



About us

MAKEL Companies Group has been conducting production with 100% domestic capital for Turkey and world markets using the most advanced technologies in electronic equipment.



Achieve with different experiences in the sector

42nd year

MAKEL started its journey in electronic materials sector in 1977. Starting with production of switches and sockets for the first time in 1987, Makel expanded its product range quickly during the next few years and has continued to product various products ranging from automatic switches, fuse boxes to electronic counters via state-of-the-art machinery.

Productions in confined space of

45.000^{m²}

in Esenyurt, Istanbul



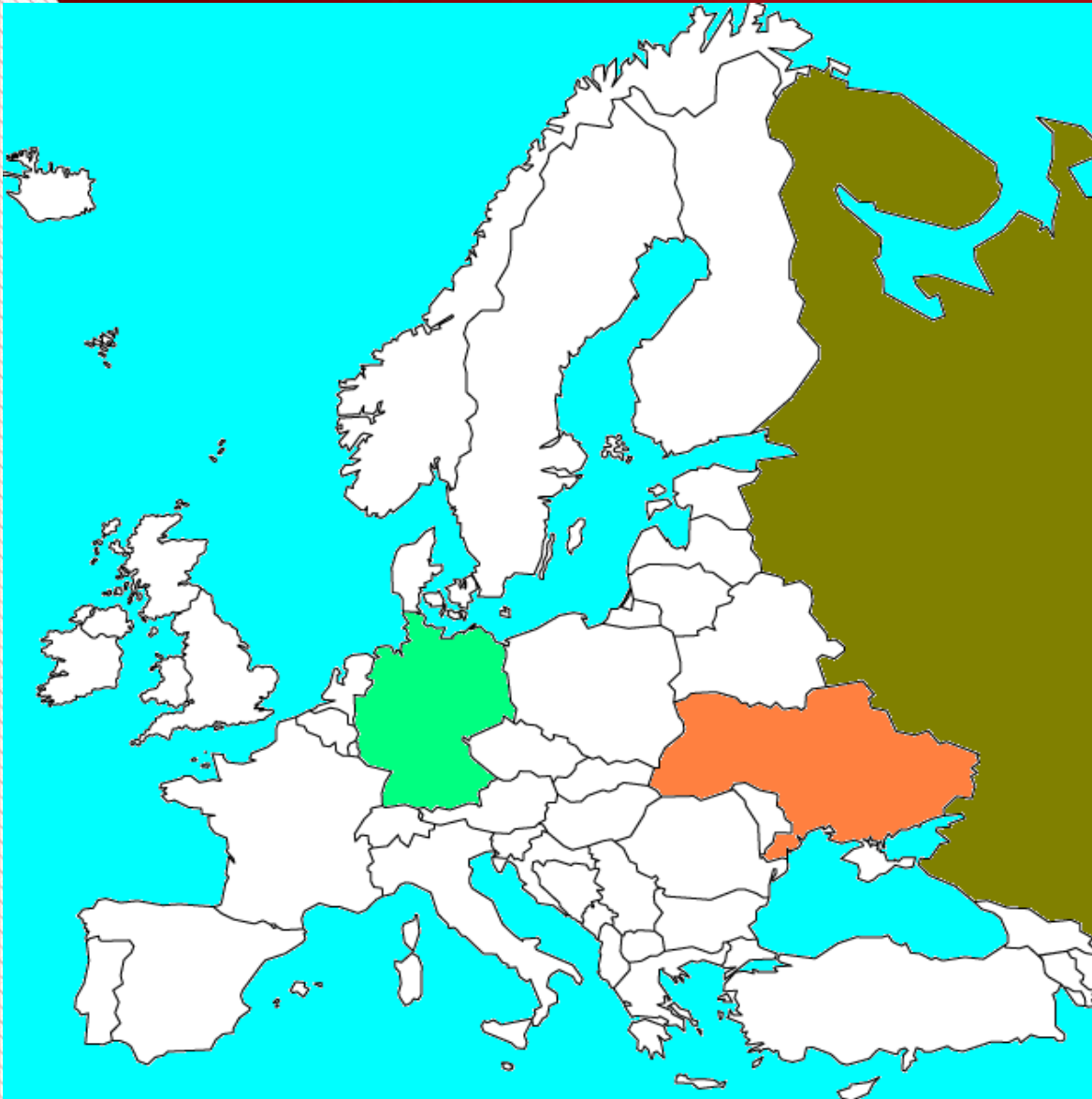
over 1000^{*}
workers

With its main and
side industry, we are
proud to increase
employment in Turkey.

* With subcontractors



International Locations



Makel Russia

Makel Ukraine

A global Turkish Brand

Makel, thanks to successful sales and marketing policies pursued in foreign markets since the beginning of the 90s, conducts exportation to over 40 countries in Africa, Asia and Europe.

Being one of the most well-known and selected brands in terms of quality, price and service in countries of exportation, Makel is the first company entering into Russian market.

Together with Moscow branch opened in 2006, Ukraine branches opened during recent years and St. Petersburg - Rostov representative offices, Make continues to improve its image as a global Turkish brand.

Being a large family with its business partners, suppliers and workers, MAKEL is one of the leading brands in the Turkish market, our company conducts exports to

more than 50 countries

in a wide geography with a population of over 1 billion in Europe, Asia and Africa, and we have represent our country successfully as one of the export leaders in the field of electronic materials in Turkey for many years.



A world map is shown in the background, rendered in a light blue color. Overlaid on the map are numerous glowing yellow lines that represent global connections or trade routes. These lines arc across the map, connecting various points across different continents. The map is set against a dark blue background with a subtle grid pattern.

TURQUALITY®

MAKEL is included in "Turquality Brand Support Program" by Ministry of Economy of Turkish Republic as of 2010 in which Turkish brands representing Turkey successfully around the world are added, and the company carries out its operations with great enthusiasm and with the principle of "giving what is acquired from Turkey to Turkey".

TURKISH EXPORTER ASSEMBLY - TIM

MAKEL is the active member of management board of the Electronic and Electricity sector in TIM



R&D DEPARTMENT



- Innovative projects with high added value,
To carry the brand up in competitive international markets
- Approved by the Ministry of industry and technology
- A total area of 1.750 m²
- 2 million dollar investment
- High Voltage and Current Laboratory
- Meter Testing and Development Laboratory



R&D BASIC BRANCHES

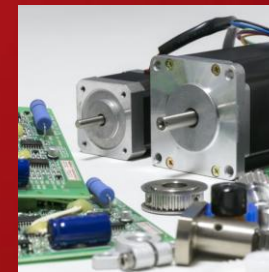
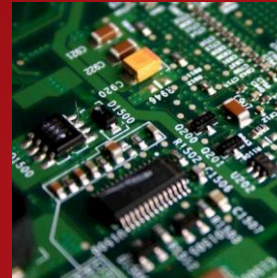
Electronics & Comm. Engineering

Software Engineering

Mechanical Engineering

Industrial Design

Control and Automation



- Wiring accesories
- Smart Buildings and Homes products, Software platforms
- Measurement and control for Smart Grid
- Conventional and Smart Lighting
- HAN, NAN and WAN communication units for connectivity
- Automation and Industry 4.0
- Circuit Breakers

From Raw Material to Product

More than 100 plastic injection and blow injection machinery

Eccentric presses with variety tonnages

SMT lines with 220 Thousand component assembly capacity per hour

Wave soldering lines

More than 1500 m² Automation lines

Production test systems



PRODUCT CATEGORIES

Smart Home Intelligent House

Systems Switch Group

- Cella Luxury Switch Series
- Lumia Luxury Switch Series
- Modüler Switch Series (Cellia Modular Metal, Millanta, Square)
- Karea Switch Series
- Defne Switch Series
- Lillium Family Switch Series
- Mimoza Switch Series
- Rose Switch Series
- Surface-Mounted Switch Series
- Moist Place and Moist

Place Plus IP44-55 Switch Series

Group Sockets and Accessories

Switchgear Group

- Automatic Circuit Breakers (3-6-10 kA)
- Compact Switches
- Leakage Current Protection Switch (3-6-10 kA)
- Leakage Current-Protected Compact Switches

Fuse Boxes

Electronic Electrical Meters Reactive

Power Control Relay Panelmeter

Voltmeter

Led Lightning Group

Led Bulb

Led Downlight



Switches and Sockets

- Cella luxury series, British series, Modular Switches and Sockets, Lumia luxury, Karea , Defne, Lillium , Mimoza , Rose and Lunis Switches and sockets
- Moist Place Series Nemliyer Plus IP44-55 , Flush Mount Series, Group Sockets and accesories



Industrial lines & Circuit Breakers

- Automatic fuses (3-6-10kA), RCCB, MCB, Modular & Mini Compensation Contactors, Engine Protection and Termic Switches, Parafudur, Pulse current switches, PFC and SVAR, Multimeters, Ammeters and Voltmeters, Inductive load drivers, Engine, Current, Voltage and Liquid level protection relays , Tiem and Photocell Relays, Low Voltage current transformers , Shunt Reactor, Harmonic Filters, Wall mount and Flushmont Fuseboxes



Smart Grid Products

- Import/Export SinglePhase, ThreePhase and Industrial Meters
- Connectivity Products: GPRS / NB-IoT / PLC / Ethernet / Wireless Modems
- AMI system MDM Solutions



Smart Buildings and Home Automation systems

- Pb and Touch Switch sensors, Switch and Jalousi Actuators, Push Button and touch thermostats, IP Control units ,KNX Home Server, Binary Input Modules, Flush mount actuators, Presence Detectors , DND and Energy Savers, Dimmers, Power supplies, IP Routers, IOS- Android Panels and Software



Lighting

- Led Bulbs, Led Slim Downlights, Led Panels, Armatures with Motion de Conventional and DALI drivers



Makel Electronic Electricity Meters

- Makel has broad meter portfolio both for general purpose usage and for AMI systems.
- **All have multi-tariff, backlighted, communication, load profile**
 - Monophase meters, (bidirectional, circuit breaker opt.)
 - Uni or bidirectional Threephase meters for Direct (circuit breaker opt.) or CT connection
 - Unidirectional or Bidirectional, Class B or Class C, Direct, CT or CT&VT connected Industrial Meters
- 100% test and verification
- MID compliant
- Wide operating temperature between -40 to +85 °C
- Improved surge protection
- Wide LCD screen with backlight
- Temperature and Xtal compensation for low time drift
- Communication interfaces for AMR/AMI systems
- All meters can be traced throughout their life using unique serial numbers

Makel Meters at a Glance

Single Phase



M560 Series, Mature



M600 Series



M610 Series

Three Phase



T510 Series, Mature



C520.K0T Series



T600 Series



T610 Active Series

Industrial



C500 Series, Mature

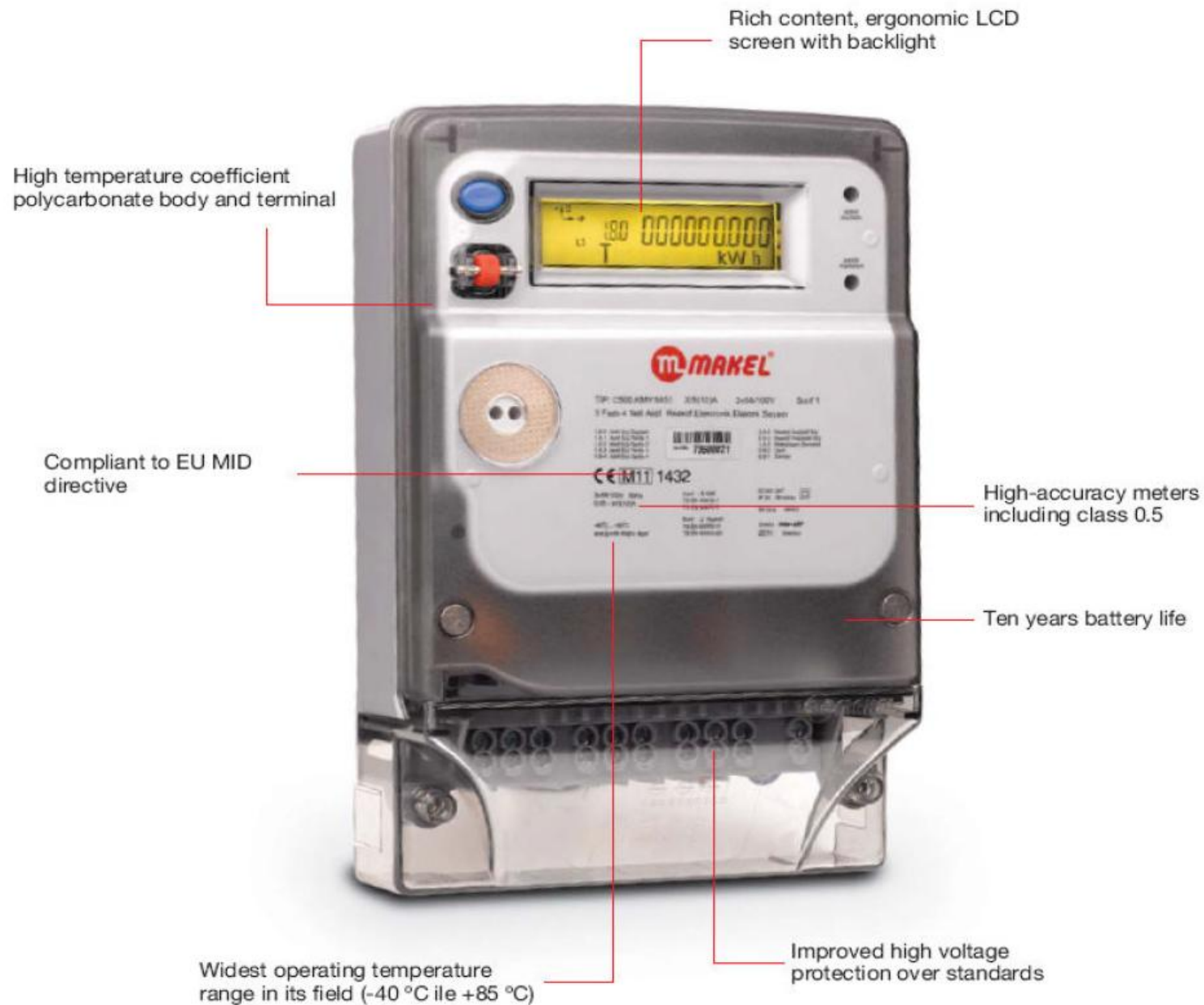


C520 Series



T610 Industrial Series

GENERAL SPECS.



