ALCKATRON®

CUTTING EDGE INNOVATIONS

Smart utility billing automation solutions

CONSERVATION
MANAGEMENT
AUTOMATION

SMART UTILITY MANAGEMENT

PROPOSAL

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INTRODUCTION

Today, natural resources are becoming increasingly scarce while our needs are growing in an ever more densely populated and urbanized world facing climate change issues. The world has to rethink its relationship with resources and come up with new social and economic growth models that are more efficient, better balanced and more sustainable.

Alckatron Innovations Ltd applies its capacity for innovation to pursuing human progress and well being, and improving the performance of businesses and regions.

To make the switch from a resource consumption rationale to a use-and-recover approach in today's circular economy, Alckatron Innovations Ltd implements solutions aimed at improving access to resources while at the same time protecting and renewing those same resources.

Alckatron innovations Ltd accompanies cities in their smart development through a network of companies and experts at three levels of integration:

- **Smart operations**
- **Smart services**
- **Smart ecosystem**

Recent key figures

WATER

SMART=

Making the most of water resources by leveraging data for action.

To use smart water services means **improving water efficiency** for the benefit of every city and its residents, using data and technologies as enablers, to increase **efficiency of irrigation networks** and **reuse of water**, allow for **deferred investment** in water production plants and **optimization in pipe renewal,** as well as **preserve resources** (energy and water) by **enhancing leakage management** and **enabling demand response programs.**

Activities to reach these targets concern three levels:

Performance

Utility level: monitoring water quality, reducing non-revenue water, benchmarks of operation, optimizing capital spending and return on asset, realtime control of operations to optimize resources

Customer experience

End-user level: enhance customer satisfaction and bring new services to them, while raising awareness about resource conservation and facilitate the introduction of new tariff schemes, and supporting VIP/ large consumers in decreasing their water footprint

Multiple benefits

Stakeholders outside the water sector: multiply the benefits of sharing data to reduce costs, enhance innovation and increase the overall smartness of the city

We propose a **long-term partnership** with **quick wins** and **commitment on performance,** where we could assist in all phases: **designing, implementing** and **operating innovative solutions.**

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WATER

A pilot for smart water Management

Explore, evaluate and decide

As part of our overall proposal for your city, we have identified priority steps for smart water management, one of which is the implementation of a pilot: To successfully design and implement innovative services, we recommend developing a pilot area for leakage management and automated meter reading for the distribution networks of potable water and Treated Sewage Effluent (TSE). This pilot will help develop a tailormade solution adapted to local specificness, test new services, and identify how to adapt operational procedures to make the most of the area and city assets.

Main aspects to be considered

THREE AREAS OF FOCUS have been identified where we would deliver the highest value to your city:

1 **CUSTOMER** MANAGEMENT
- Customized information
- Demand response

2 **WATER** OPERATIONS
- Reduction of apparent losses
- Enhanced leak detection and water quality

3 **WATER** ASSET MANAGEMENT

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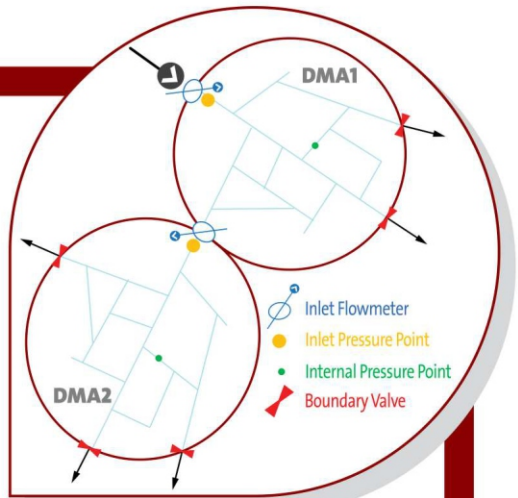
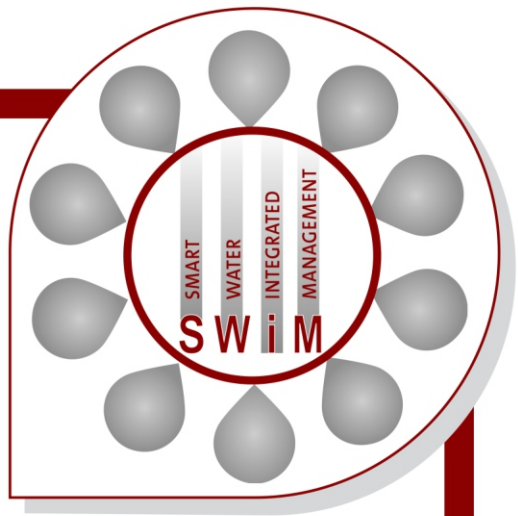
a. Audit & Design

Understand: customers, water assets (pipe, meter, SCADA...), main challenges: local / city



- Understand the potable water and recycled water networks of the pilot area: network schematics, maps, GIS, hydraulic model, ...
- Review of customer meter databases (potable water, treated sewage effluent)
- Identify the main challenges faced at the local level (pilot area) and at the city level by water utilities

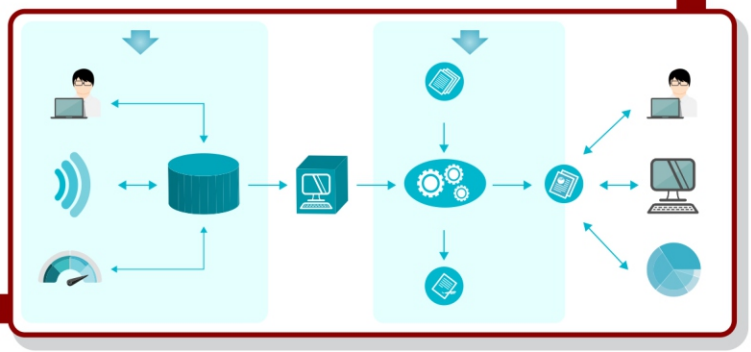
Definition of the functions for the smart water management



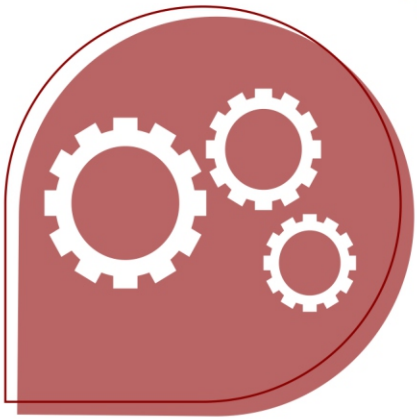
- Identification of the users (utilities, customer types, other entities) and data (occupancy profile, consumption, quality, building occupancy type...)
- Description of the needs from the different users to derive the different functions for the smart water management
- Identification of corresponding work flows of data
- Coordination with other initiatives under implementation at the pilot level: areas of collaboration with other stakeholders (beneficial data exchange), data available vs ease of access

Design of the smart water management system

- Identification of the available technologies for remote data collection, communication, transfer, display and analysis
- Definition of the technical specifications for the smart water management system
- Coordination with other initiatives
- Prepare scope of works for the technology providers
- Analysis of the proposals and cost/benefit analysis



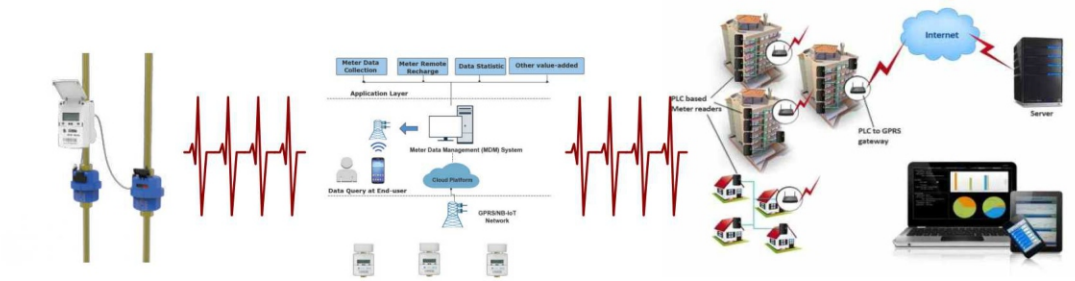
On-site hydraulic validation of the District Metered Areas (DMA) and meter inspection



- Pressure testing (essentially at night) - drop-test procedure to prove hydraulic isolation
- Identification of missing or erroneous network interconnections
- Meteorological assessment of existing flow meters used as flow monitoring points
- Inspection of water meters, gaps and anomalies in the customer meter database
- Recommendation for remediation plan if needed
  - Number of known boundary valves that need to be changed
  - Number of new boundary valves that need to be installed
  - Meters to be further tested
  - Meters to be repaired / replaced

Turn-key solutions

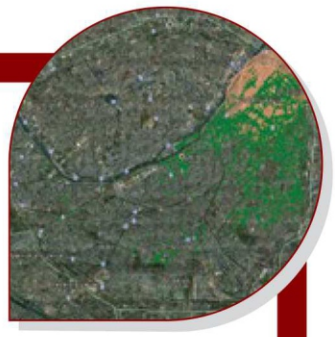
Alckatron Innovations Ltd can deliver turn-key smart water management solutions from the smart meters to the operations of the water networks. We already deployed its field proven solutions successfully with active units being operated.



The main competitive advantages of our in-house solutions are the following:

- Complete solution from Automated Meter Reading to Web portal: no additional software or hardware needed
- Independency from meter vendors: compatible with a wide range of water meters currently deployed, no replacement required
- Reliable: resistant with time, tamper, flood...
- Low power / low consumption
- Flexible: a comprehensive range of radio modules (integrated, remote, sub metering...)
- Reliable indicators based on Automated Meter Reading
- Daily calculation of Key Performance Indicators for fast reaction
- District Metered Area architecture for immediate focus on the weakest part of the network
- Scalable for a variety of deployments

b. Implementation



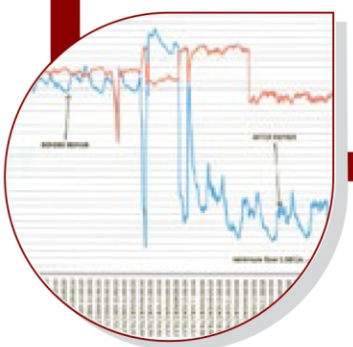
Deployment of Automated Metering Infrastructure

Typical steps to deploy a dedicated Machine to Machine network:

- Arrange survey / fit: Source materials (eg radio modules, water quality probe,...), programme works, survey / fit
- Set up web-portal account
- Upgrade water meters, install sensors: programme works, upgrade with Automated Meter Reading
- Commission M2M network: Pairing
- Hand over

Focus : Instrumentation of District Metered as (DMA)

- Construction works of instrumentation chamber (flow meter, pressure sensors) if needed
- Flow and pressure monitoring
  - 5 minutes time-step recording for the flow
  - 15 minutes time-step recording for the pressure
- Data retrieved
  - Once a day towards a web platform
  - Or manual downloading via a data logger

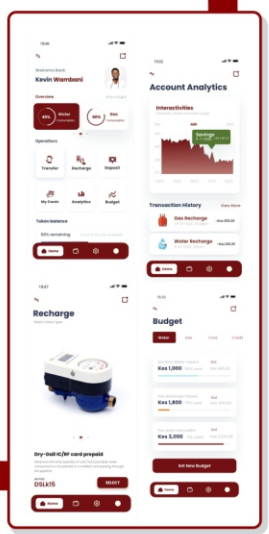


Focus : Configuration of a web portal for data display and alert threshold

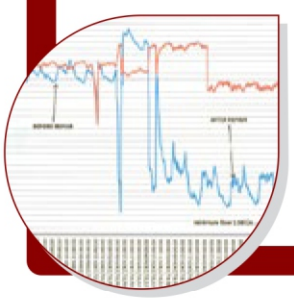
- Key Performance Indicators: eg supplied volumes, network efficiency, apparent losses, night flow, active chlorine concentration
- Dashboards: eg map of global view of anomalies and alarms for all the meters of the area, map of network efficiency per district, graphs of distributed volumes, consumed volumes and apparent losses
- Individual Meter management: eg complete list of water meters and associated detailed information (consumption and anomalies)
- Consumer Focus: eg global consumption of each customer segment (domestic, companies, shops, governmental entities, ...)

