BAYLAN

REMOTE READING AND PREPAID WATER METER

"Metering is Evolved"

MI-001
OIML R 49

TS EN ISO/IEC 17025:2010

TS EN ISO/IEC 17020:2005

ISO 9001 BUREAU VERITAS Certification

AK-311

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Contents

The World's Leading Brand of Water Meters...

It is apparent that in todays market water meters are expected to have broader functions than simply displaying the consumption state. The water meters performing several functions concurrently are taking their place in our daily life.

These types of water meters are widely preferred by consumers and municipal waterworks centers due to fact that they save large amount of time and money. Electronic water meters are replacing the mechanical watermeters worldwide.

Our company is presently producing with high technology in two different plants located at Atatürk Industrial Zone, Çiğli on 21.000 m2 closed area.

We have a staff of 600 people in total consisting of 40 engineers, technicians and workers who are specialized on their own professions.
Baylan has the capacity to produce 15.000 pcs of water meters per day, and presently exporting its manufactured goods to different countries on all over the world. This fact has made Baylan an international and a well-known company in the world.

In our facilities, we produce different types of water meters from 15 mm to 200 mm nominal diameters. All of our products are approved by official institutes of European countries according to EEC 75/33 and 2004/22/EC standards. All of our meters have EEC and CE approvals.

Our company is holding ISO 9001 Quality System Certificate which is given by Bureau Veritas. Our company has also ISO 17020, ISO 17025, ISO 27001, ISO 14001 and OHSAS 18001 certifications.

Our company has retained the most remarkable support from its dear customers and its young and dynamic staff. Depending on the admiration and trust we gained, Baylan will try to be indispensible for its customers. We would like to thank to this family formed by directors, workers and customers.

Remote Reading and Prepaid Water Meters

Water Meter;

The water meter is a measuring device that inspects the water use. It is connected to the installation of the customers house. It helps the public works administration to eliminate the problems faced during collection of bills. It displays the water consumption on its LCD screen in (m3) cubic meters.

Remote Reading and Prepaid Water Meter Systems as one the most effective water meter system, provides a wide range of conveniences. It has been observed by the public utilities that this system has effectively enhanced the whole process. The system especially optimizes the amount of payments received while it effectively helps the fraud detection. The Prepaid water meter system is preferred by the public works and the customers due to its cost effective use.
The electonic measuring systems are taking place of mechanical systems worldwide day by day.

AMR Remote Meter Reading Systems

BAYLAN AMR Remote Meter Reading System Technology enables users obtain meter readings without need for visiting and manually reading water meters. Technology also enables the users cut-off the consumers water remotely if necessary.

Consumers are no longer disturbed by any personnel entering their residences to read their meters, which serves as the main advantage of the system. Baylan AMR Remote Meter Reading System consists of two different applications: Mobile Reading System and Fixed Network System (GPRS).