General Characteristics of Single Phase M600 and M560 Meters



M600
4 Models



M560

- 5(80)A, 5 (100) A, Class B, single phase Meters
- LCD Backlight
- Obis coded reading on EN 62056-21, optical and RS485
- Instantaneous Current, voltage and demand information on LCD
- Crystal and temperature calibration for RTC accuracy and accuracy
- Up to 2 years load profile records
- 4 Tariffs, 8 Time Zones, Cancelable DST
- Wide operating voltage range 50 - 300 V
- Wide operating temperature range from -40 to +85
- Optional circuit breaker (M560 only)
- Import/ Import-Export measurement option

General Characteristics of Single Phase M610Meters



M610
8 Models

- SMPS power supply
- 5(60)A, 5(80)A, 5 (100) A, Class B Active , Class 2 Reactive single phase Meters
- Additional Features on M600
 - Prepayment ready, Mifare PLUS card reader
 - 90A, 120A Circuit breaker
 - Reactive measurement

Single Phase Meters LCD and Connection

M600, M610 Series

LCD EKTRAN

Tarife

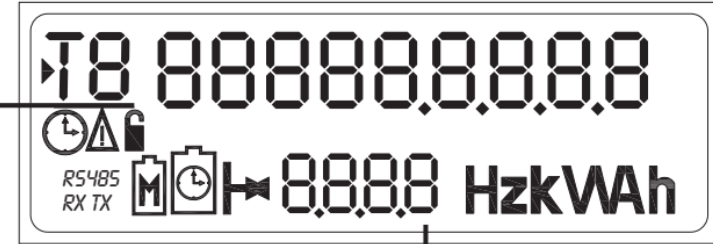


Obis

▶	Geçerli tarife
⌚	Saat hatası
RX TX	Haberleşme ikonları. Sayaç veri gönderirken Tx, veri alırken Rx ikonu çıkar.
▶	İmport Enerji. (Şebekeden alınan)
◀	Export Enerji. (Şebekeye verilen)
⚠	Ana kapak açıldı ihbarı.
🔒	Klemens kapağı açıldı ihbarı.
🔋	Pil zayıflaması.

M560 Series

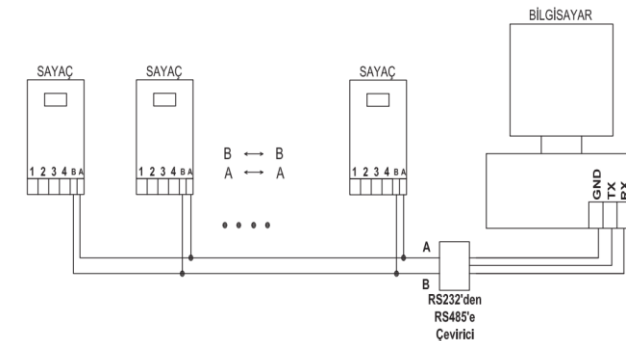
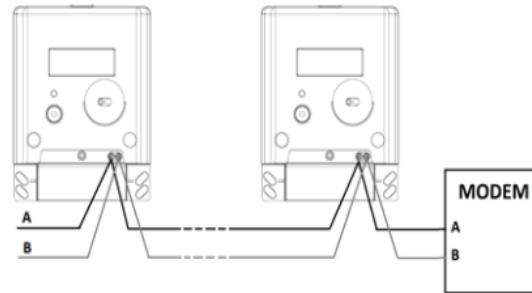
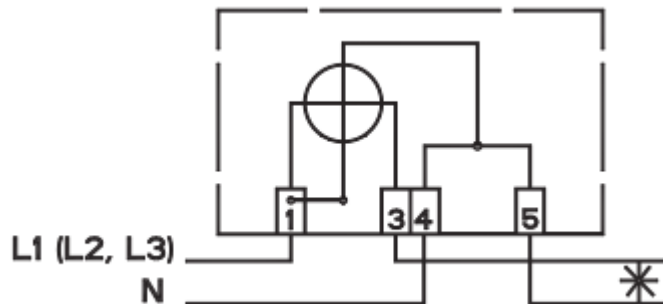
Tarife kodları
(T,T1,T2,T3,T4)



Obis kodları

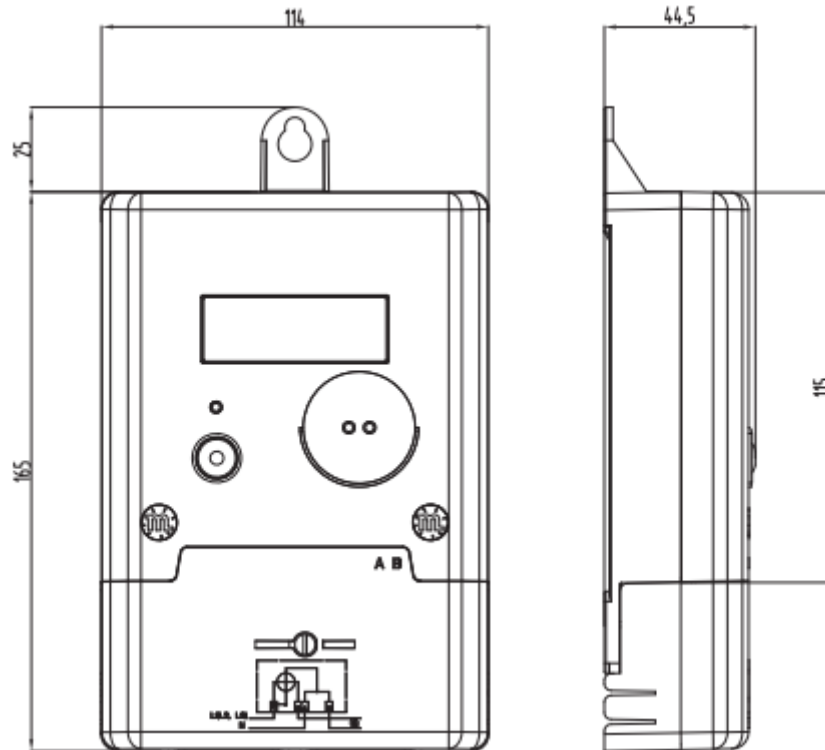
Kodlama açıklamaları

- 🔋 : Pil zayıflaması
- ⌚ : Zaman saati hatası
- 🔒 : Klemens kapağı açıldı ihbarı
- ⚠ : Sayaç kapağı açıldı ihbarı
- ▶ : Aktif tarifeyi belirtir (Güncel Tarife)
- Ⓜ : Maksimum Demand (MD)
- ▶ : Çift Yönlü Sayaçlarda Şebekeden Çekilen anlamına (import) gelir.
- ◀ : Çift Yönlü Sayaçlarda Şebekeye Verilen anlamına (export) gelir.

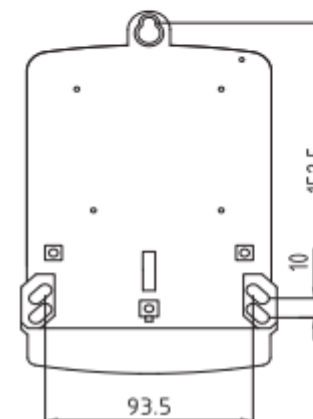
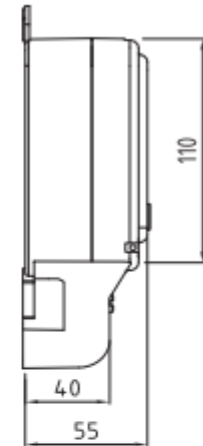
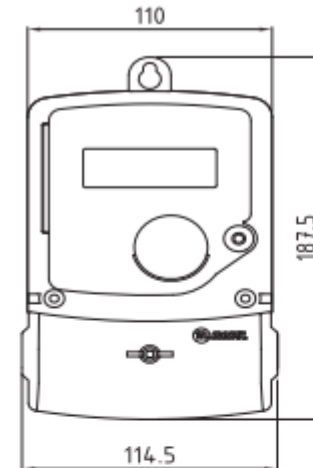


Single Phase Meters , Dimensions

M600/M610 Series



M560 Series



General Features of Three Phase T600 and T510 Meters



T600, 6 base models



T510

- Direct 5 (100) A and CT X / 5 (10) A connection option
- Multi channel load profile up to 2 years record with 15m min intervals.
- Obis codes reading on EN 62056-21, optical and RS485
- 4 Tariffs (optional 16 tariffs), 8 time zones (optional 32) (optional season and holidays programming)
- 100A capacity cut-out relay (optional T510)
- Reading the instantaneous current, voltage, frequency information and demand information of each phase from LCD
- Wide operating voltage range 50 - 300 V
- Wide operating temperature range from -40 to +85 C
- Crystal and temperature calibration for RTC accuracy and accuracy
- Import/ Import-Export measurement option
- Smart Ready option (only for T600 and T610)
- Magnetic tampering detector
- NFC option (T600 series)

General Features of Three Phase T610 Meters

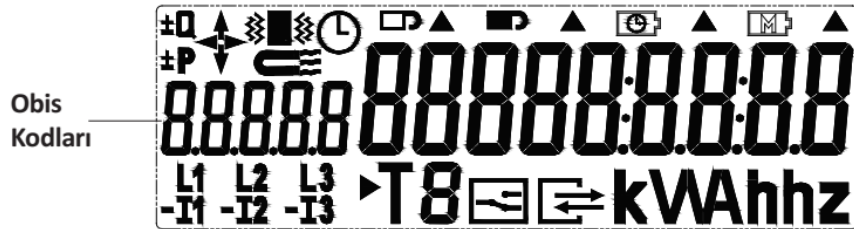


T610
More than 16
base models

- Direct 5(60)A, 5(80)A and 5 (100) A and CT X / 5 (10) A
- SMPS Based meters
- Additional Features on T600 series
 - Internal circuit breaker up to 100A
 - Prepayment option, Internal Mifare Plus Card reader
 - Wifi Option
 - Class 2 reactive measurement

Three Phase Meters LCD and Connection






T600 and T610 Series

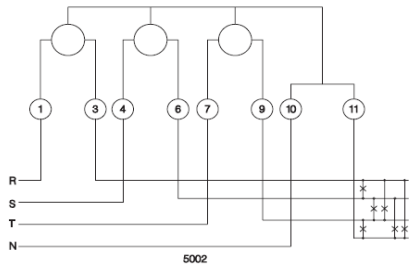


Gerilim ve Akım
İkonları

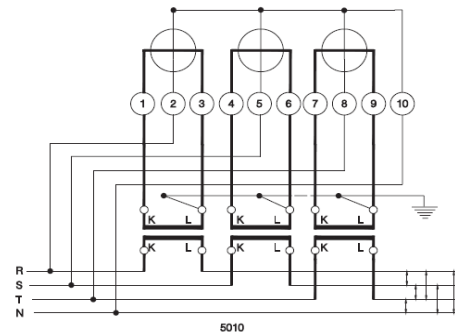
Tarife Göstergesi

Birimler

-  : Pil zayıf uyarısı
-  : Zaman saati hatası
-  : Klemens kapağı açıldı ihbarı
-  : Sayaç kapağı açıldı ihbarı
-  : Manyetik alan algılandığını gösterir

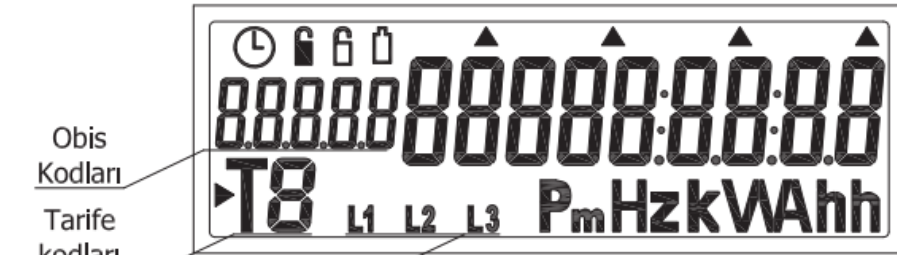


Direct Connection








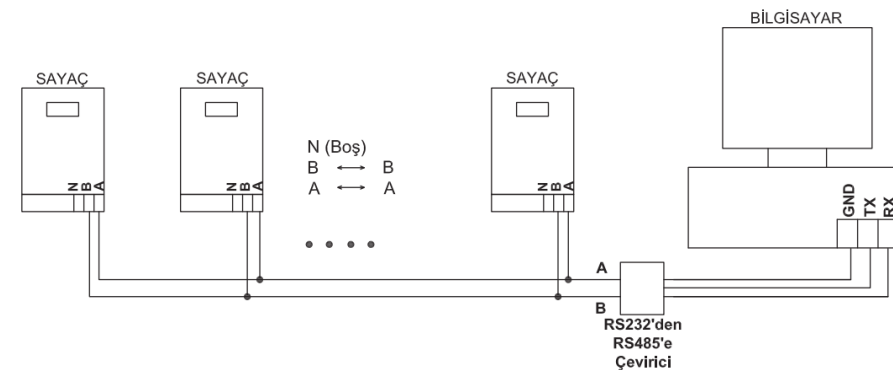
CT Connection

T510 Series



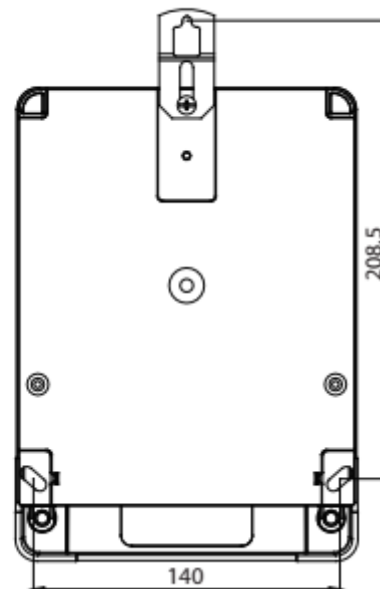
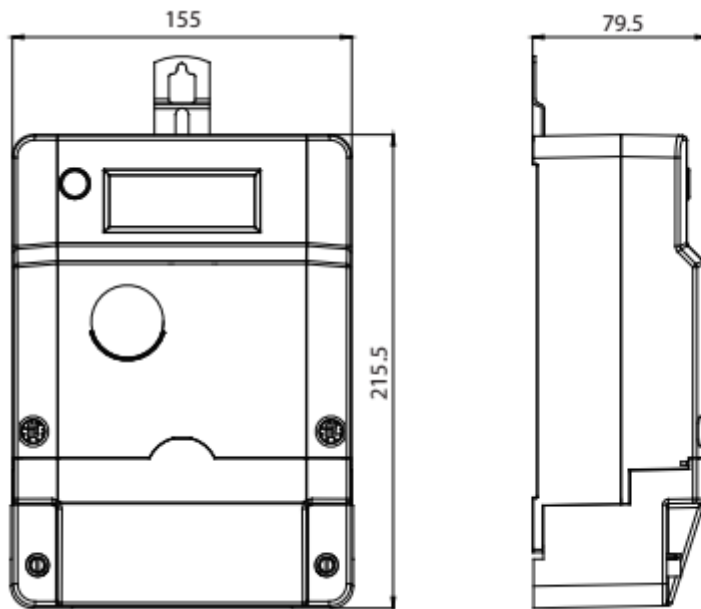
R-S-T
Faz Göstergesi