Setting up of new services for customers of potable water

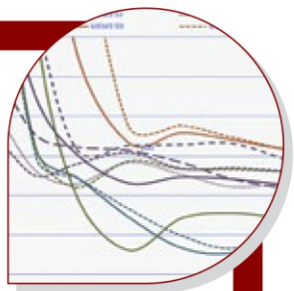
- Customer information
  - Development and validation of new communications channels (integrated or not to the existing systems): Mobile app, web pages, SMS...
  - Roll out of new services for the customers:
    - Customised information: bill, monitoring of water consumption, comparison with previous consumption and similar consumer
    - Alerts: leakage suspected in the house, emergency works on the water networks



Base-lining



- Collection of data during a baseline period (duration to be validated)
- Real losses computation
- Apparent losses computation
- Water quality



C. Operation

M2M networks operations and data sharing

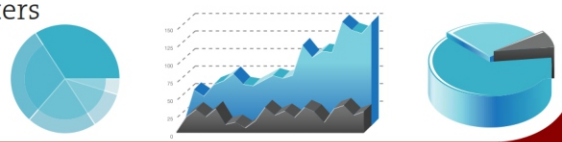
- One of the options could be to design, build and operate a dedicated Machine to Machine network with us guaranteeing data availability. Such networks could then be also used for other applications and shared with other stakeholders such as monitoring of environmental conditions (air pollution, noise, weather...), as well as other parameters in the area (eg fill level of waste containers).
- Test of business models
- Data sharing with other entities (governmental bodies or other) using a 3D platform and city model

Customer awareness

- Analyze data collected for the water distribution networks in the pilot area
  - Benchmarking: profiling: per occupant type, season, building type, occupancy level, ...
  - Analysis of consumption trends
  - Comparison with other districts from the city if available
- Implement demand response programme
  - Simulation of new tariff structures based on time of use: peak/ off-peak, seasonal, ...
  - Identification of anomalies (alert + response management)
  - Provide water footprint awareness to end user
  - Engage end-user in a better resource conservation
  - Organize a communication campaign
    - Workshop on conservation awareness
    - Contest on bench marked consumption between buildings
    - Link with carbon footprint
- Provide a specific service linked to leak occurring within premises: from end-user alert to the repair, and prompt identification of leakage

Reduction of apparent losses

- Analysis of the data linked to the water meters
- Apparent losses computation
- Meter sizing according the consumption profile measured
- Identification of blocked / defective meters
- Replacement / renewal plan of water meters

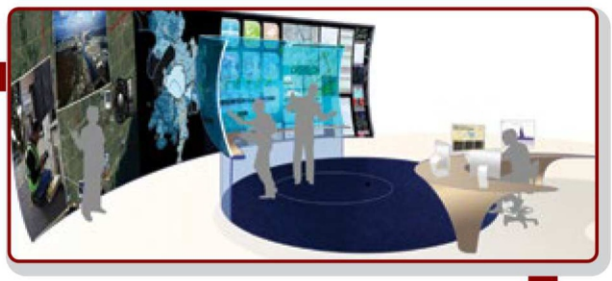


Enhanced leak detection and water quality

- Near-time monitoring of the distribution water networks (flow, pressure, water quality)
- Specific service related to water quality monitoring for sensitive areas: Swimming pools, nurseries, ...

- Real losses computation
- Preparation of new O&M procedures
- Training of leak detection teams
- Priority dispatch of work order and emergency works and assignment to relevant teams in case of anomalies
- Priority management to ensure speed and quality of repair

Asset management



- Participate to the water asset inventory
- Ensure the accuracy of the data, eg water meter database, customer database
- Update the Geographical Information System / maps with relevant information (stressed pipes, burst, defective meters...)
- Update of hydraulic model with data collected
- Assist in pressure management with the design and installation of pressure reducing valves
- Support to define the specifications for a central control center (water utilities only or shared with other stakeholders)

Key benefits

For the pilot area

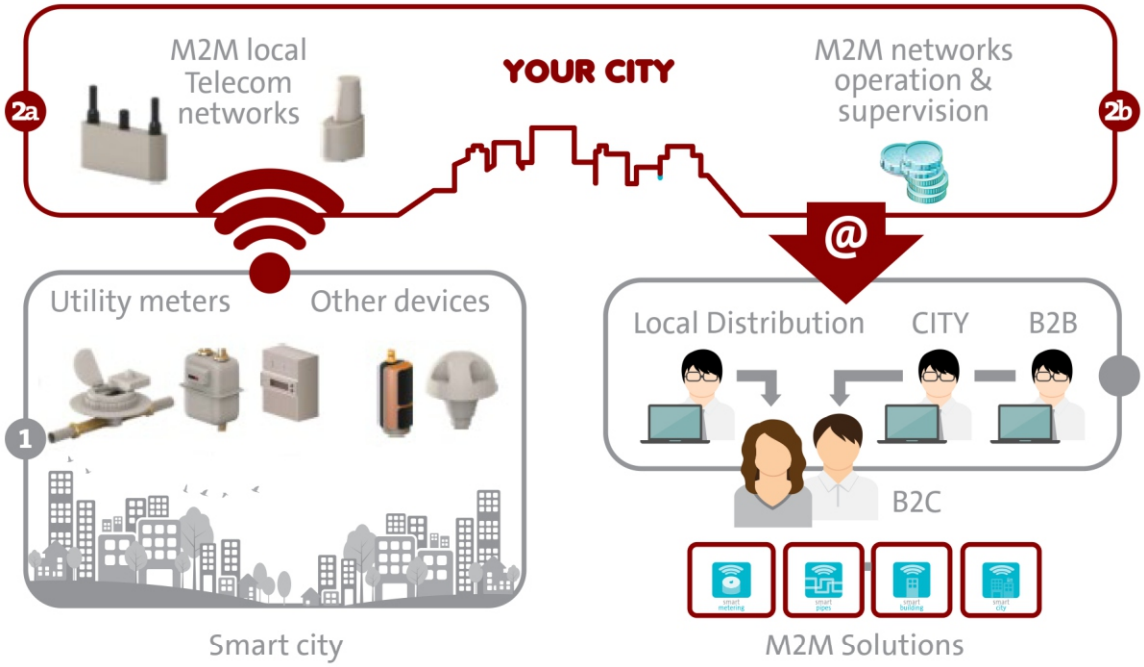
- ✓ Establish the pilot area as a showcase and model for the deployment of smart water management at the city scale
- ✓ Enhance customer experience by inventing new services for end-users
- ✓ Assess, monitor, and limit the level of leakage at the district level
- ✓ Decrease environmental footprint
- ✓ Customize and adapt functions from the smart water management system
- ✓ Adjust solutions to legacy systems (meters, communication networks, management systems...)
- ✓ Involve stakeholders on an urban data platform
- ✓ Test new business models linked to machine-to-machine networks
- ✓ Optimize operational procedures

From the **implementation** at a larger scale

- ✓ Savings of potable water and recycled water (enhanced leakage management, water efficiency program and demand response)
- ✓ Increased availability of recycled water and water reuse
- ✓ Deferred investment in water production and distribution
- ✓ Long-term partnership with quick wins
- ✓ Smooth transition to new services making the most of new technologies and communication services
- ✓ New services to your city's residents
- ✓ Multiple benefits for your city's stakeholders outside the water sector

Open & interoperable telecom solution for future sustainability

Design, roll-out & operations



The System, which is tasked with **optimizing production, network maintenance, emergency call-outs, customer service management** and **risk management.** Considerable efforts to reduce energy consumption, manage emissions and discharge, and pursue an ambitious reforestation program have delivered a **carbon-neutral service**, a world first for a water utility.

Water traceability is based on the model used in the food & beverage industry, guaranteeing consumers continuous control over the sanitary quality of their water. Third-generation meter reading technology, will be deployed and already provides precise monitoring of consumption for half of the people who use the service, along with **easy leak detection**. The **automated meter reading solution** is **open and interoperable** and **will be the largest in Africa**. Customer relations have also been improved through services adapted to different types of user and close consultation with the public.

High-quality service for all residents

With the service provided by smart metering, water end-users can **follow up their daily water consumption** and will be automatically alerted in case of leakage. Services implemented include an online account to access information on the water services and daily water consumption. For example, water end-users can **set up alerts via email or SMS** to be informed in case their water consumption exceeds the usual level. In addition, **alerts following suspected leakage** at their place will be automatically sent to them. All of these services contribute significantly to raise awareness with customers on the need to preserve water resources through a more responsible behavior.

OUR SOLUTIONS

Collecting Water Revenue in time from End-user becomes one of the headache for real estate water management agencies, which leads to the high Non-revenue Water(NRW). in order to solve this problem, we provide Prepaid Water Meter Solution which requires to pay before you consume, by integrated valve inside the prepaid water meter, the water supply will be cut off when purchased water in meter is consumed up until next meter recharge operation.
Our System enables the Water Authority to collect water revenue fully in advance and no need to collect the meters' data manually at site, which dramatically reduce the labor cost and improve the working efficiency.
We provide different Prepayment Solution basing on different Water Credit Transfer.

01

PREPAID AND MOBILE VENDING SOLUTIONS

Our Prepaid and Mobile Vending Solutions include:

1) Smart Card Type Prepaid Water Meter

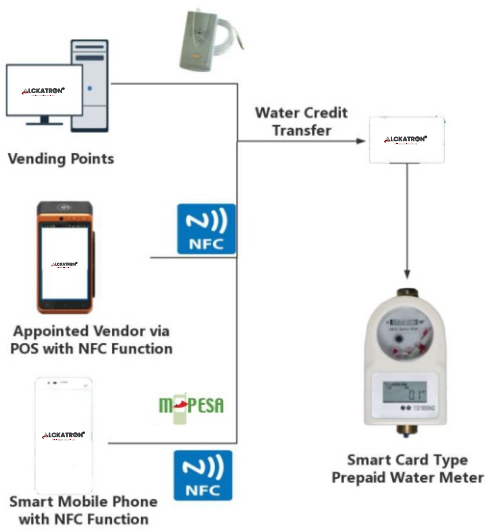
2) Split Type STS Prepaid Water Meter

3) Smart Card Type STS Prepaid Water Meter

Moreover, aims to making the water vending much more convenient, we provide Mobile Vending Solution by Android APP through POS(Point of Sale), avoid heavy investment in establishment of traditional Vending Points for Water Authority. And by integrating to local E-payment Platfrom, it makes the self-service of water purchase possible.

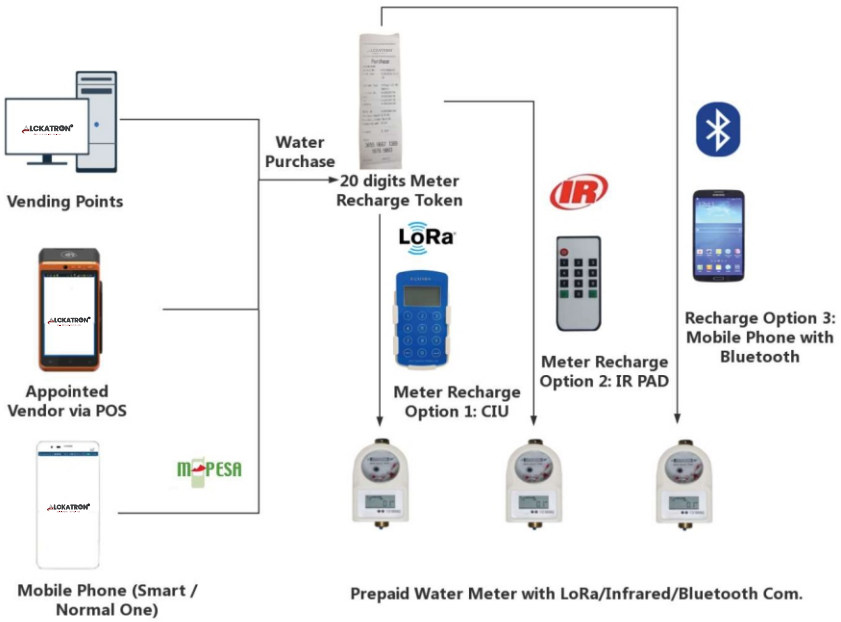
1. Smart Card Type Prepaid Water Meter

Our Smart Card Prepaid Water Meter Solution adopts Philip Mifare S70Cad (Contactless Card with 4k Memory) as the water credit transfer media, which ensures the bi-directional communication between Vending System and Prepaid Water Meter. End-user could purchase water at Vending Points or Appointed Vendor through POS or even self-service by a Smart Mobile Phone with NFCFunction to transfer the water credit into Customer Card and then put it to meter for recharge. Basic working process for Smart Card Prepaid Water Meter Solution as follows:



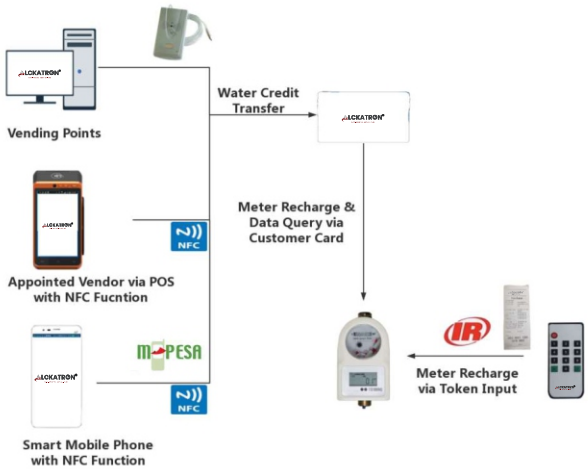
2. Split Type STS Prepaid Water Meter

The STS (Standard Transfer Specification) is an Open Architectureinitially device that can be used for the transfer of electricity prepayment tokens. It is among the unique Water & Gas Meters with advantages of Compaibility and Easy Data Transfer Basic working process for Smart Card Prepaid Water Meter Solution as follows:



3. Smart Card Type STS Prepaid Water Meter

By combining the Smart Card Type Prepaid Solution and STS Prepaid Solution, it could take full advantages from both solution and abandon the disadvantages. It could realise easy data (Water Credit / Volume) transfer for meter recharge via 20 digits token and ensures the bi-directional communication between Vending System and Prepaid Water Meter by Philip Mifare S70 Card. Basic working process for Smart Card Prepaid Water Meter Solution as follows:



02

PREPAID AMR/AMI SMART METERING SOLUTION

After collecting back the Water Revenue in time as the 1st Stage scope via Prepaid Water Meter Solution, the Water or Gas Agency shall focus on monitor & analyze the Customer Consumption Data for better decision making during water production and by monitoring the meter closely, the Water / Gas Agency should be able to find any Possible Water/Gas Leakage and Tamper situation in time. By adopting LoRa, GPRS, NB-IoT etc. communicaton technology, our Smart Water Meter could realize bi-directional communicaton between Meter Data Management (MDM) system and Smart Water Meter, to realize Remote Meter Recharge for Prepaid function and Remote Meter Data Collection for AMR/AMI function.