1-) Mobile AMR Remote Meter Reading System

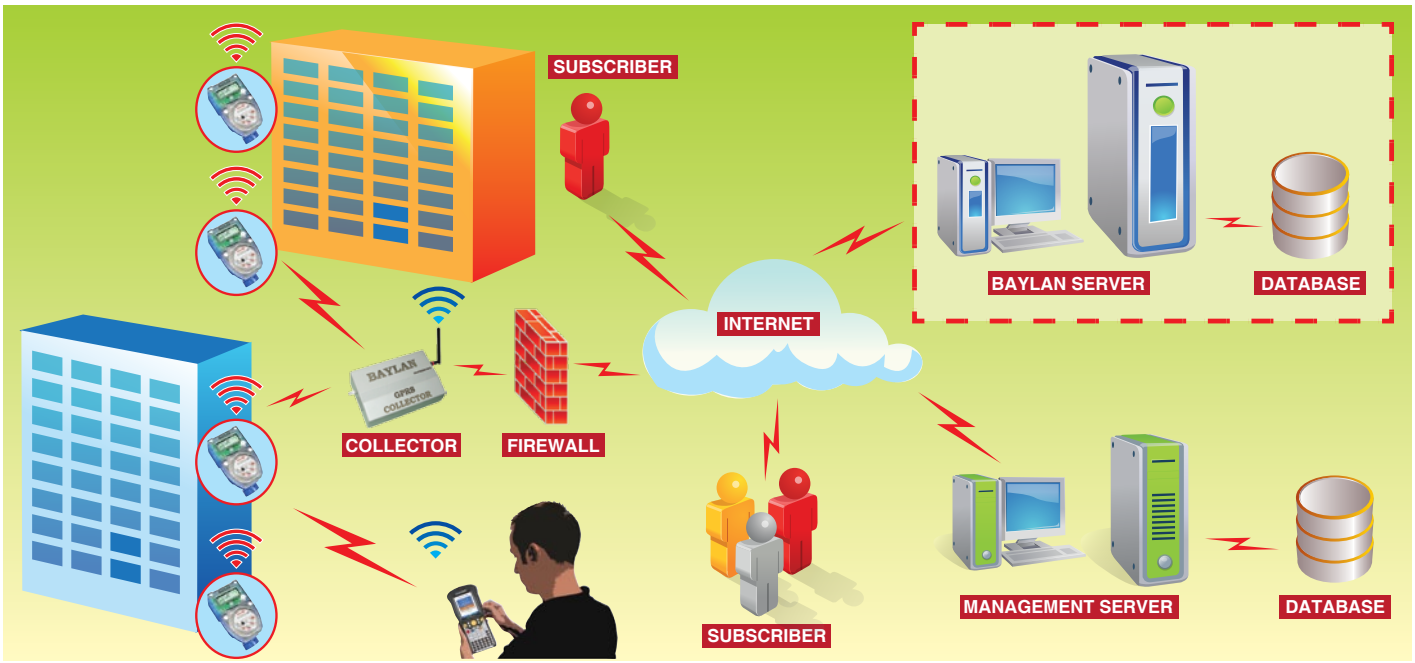
Basically the system has two types of reading method. Reading the meters via a handheld computer (PDA) with a staff or a computer based system in a vehicle. These mobile remote reading devices collect meter readings and save them to local memory.
In the municipal waterworks center the readings are trasferred to main system from the handheld computer. Right after the successful transmission process the billing procedure starts. As a summary, the system consists of three main parts: Water meter, Mobile Reading Device and the System Software.

The system includes no complex wiring, internet access or collector devices. This property enables the system to be configured and applied immediately. The AMR Mobile System utilizes only RF (Radio Frequency) communication. No other frequency carrier is needed, so the system is cost-effective when compared to other AMR solutions.

2-) Fixed AMR Remote Meter Reading System (GPRS)

System includes AMR Meters, Collectors (RF and GPRS) and Central Service System via Internet. Fixed Network System remotely collects meter data by using RF (Radio Frequency) and send them to Central Computer System via GPRS.

The Fixed Network System provides easy to use, quicker and low-cost reading ability. The system may be managed everywhere that has internet connection. Water meter states may be observed everywhere regardless of current location.



AMR Remote Meter Reading Systems

Another benefit of the system the improved customer service. Customers can manage their own consumption records such as invoice, debts, payment etc. from internet with their passwords.

Baylan AMR Remote Meter Reading System works on RF and GPRS technologies and does not use any complex wiring. System is cost competitive when compared to other AMR technologies.

Benefits of the AMR System

It is much more easier and faster to read water meters. As the reading costs fall, the benefits start rising.

The benefits of the system include reduced labor costs, easier collection of water meter bills, effective management of consumers records such as payments, debts, invoices and valve states.

The system has no limitation of the quantity of meters to be installed in the AMR network.
The officers have the chance of acting faster in case of a damage or illegal consumption detected in the water supply infrastructure. The revenue increases as the management ability rises.

Complete digital system avoids reading errors. Water consumption can be observed and managed reliably. Baylan Remote Meter Reading System users may receive the consumption state of any consumer instantly.

Software

Each user has a login defined by username and password, specifically configuring the system according to authorization level. Users manage the whole system as well as meter states, statistics. Several rich content reports and analysis graphics are provided by the system.

Prepaid Water Meter System

Prepaid water meter system is based on the principal that the billing and collection is done in advance. Every customer is assigned a card. Using the smart cards the customer may top up credit as desired at the vending points. The water meter may download the credit when it reads the card.

The water meter shuts off its valve when it runs out of credit.

When the water meter reads the card once again, it receives the emergency credit and opens its valve. By this way the customer is reminded to buy credit while it is possible to use the emergency credit for a short time.

It is also possible to top up debt credit, amount specified by the public works by using kiosks outside the working hours.