-  : Pil zayıf uyarısı
-  : Zaman saati hatası
-  : Klemens kapağı açıldı ihbarı
-  : Sayaç kapağı açıldı ihbarı
-  : Maksimum Demand (MD)

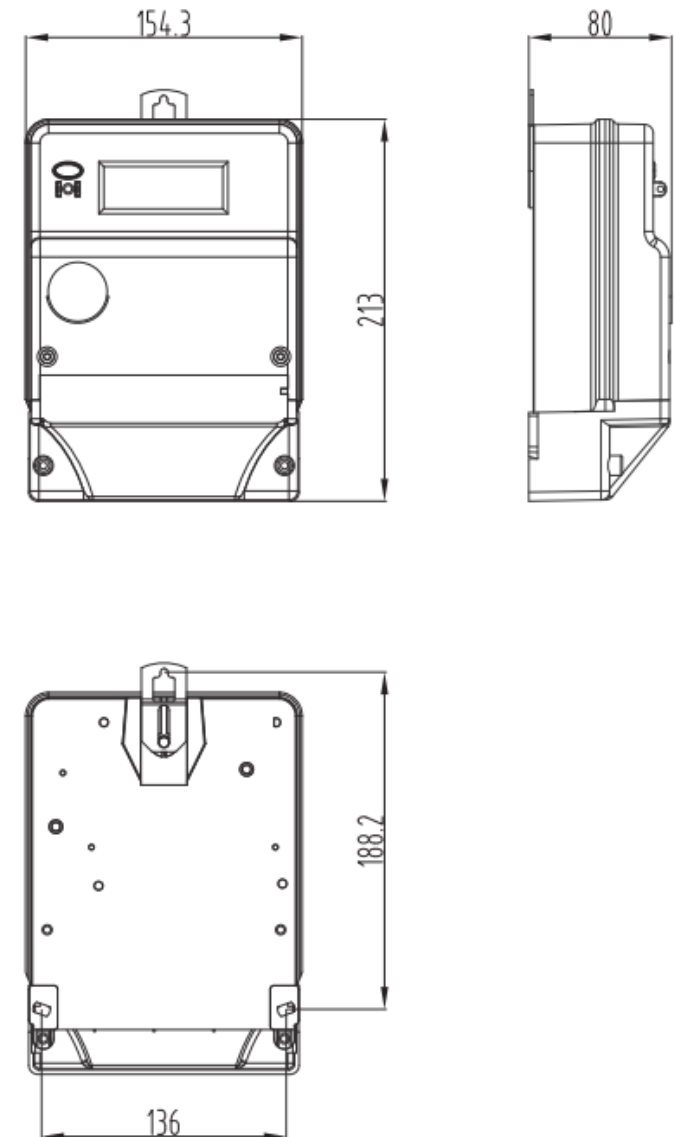


Three Phase meters, Dimensions

T600/T610 Series



T510 Series



T600/T610 Meter Models



Notation:
T600.225XZ- O
T610.ABZ.225X-O

X represents I_{\max} current:

- 6: 60A
- 8: 80A
- 1: 100A

Z represents Directionality : Blank or Y Import only
T Import-Export

A represents Active Energy Class : K : Class 1 , A : Class 0.5

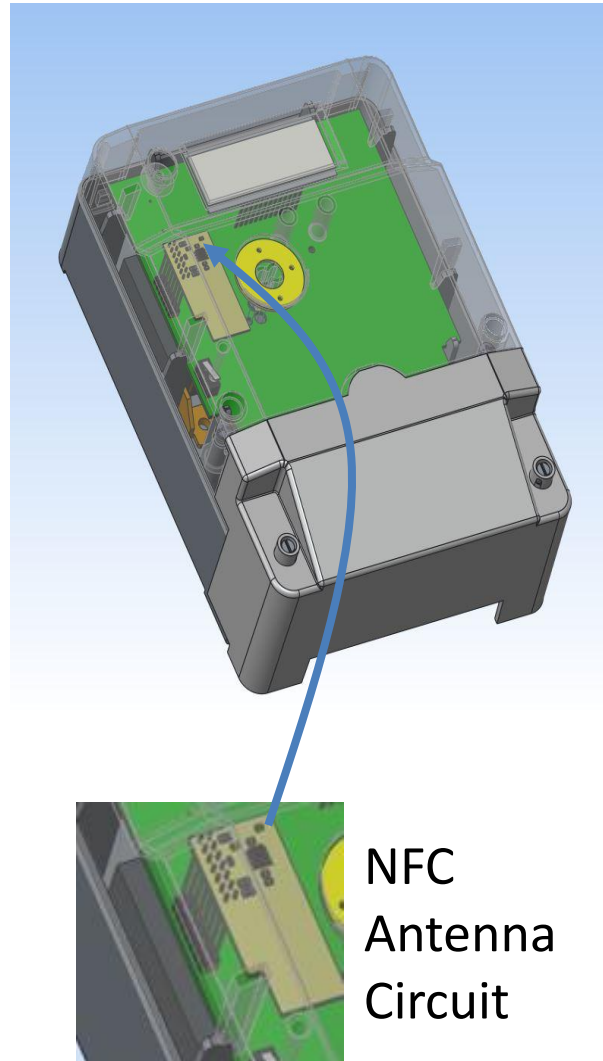
B represents Reactive Energy Class : 0 No measurement
M: Class 2

O is options

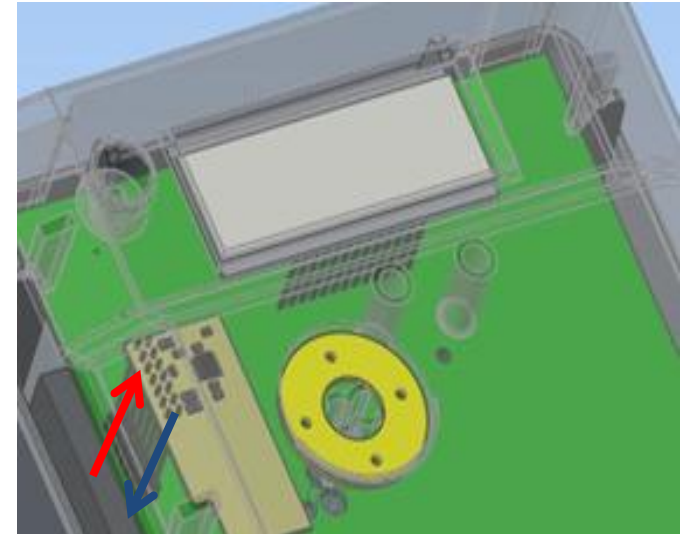
COMMUNICATION - NFC OPTION

Another communication feature of the meter is Near Field Communication(NFC) that brings many advantage for reading meter data. Meter data can be read by operator with NFC enabled

Devices ,
even meter broken
or not energized.
NFC circuit is
independent to meter
main processor and power
supply. It generate supply
voltage itself when close
NFC enable device.

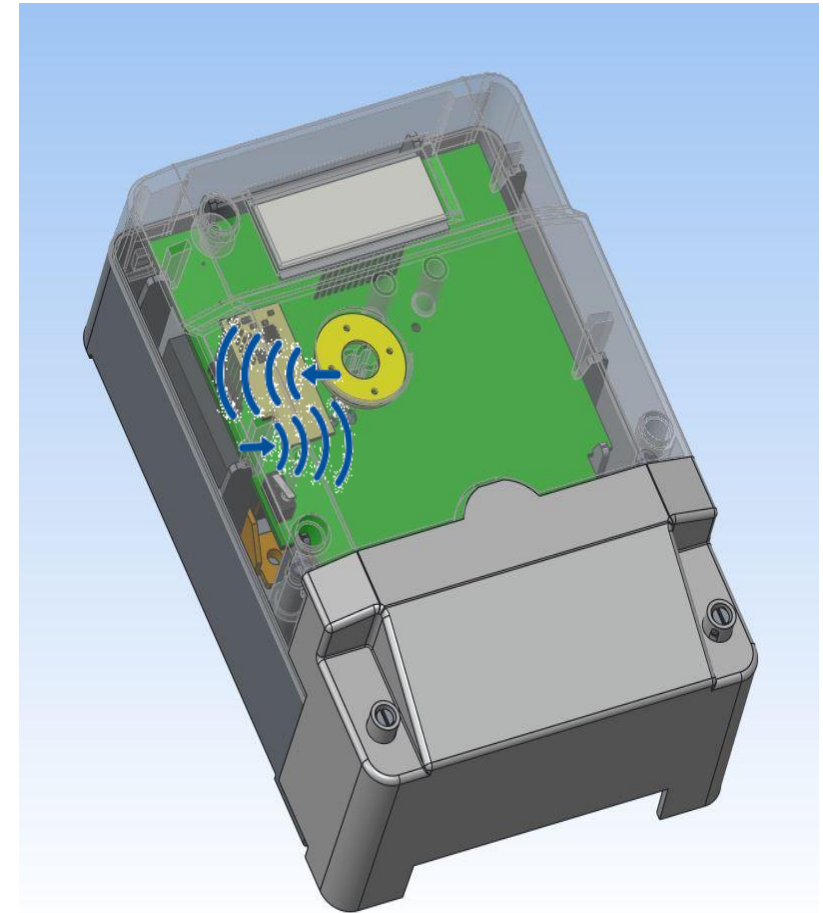
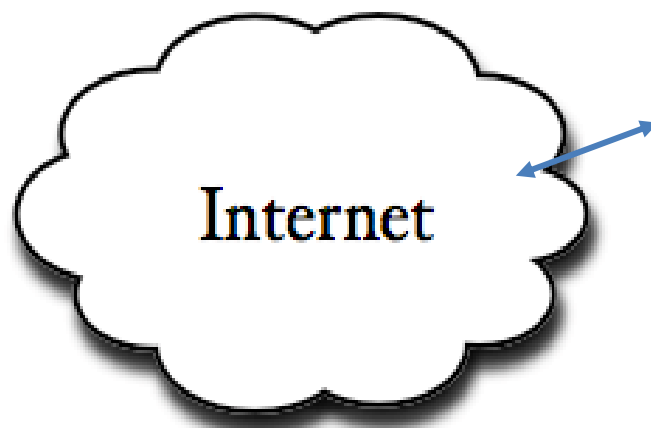


NFC
Antenna
Circuit



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COMMUNICATION – NFC OPTION



- Energy values can be read when phase voltage not exist, battery low, meter broken.
- NFC can be replace optical port communication
- High data security, crypto algorithm
- User friendly and secure Android Application.

Tampering Protection

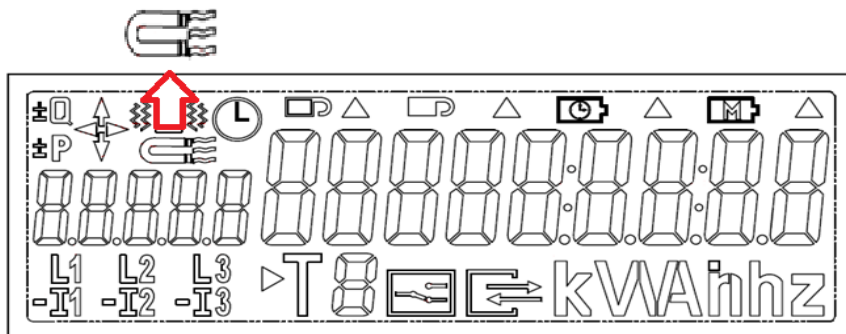
Meter protect itself against tampering attempt from outside and gives alarm both LCD and specific obis registers.

- Main Cover Opening Alarm
 - Terminal Cover Opening Alarm
 - Magnetic Tempering Detection
- are mainly tempering alarm flags.

From FW side, metrological data validate checksum calculation and periodic backup protect data external flash memory apart from main microcontroller.



PERMANENT
MAGNET



ies Three Phase Electricity
Meter

Smart Meter Migration

The meter mainly has 2 mechanical option as standard T600 or T610 and Smart Ready T600 or T610 Electricity Meter. The differences is extension PCB socket options and terminal cover.

Standard meter:

- Optical port
- 1X RS485 port (optional)



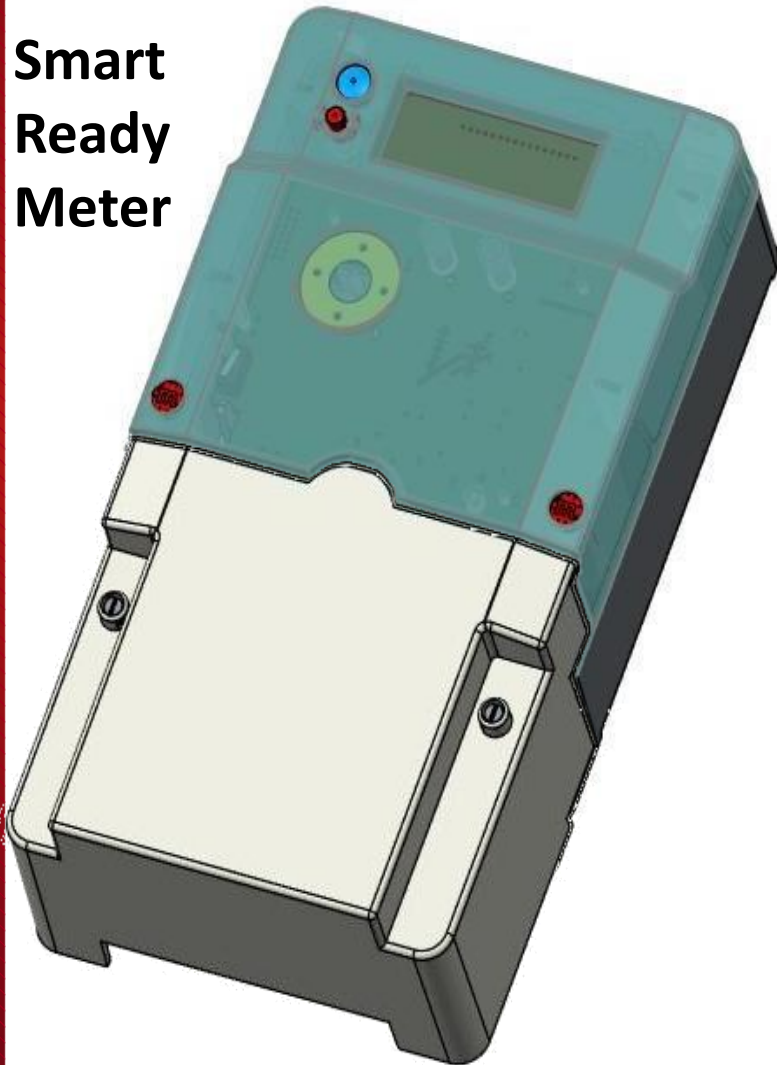
Smart Ready:

- Optical port
- Extension PCB design according to internal communication modem such as NB-IOT, PLC, GPRS

Modem can be insert inside of the terminal cover and connect the meter easily.