Alckatron Prepaid AMR/AMI Smart Metering Solution include:

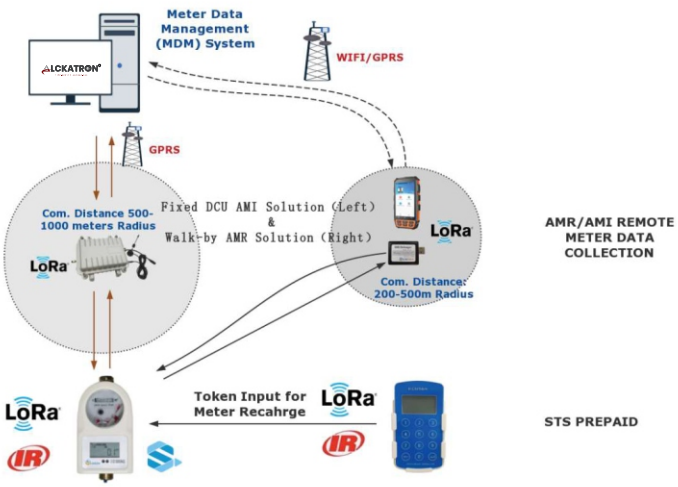
1) LoRa STS Prepaid AMR/AMI Solution

2) GPRS Prepaid AMI Solution

3) NB-IoT Prepaid AMI Solution

1) LoRa STS Prepaid AMR/AMI Solution

By integrating SEMTECH LoRa Com. module in Alckatron Smart Water Meter, it could realize both Prepaid and Remote Meter Data Collection function (AMR/AMI) FOR PREPAID FUNCTION, it confirms to STS Standard (IEC62055-41,51). End-user could get a 20 digits meter recharge token either at Vending Points or Appointed Vendor through POS, put it into meter via CIU (Customer Interface Unit) through LoRa RF Wireless Communicaton to realize FOR WALK-BY AMR FUNCTION, by taking Alckatron PDA equipped with Alckatron pre-paid APP and MDC (Mobile Data Collector device), the Appointed Maintainer could remotely and automatically get the meters' data while walking / driving along the street. FOR FIXED DCU AMI FUNCTION, by establishing DCU (Data Concentrator Unit) to cover the meters nearby in around 500 radius, all the meters in coverage shall automatically upload the corresponding data into Meter Data Management (MDM) system at defined time interval (every day / week / month) The basic working process of LoRa Prepaid AMR/AMI Solution are as follows:

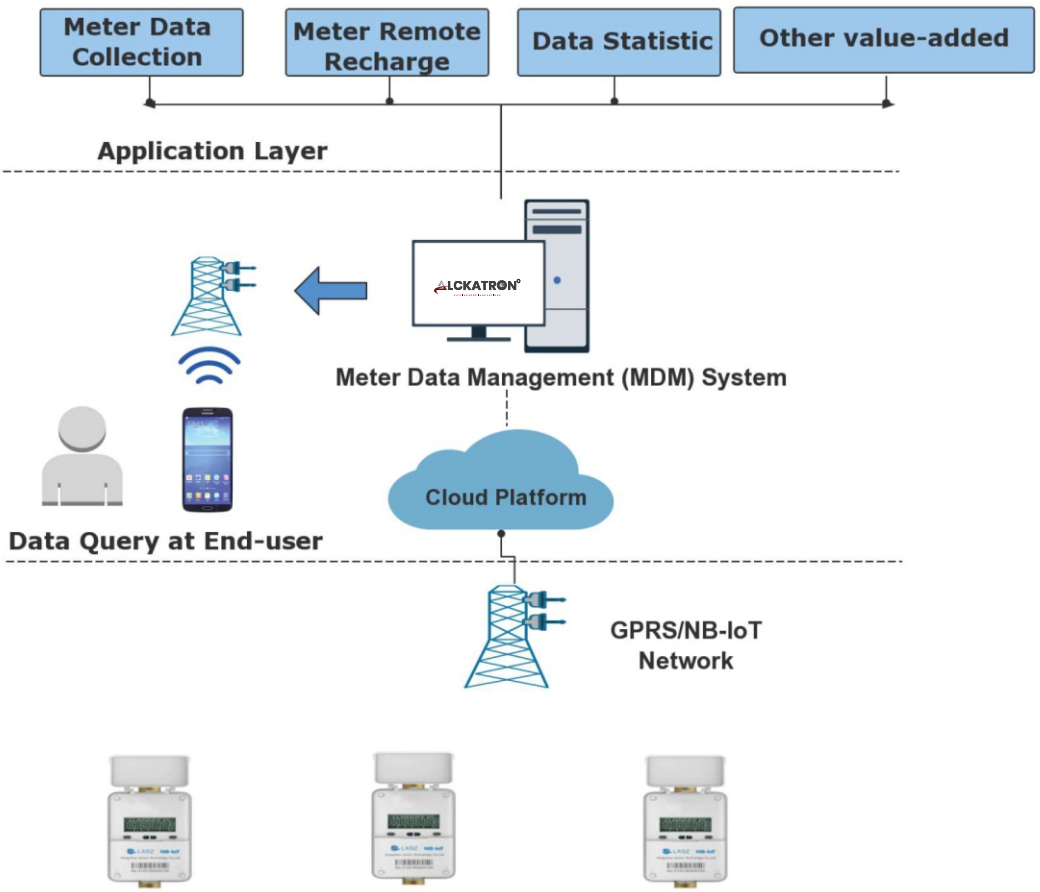


2) GPRS / NB-IoT Prepaid AMI Solution

By integrating GPRS/NB-IoT Communication Module and correspondingly SIM Card into Alckatron Smart Water Meter, it could rely on existed GPRS / NB-IoT base station to upload pre-defined meter's data includes Hourly Consumption Data Record, Battery Voltage etc., for further data analyzing and meter monitoring.

In the meantime, for prepaid function, it could realize Remote Meter Recharge through GPRS/NB-IoT network, no need for any separate keypad for token input.

The basic working process of GPRS/NB-IoT AMI Solution are as follows



03

POSTPAID AMR/AMI SOLUTION

For existed Mechanical Water Meter and Gas Meter, if it is pre-equipped with Pulse Output or Inductive Sampling device, Alckatron could provide the mechanical meter upgrade solution by equipping an external Meter Management Device to get the meter reading from mechanical meter part and transfer the meters' data to Center System through various integrated communication way like LoRa, GPRS, NB-IoT etc. for further analyzing. It provides a cost-effective solution for Water/Gas Authority, making the mechanical water/gas meter to smart one at a reasonable cost to reduce the labor cost and improve the working efficiency.

Alckatron provides mechanical meter upgrade solution for both Water Meter and Gas Meter as follows:

Mechanical Water or Gas Meter Upgrade.

Alckatron Smart Meter Management Device could be fixed to Mechanical Water Meter, getting the meter reading through reserved Pulse Output signal or Inductive Sampling technology. In the meantime, it integrates LoRa, GPRS, NB-IoT communication inside to transfer the data to Center System remotely either through Walk-by solution or totally automatic way. For detailed meter data collection way, please refer to "Prepaid AMR/AMI Solution"

04

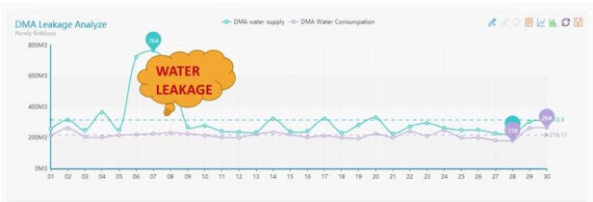
DMA (DATA MANAGEMENT AREA) SYSTEM

According to various research, There is high Non-Revenue Water (NRW) in Water Assets mainly because of following two reasons:

1) Failure of collecting water fee from end-user of the metered consumed water
2) Water pipe leakage and bypass situation which water is non-metered Alckatron provides solutions for both possible reasons, aims to reduce the NRW for Water Authority, improve the working efficieny to reach a better performance
3) Prepaid Water Meter solution to collect the metered consumed water revenue from end-user in time
4) DMA (Data Management Area) system to detect the possible Water Leakage in the pipeline and bypass situation to reduced unmetered water

By applying Industrial AMI Smart Water Meter at each inlet of water supply at specific are and Domestic AMI Smart Water Meter at each household, the Center System could get the meters' data of Supply (Industrial AMI Water Meter) and Consume (Domestic AMI Smart Water Meter), by analyzing these data, the system could detect possible leakage in pipeline or bypass situation and inform the management team of Water Authority in time.

Case 1: Detect the Water Leakage in pipeline



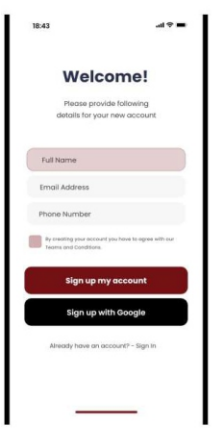
In this case, there is an obvious gap between the water supply (data from Industrial Water Meter at inlet of area) and water consume (data from Domestic Water Meter at each household), which means there is possibly having a Water Leakage in this are. By further analyzing each meters' Hourly Consumption Data Record, the System could locate the exact Water Leakage position and send technician to do maintenance in time.

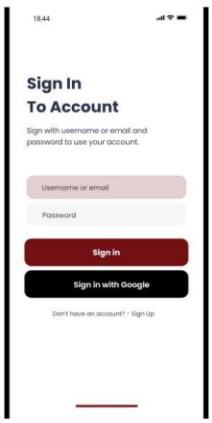
Case 2: Detect the Bypass situation in pipeline

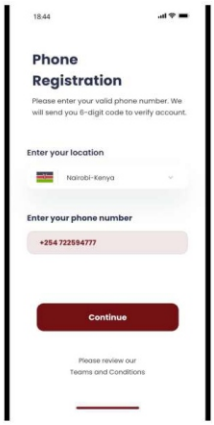
In this case, for one specific customer, the hourly/monthly consumption data keeps low during the official running status, which the system defines it may have possible bypass situation. The Water Authority could send some technician to check on site

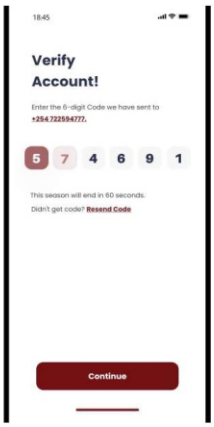
SYSTEM SCREENSHOTS

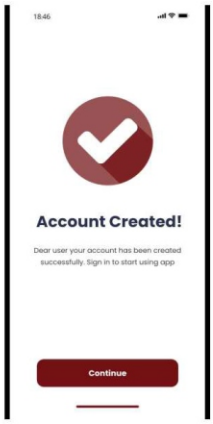
A glimpse of how the end user will be paying for water and other needed services thyrough our user firendly mobile APP