AK-311 Prepaid Water Meter Main Control Unit

The main control unit of Baylan AK-311 Prepaid Water Meter is designed to keep track of total consumption, remaining credit, total used credit, water meter nr, general state of water meter in its resident memory. The information specified is not volatile during the replacement of the main supply unit.

The remaining credit is gradually decreased in conjunction with the amount of unit water passing through the water meter. By this way the customer is able to observe the spent credit, remaining credit and the water unit price on the LCD display of the water meter.

It is especially inconvenient when step tariff is applied and credit fee based system is considered, the customer to observe the remaining credit. When the water meter runs out of credit it shuts off its valve.

When the valve is shut off, the customer has the option to use the emergency credit in the smart card. When water meter reads the smart card, sequentially the loaded credit, the total water usage, the remaining credit in the water meter, the current unit price of the water are displayed. Without using the smart card if the customer presses the button on the water meter, only the total remaining credit is displayed.

AK-311 Prepaid Water Meter Main Control Unit

The Main Control Unit of Baylan AK-311 Prepaid Water Meter System constantly measures the voltage level of the Supply Unit. If the control unit is not able shut off the valve, the water meter keeps measuring the water usage. Used amount of credit is saved as debt, and when customer buys credit, initially the debt is automatically calculated. Water Meter with Smart Card credit decrease sensitivity is 0.01 cubic meters.

Baylan Prepaid Water Meters have been designed with LCD backlight enabled. Due to this property it is possible to read the information easily even in the dark.

Water Meters keeps track of the count of valve state changes as well as the date of recent open-close actions.

Baylan AK-311 Prepaid Water Meters have the property of continuous water use for the subscriber not to be effected on holidays. The range of dates to apply the continuous water use are specified by parameters in the customers smart card.

AK-311 Warnings

1. Leak Warning

If water meter detects 10 to 40 m3 of constant water flow for 2 days it activates the leak warning. It starts to display the "Leak" warning on the screen. If the leak is resolved within 2 days or if it reads the authorization card, the warning is cleared.

2. Fire Service Used Warning

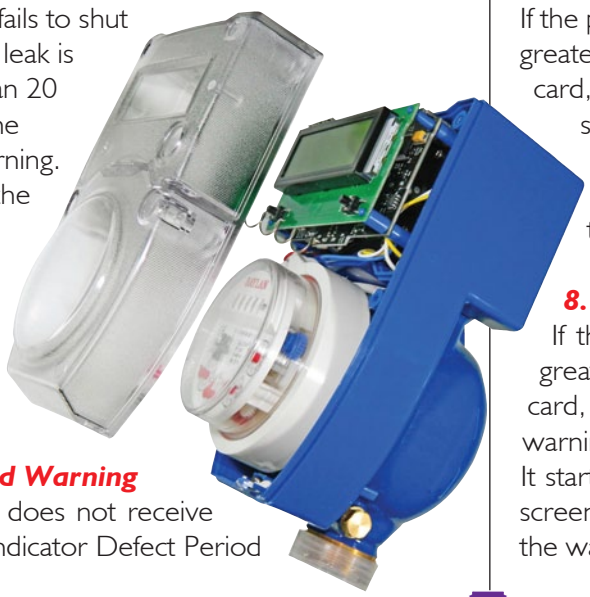
It is activated when the Fire Service is used. It starts to display the "Fire Service Used" warning on the screen. It clears the warning if it reads the authorization message

3. Insufficient credit Warning

It is activated when the remaining credit is less than the critical credit definition carried by the smart card. It starts to display the "Insufficient Credit" warning. It clears the warning if it reads the authorization card

4. The Valve Defected Warning

If the watermeter fails to shut off the valve and a leak is detected more than 20 times it activates the valve defected warning. It starts to display the "Valve Defected" warning. It clears the message if it reads the authorization card.



5. Pulse Defected Warning

If the watermeter does not receive pulses as long as Indicator Defect Period definition in smart card, it shuts off its valve. It starts to display the "Pulse Defect" warning. It clears the warning message if it reads the authorization card. If after opening the valve the water starts to flow, the customers card can clear the warning.

However if after opening the valve water flow is missing, the water meter activates the Pulse Defect Warning and authorization card is necessary to clear the warning.

6. Dribble Detected Warning

If the water meter detects water flow for 300 liters while in closed valve state it tries to shut off its valve once again. It starts to display the "Dribble Detected" warning on the screen.