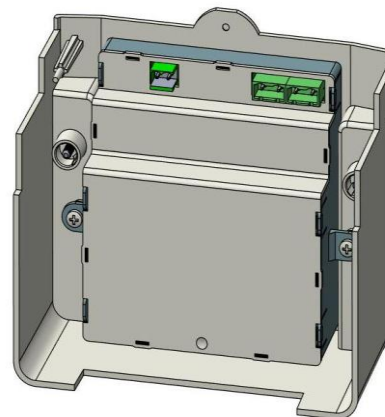
SMART METER MIGRATION

Smart Ready Meter



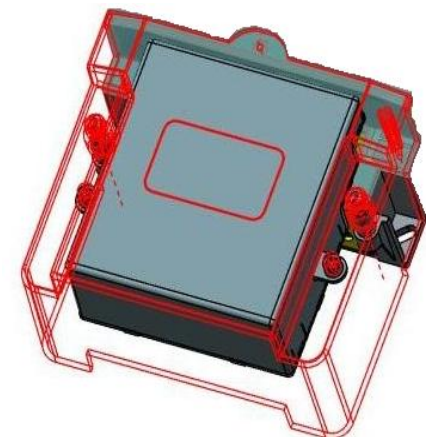
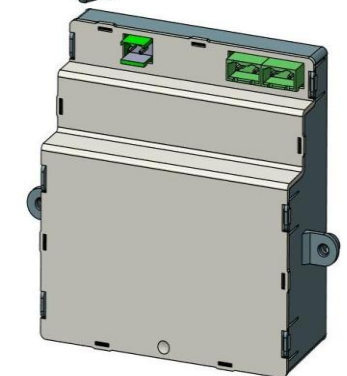
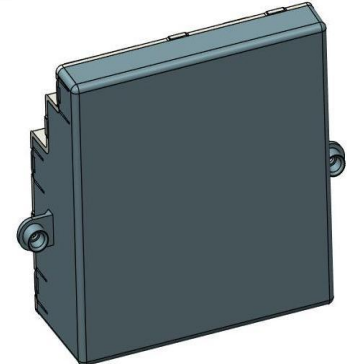
Smart Meter

- Low investment cost
- Support new technology
- Plug and Play
- Independent devices



Communication Modems

- RF-Mesh
- PLC,
- NB-IoT
- GPRS, 3G
- Future Models



C520 Meter General Characteristics



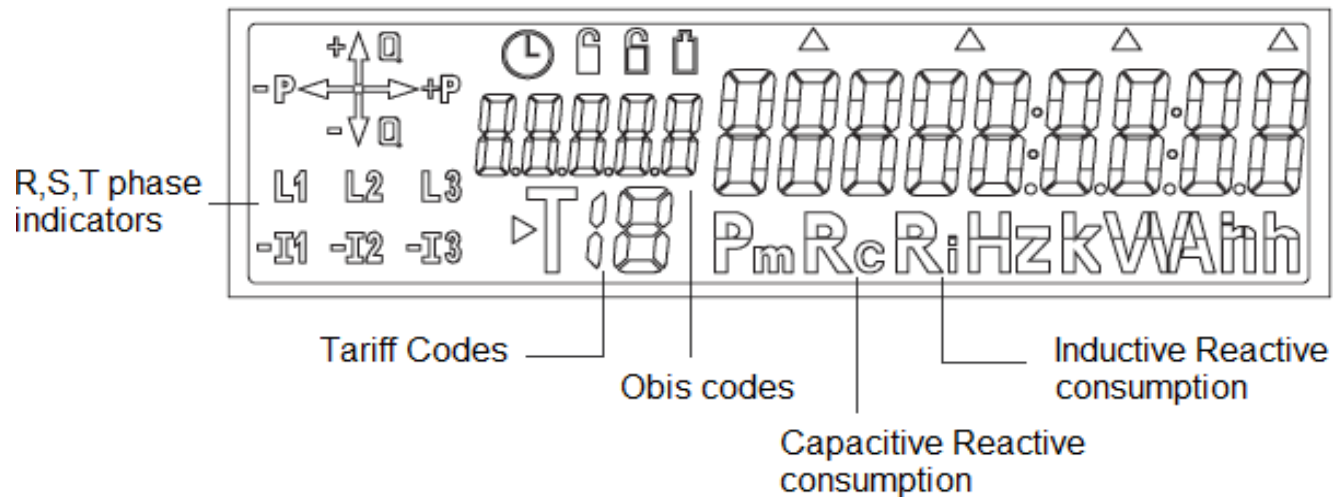
C520









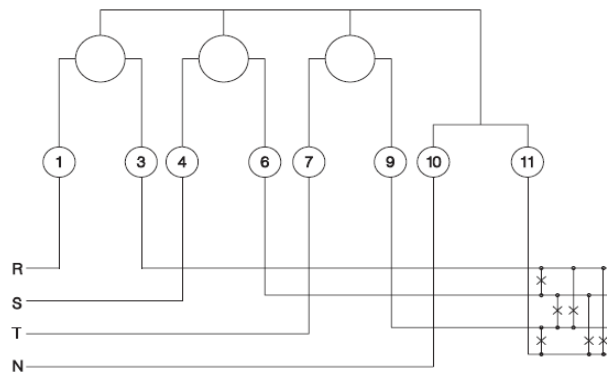
T610 Industrial

- Direct, CT and CT & VT connection options 5 (100) A, X / 5 (10) A, 220 / 380V, 58/100/220 / 380V
- Class C and Class B Active, Class 2 Reactive, one-way and bidirectional measurement options
- Load profile capacity up to 180 days with 5 channels 30min intervals, adjustable recording period from 1min to 60min
- Advanced 4 Tariffs (optional 16 tariffs), 8 time zones (optional 32) (optional season and holidays programming)
- Magnetic sensor despite magnetic manipulations
- Obis coded reading on EN 62056-21, optical and RS485
- Wide operating temperature -40 to +85 C
- Temperature and xtal calibration for low time drift
- Analysis up to the 15th harmonic
- Reading the instantaneous current, voltage, frequency, cos phi, information and demand information of each phase from LCD
- WDEV 2.0 compatible quadrant LCD
- 5A relay output
- Pulse output
- Dynamic adjustable menu

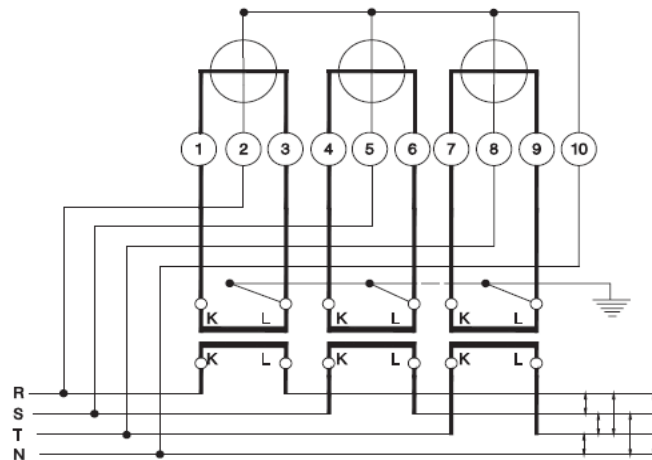
Industrial Meters LCD and connection diagrams



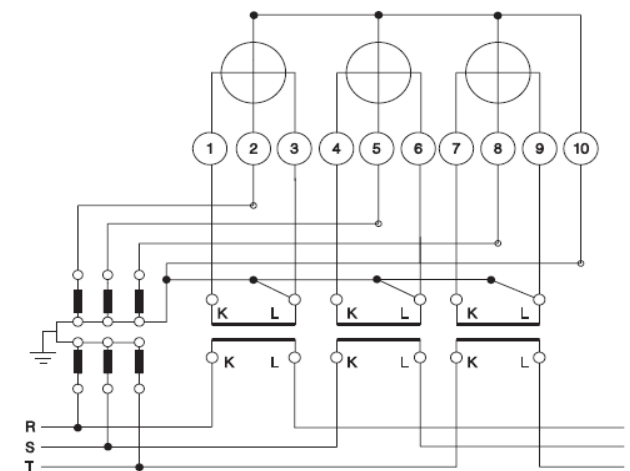
	Battery Status
	RTC error
	Terminal cover opening
	Main cover opening
	Active Tariff
	Maximum Demand



Direct

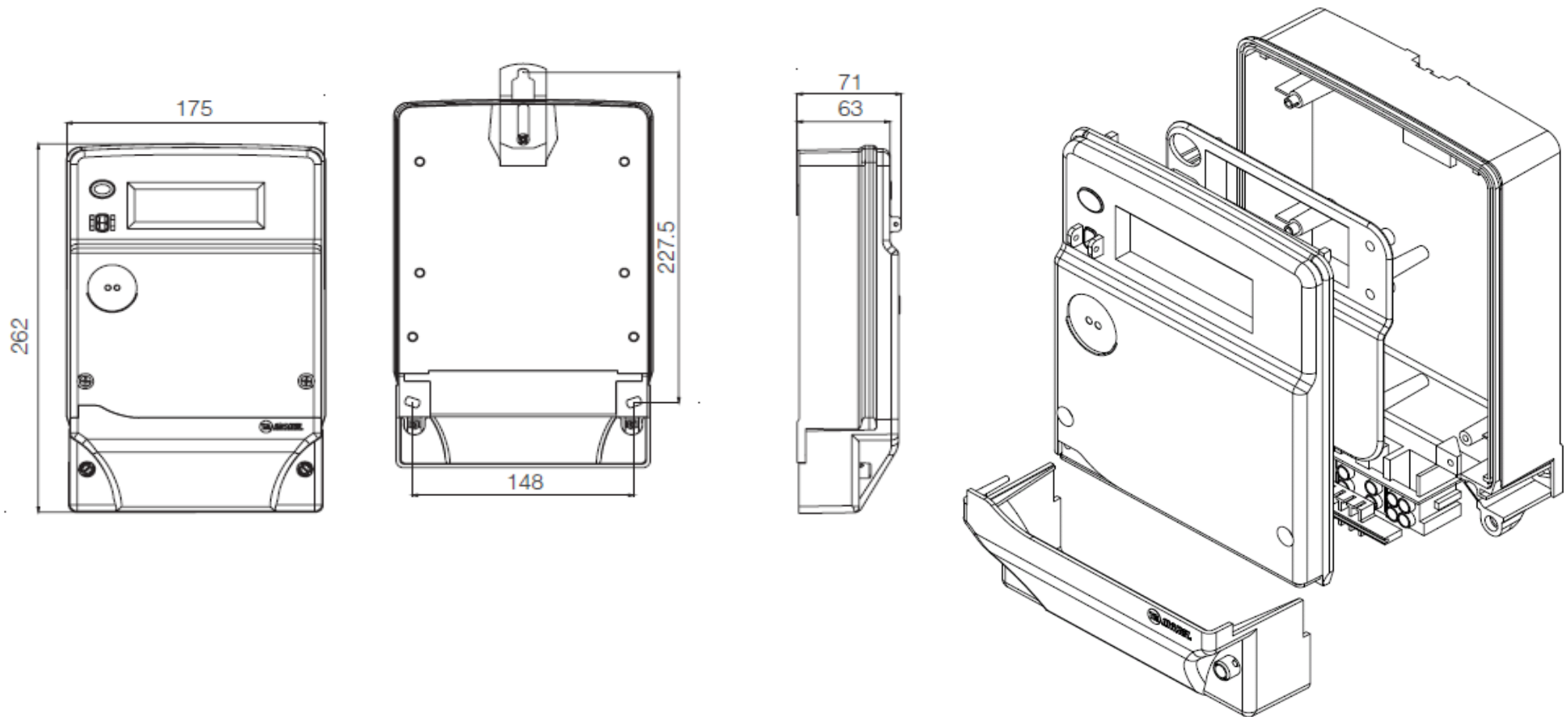


CT



CT and VT

Industrial Meter , Outline dimensions



MODEM TYPES

- Makel has different types of communication modems ;
- External modems are connected externally to meters using meters RS485 communication ports, Internal Modems are embedded under terminal cover.

• External Modem Types

- Wport2 GSM/GPRS Modem : In production
- Wport2E 3G modem : In production
- Nport-E , NBloT modem, In production
- Lport- E LoRAWAN :long range wireless modem , Field tests
- Pport G3-E , G3-PLC solution, Pilot stage
- Eport : Ethernet Gateway , In production
- Rport Ext : RF-Mesh in Production

• Embedded Modems

- Wport2-IT /Wport2-IM GSM-GPRS modem : In production
- Nport-IT /Nport-IM , NBloT modem : Samples
- Rport IT /Rport-IM : RF mesh, In production / Q1 2021

- Pport G3-IT and Pport G3-DCU: G3-PLC solution, available for Testing and Pilot
- Eport : Ethernet Gateway , Available at Q1 2021
- Lport- IT and Lport DCU : LoRaWAN long range wireless modem and DCU, Available for evaluation

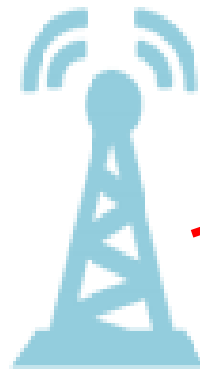
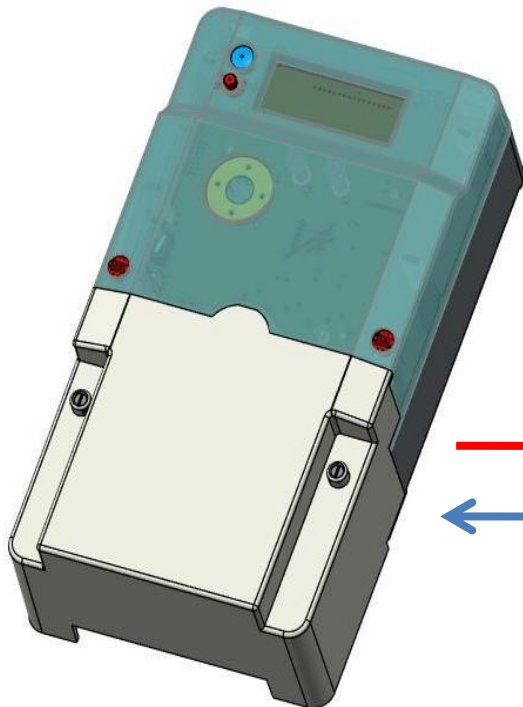
Nport-IT : NBloT Narrow Band IoT Modem

- ❖ *Low power requirements*
- ❖ *Low Service cost, No maintenance*
- ❖ *Comparably Higher Speed*
- ❖ *IP compatibility*
- ❖ *High security*

*NB-IoT
Module*

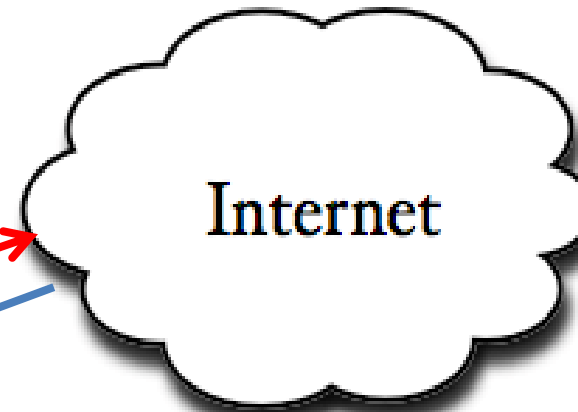


*Network
Management
Center*



NB-IOT

4G Base Station



Internet



NB-IOT (NARROW BAND - IOT) COMMUNICATION MODULE

Directly supported by 4G compatible mobile communication networks, the NB-IoT communication solution is the network solution to be used in M2M applications in smart networks and smart cities.