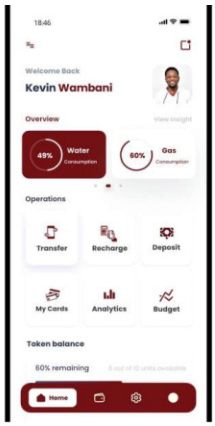


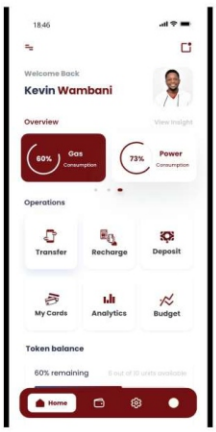


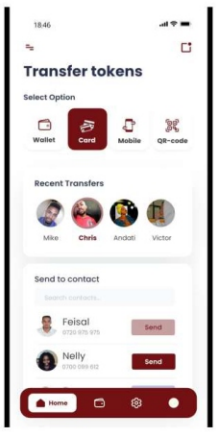


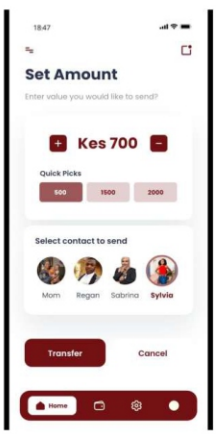


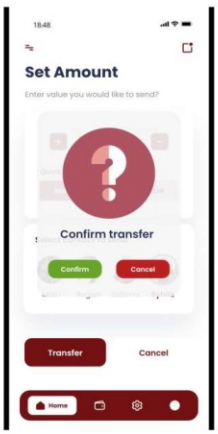


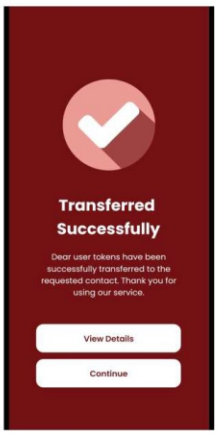


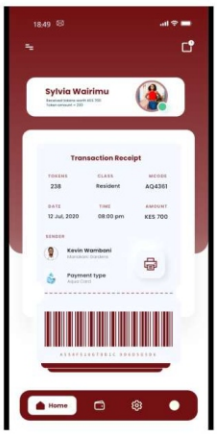


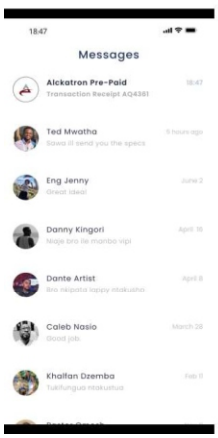


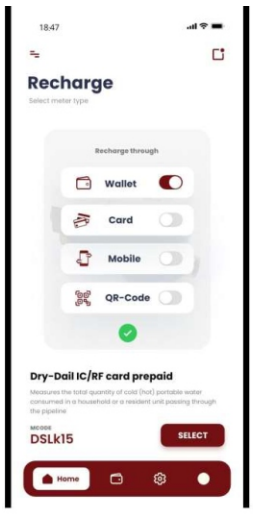


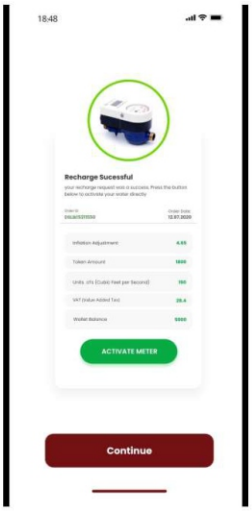


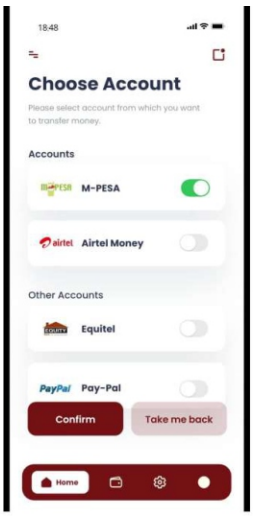


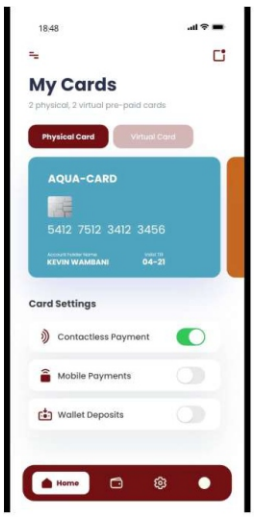


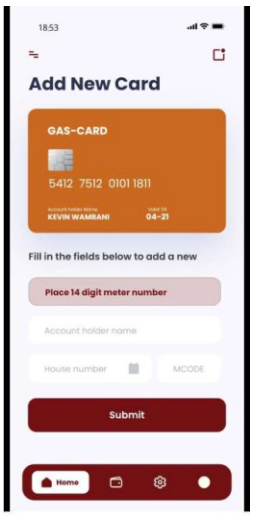


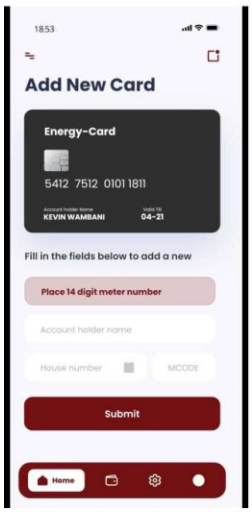

Recharge
Wallet
Card
Mobile
QR-Code
Dry-Dail IC/RF card prepaid
DSLK15
SELECT
Home

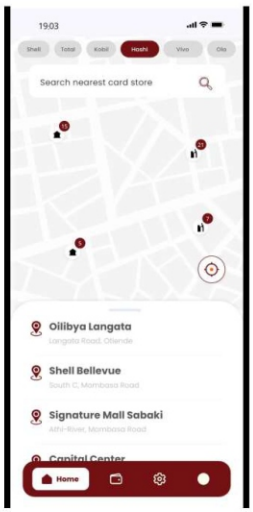

Recharge Sucessful
ACTIVATE METER
Continue

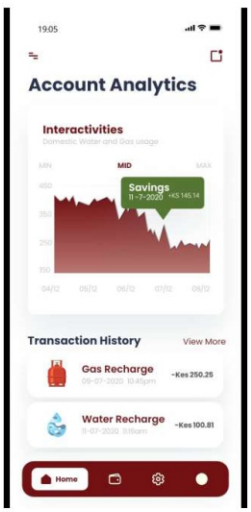

Choose Account
Please select account from which you want to transfer money.
Accounts
M-PESA
Airtel Money
Other Accounts
Equitel
Pay-Pal
Confirm
Take me back
Home

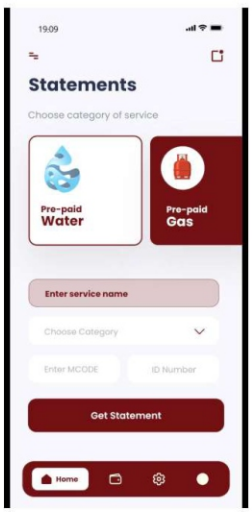

My Cards
2 physical, 2 virtual pre-paid cards
Physical Card
Virtual Card
AQUA-CARD
5412 7512 3412 3456
KEVIN WAMBANI
04-21
Card Settings
Contactless Payment
Mobile Payments
Wallet Deposits
Home

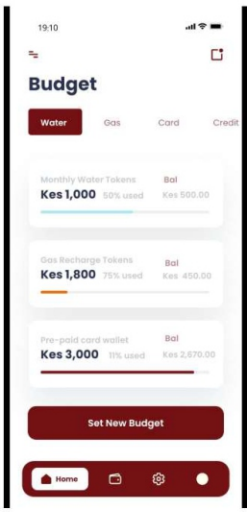

Add New Card
GAS-CARD
5412 7512 0101 1811
KEVIN WAMBANI
04-21
Fill in the fields below to add a new
Place 14 digit meter number
Account holder name
House number
MCODE
Submit
Home

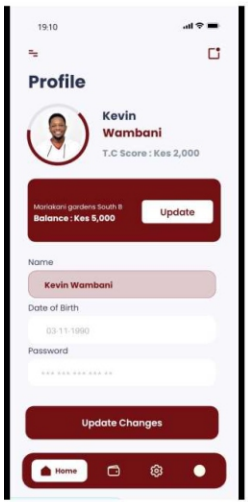

Add New Card
Energy-Card
5412 7512 0101 1811
KEVIN WAMBANI
04-21
Fill in the fields below to add a new
Place 14 digit meter number
Account holder name
House number
MCODE
Submit
Home

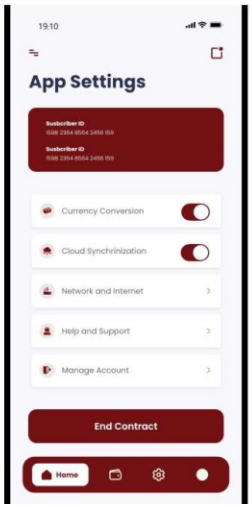

Search nearest card store
Olibya Langata
Shell Bellevue
Signature Mall Sabaki
Home

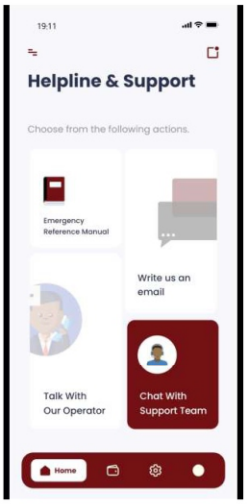

Account Analytics
Interactivities
Savings
Transaction History
View More
Gas Recharge
-Kes 250.25
Water Recharge
-Kes 100.81
Home

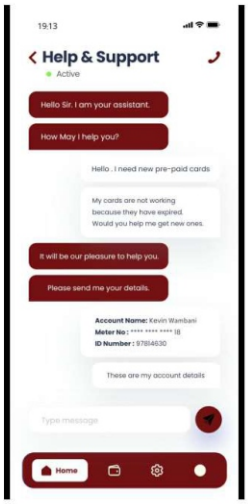

Statements
Choose category of service
Pre-paid Water
Pre-paid Gas
Enter service name
Choose Category
Enter MCODE
ID Number
Get Statement
Home


Budget
Water
Gas
Card
Credit
Monthly Water Tokens
Kes 1,000
Gas Recharge Tokens
Kes 1,800
Pre-paid card wallet
Kes 3,000
Set New Budget
Home


Profile
Kevin Wambani
T.C Score : Kes 2,000
Balance : Kes 5,000
Update
Name
Kevin Wambani
Date of Birth
Password
Update Changes
Home


App Settings
Currency Conversion
Cloud Synchronization
Network and Internet
Help and Support
Manage Account
End Contract
Home


Helpline & Support
Choose from the following actions.
Emergency Reference Manual
Write us an email
Talk With Our Operator
Chat With Support Team
Home


Help & Support
Active
Hello Sir. I am your assistant.
How May I help you?
Hello . I need new pre-paid cards
My cards are not working because they have expired. Would you help me get new ones.
It will be our pleasure to help you.
Please send me your details.
Account Name: Kevin Wambani
Meter No :
ID Number : 97814630
These are my account details
Home

SMART METRES PRICE LIST

Item	Description	Size mm	Qty PCS	Unit Price USD	Amount USD
IORA WATER METER					
Option 1	Wireless remote reading and control water meter,brass body with valve; Lora meter to data concentrator concentrator to server, Cold water 0-50 Centigrade 	DN15	1	US$65.16	US$65.16
		DN20	1	US$ 88.17	US$88.17
		DN25	1	US$149.21	US$149.21
Option 2	Wireless remote reading and control ultrasonic water meter,brass body without valve; Lora meter to meter and GPRS Meter to data concentrator, Cold water 0-50 Centigrade 	DN15	1	US$67.21	US$67.21
		DN20	1	US$120.21	US$120.21
		DN25	1	US$193.23	US$193.23
		DN32	1	US$268.25	US$268.25
		DN40	1	US$320.74	US$320.74
data concentrator			1	US$742.35	US$742.35

Price Valid time : 1 Month

USD /RMB exchange rate = 6.6

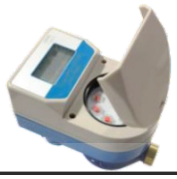
SMART METRES PRICE LIST

Item	Description	Size mm	Qty PCS	Unit Price USD	Amount USD
ULTRASONIC WATER METER					
Option 3	Ultrasonic water meter , with rs485, Cold water 0-50 Centigrade , brass body , R200 	DN15	1	US$238.60	US$238.60
		DN20	1	US$340.53	US$340.53
		DN25	1	US$449.22	US$449.22
		DN32	1	US$555.97	US$555.97
		DN40	1	US$771.41	US$771.41
Option 4	K5 Ultrasonic water meter , with rs485, Cold water 0-50 Centigrade , brass body , R250 	DN50	1	$1188.56	$1188.56
		DN65	1	$1218.34	$1218.34
		DN80	1	$2277.89	$2277.89
		DN100	1	$2317.59	$2317.59
		DN125	1	$3357.28	$3357.28
		DN150	1	$3436.69	$3436.69
		DN200	1	$4506.17	$4506.17
		DN250	1	$4923.00	$4923.00
		DN300	1	$5210.83	$5210.83

Price Valid time : 1 Month

USD /RMB exchange rate = 6.6

SMART METRES PRICE LIST

Item	Description	Size mm	Qty PCS	Unit Price USD	Amount USD
Option 5	Wireless remote reading and control water meter, brass body with valve control GPRS data transmission from water meter to Service platform 	DN15	1	$85.44	$85.44
		DN20	1	$150.35	$150.35
		DN25	1	$266.90	$266.90
Option 6	Wireless remote reading and control water meter, iron body without valve control GPRS data transmission from water meter to Service platform 	DN32	1	$376.47	$376.47
		DN40	1	$38.94	$38.94
Option 7	Wireless remote reading and control water meter, iron body without valve control GPRS data transmission from water meter to Service platform 	DN50	1	US$441.72	US$441.72
		DN65	1	US$452.77	US$452.77
		DN80	1	US$556.33	US$556.33
		DN100	1	US$563.19	US$563.19
		DN125	1	US$584.66	US$584.66
		DN150	1	US$605.92	US$605.92
		DN200	1	US$735.04	US$735.04
		DN250	1	US$803.90	US$803.90
		DN300	1	US$966.49	US$966.49

FIELD PHOTOS

GO TO NEXT PAGE TO SEE OUR FARMING SOLUTION

ALCKATRON®
CUTTING EDGE INNOVATIONS

User Manual

The following document describe the installation procedures and the web interface of the Alckatron irrigation control system.

The system described in this document collects data from soil sensor tensiometers and facilitate execution of irrigation commands 24/7.

The system functions as data logger for autonomous irrigation. Alternately the user can utilize the data logged for decision support in the irrigation based on timing or amount of water application.

Alckatron System Components

The Alckatron autonomous irrigation control system include the following components:

Valve Switch – Irrigation Controller

Irrigation controller and base station for receiving data from wireless tensiometers around it, communication with cloud server and the execution of the irrigation commands based on user defined policy.