The warning is cleared if leak is not repeated in one hour. If it reads the authorization card the warning message is cleared.

7. Overflow Warning

If the periodic water flow definition of the water meter is greater than the overflow amount defined in the smart card, the meter activates the Overflow Warning. It starts to display the "Overflow Warning" message on the screen. At the end of the period automatically, or by reading the authorization card the warning message is cleared.

8. Maximum Flow Warning

If the water flow in the water meter is detected as greater than the maximum flow definition in the smart card, the water meter activates the maximum flow warning.

It starts to display the "Maximum Flow" warning on the screen. When the water flow reaches to its normal state the warning message is cleared.

AK-311 Warnings

9. Battery Low Warning

If the battery level is lower than minimum operating level of the water meter, it shuts off its valve. It starts to display the "Battery Low" warning on the screen. Replacing the battery or reading the authorization card clears the warning message.

10. Exposed to Valve Test Card Warning

The water meter actives this warning when its valve state changed by using this card.
It starts to display the "Exposed to Test Card" warning If the water meter reads the test card once again, the warning message is cleared.

AK-311 Functional Exceptions

1. Cover Removed Exception

If the upper body of the water meter is removed it shuts off its valve disables the use. It displays the "Exception! Upper body removed" message on the screen. If it reads the authorization card the water meter permits the water use.

2. Connections Removed Exception

If the device installed against removal of connections is removed the water meter shuts off the valve and disables the use. It displays the "Exception! Connections Removed" message on the screen. If it reads the authorization card the water meter permits the water use.

3. Battery Cover Exception

If it reads the authorization card the water meter permits the water use. It displays the "Exception! Battery Cover Removed" message on the screen. If it reads the authorization card the water meter permits the water use.

4. Magnetic Protection Exception

If the magnetic pulse reading unit is affected by an external agent more than 5 seconds, the water meter shuts off its valve and disables the water use. It displays the "Exception! Magnetic Protection" message on the screen. If it reads the authorization card the water meter permits the water use.

Notes: The warning and interferences defined in the water meters may differ according to requirements of municipalities

Valve Control Unit Functional Properties

The system utilizes the ball valve supported driven by the electrical motor. It has been manufactured with non-corrosive metal mold which conforms to TSE 3148 standards.

The electronic control unit prevents possible calcification by periodically opening and closing the valve. When open the particles in the water, flow through the turbune section and does not damage the rotor or the rigid body. When the ball valve is shut off it does not let the water pass through the water meter. It takes 15 seconds to open and shut off the valve.

Fire Service Water Meter Specifications

Pressing simultaneously both buttons on the water meter for 7 seconds enables the fire service of the water meter, and "Fire Service On" is displayed on the screen.

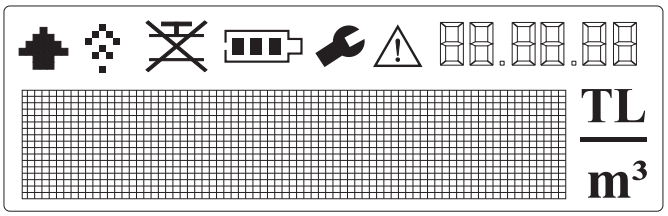
During the period definition carried by the smart card, the water meter will not shut off its valve even if it runs out of credit or enters the interference state.

If the fire service enabled when the water meter has credit in it, the period starts after it runs out of credit and records the used amount of water as debt. If the fire service is used when it has no credit, it automatically opens its valve and enables the water pass through. When the period is over it shuts off its valve.

The water meter displays the message "Fire Service Called" on the screen till it reads the the authorized card. It is not possible to use the fire service more than once.

The information that the fire service was used is carried to the center via customer or control cards. The authorization card can clear this sign of warning.