Because this network technology does not include a speech channel, has a low speed data channel, no channel allocation, and a base station can serve tens of thousands of NB-IoT modules, it will have much more affordable operational costs than GPRS, 3G and 4G data applications.

Low power requirements, usable with battery applications, and less energy consumption compared to high energy consuming PLC s seem to be important features.

The NB-IoT-enabled meters will be able to connect directly to the Internet, without the need for data concentrators. Due to the use of mobile telephony infrastructure, coverage will be the coverage of base stations.

NKM prefers NB-IoT technology because of its cost effectiveness, satisfactory throughputs, direct internet access, high security, LTE compatibility, robust infrastructure and maintenance free (base station etc.) operation.

Makel GSM/GPRS/EDGE ve Nb-IoT External Modems



*Wport2 GSM/GPRS/EDGE modem
(Internal and External)*



*Nb-IoT Modems (internal
and External)*



Internal Modem

Bands	B1, B2, B3, B4, B5, B8, B12, B13, B18, B19, B20, B25, B26, B28, B66, B71, B85
Output power	LTE: 23 dBm (Power Class 3)

Modem connections - External and integrated models



External Modems



Integrated modems



T600 Smart Meter

General Specifications

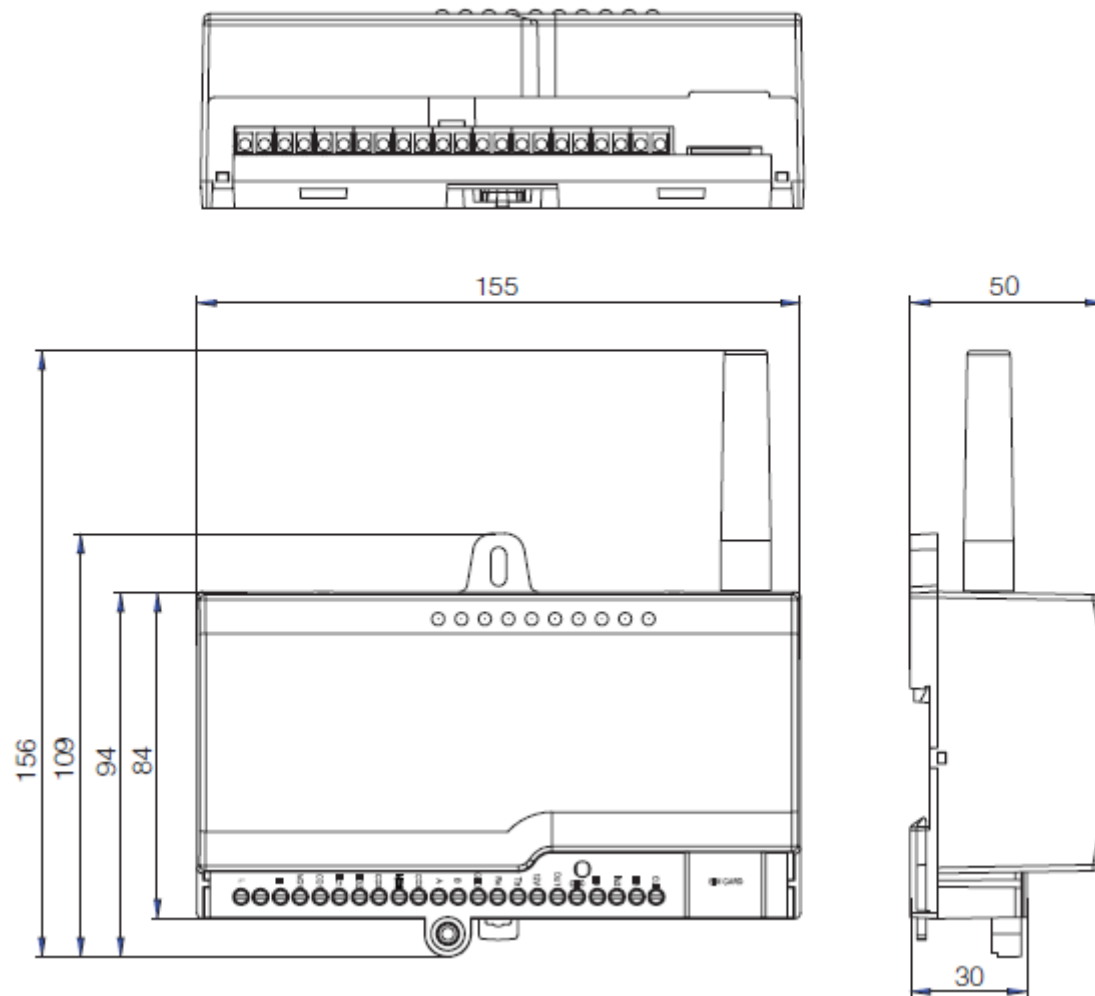
- ▶ Support simultaneous multiple port TCP/UDP/IP protocols on GPRS/EDGE and NB-IoT
- ▶ Operator independent
- ▶ Provides secure communication with its powerful DES algorithm
- ▶ Supports software upgrade through air.
- ▶ RTC can also be updated using time data from 3G/4G Network.
- ▶ Supports IEC 62056-21 mod C and DLMS-COSEM protocols for meter communication with variable speeds.
- ▶ Modem device, store logs of remote remote or local software updates, parameter definitions, access attempts from unauthorised IP's other than defined IP, signal deficiencies, auxiliary information such as network errors and similar information along with date/time tags related to these events.
- ▶ Periodic and instant orders with variable contents can be defined According to these orders, WPort2/NPort-ET automatically communicates with meters and collects requested data and stores them in to its memory and realizes requested control operations.
- ▶ It is equipped with three digital inputs for instrument panel, opening cover or similar needs.
- ▶ It is equipped with 3 relay outputs for the activation of devices connected externally.
- ▶ Supports GSM/GPRS/EDGE, 900/1800/1900 Class B / LTE/CAT NB1/B20/B8 communication.
- ▶ External antenna can be connected in case of poor signal conditions.
- ▶ WPort2/NPort-ET has signal led's for indications such as connection status and communication activities.
- ▶ Sim card can be inserted and removed with its push/push type sim card connector without opening the device case.
- ▶ WPort2/NPort-ET has simultaneously working RS232 and RS485 communication interfaces. RS485 interface supports up to 31 meters connected simultaneously.
- ▶ All connections terminals are sealable
- ▶ Automatic reset feature provides a failsafe mechanism to recover from locks.
- ▶ 100% compatible to web based Makel Usobim AMI/AMR system.

Technical Specifications

Model	WPort2	NPort-ET
Communication type	GSM/GPRS/EDGE	LTE CAT NB1
Frequency Band	900/1800 MHz	900 /1800 band
GPRS Class	Class 10	B20 / B8
TCP/IP Support	Yes	No / UDP
RS232 Communications	1 unit	1 unit
RS485 Communications	1 unit	1 unit
Digital inputs	3 unit	3 unit
CLI Input	1 unit	1 unit
Relay Capacity	1 unit 10A 250VAC, 2 unit 5A 250VAC	1 unit 10A 250VAC 2 unit 5A 250VAC
Digital output	1 unit	1 unit
Communication Type	RS232 ve RS485	RS232 ve RS485
Sim Card	1.8V/3V	1.8V/3V
External Antenna	SMA (50 Ohm)	SMA (50 Ohm)
RTC	Yes	Yes
Operating Temperature	-30°C / +75°C	-30°C / +75°C
Operating Voltage	50V - 300V	50V - 300V
Dimensions	155 x 110 x 50	155 x 110 x 50
Weight	250 gr	250 gr
Remote SW upgrade	Yes	Yes
Data Security	DES	DES

Outline Dimensions

External Modems



RF Mesh Solution

- RPORT-IT /Rport-IM (Three phase and Single phase meters)
 - IEEE 802.15.4e 6TISCH time slotted channel hopping Medium Access protocol
 - Spread spektrum
 - 250 kbps /net 80 kbps throughput on single channel
 - Mesh support with IPV6
 - 2.4 Ghz and Sub 1 GHz Support
 - Very Low power
 - Secure Join AES128/256
 - 16 Parallel Channel can bu used to increase throughput
 - Lipo battery for energy faults



Rport-IT

- Rport-REPS
 - Solar panel supported intermediate nodes to extend coverage.



- Rport – DCU
 - DCU for 200 – 400 Nodes
 - Quad Core Arm Cortex A53, 1.2 GHz



GPRS Modem Configuration :

Installation of SIM card

- Please remove the terminal cover from meter (Fig. 1, 2, 3)
- Detach the modem from terminal cover (Fig. 4 – 7)
- Insert the sim card and antenna (Fig. 8, 9)
- Replace the modem to terminal cover and fix it with screw. (Fig. 10)
- Put the terminal cover on meter. (Fig. 11, 12)
- Energise the meter.
- Modem is ready to use. Please look at the back side, leds blinks up.



1



2



3



4



5



6



7



8



9



10



11



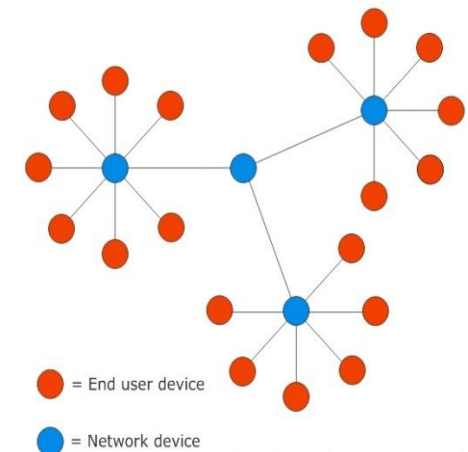
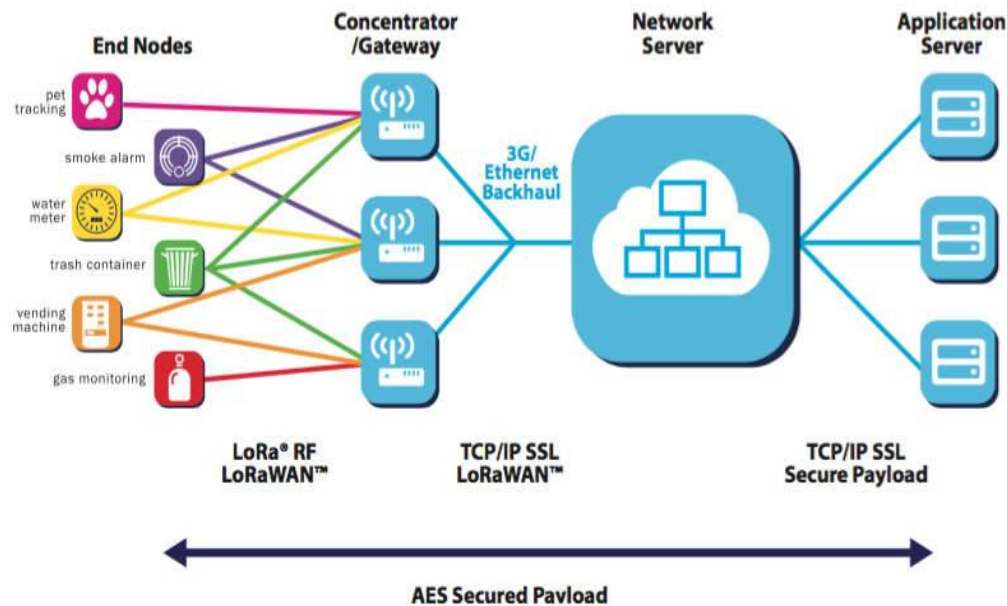
12

Makel Eport Gateway -100 Mbps Ethernet interface



- ❖ Communicating over Ethernet infrastructure
- ❖ Fully integrated with Makel USOBIM
- ❖ To be able to read many domestic and foreign brand meters with the support of central services

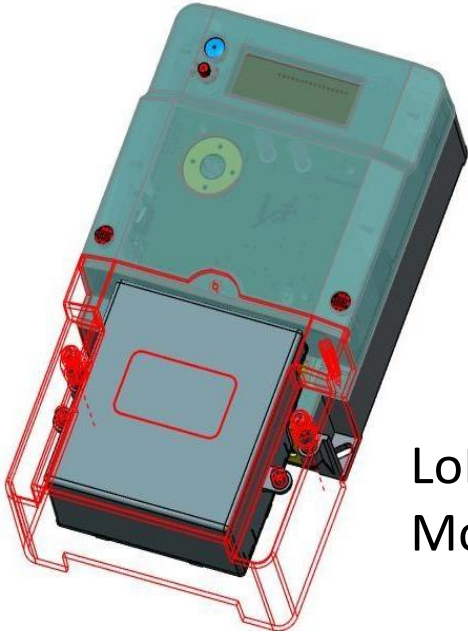
LoRAWAN long distance Wireless



Star Network

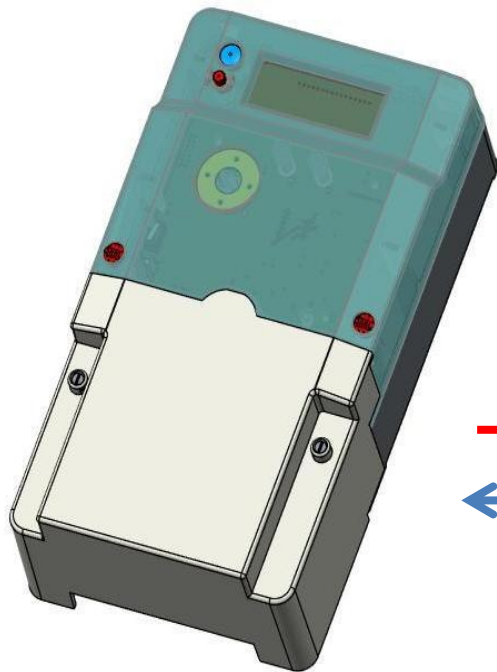
- ❖ Speed is a little low, but the distance is quite high
- ❖ Sub 1Ghz , long distance (20km)
- ❖ 300bps - 5kbps

