



KÖHLER

ELEKTRİK SAYAÇLARI SAN.ve TİC. A.Ş.

AEL.TF.28

**THREE-PHASE ELECTRONIC ENERGY METER
INTRODUCTION AND USER MANUAL**

C €1783

TS EN ISO 9001

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0. INTRODUCTION

This manual describes the technical data of the electronic electricity meters produced with advanced technology in compliance with Measuring Instruments Directive 2014/32/EU published by the EU under the new approach legislation; they measure active electrical energy and maximum demand, show these data on the LCD display, change the clock automatically for summer/winter time, 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.

1. METER TECHNICAL SPECIFICATIONS

Model Name	AEL.TF.28 (Prepayment)
Meter Description	3-Phase, 4-Wire, 4-Tariff, Demand-Metering, Outdoor, Active Electronic Electricity Meter
Accuracy Class	A
Reference Voltage (Un)	3x230/400 V
Reference Frequency (Fn)	50 Hz $\pm 5\%$
Starting Current (Ist)	0.02A (0.04.Itr)
Minimum Current (Imin)	0.1A
Transitional Current (Itr)	0.25A
Reference Current (In)	5A
Maximum Current (Imax)	10A
IP Class	IP54 (Outdoor)
Protection Class	Two (2)
Relative Humidity	95%
Operating Temperature	-40 °C, +70 °C (3K7)
Connection Type	Current Input: Via transformer Voltage Input: Direct
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	$\leq 2W$, $\leq 10VA$
Current Circuit Consumption	$\leq 4VA$
ESD Voltage Withstand	Contact: 8 kV Air: 15 kV
Impulse Voltage	6 kV
Meter Constant	10000 imp/kWh
LCD Display	6+3 Digits
Communication Speed	300-4800 Baud (IEC 62056-21)
Interface Unit	Optical Port (IEC 62056-21)
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) (IEC-EN 61038)
Data Storage Capacity	1 Year
Relevant Standards	EN 50470-1, EN 50470-3

Error Limit under Reference Conditions

Current Range	Power Factor	Error Limit (%) Class B
$I_{min} \leq I < I_{tr}$	1	± 1.5
$I_{tr} \leq I \leq I_{max}$	0.5 ind....1.....cap 0.8	± 1

2. MAIN FUNCTIONS

- **Measurement:** The meter measures total active energy across 4 tariffs.
- **Programming the Meter:** Time zones and tariffs can be programmed. Eight separate time zones can be defined within a day and each time zone can be mapped to one of the 4 tariffs. It also allows separate tariff settings for weekdays, Saturdays and Sundays.
- **Reading the Meter:** 12 months of billing data, total energy consumed, terminal cover opening data, 6 months of demand data and the main cover first opening date can be read from the meter via the optical port.
- **Self-Diagnostics Feature:** The meter continuously checks its internal circuits and shows the following fault types in the display menu.



Main Cover
Open Warning



Terminal Cover
Open Warning



System Battery
Low Warning



Clock Battery
Low Warning



Clock Error

- **Terminal Cover and Main Cover Opening/Closing Recording Feature:**

If the main cover is opened, it records the first opening date.

If the terminal cover is opened, it records the first opening date for each month and the total number of openings within that month.

The cover opening date and count information is stored in memory for the last 12 months.

- **Communication:** Data read through the optical port with an optical reader is transferred to a portable computer (handheld unit).
- **Signal Output:** One LED on the meter indicates the active energy consumed. The number of flashes gives the meter's Imp/kWh value.
1000 Imp/kWh: 1000 flashes=1kWh
- **Summer/Winter Clock Change:** The meter performs the summer/winter clock change automatically.
- **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 button and read from the optical port.