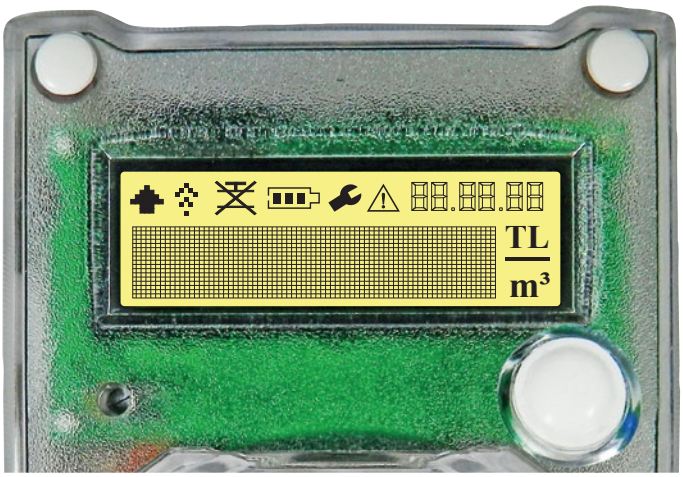
LCD icons



	Flow direction
	RF Signal On
	Valve shut off icon (Activated when the valve is in closed state)
	Battery Level Icon (The icon shows the charge level of the battery)
	Warning Icon (Displayed when an exception or warning is active)
	Key icon (Displayed in case of any detected defect)
	Displays (The icons that the date time of of water meter is displayed.)
TL	Activated when the unit price is displayed on the screen.
m³	Activated when the consumption is displayed on the screen. (cubic meter)

The terms displayed on LCD

The information displayed on LCD screen are as follows:



1. Valve Status
2. Consumption
3. Total Credit
4. Loaded Credit
5. Current Tariff
6. Current Step
7. Warnings if existing
8. Exceptions if existing
9. Version

Main Features

- MID Certificated
- wM-Bus EN-13757 with standard Radio Frequency automatic remote reading.
- The water meter is completely isolated and resistant to external effects of humidity or direct water exposure.
- The total consumption can be observed both from mechanical and electonic indicator.
- Having ball valve in the design prevents possible calcification by periodically opening and closing the valve. Using contactless card the electronic card interface is isolated from external effects such as dust, humidity and corrosion.
- The smart cards used in the system conform to ISO14443A protocol.
- Every customer is assigned a customer card. The smart card can only operate on assigned water meter. Electronic indicator displays consumption, credit amount, debt, unit credit price, battery level information.
- Battery level, alert states, current period, current step and tariffs are carried to the central water management system via customer card.
- Water meter shuts off its valve when exceptions are raised. The authorization card is necessary to be used by the officers of public works to enable the water meter. Otherwise the water meter is disabled even if it has credit in.
- The electronic unit has a long life lithium batterie.
- When the battery level falls below the critical limit, the water meter shuts off its valve recording (consumption, credit, debt, alert states) to its non-volatile memory. It does not open its valve till the batteries are replaced.
- Customer may drawback the credit from the water meter only when the customers card is signed as drawback card at the vending point.The credit is transfered back to the card when water meter reads it. Having no credit, the water meter shuts off its valve, the remaining credit is totally loaded to the card and the customer may drawback the credit from vending point.
- The batteries are constantly measured. The state of the batteries are notified to the center by the customer card.

Repair & Maintenance

• Baylan Water Meters are manufactured by using the latest technology and supplies under control of skilled personnel under inspection of wide range of quality control tests.

The sensitivity of measurement of our water meters have been tested and approved by "T.C. Sanayi ve Ticaret Bakanligi Ölçüler ve Ayar Müdürlügü".

• If necessary it is obligatory to perform the repair and maintenance of the meters by authorized services.

Installing and Directives

• Water meter should be installed in an environment free from external distractive effects. Before connecting your water meter bring both sides of the installation to the same level and clean inside.

• The water meter is manufactured to be used with clean water. Do not use the water meter in muddy unsuitable water facilities.

• Install your water meter on the horizontal axis coinciding the arrow direction on the rigid body of the water meter.

Smart Card

✶ Buying credit and test processes can only be made with the assigned card specific to the water meter.
✶ Every water meter has a unique assigned card
✶ If the customer looses the assigned card, a new card is defined and the old card is no more valid.

System uses contactless cards conforming the ISO 14443A standards. The smart cards have 1kb of memory, 100.000 times of read-write ability, 10 years of retention period, ISO/IEC DIC9798-2 standard and 3 levels of encrypted communication abilities.

