year
Time Clock Accuracy	0,5 s/day (at room temperature) (IEC-EN 61038)
Data Storage Capacity	1 year
Related Standards	TS EN 50470-1, TS EN 50470-3

Percentage Error Limits at Reference Conditions (Active)

Current Range	Power Factor	Percentage Error Limit (%) Class B
$I_{min} \leq I < I_{tr}$	1	$\pm 1,5$
$I_{tr} \leq I \leq I_{max}$	0,5 ind....1cap 0,8	± 1

2. MAIN FUNCTIONS

- **Gauging:** The electricity meter the total active power in four different tariffs.
- **Programming the Electricity Meter:** Time slices and tariffs are programmable. For a whole day, 8 different time slices may be determined and each time slice may be selected and paired with one tariff out of four. Furthermore, the electricity meter has a feature capable to tariff individually the weekdays, Saturdays and Sundays.
- **Reading the Electricity Meter:** Invoicing data for 12 months, consumed total power amount, data about lid openings of electric terminal box, demand data for 6 months and initial opening date of upper lid can be read on optic port of the electricity meter.
- **Auto Trouble-Shooting Feature:** The electricity meter continuously controls its internal circuits and displays in the menu of its monitor the trouble types shown hereunder.



Electric Terminal Box Lid and Upper Lid Opening, Closing, Recording Features:

When the upper lid is opened, the first opening date is stored. When the lid of electric terminal box is opened, the first opening date of each month and total of openings throughout the relevant month is stored. Lid opening dates and numbers of the most recent 12 months are stored in the memory.

Communication: The data is transmitted to a portable computer (indexor) through an optical reader from optic port of the electricity meter.

- **Signal Output:** On the electricity meter, there is two LEDs so as to indicate the consumed active energy. Numbers of blinks of these LEDs shows lmp/kWh values of the electricity meter.

1600 lmp/kWh : 1600 Blinks = 1 kWh

Summer/Winter Day Light Saving Time: The electricity meter automatically switches to summer / winter day time light saving time.

- **Displaying during Power Failure:** When the power is cut, the data requested can be brought to the LCD monitor via the call-button on the electricity meter and reading can be taken from optic port.

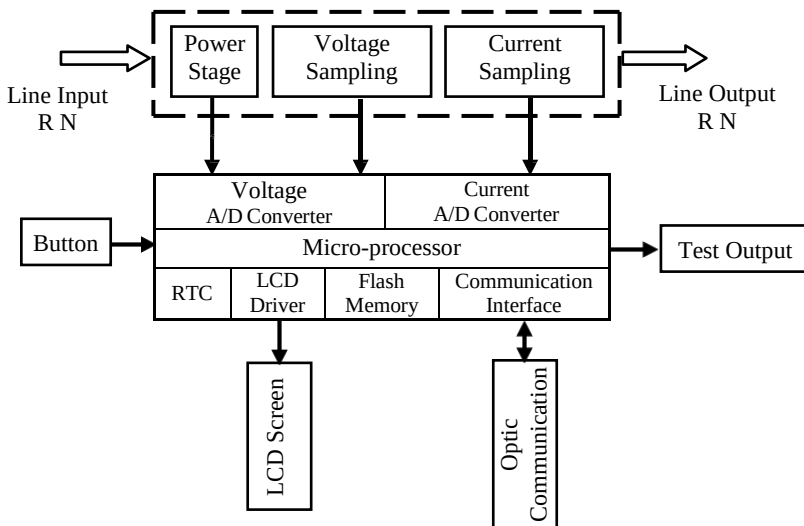
3. STRUCTURE AND OPERATION PRINCIPLE OF THE ELECTRICITY METER

Structure of the Electricity Meter

Casing and lids of the electricity meter are in compliance with IP54 Outdoor Standard and fully sealed. The electricity meter is made of high-grade nonflammable plastics (PVC). All electronic components are laid out on a special PCB card; and these cards are mounted to the casing of the electricity meter.

Following calibration of the electricity meter, the upper lid is screwed in the factory and sealed by Ministry of Industry and Commerce of Republic of Türkiye. The lid of electric terminal box is sealed by authorized TEDAŞ personnel following assembly of the electricity meter.

Block Diagram of Operation



4. STARTING-UP THE ELECTRICITY METER

Normally the electricity meter as well as the LCD monitor operates, when the meter is mounted and powered on.

Controlling the Functions

Once the electricity meter is mounted, its electrical connections should be checked whether they are proper or not. After the electricity meter mounted properly to its place, the screw on the lid of the electric terminal box should be tightened. 2nd lock indicator blinking on the LCD monitor will disappear after the first reading. If not, then it means either the lid of the electric terminal box is not attached properly or its screw is not tightened well.

Operation of the LCD Monitor

Following initial operation of the electricity meter, the auto-display mod will activate. Each menu of the display will be displayed for 5 seconds and then automatically proceed to the next informative menu. When the button on the electricity meter is pushed down, the button menu mod will activate and the data on the monitor will be stay for 1 minute on the monitor. After 1 minute it return to the auto-display mod.

5. LCD MONITOR INDICATORS



Definitions of the symbols and indicators on the LCD Monitor are as follows:



The Upper Lid is Open

This symbol indicates that the upper lid is opened. If the indicator is blinking while the lid is close, then it is indicating that the lid is opened earlier. If the indicator is being displayed on the monitor continuously, then the upper lid is on open position.



The Lid of Electric Terminal Box is Open :

This symbol indicates that the lid of the electric terminal box is opened. If the indicator is blinking while the lid is close, then it is indicating that the lid is opened earlier. If the indicator is being displayed on the monitor continuously, then the lid is on open position. Symbol will disappear after the electricity meter is read.