Tensiometer Sensor

Wireless device measuring water tension in the soil.

Wireless Solenoid Switcher

This device controls wirelessly the solenoid state of a hydraulic valve. It is powered by 2 AA batteries and receives its commands for the Valve Switch controller. This device is used mainly as Valve Switch port extender.

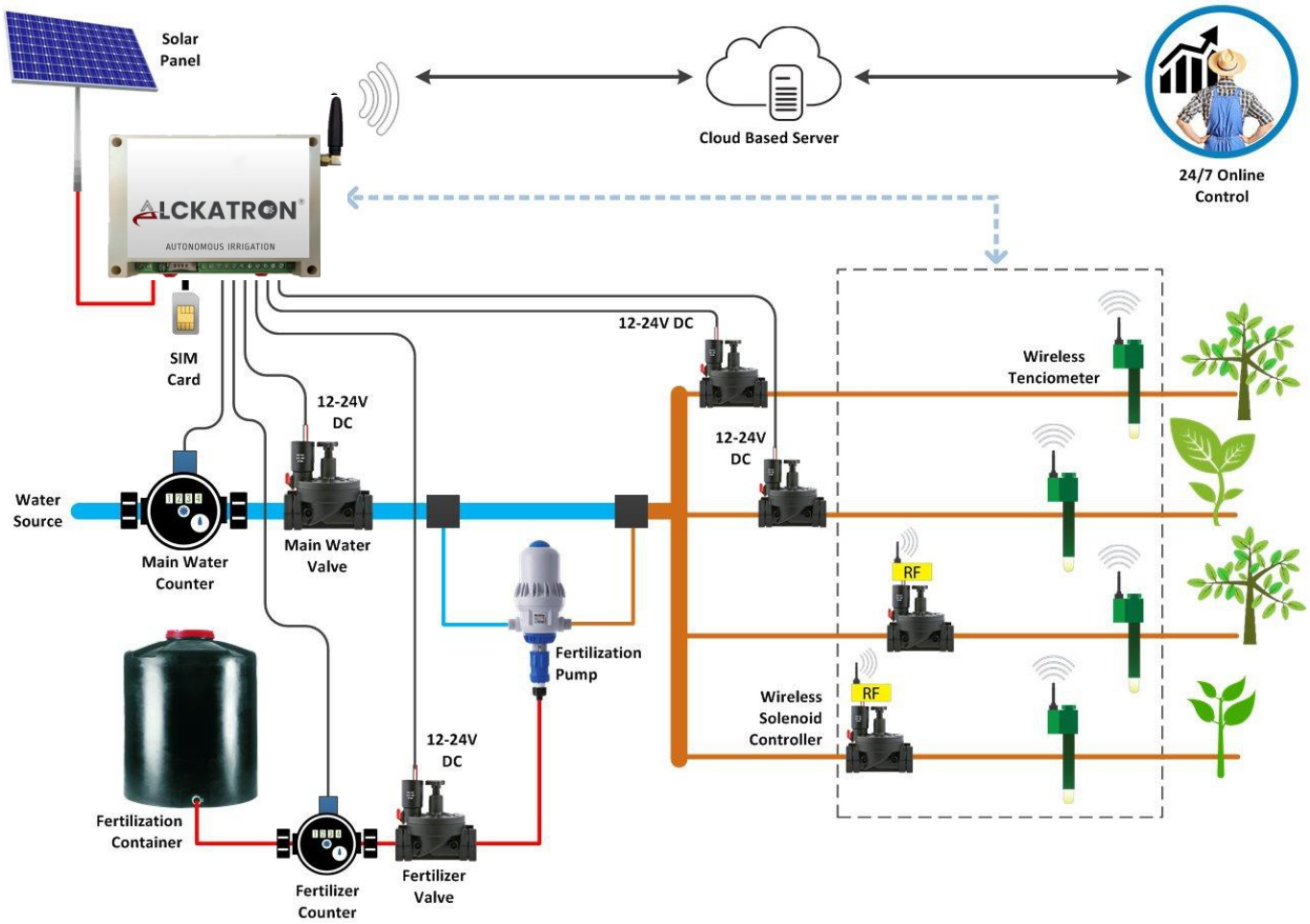
System Operation Mode

The operation of the system components:

1. The Valve Switch unit connects to the water and fertilizer counters and the hydraulic valves. It serves as a communication transfer unit (GPS), sending irrigation and tension data to the cloud and receiving execution commands that control irrigation and fertilization.

2. Tensiometers installed up to 1km (direct line) around a Valve Switch, measuring and collecting soil tension data every 1 minute and transmitting it in RF communication to the Valve Switch.

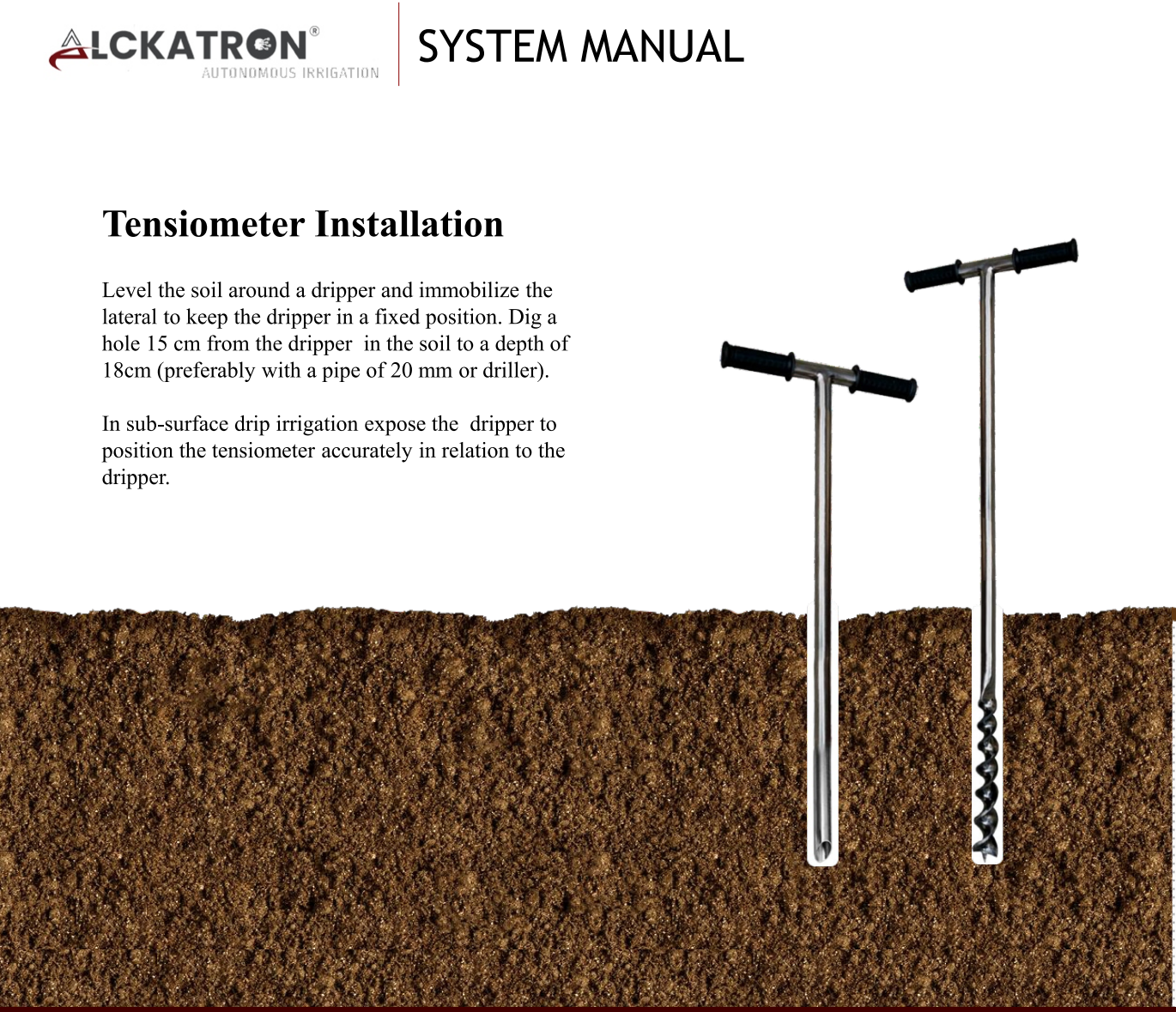
3. Cloud Server collects the tension data and transmits back commands of opening/closing the relevant valves based on the policy of irrigation defined by the user and the Alckatron proprietary irrigation algorithm that control the irrigation depth.

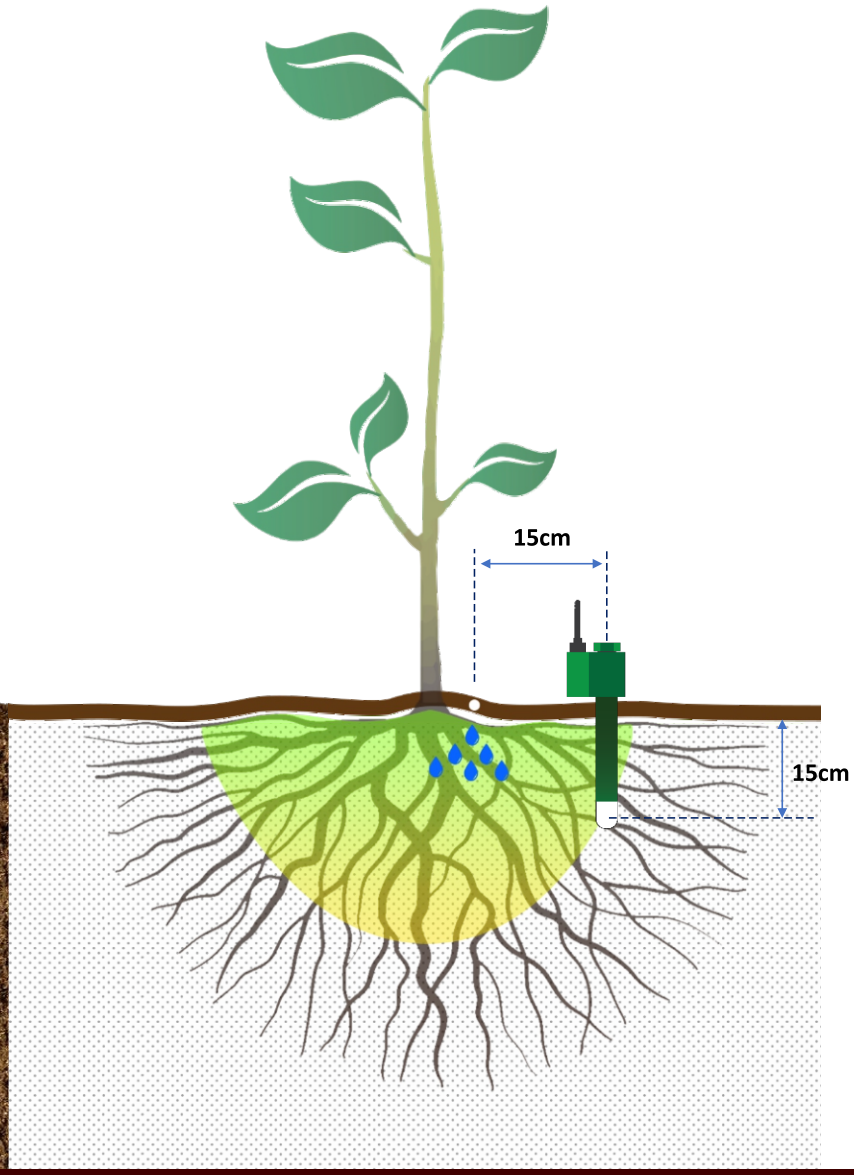


Tensiometer Installation

Level the soil around a dripper and immobilize the lateral to keep the dripper in a fixed position. Dig a hole 15 cm from the dripper in the soil to a depth of 18cm (preferably with a pipe of 20 mm or driller).

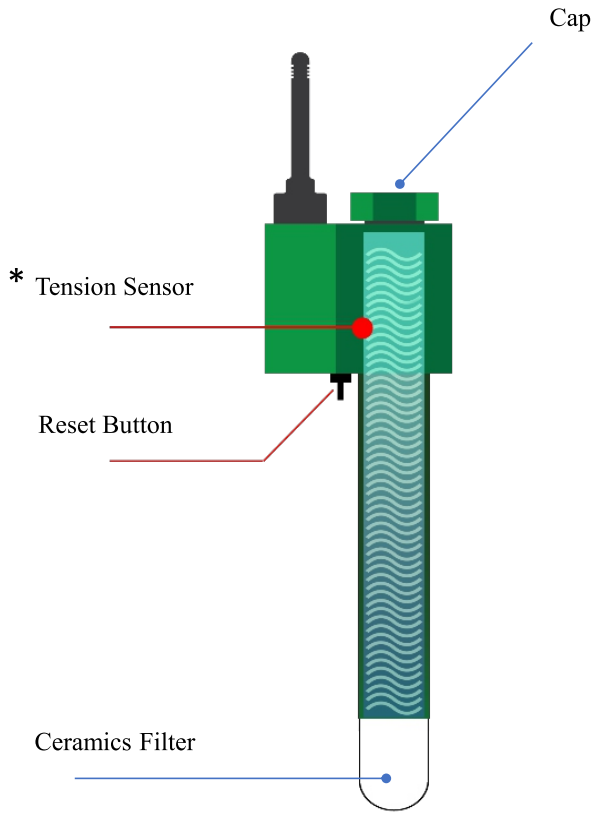
In sub-surface drip irrigation expose the dripper to position the tensiometer accurately in relation to the dripper.