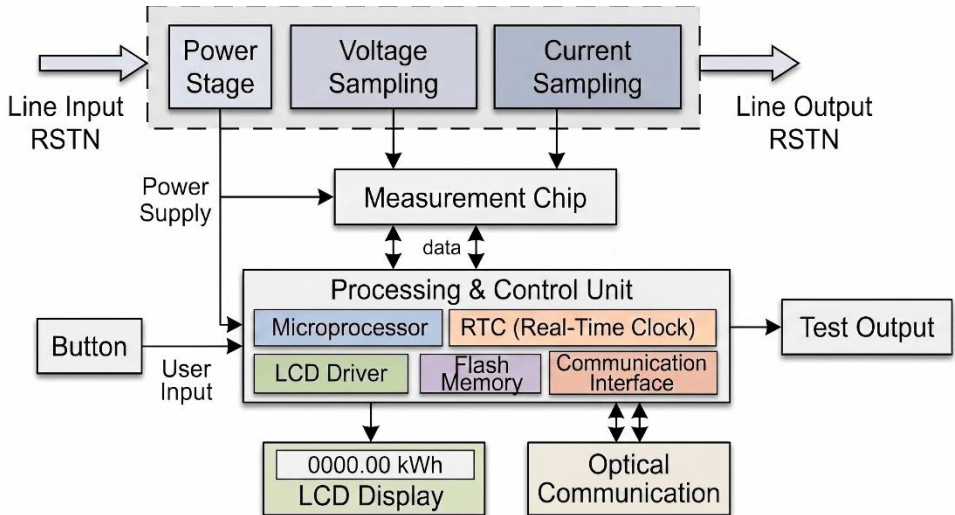
3. METER STRUCTURE AND OPERATING PRINCIPLE

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 dedicated PCB and these boards are fitted into the meter body.

3.2. Operating 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 correctly mounted, the terminal cover screw is tightened. The flashing 2nd lock symbol on the LCD will disappear after the first reading.

If not, the terminal cover is not fitted properly or its screw is not tight.

4.2. Operation of the LCD Display

When the meter starts up, auto-display mode is activated. Each menu stays on the screen for 5 seconds and then moves to the next information menu.

When the button on the meter is pressed, the display call mode is activated and the information on the screen stays for 1 minute. After 1 minute it returns to the auto-display mode.

5. LCD DISPLAY INFORMATION



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



Main Cover Open

This symbol shows the main cover opening status. If it flashes while the cover is closed, the cover has been opened before. If it is shown steadily, the main cover is open.



Terminal Cover Open

This symbol shows the terminal cover opening status. If it flashes while the cover is closed, the cover has been opened before. If it is shown steadily, the cover is open. The symbol disappears once the meter has been read.



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.

T1T2T3T4

Tariff Indicator: Shows the tariff period applicable at the time the meter is in use.

T8

Shows the tariff information currently being read on the display.

kWh

Indicates the unit of active energy.

L1L2L3

Indicates whether phase R (L1), phase S (L2) and phase T (L3) are present. Used on three-phase meters.