LoRAWAN, Lport-IT Modem



LoRAWAN
Modem

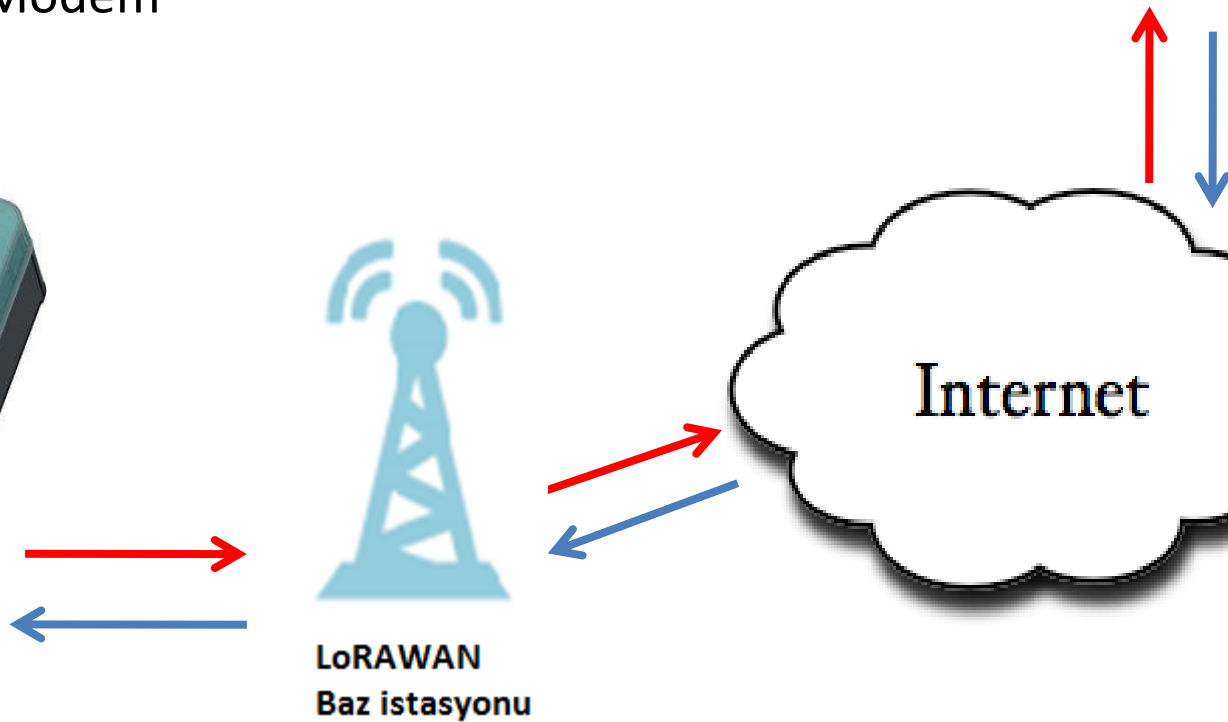
- ❖ Long Distance
- ❖ Requires Base station (data concentrator up to 500 Nodes in a single network)
- ❖ Low Power



LoRAWAN
Baz istasyonu



Network
Management
Center



PLC SOLUTIONS

It is the communication made without the new infrastructure by using the existing 230V power lines.

1st generation PLC - Old technology 1970 - 90

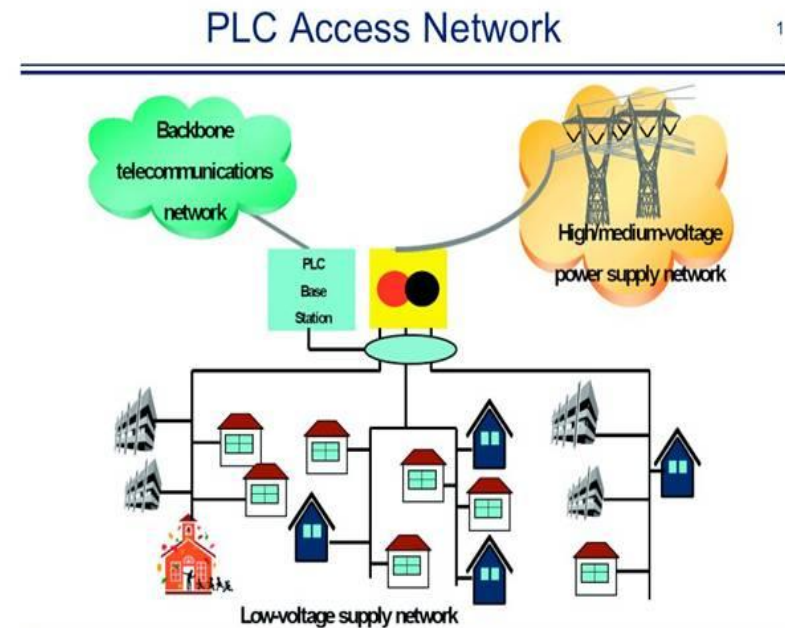
2nd generation PLC solutions based on FSK 1990 - 2005

3rd generation PLC solutions based on OFDM 2010 -
Narrow band long distance indoor and outdoor 1-1.5 km (counter and similar applications)

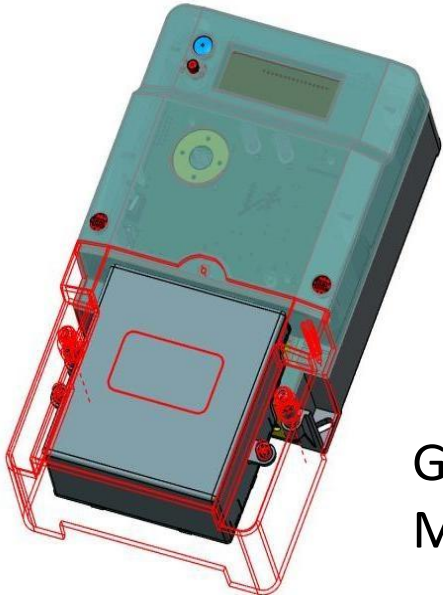
Wide Band Short Distance In-Building 40 - 50m
(Building, Home Internet Connection Devices)

3rd Generation PLC standards

- PRIME - Spain: Iberdrola, Endesa
- G3 France, ERDF, IPv6 compatible
- IEEE.1901.2 General



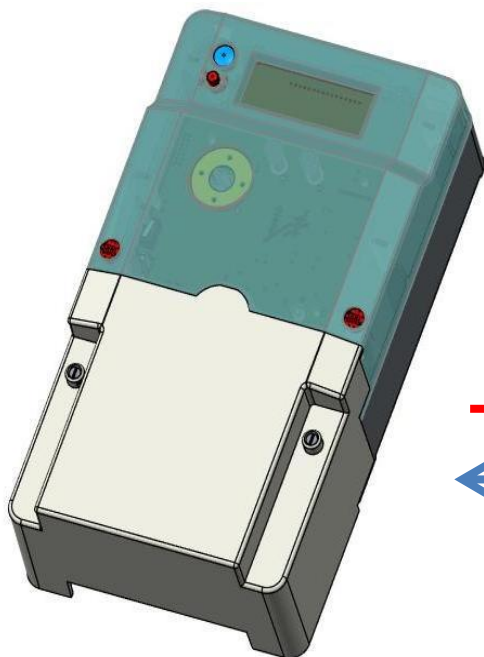
Pport- IT: G3-PLC (Power Line Communications)



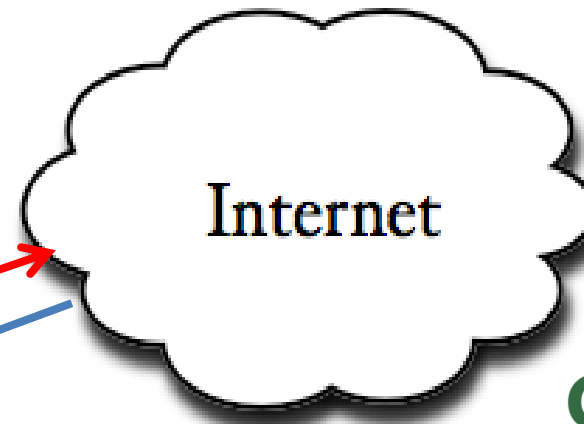
G3-PLC
Modem



Network
Management
center



Makel Pport DCU-G3



Internet

G3-PLC
Alliance

PREPAID METERS

- Split type Card based Meters
- Split type Keypad meters
- Split type NFC meters

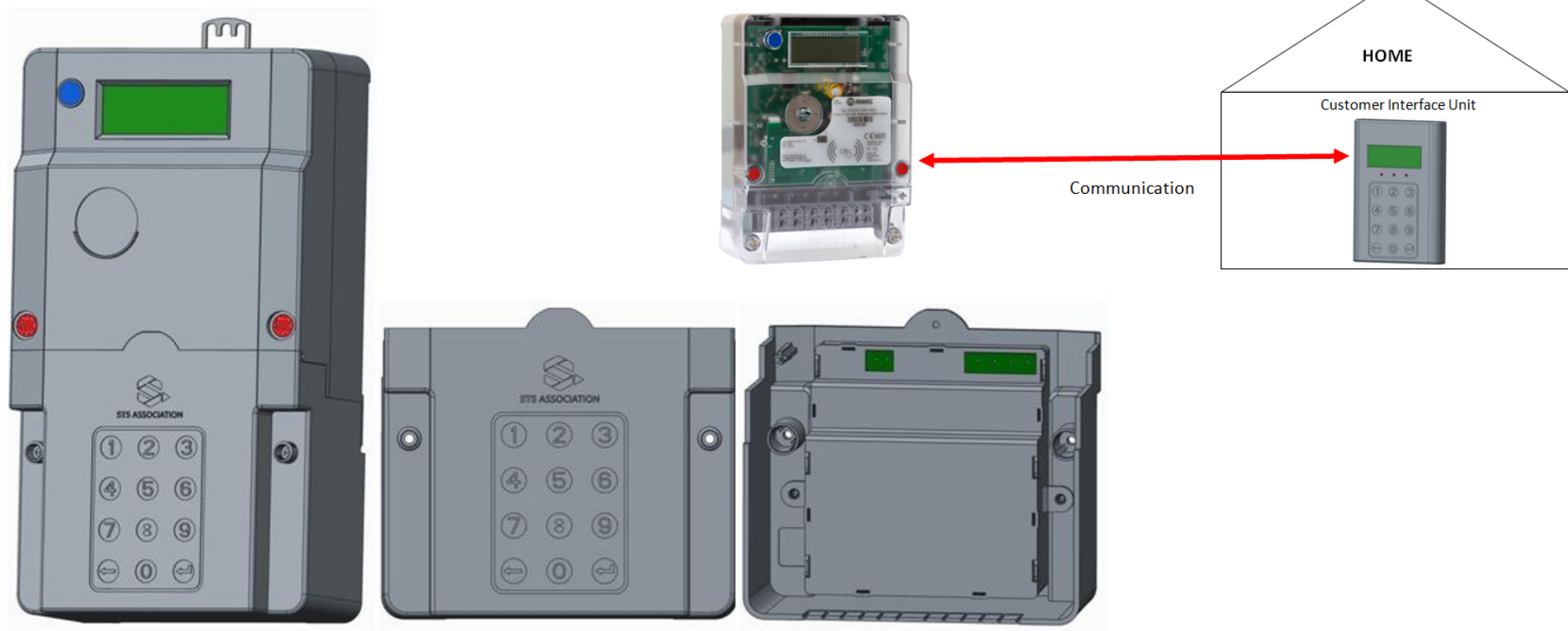
SINGLE PHASE METERS – STS Meters M610.KMT.2251 series

- Add-on Keypad enables STS Token entry.
- STS Token entry can also be entered via Makel customer interface unit optionally
- For CIU , RS485 and RF versions will be available soon.
- Meter LCD menu displays purchase credit, remain credit, token entry result etc.
- This menu may customize according to customer request.

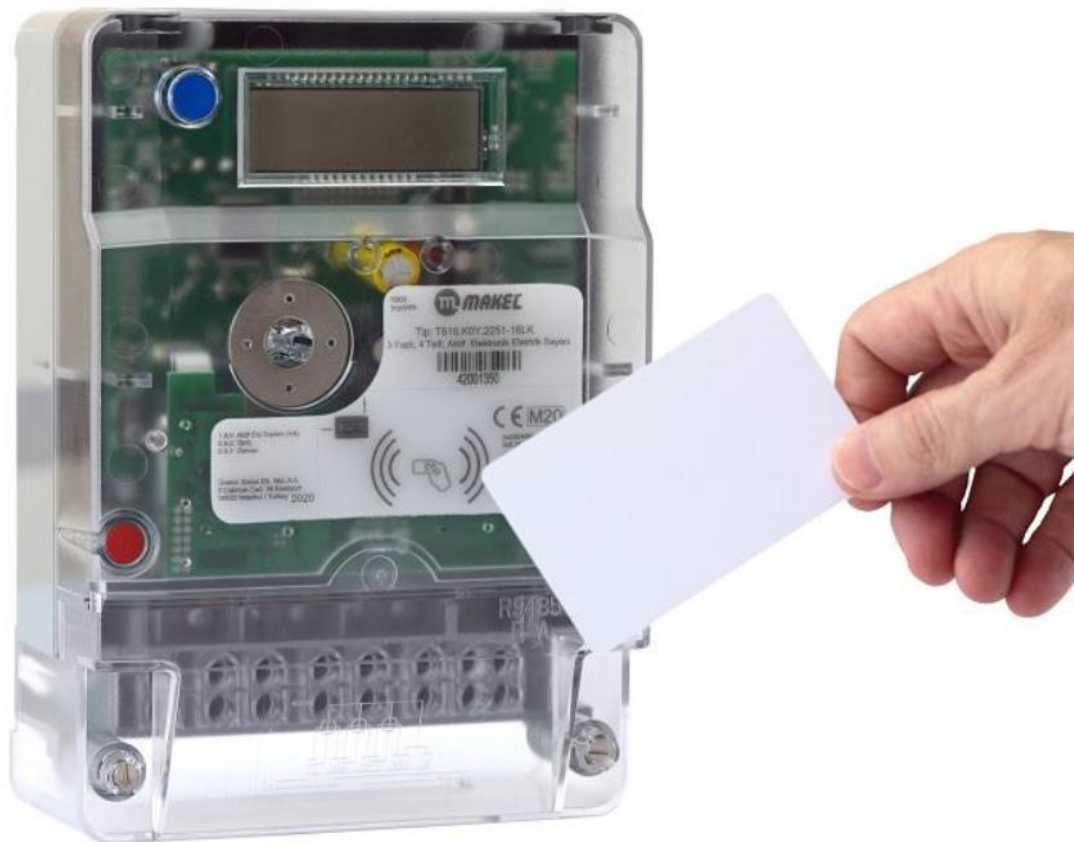


THREE PHASE METERS – STS Meters T610.KMT.2251 series

- Add-on Keypad enables STS Token entry.
- STS Token entry can also be entered via Makel customer interface unit optionally
- For CIU , RS485 and RF versions will be available soon.
- Meter LCD menu displays purchase credit, remain credit, token entry result etc.
- This menu may customize according to customer request.