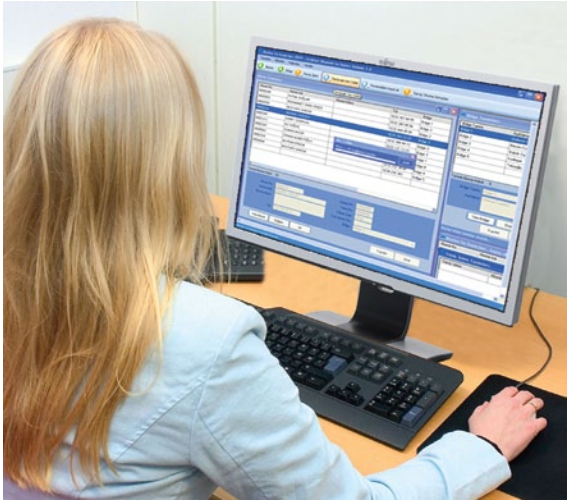
Customer Card : This card is assigned to the customer and it is used to transfer information, display information and to load credit. Additionally smart cards are able to drawback the credit from the water meters.

Authorization Card : When the water meter disables itself displaying an exception, authorization cardre-activates the the water meter.

Control Card : Used by the public works officers, displays the complete state of the water me

AK-311 Water Meter Customer Card Features

All the operations based on customers are made with the customer card. When assigned, all the customer specific information such as tariffs, emergency credit, critical credit are copied to the customer card. When the water meter reads the card, all this information is downloaded to the water meter. Customers can top up credit to their water meters by using this card. Water meter transfers all the information and its current state to the main center by the customer card. The central system receives all the information such as (battery level, alert states, consumption index, recent credit loading date) when the customer card is read at the vending point. In the same time if the step and tariff information needs to be updated in the water meter, simply the customer card is updated. When the water meter runs out of credit, customer may load the emergency credit by exposing the card to the meter once more.



Customers may sign their customer cards as drawback card at the vending points if desired. By this way the credit loaded from the water meter to the customer card. The drawback operation shuts off the valve of the water meter if desired by the customer. Continuous water consumption request dates, maximum flow limit, maximum consumption date, valve shut off date if customer desires to shut off the valve on a specified date, and fire service, are all carried to the water meter by the customer card.

The Features Of The Customer Card

1. Top up credit
2. Loads Emergency Credit
3. Transmits tariff and step information.
4. Transmits fire service period.
5. Transmits the open-close period of the valve.
6. Transmits the critical credit definition.
7. Transmits the maximum flow definition.
8. Transmits the extreme consumption definition.
9. Transmits the indicator exception period definition.
10. Transmits the continuous water flow initial and final dates.
11. Transmits the valve shut off date.
12. Drawback operation.
13. Transmits the water meter information to the center.

A-SIZE Lithium Batteries Technical Specification

- Nominal Voltage : 3,6 V
- Nominal Capacity : 8,50 A/h
- Operating Temperature : -55°C - +85°C
- Weight : 24 g
- Retention period in room temperature : 10 year

- High and stable operating voltage
- Low self-discharge rate
- RoHS Compliance

LCD Screen Technical Specification

- LCD Type : STN/Transflective/Positive
- Multiplexing Rate : 1/17 DUTY, 1/5 BIAS
- VDD : 3 V
- Vop : 5 V
- Operating Temperature : -20 °C - 70°C
- Retention temperature : -30 °C - 80°C
- Backlight : LED
- Driver : ST7522D
- Connector : Zebra

Philips Mifare Smart Card Technical Specification

- Contactless data and energy transfer (no need for a battery)
- Operates in distance up to 100mm (Depends on antenna shape)
- Operating Frequency
- Fast data transfer up to 106kbits /s
- Enhanced data security
- 1 KBs of memory unit (4 blocks in each 16 sectors)
- Ability to access each block with a unique password
- 10 years of data retention
- 100.000 times of read write access.
- ISO/IEC DIC9798-2 standard compliant and 3 levels of encrypted communication support.
- Dual key support for each sector (48 bits)
- Unique serial number feature

Philips RC 530 Card Reader Technical Features

- Operates in distance up to 100mm (Depends on antenna shape)
- ISO 14443A contactless card communication standard compliant.
- Ability to read and write MIFARE standard cards.
- Baud Rate:Communication support up to 424 MHZ.
- Encrypted communication
- Unique serial number assignment

Software

✶ The Water Meter Management Software has been designed by the talented and experienced Software Engineers to answer the needs of the public works offices practically and effectively. It is possible to entegrate the software with the current automation software of the public works.

✶ Enhanced security enables only the access granted personnel to reach the database. Each user can enter the system with his unique ID and password. With the specified level of authorization the accessed menus vary.

✶ Software Turkish, English, French, Portuguese and Arabic language support.

✶ The software has modules such as customer operations, sales operations, reporting services.