5.1 Display List Example

Date Menu



Time Menu



Total Active Energy



Active Energy in Tariff
T1



Active Energy in Tariff
T2



Active Energy in Tariff
T3



Active Energy in Tariff
T4



Maximum Demand
within the Month



Demand Date

T1
20 10:0 1:02 P

kWh Price

T1
F 100.01

Serial Number

T1
20 100 102

Program Version Loading
Date

T1
P 06:00:00

Remaining Credit

T1
P uon:0000 0

First Digit: Tariff Type

1: Multi-Tariff

2: Single-Tariff

Second Digit: Tariff Code

T1
0 8A 001

Remaining kWh = Credit /
Price

T1
A 00000

Program Version

T1
PA06:0000

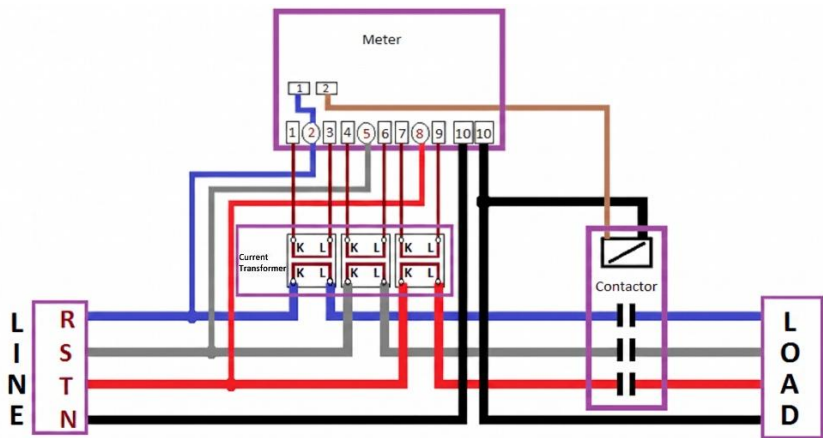
Test Display

L1L2L3T1T2T3T4 0 0 0 0 0 0 0 0
000:00:00:00 T0 kWh

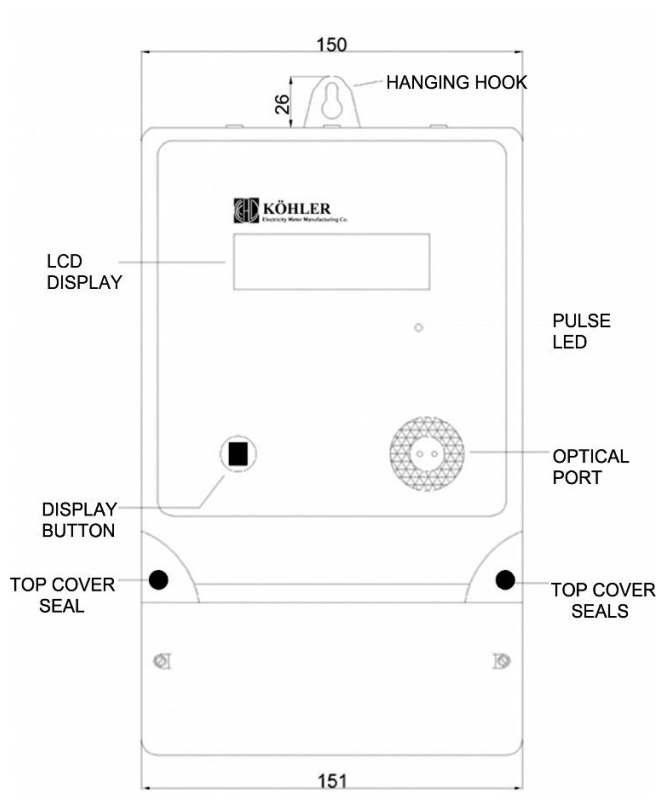
6. CONNECTION DIAGRAM

6.1 Connection Diagram of AEL.TF.28 Meters

The phase and neutral terminals of AEL.TF.28 prepayment three-phase meters are 7 mm in diameter. If the meter is connected to an 80 Ampere line, the copper conductor cross-section of the cable must be at least 20 mm².



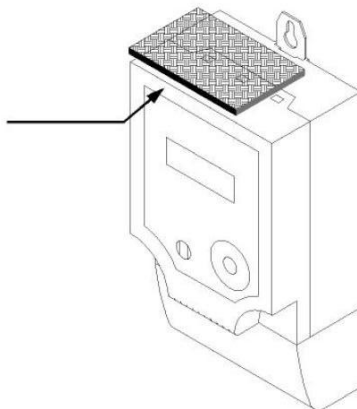
7. DIMENSIONS



8-CREDIT LOADING

8.1- The prepayment meter is designed so that data can be transferred in both directions, from card to meter and from meter to card, when the loading card is brought near the top of the meter.

8.2- To load credit, hold the card near the top surface of the meter while it is energised. Keep it there until the audible alarm sounds and the newly loaded credit and kWh appear on the display.



8.3- To recover the credit and kWh loaded on the meter, hold the empty loading card near the top surface of the energised meter for 10 seconds. Keep it there until the alarm sounds and the credit and kWh on the display read “0”.

8.4- Credit and kWh are loaded onto the meter in proportion to the payment made. Press the blue button on the meter to display this information.

8.5- Once credit and kWh have been loaded, the meter starts counting and the kWh and credit consumed are deducted from the loaded amounts.

8.6- When the meter is first brought to the utility for subscription, the subscriber's tariff code can be loaded via the optical port by authorised distribution company personnel while the terminal cover is open, and is also shown on the meter LCD.

8.7- In tariff applications a value is loaded onto the card per tariff and credit is deducted in proportion during consumption. When loading the card, tariff or non-tariff use can be selected.

8.8- If the card is lost, the distribution company can create a duplicate using the loading devices after obtaining the meter serial number from the subscriber.

8.9- During card loading the meter's average daily credit use is calculated and the low-credit alarm level is loaded onto the card accordingly. The level that triggers the audible alarm is five times the average daily credit use. When the credit falls to the alarm level the meter sounds an alarm, which continues until the user presses the meter button. If the user buys no credit the next day, the alarm sounds again at 21:00 with a flashing display, provided the credit has fallen. If it has not fallen, the user is assumed to be deliberately not buying credit and no alarm is given. This cycle continues until the credit runs out. If the credit runs out after 16:00 on a Friday no disconnection is made, and if no credit has been loaded by 06:00 on Monday the power is cut. When credit is loaded, the relay inside the meter switches the power back on.

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)** : 3 Phase 4 Wire, 4 Tariff, Demand Measuring, Outdoor, Prepaid, Active Electronic Electricity Meter
3 Fazlı, 4 Telli, 4 Tarifeli, Demantmetreli, Bina Dışı, Ön Ödemeli, Aktif Elektronik Elektrik Sayacı
- Model Name (Model Adı)** : AEL.TF.28
- 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)
- EU Approval Number (AB Onay No)** : 1783-MID-041
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

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