CARD TYPE THREE PHASE METERS –T610.KMT.2251-C16LK series



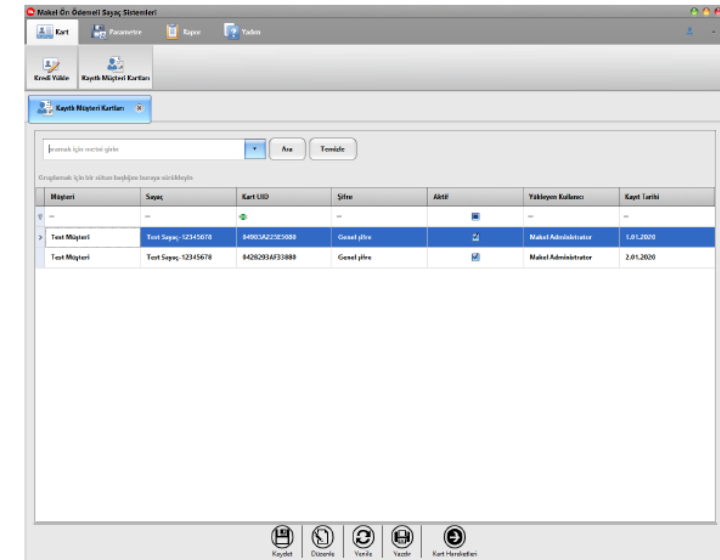
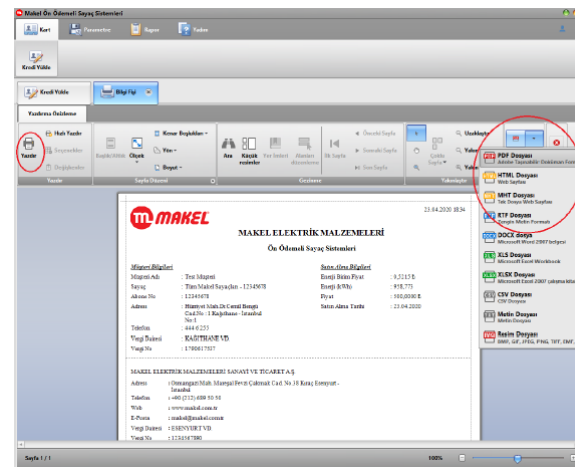
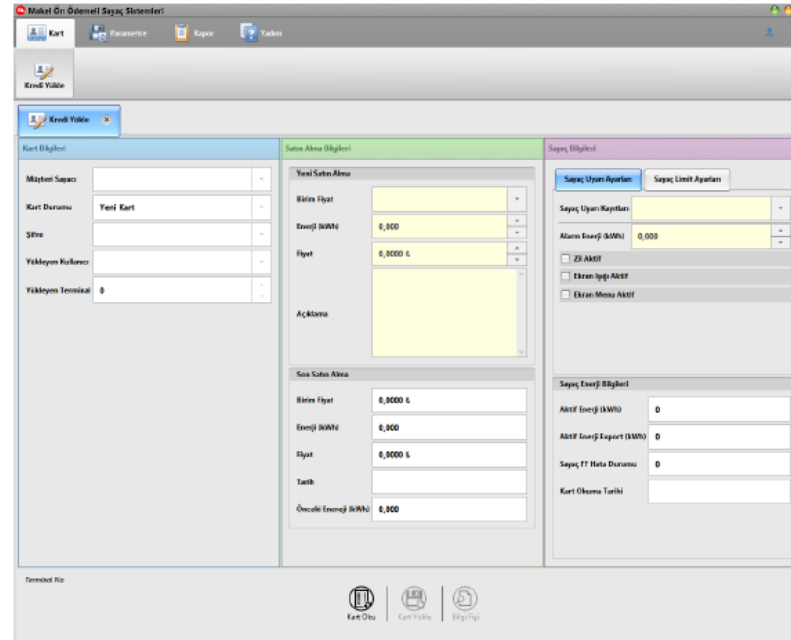
- 100A
- Highly Secure Mifare Plus Card support
- Demand Limit
- Friendly times
- Warning Options
- Credit Refund

CARD TYPE SINGLE PHASE METERS –M610.KMT.2251-C16LK series



- 80A , 100A version
- Highly Secure Mifare Plus Card support
- Demand Limit
- Friendly times
- Warning Options
- Credit Refund

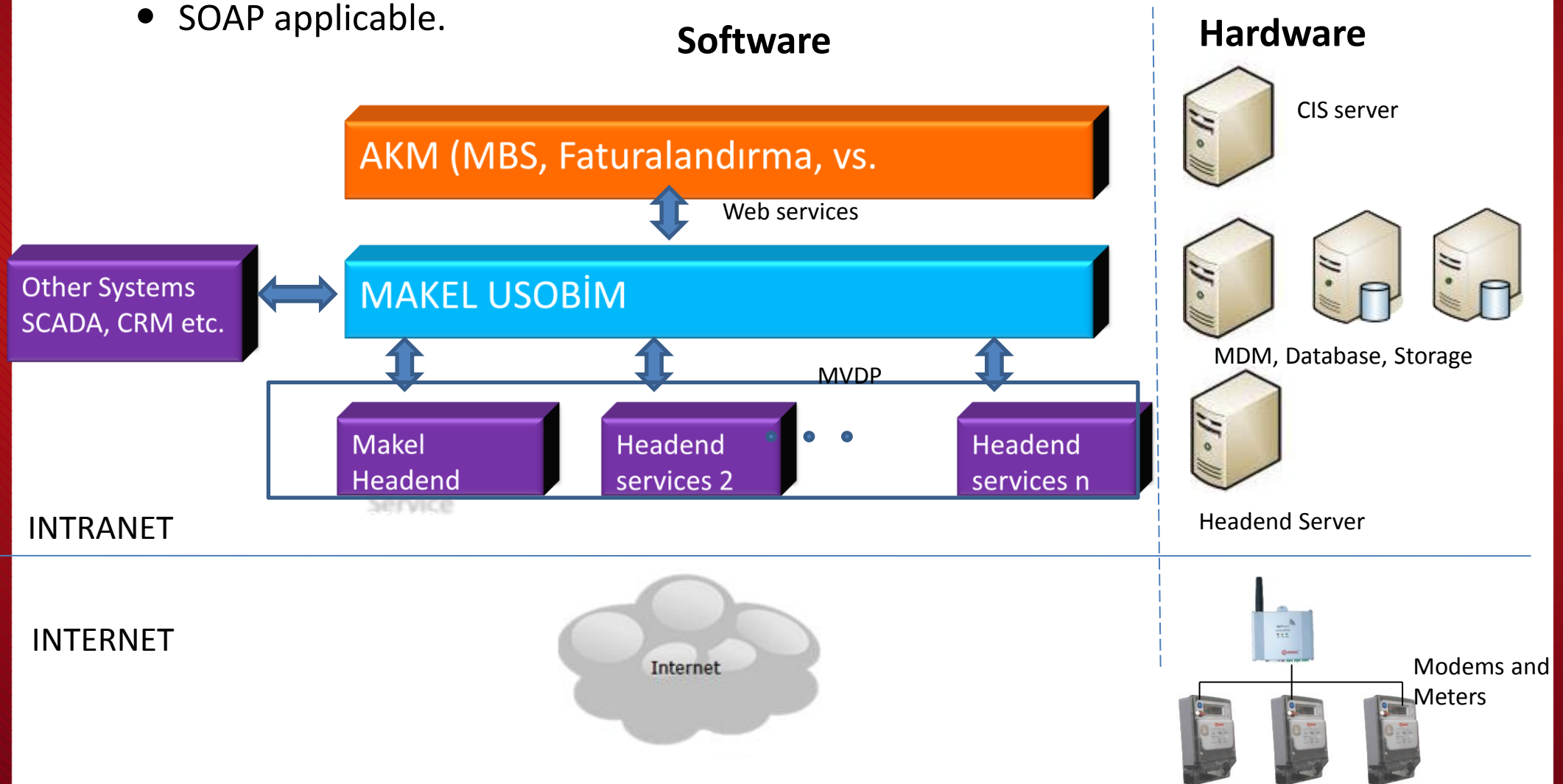
MCR-01 CARD READER



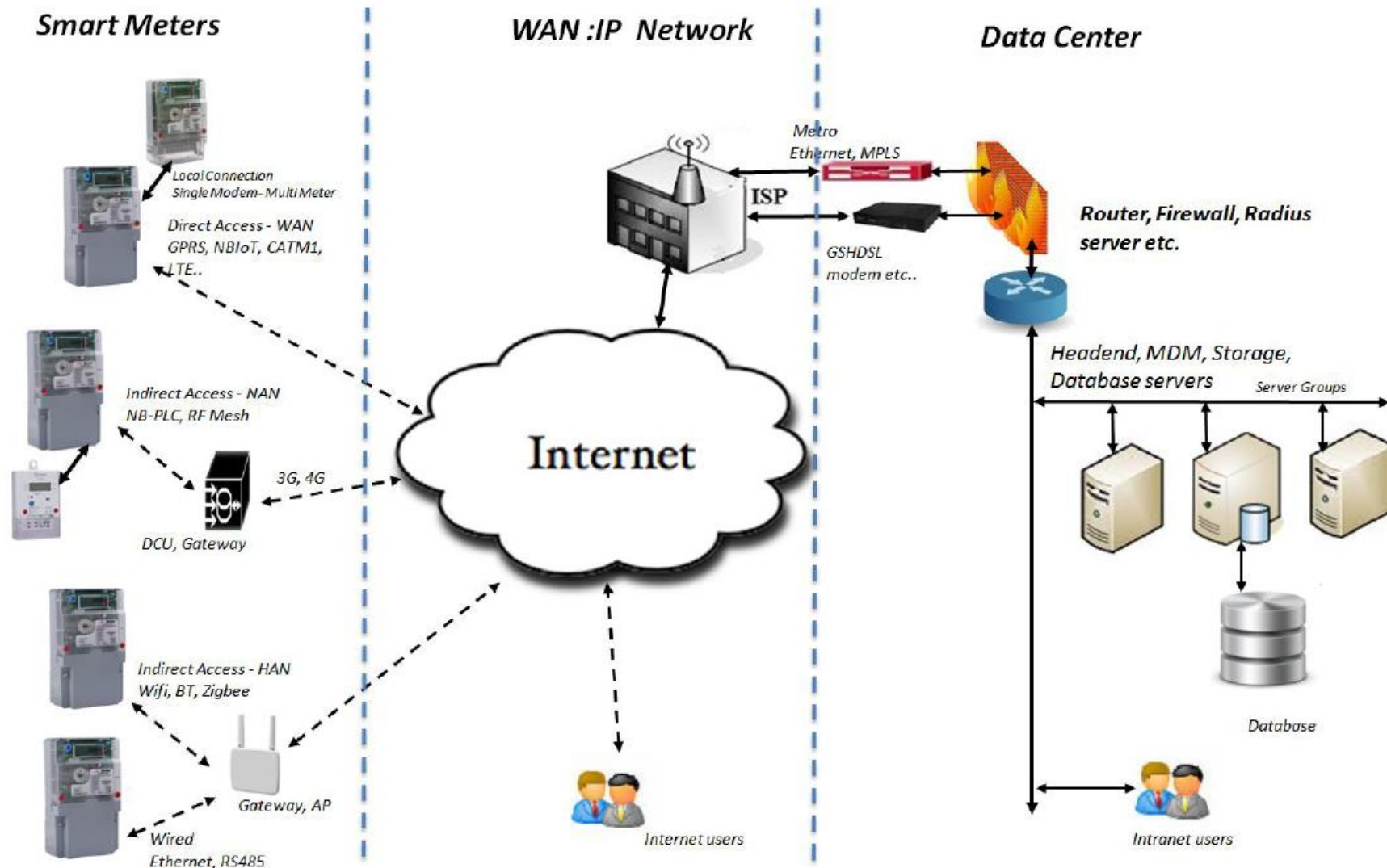
- API support
- Windows Application

MAKEL AMI Solutions

- Makel USOBİM (AMI System software)
 - SOA (Service Oriented Architecture)
 - XML based web services(MVDP Modem Data Exchange Protocol)
 - SOAP applicable.

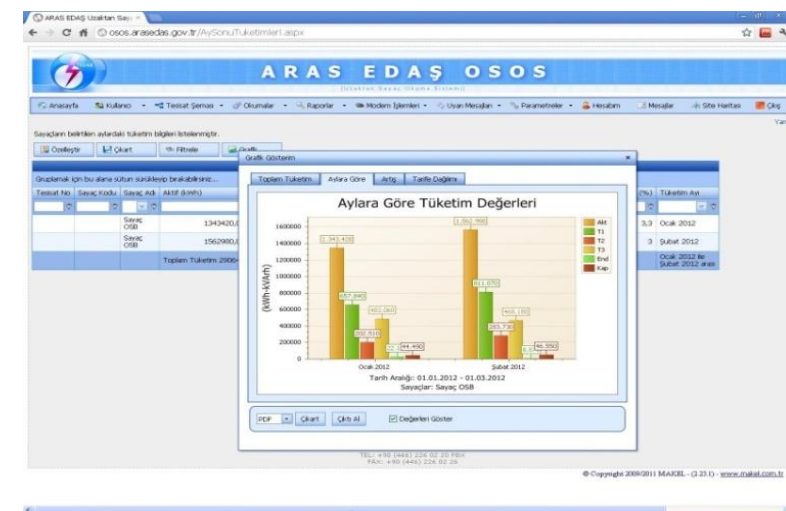
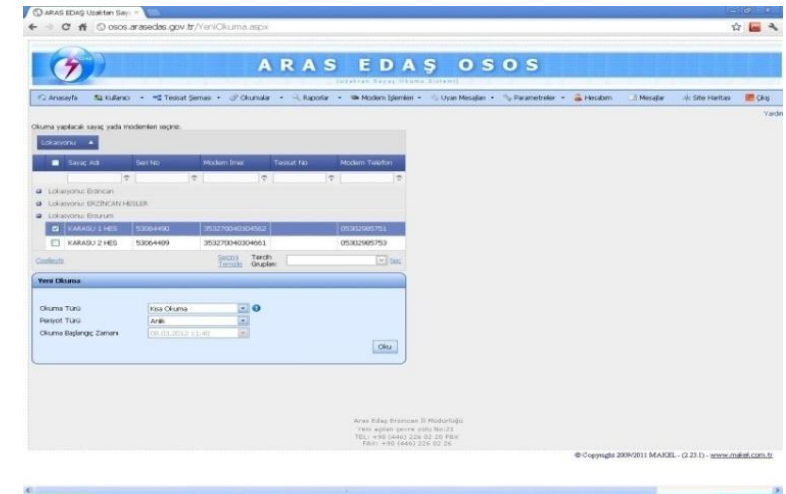


USOBIM System Basic Architecture



MAKEL USOBİM-1

- Applications over 4000
- 100% web interface
- Meter data collection, management and report
 - Different Level of authorisation
 - Virtual Locations
 - Periodic or instant read or control commands
 - Messaging
 - Data access and content security
 - Advanced queries
 - Various Alarm Triggers: ratio Reactive/active, unsuccessful comm., consumption inconsistency
 - Various reports and exports: OSF forms, xls, txt, pdf, JPG, PNG....
- Service Oriented Architecture (SOA)
- Communication between different systems (GIS, CIS, SCADA, OMS ...)