✶ It is possible to access every information based on invoice records, customer records. The software has the ability to prepare analysis graphics based on list of customers who do not buy credit for a specified period, or a selected region of residence, or customers types.

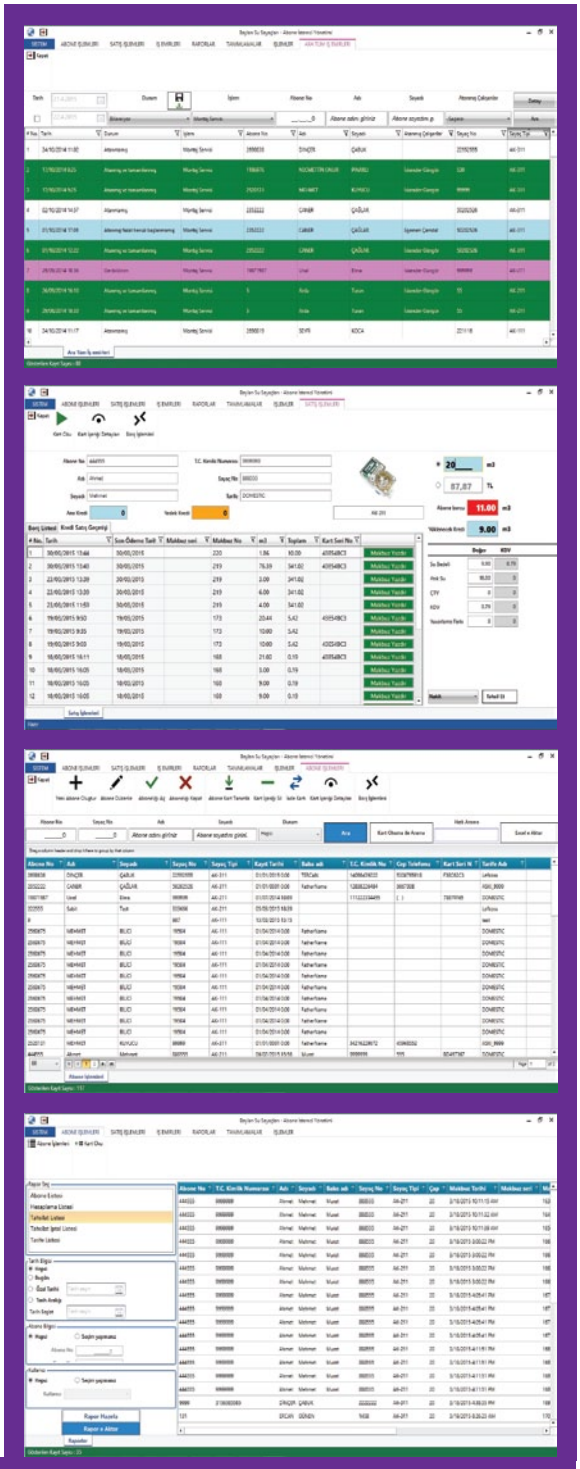
✶ Buying credit means automatically to carry the water meter state information to the vending point.

✶ In order to receive the most recent information of the water meter, it is necessary that the water meter reads the card before bringing the card to the vending point.

✶ If desired by the public works it is possible to setup kiosks which loads credit to customer cards in advance.

✶ Specified by the water works authorities, water meters support up to 4 different step tariffs.

✶ Step-Tariff database is created within the software. When the customer comes to buy credit to the card, the updated information database is transfered to the card.



The Software Integration Process

Baylan Water Meter Management System is designed flexible to work with the current software that the public works use. The sales unit communication features are combined in a DLL library.

The current software used in the public works may easily integrate with Baylan Water Meter Management System by using this library.
The software that the public works use creates a job orders so Baylan Water Meter Management System tops up the customer card with the desired amount of credit.
The current management software used by the public works may perform the realization and collection steps while Baylan Water Meter Management System may perform the actual credit sales.

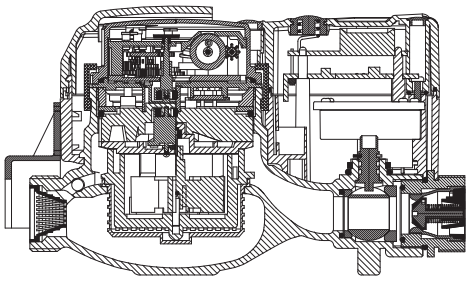
Acting independant from the current software Baylan Water Meter Management System can perform also the money collection. A common integration study may be completed with the software company of the water works.