Clock Error: If the clock does not operate normal, this symbol will be displayed.



Battery of the System: If the voltage of the battery of the system is low, this symbol will be displayed.



Battery of the Clock: If the voltage of the battery of the clock is low, this symbol will be displayed.

T1T2T3T4

Tariff display: These symbols indicate the timely using active tariff period of the electricity meter.

T8

These symbol indicate currently reading active tariff on the monitor.

kWh

These symbol indicate the active energy unit.

5.1 Screen List Sample

Date Menu



Hour Menu



Total Active Energy



Active Energy on T1
Tariff



Active Energy on T2
Tariff



Active Energy on T3
Tariff



Active Energy on T4
Tariff



Maximum Demand Per
Month



Demand Hour

T1
20 10:0 102 P

Kwh / Price

T1
F 100.01

Serial Number

T1
20 100 102

Program Version
Installation Date

T1
P 06:00:00

Remaining Units

T1
P uon:0000 0

First Counting Tariff Type
1:Multi Tariff
2:Single Tariff
Second Counting Tariff
Code

T1
0 8A 001

Remaining Kwh =
Credits / Price

T1
A 00000

Program Version

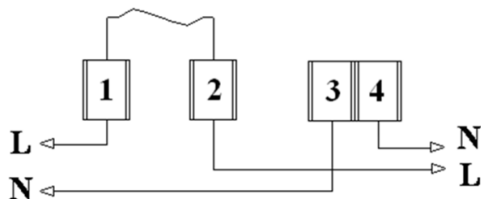
T1
PA06:0000

Test Screen

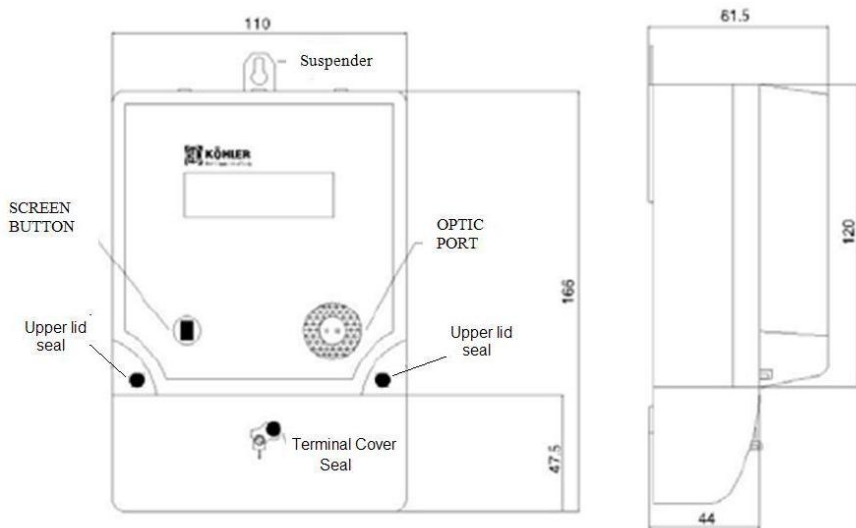
L1L2L3T1T2T3T4 0000000000
888:88:88:88 T0 kWh

6. CONNECTION DIAGRAM

Inner diameter of phase and neutral sleeve of AEL.MF.15 single-phase meters is 6,3mm. If this watt-hour meter will be connected to a line of 80 Ampere, the cross section of copper and conductive part of line cable should at least be 25mm².



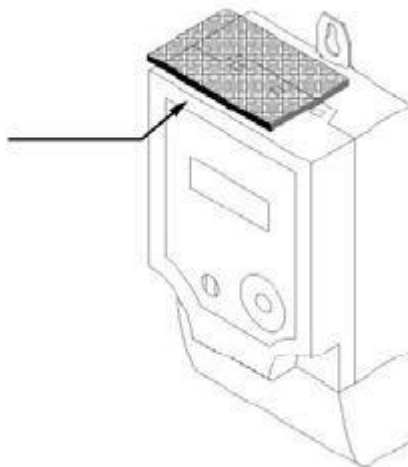
7. DIAGRAM FOR ASSEMBLAGE MEASUREMENT AND SEAL



8 – ADDING UNITS

8.1 – Prepaid counter is designed as to perform transfer from the counter to the card or from the card to the counter when the card is approached to the upper surface of the counter.

8.2- When there is energy in the counter, card is approached to the upper surface of the counter for adding units. Card is not removed until a sound alarm is heard and the screen displays the new unit info.



8.3- When the counter is brought to the institution for subscription for the first time, the tariff code of the subscriber can be loaded via optic port when the electric terminal cover is open by electric distribution company authorized personnel and this code is displayed on counter LCD.

8.4- In applications with tariff, value is loaded to the card according to tariffs and during the consumption units are decreased as per this value. When adding units to the card, one can choose whether the counter will be scheduled (with tariff) or unscheduled (without tariff).

8.5- In case the card is lost, electricity distribution company can create the same card via unit-adding devices and by learning the counter serial number from the subscriber.

8.6- The average daily credit use of the counter will be calculated during the unit-adding procedure and accordingly the low unit level at which the low unit alarm will be set off shall be loaded to the card. Low unit level with sound alarm, is going to be five fold of average daily credit use price. If the units in the counter is low as to activate the alarm, the counter will give out a sound alarm which will continue until the user press the counter button. If the user does not add up unit the next day, and if the units are low at 21.00, the sound alarm will be activated again and the screen will start to flash. If the units are not low, it is supposed that the user does not get more units on purpose and no alarm will start. This cycle will continue until the units are over. If the units are over after 16.00 on Friday, the energy will not be cut off. However, if no units are added until 16.00 on Monday, the energy will be cut off. When units are added, the relay in the counter will release the energy again.

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