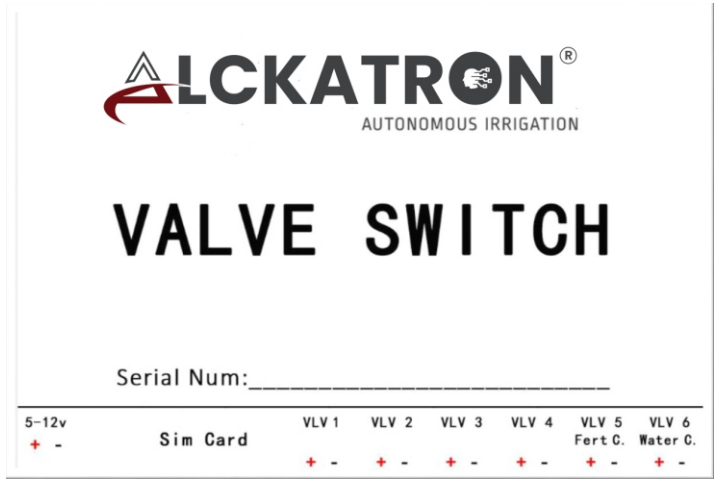
Tensiometer Installation

1. Fill the hole with water and some broken up soil, to make sure there will be a good grip between the sensor ceramics and the soil.
2. Unscrew the tensiometer's cap and fill it with water up to the top. Be aware that the tension sensor (*) is inside the tensiometer tube and it is always in contact with the water in the tube
3. Close the cap of the tensiometer by hand, not too tight.
4. Insert the tensiometer into the hole in the ground.
5. Tighten the soil around the tensiometer.
6. While holding the head of the tensiometer, close its cap very firmly with screwdriver, if needed tighten the soil around the tensiometer
7. Press the reset button to zero the tensiometer, the device will wait for 3 minutes and after that it will reset itself automatically. By doing it is eliminating both the internal and external pressure.



Valve Switch Connection

1. Insert an original large size sim card in the sim card slot
2. Connect the output of the AC power adapter (connected to electricity grid) or connect the solar panel + and – wires to the right connectors as displayed below.
3. Connect solenoids valves and counters to the right ports as displayed below.
4. The main water valve should be connected to port number 6 and the fertilizer valve to port number 5.
5. Write down the valve assignment of ports 1-4 , corresponding to specific irrigation plots 1-4, in order to define it later properly in the web interface



Wireless Solenoid Switcher

This device functions as a Valve Switch ports extension. Connect the solenoid wires to the plus and minus inputs of the unit.

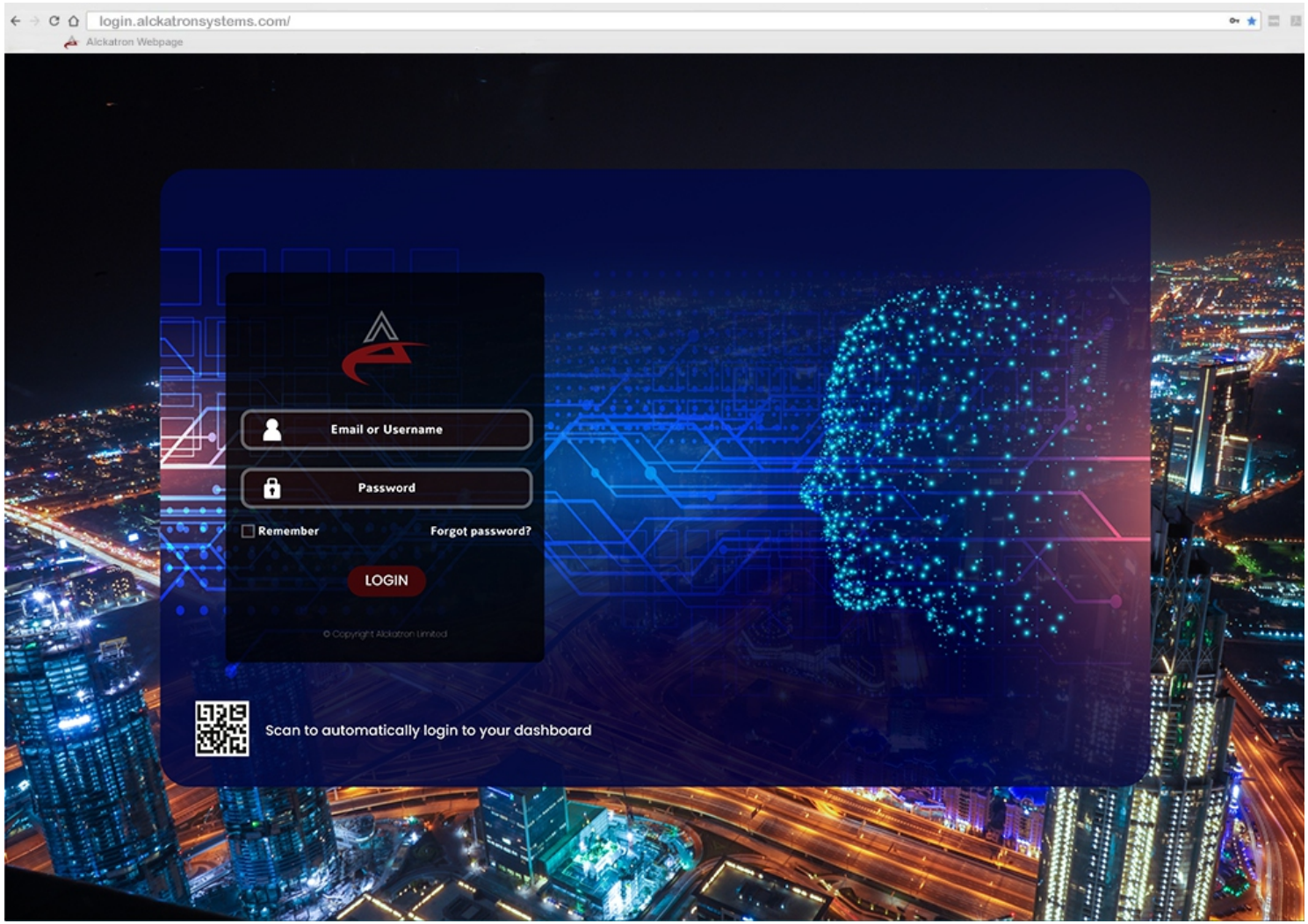
In case the batteries of this unit needs to be replaced, open the box by unscrewing the screws and replacing the 2 AA batteries.

Interface Login

To log in to the online control interface use the web link:

login.alckatronsystems.com

Use the user-name and password you received from the automated email to enter to your profile.



Interface Main Screen

The main screen includes the following:

1. In the upper left part of the screen is a list of the assets (controllers, sensors, fields, greenhouses) and in the lower part the tensiometer sensors installed in those assets.

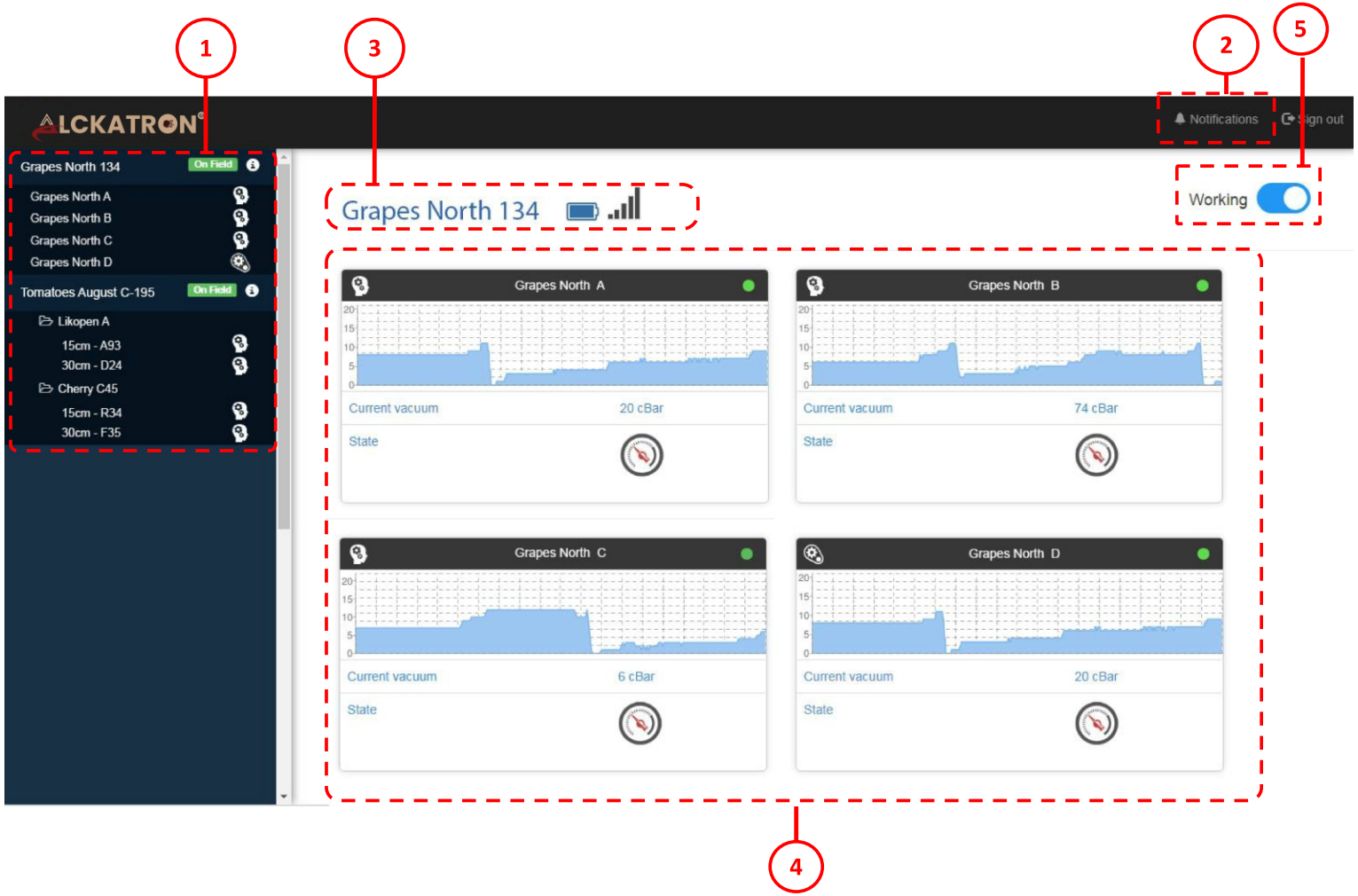
2. Up right you can see notifications relevant to the state of your systems.

3. When clicking on the upper left part of the main screen it displays the selected controller (Valve Switch) or virtual entity that represents a field or a green house.

4. Graphical representation of the tensiometers included in the virtual entity (described in previous point).

5. Moving this button to the left will disable the selected entity from irrigating.

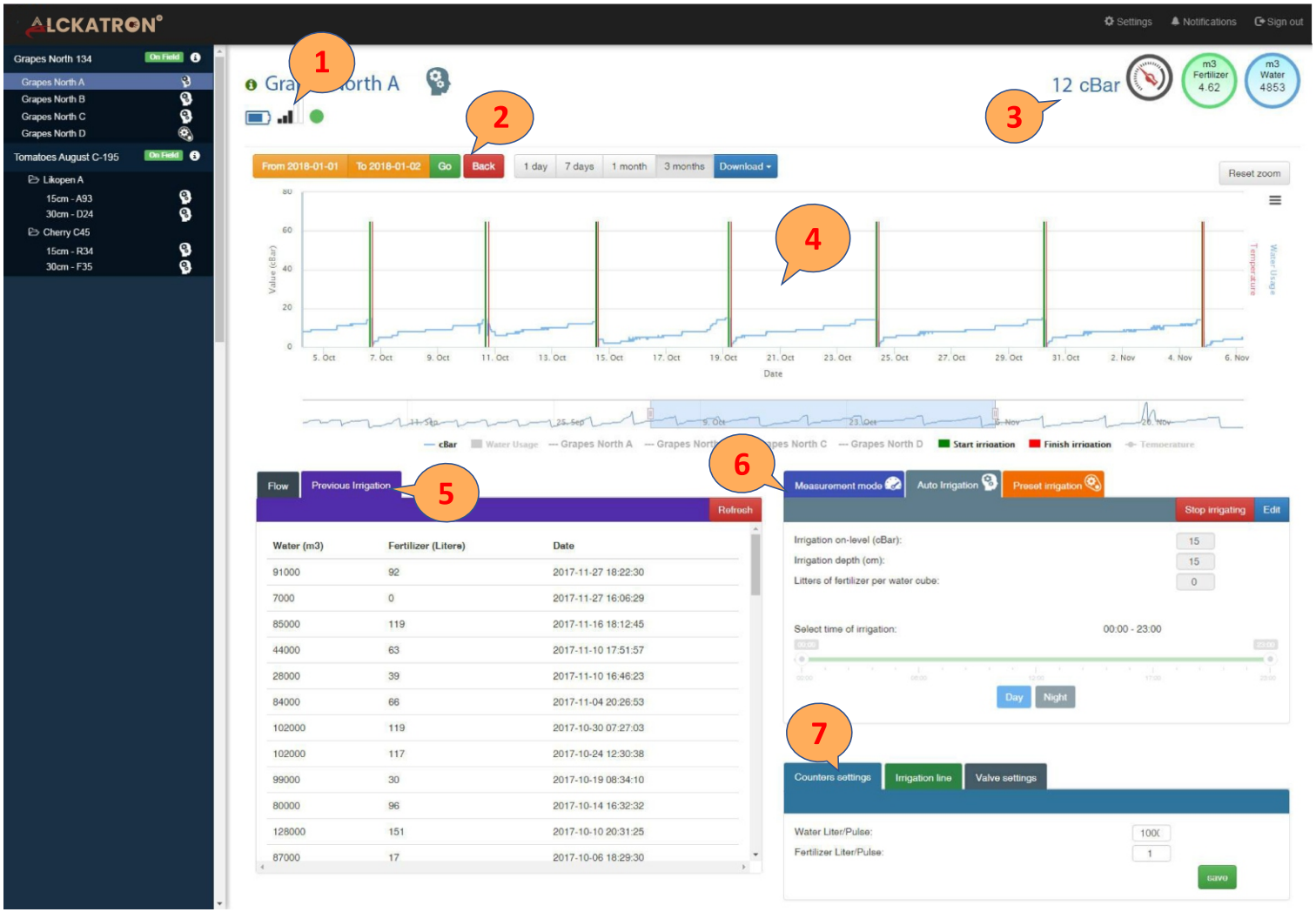
   By clicking on any of the sensors (tensiometers), you can proceed to the next screen and review the detailed data from this sensor.