AK-311 Technical Specifications

GENERAL

- MID Certificated
- Radio Frequency automatic remote reading
- Reading through the center of the GPRS system, the collector of conformity
- Complete management of the water consumption
- Elimination of meter reading process
- No meter dismantling because of the debts
- Contactless card usage ensures isolation against external affects
- Setting up different tariffs • Suitable for potable water
- IP68 protected electronic circuit and mechanical meter
- Check valve disabling bi-directional water flow
- Sleeve security check and electronic sensor
- Lithium battery replaced by local administration
- LCD display with back light
- Suitable for cold water up to 50°C
- All spare parts available, wide range of service network
- Leakage control system, 3 years of warranty

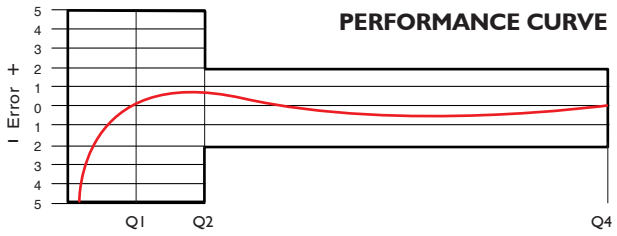
AK-311
Remote Reading
And Prepaid
Water Meters



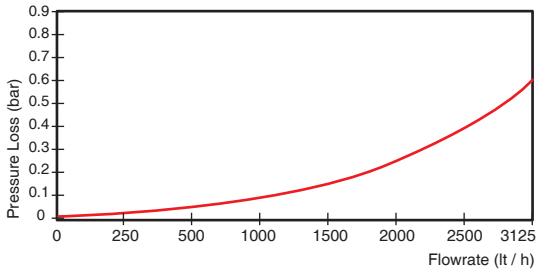
PERFORMANCE DATA

Permanent Flowrate	Q3	(m^3/h)	: 2.5	2.5	4	4	4
Overload Flowrate	Q4	(m^3/h)	: 3.125	3.125	5	5	5
Transitional Flowrate	Q2	(m^3/h)	: 0.025	0.025	0.064	0.040	0.032
Minimum Flowrate	Q1	(m^3/h)	: 0.0156	0.0156	0.040	0.025	0.020
Q3/Q1 (MI-001 OIML R49)			: 160	160	100	160	200
Connecting diameter			: G1B	G 3/4B		G1B	
Length		(mm)	: 190	165-190		190	
Initial Flowrate	Qi	(l/h)	: 7				
Maximum Working Pressure		(bar)	: 16				
Maximum Working Temperature		(°C)	: 50				
Pressure Loss		(bar)	: 0.6				
Maximum Registration Capacity		(m^3)	: 99999				
Smallest Reading Resolution		(m^3)	: 0.00005				
Mounting on the network			: Horizontal				
Quantity per package			: 5				
Package dimensions		(cm)	: 16x54.5x23				

PERFORMANCE CURVE

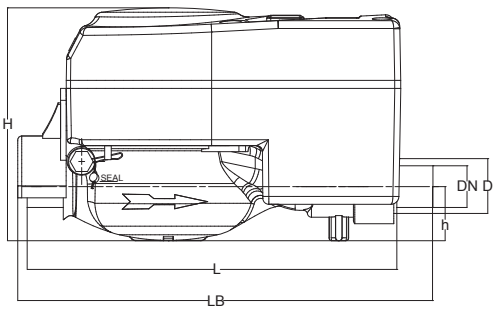


PRESSURE LOSS CURVE



DIMENSIONS

Nominal diameter	**DN**	**15**	**15**	**20**	mm
Connecting diameter	D	G 3/4	G 3/4	G 1	B
Total overall meter height	H	118	118	118	mm
Axis height	h	27	27	27	mm
Length	L	190	165	190	mm
Width	B	100	100	100	mm
Length with connections	LB	266	241	270	mm
LCD Screen Length		64x20	64x20	64x20	mm
LCD Screen Angle		30°	30°	30°	mm
Unit weight		1.88	1.85	1.91	kg
Package Weight (without connections)		10.23	10.20	10.49	kg
Package Weight (with connections)		10.83	10.80	11.39	kg



"Due to continuous development of our products, we reserve the right to modify our product design or construction without prior notice."