- [illegible]

MAKEL Headend communication service

- SOA based, AMI communications service: windows background service.
- Security : DES.
- IEC 62056-21 and DLMS-COSEM protocol support.
 - Communicates with many meters with different brands.
- All kind of information can be transferred from or to meters
- Checks data integrity
- Able to read more than one meters if connected to one modem.

- **LOG Records**

- remote or local parameter updates,
- unauthorized IP access,
- Signal insufficiencies.

- **Work orders support (push-mode)**

- Periodic work orders.
- Readout, package and load profile readings
- Reading the meters at specified times and sending the data to the center
- Storage of data in communication with the center, sending when communication is established

- **Packets**

- 4 ready package definition (Counter ID, meter status, energy indexes, meter errors)
- Create up to 10 user-defined packages

A screenshot of a web interface login page. The page has a light gray background. On the left, there is a white rectangular box with a gray border. Inside this box, the word 'GİRİŞ' is written in a large, bold, sans-serif font. Below it, there are two input fields. The first is labeled 'Kullanıcı Adı:' and the second is labeled 'Şifre:'. Both labels are in a bold, sans-serif font. Below the input fields, there is a button labeled 'Giriş' in a bold, sans-serif font. To the right of the input fields, there is a small icon of a padlock with a yellow and black striped band around it, indicating a security or login status.

Web interface login page

WEB Interface

- Can be accessed over both internet or intranet
- Users can be authorized on a specific meter or on a specific virtual location.
- Users access can be limited according to which pages they can access or which transfer requests they can define.

WEB Interface

- Transfer requests can be defined to meters instantly or periodically like hourly, daily, weekly, monthly.
- Users can send messages to other users on the system.
- Users can define automatic warning message parameters in order to get warning messages by SMS or E-Mail

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Yeni Okuma										
<input type="checkbox"/>	Müşteri	Tesisat No	Seri No	Sayaç Kodu	Sayaç Adı	Abone No	Modem-İmei	Modem Adı	Modem-Telefon	APN Bilgisi
<input type="checkbox"/>			73294609		Sağlamlar Atlıhisar(7322)	10000073220	352421043613381	Sağlamlar Atlıhisar(7322)	05344133334	mgbs
<input type="checkbox"/>			67266013		KURT İNŞAAT SERA 6075	10000060750	352421040734263	KURT İNŞAAT SERA	05308123681	mgbs
<input type="checkbox"/>			67263013		İplikçiöğlü Petrol Çevre Yolu (4288)	10000042880	352421043608415	İplikçiöğlü Petrol (4288)	05309923121	mgbs
<input type="checkbox"/>			67268668		İplikçiöğlü Petrol Filli Kavşak (6148)	10000061480	352421043609702	İplikçiöğlü Petrol (6148)	05309923122	mgbs
<input type="checkbox"/>			60020226		Afyon Yumurta	0	352421040743942	Afyon Yumurta	05307420037	mgbs
<input type="checkbox"/>			80013948		ULAŞ	10000001590	352421043620360	ULAŞ	05309923123	mgbs
<input type="checkbox"/>			50959599		BORAN 640	10000006400	352421040722540	BORAN 640	05344272908	mgbs
<input type="checkbox"/>			80047670		BORAN 642.1	10000006421	352421040360671	BORAN 640.1	05344236870	mgbs
<input type="checkbox"/>			60038328		İPEK 647.1	10000006471	352421040782429	İPEK 647.1	05305902666	mgbs
<input type="checkbox"/>			80049009		İPEK 648	10000006480	352421040360663	İPEK 648	05305902667	mgbs

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Yeni Okuma

Okuma Türü: Kısa Okuma

Periyot Türü: Anlık

Okuma Başlangıç Zamanı: 14.05.2018 14:15

Okuma Bitiş Zamanı:

☐ Bitiş Zamanını Seç

Periyot Sıklığı: 1

Oku

Transfer Request Page

WEB Interface

- Web interface is pure and easy to understand.
- All report pages can be exported to Excel, Word or CSV format.
- All graph report can be saved as image types like JPG, GIF, PNG etc...
- Report pages can be customized by users.
- All report pages has filter panel which enables to filter by meter or virtual location.

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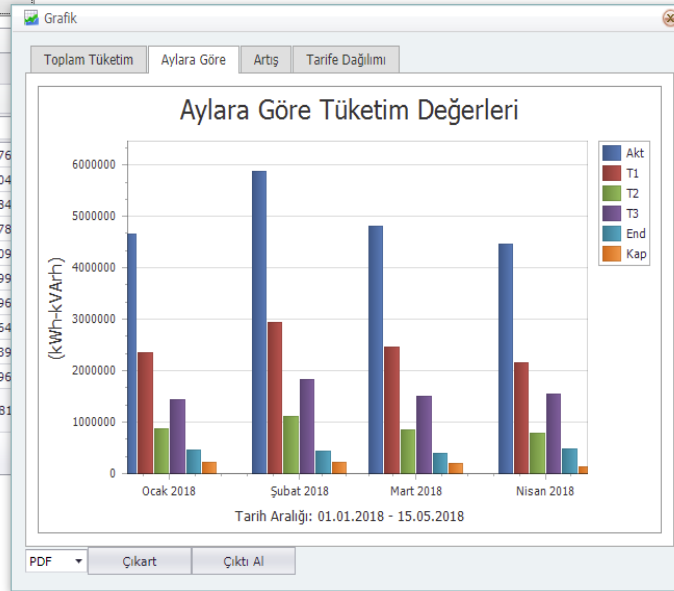
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Sütun başlığını o sütuna göre gruplamak için buraya sürükleyin

Tesisat No	Seri No	Sayaç Adı	Aktif(kWh)
	50959444	Çimento(4170)	376
	50959444	Çimento(4170)	304
	50959599	BORAN 640	84
	50959599	BORAN 640	78
	50959599	BORAN 640	109
	50959599	BORAN 640	99
	80047670	BORAN 642.1	1496
	80047670	BORAN 642.1	1064
	80047670	BORAN 642.1	1539
	80047670	BORAN 642.1	96

Toplam 198181

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Aktif(kVarh)	End/Aktif (%)	Kap/Aktif (%)	Dönem	#
0,000	0,1	0	Ocak 2018	
0,000	0,1	0	Şubat 2018	
590,720	13,3	7	Şubat 2018	
715,520	10,7	9,2	Ocak 2018	
580,960	14,6	5,3	Mart 2018	
468,960	17,3	4,7	Nisan 2018	
780,640	14,8	0,5	Nisan 2018	
484,480	8	0,5	Şubat 2018	
887,520	9,7	0,6	Mart 2018	
308,960	4,6	3,2	Ocak 2018	
795673,855			Mart 2018 ile Şubat 2018 arası	

Sayfadaki kayıt sayısı: 10

Consumption Graphs

WEB Interface

- Web Interface can give the following reports at least:
 - Last Transferred Energy Indexes
 - All Transferred Energy Indexes
 - Monthly Energy Indexes
 - Monthly Energy Consumptions/Productions
 - Load Profile Data
 - Power Off Dates on Each Phase
 - Warning Count
 - Meter Date-time and System Date-time difference

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Okunan Tüm Endeks Bilgileri

Sütun başlığını o sütuna göre gruplamak için buraya sürükleyin

Tesisat No	Seri No	Sayaç Adı	Tarih	Aktif(kWh)	Tarife 1(kWh)	Tarife 2(kWh)	Tarife 3(kWh)	Endüktif(kVArh)	Kapasitif(kVArh)	End/Aktif (%)	Kap/Aktif (%)	#
	65001036	BRL ENERJİ 3 8616	14.05.2018 15:06:35	8,204	0,984	2,170	5,050	0,111	21,234	4,1	80,7	
	65001016	BRL ENERJİ 5 8618	14.05.2018 15:01:40	17,944	2,141	4,654	11,149	0,104	12,433	0	73,6	
	65000389	SEY ENERJİ 1 8614	14.05.2018 15:01:16	4,161	0,452	1,143	2,566	0,043	19,464	2,5	100	
	65001028	MSC ENERJİ2 8615	14.05.2018 15:01:15	4,598	0,540	1,225	2,833	0,001	9,588	0	100	
	65001362	SEY ENERJİ 4 8617	14.05.2018 15:01:14	4,097	0,475	1,122	2,500	0,051	21,623	3,8	100	
	69198296	SODAŞ 4430	14.05.2018 15:01:00	1147,890	516,472	256,179	375,239	124,121	76,268	2,9	12,1	
	63027265	CEREN KARDEŞLER GES 8235	14.05.2018 15:00:33	27184,000	2421,000	7727,000	17035,000	105119,000	23,000	100	0,3	
	69198296	SODAŞ 4430	14.05.2018 15:00:26	1147,890	516,472	256,179	375,239	124,121	76,268	2,9	12,1	
	65001746	AFYON ENERJİ YEDEK	14.05.2018 14:59:08	1,804	1,088	0,447	0,269	0,356	0,039	11,6	0	
	65001782	AFYON ENERJİ ASIL	14.05.2018 14:58:53	1,805	1,087	0,449	0,269	0,357	0,039	14	0	

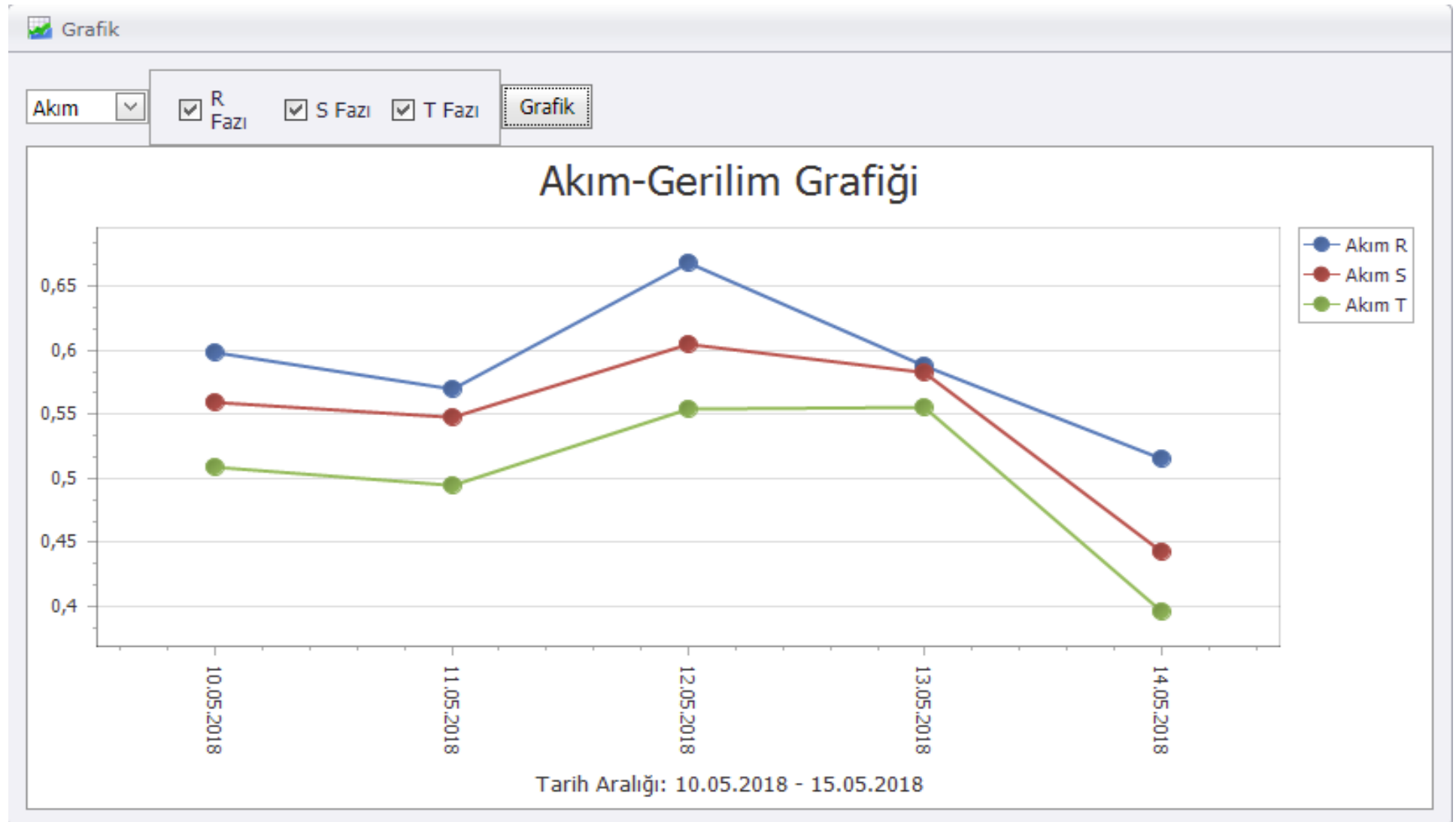
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All Energy Indexes Listing Page

WEB Interface

- OSF forms can be automatically generated by load profile records.
- OSF forms of all meters can be get by a single click.
- Data can be shared among other systems by Text, CSV or Web Services.



Load Profile Graphics

Database

- Makel AMR system uses Microsoft SQL Server versions as a database engine.
- System database has been designed according to performance criterias and relational database methodoligies.