Plot configuration

Click on one of the sensors to review the configuration that will affect the irrigation on this plot.

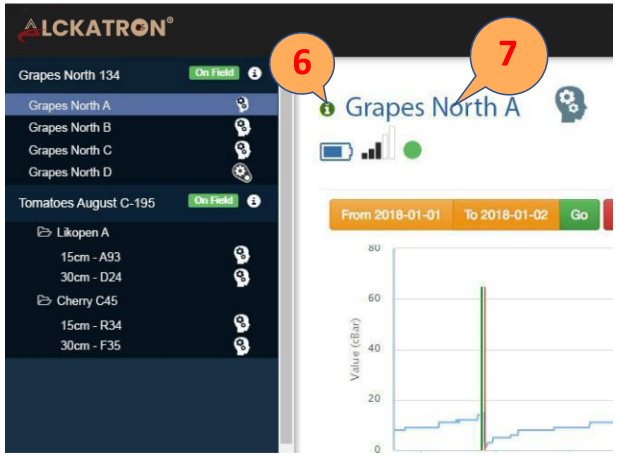
1. Name of the sensor and it's state
2. Time interval. You can select to review the last day/week/month/3 months or select from specific date interval.
3. Current sensor tension value and total volume of fertilizer and water applied.
4. Tension graph
5. Irrigation cycles report
6. Configuration of the irrigation policy and measurement parameters.
7. Configuration of counters and valves

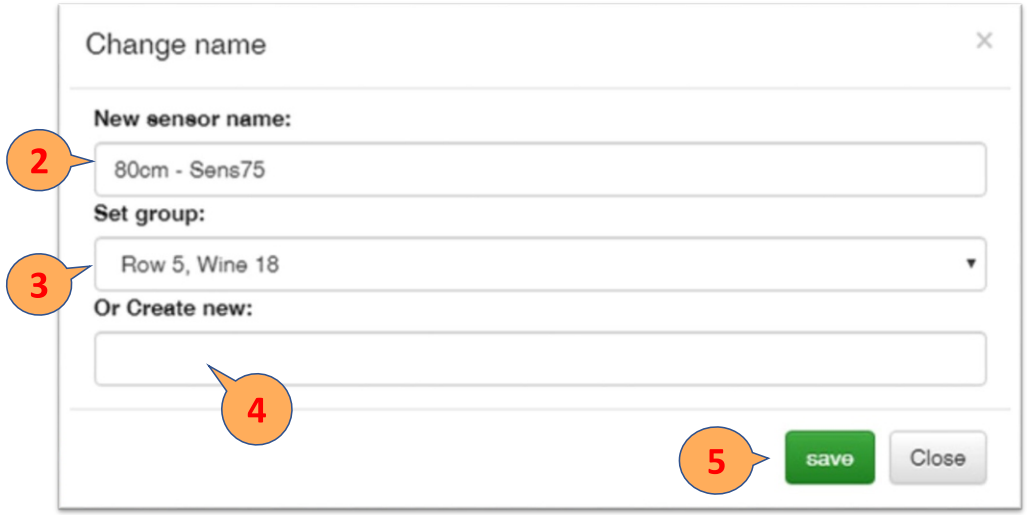


Changing the tensiometer name and its group

When it is required to define the name of a tensiometer in order to associate it with the name/number of the plot where it is installed, the next operations can be done:

1. Click on the name of the sensor
2. Assign or change name to identify the tensiometer
3. In the Set Group drop down box assign or change the group that the tensiometer belongs to.
4. If there is no group, you can create it in this field
5. Click on save to accept the changes.
6. By clicking on the green (i) button you can see the sensor's reception level, the battery level and if it is off (red) or online (green).

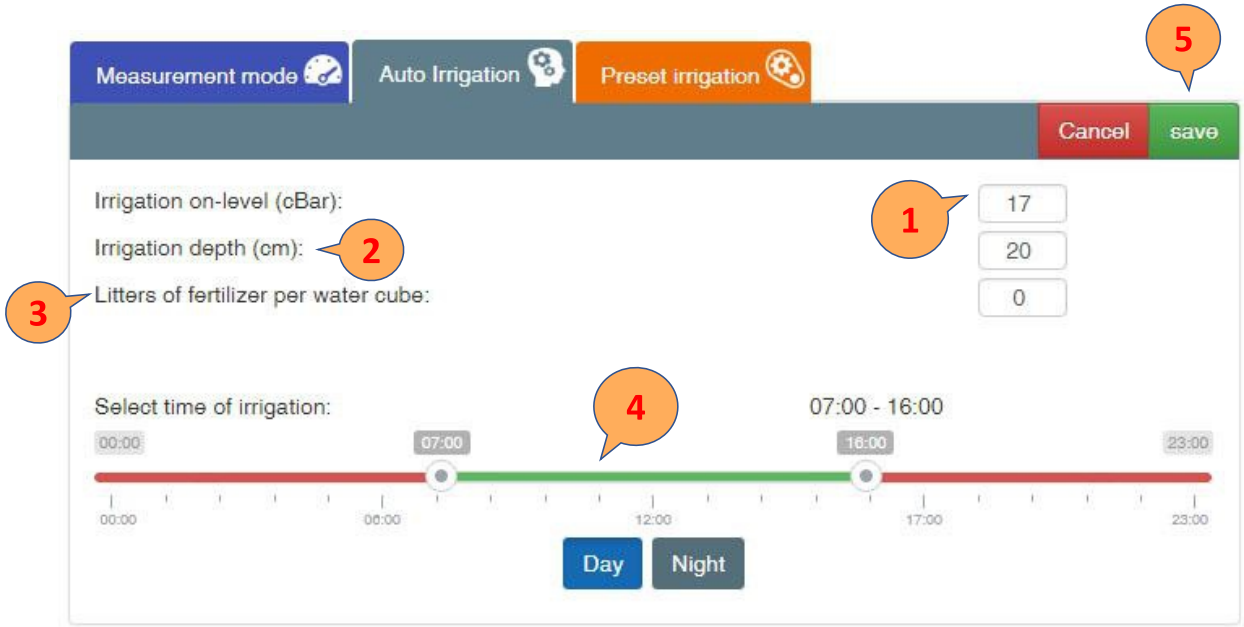


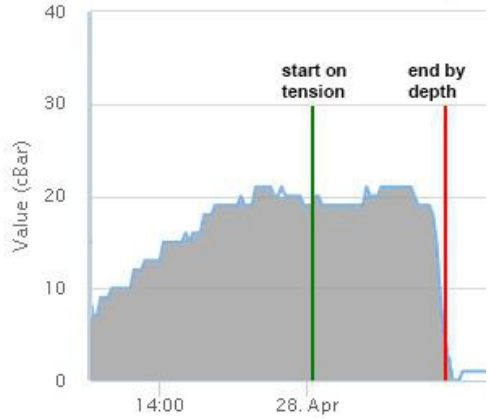


Defining the Autonomous irrigation mode

In the following interface you can define the parameters that will execute your irrigation policy for a specific plot where the selected tensiometer is installed:

1. Make sure the grey “Auto Irrigation” tab is selected and set the tension level in cBar that will trigger irrigation in this plot
2. Set the irrigation depth in centimeters to define the depth in the soil you wish the water to infiltrate
3. If the fertilizer is applied with the water, set the number of liters per 1 cube of water.
4. Define the time limitation during the day when the system can irrigation provided the threshold tension was reached
5. Click on “Save” to save your settings

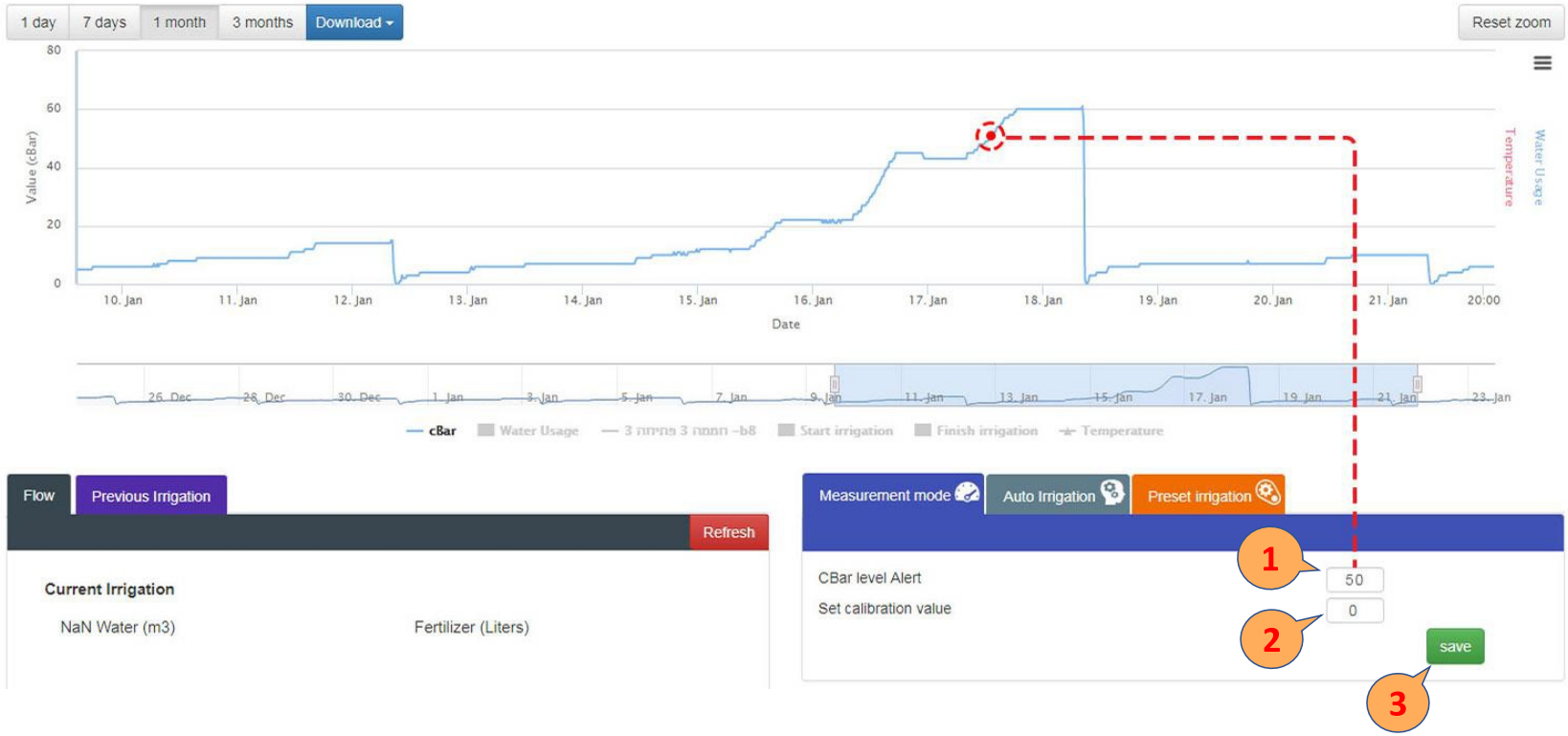




Measurement Mode:

In case you are using the system for tension measurement only (without irrigation control) you can define a few parameters to exploit some advantages of the system:

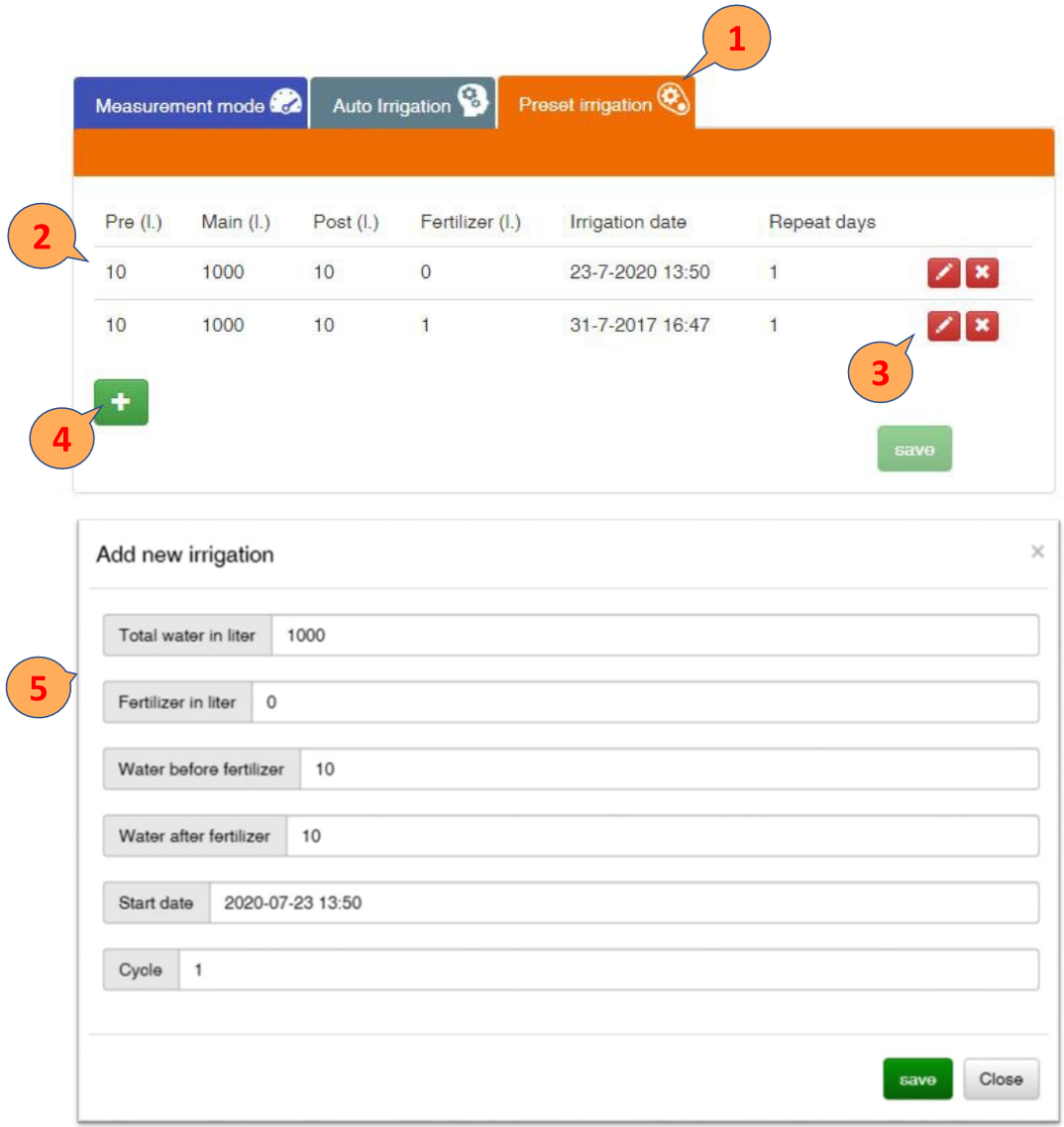
1. Set a tension level reached to alert the user by email.
2. Set calibration value to zero In case the tension registers a “negative” value (below baseline). This will transform the graph to display valid tension data
3. Click “Save” to save the changes



Preset Irrigation

In case the user wishes to define an exact amounts of irrigation irrelevant to the tension levels measured by tensiometers the “Preset Irrigation” mode can be used:

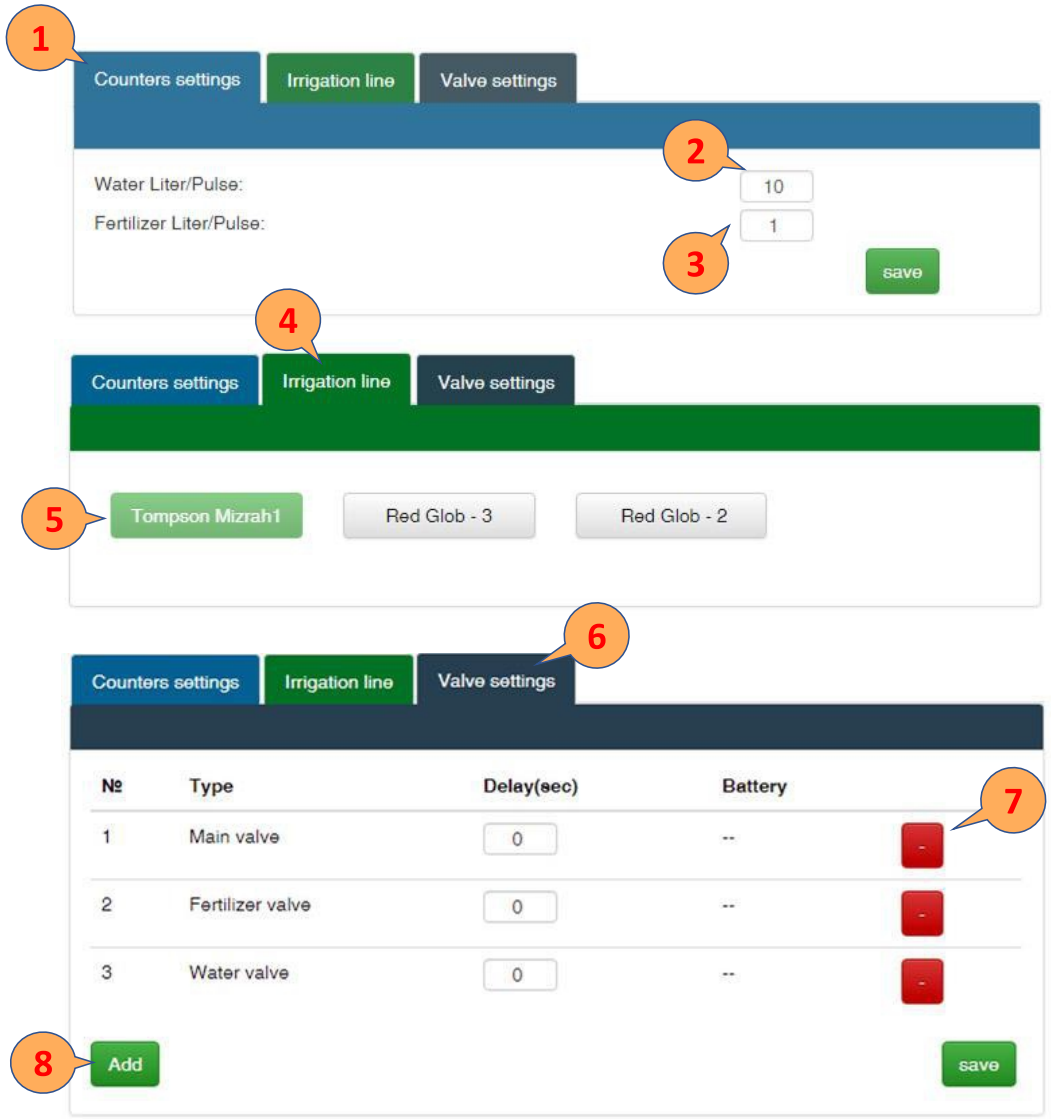
1. Click the “Preset Irrigation” tab
2. Existing irrigation programs are displayed
3. You can edit or delete those programs
4. You can add additional program of irrigation by clicking the “+” button
5. Set the amount of water and fertilizer in each irrigation cycles and set the amount of water before and after the injection of fertilizer. Setting a number in “cycle” field will set the number of days between irrigation cycles.



Valves and Counters Settings:

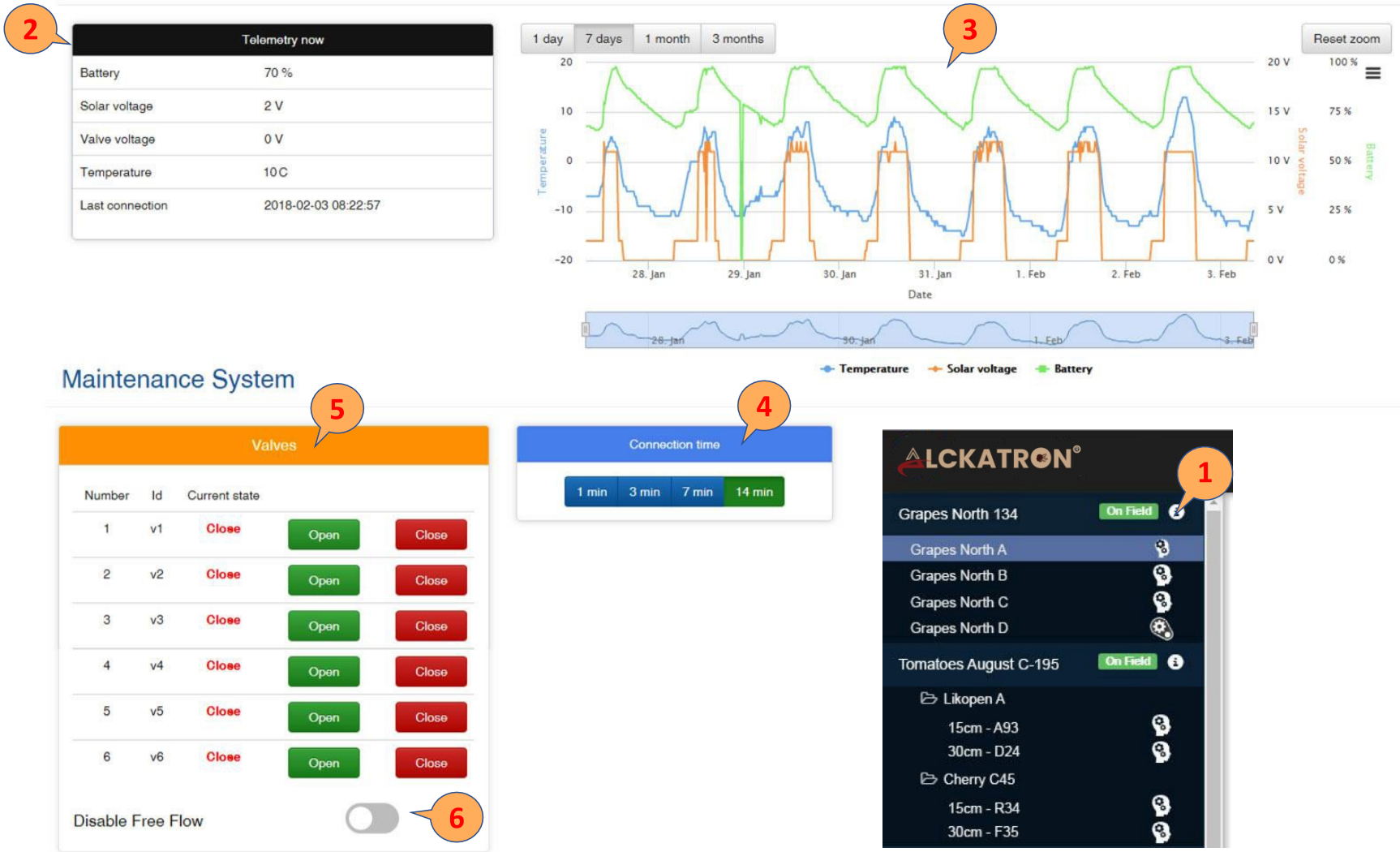
Dry contact pulses

1. In this tab you can set the amount of water and fertilizer liters registered per each pulse received by the system
2. Make sure you define the correct value in this field field (the gauge pulse output) to receive proper reports on the irrigation amount
3. Make sure you define the correct value in this field (the gauge pulse output) to receive proper reports on the fertigation amount
4. Open this tab to define which valves can irrigate simultaneously. It is preferable to avoid simultaneous irrigation in order to make sure that each irrigation cycle was counted alone and assigned to a specific plot .
5. Select the valves assignment that can irrigate simultaneously. The valves in white color irrigate simultaneously.
6. Open this tab to define the sequence of valves to be opened for each plot. An example of a sequence can be: open the main water valve, wait for 20 and open the fertilizer valve, wait for 20 and then open the water valve of this plot sec sec
7. Use this button to remove a valve from the sequence
8. Use this button to add a valve to the sequence



Maintenance screen

1. Click on the “I” icon to open the Maintenance screen of the Valve Switch unit.
2. Review the current battery charge, and the last connection date
3. Graph of the Valve Switch internal battery charge over time
4. Set the frequency of connection to the cloud server. During irrigation it switches to 3 min interval automatically
5. Manually open/close valves by clicking the relevant valve
6. Make sure to “Disable Free Flow” while opening manually valves, to avoid trying the system to block this operation

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