



# REMOTE CONTROL

THE ALOSYS SOLUTION FOR THE SMART CITY



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## REMOTE CONTROL SOLUTION

Product specifications	
Product name	ALOSYS SOLUZIONE REMOTE CONTROL ARYEL_ESTER
Technology	M2M
Company	ALOSYS COMMUNICATIONS SRL
Website	<a href="http://WWW.ALOSYS.IT">WWW.ALOSYS.IT</a>

### GENERAL DESCRIPTION

The ALOSYS REMOTE CONTROL solution by Alosys Communications S.r.l. has been designed and developed to allow remote control and alarm management of electrical panels of public-lighting system. The system provides for smart remote meter reading, remote control and remote management for equipment that has to be operational over time even without human on site intervention.

It allows to:

- Detect data from remote devices, directly or through probes;
- Interact with smart sensors, actuators, gauges, multimeters, domotics gateway;
- Manage smart remote meter reading, remote control and remote management of external devices, all integrated with the Management Centre via GSM/GPRS/Ethernet;
- Detect alarms and malfunctioning data of remote equipment;
- Implement controls according to the operational and maintenance needs collected and processed by the Management Centre;
- Prearrange the system to interact with remote devices for the Point-to-point control of the public-lighting system poles to gather information, generate and manage specific alarms.

The ALOSYS REMOTE CONTROL solution is made of the Aryel M2M device that interfaces with the ESTER Remote Management Centre to send information and receive controls.

Aryel M2M is directly connected to the electrical panel, collects its data and sends them to the ESTER Remote Management Centre.

The ESTER Remote Management Centre verifies the electrical panels operating status, consumptions and the related operational parameters.

The ESTER Remote Management Centre Front End ensures an overall view and management of the system.

The solution connects multiple devices through wired and wireless transmission media.

The flexible and scalable solution architecture is based on two operational modules designed and assembled by Alosys:

### A/ ARYEL M2M

The main device of the Alosys Remote Control solution. It allows remote control and management both of the switchboard and of the public-lighting system poles.



The main innovative features of ARYEL M2M are:

1. High configuration versatility;  
 Presetting up to 20 opto-isolated inputs and 8 outputs for controls implementation with relay in NO (normally open) or NC (Normally Closed) configuration makes ARYEL a pivotal device for the collection and distribution of information from multiple sources and equipment.
2. Multiple interface possibilities via RS485 and Ethernet 10/100BT;
3. Integrability with the LoRa transmission technology.

Readout of the several inputs coming from the electrical panel devices and transmission to the ESTER Remote Management Centre.

The main possible measurements are listed below:

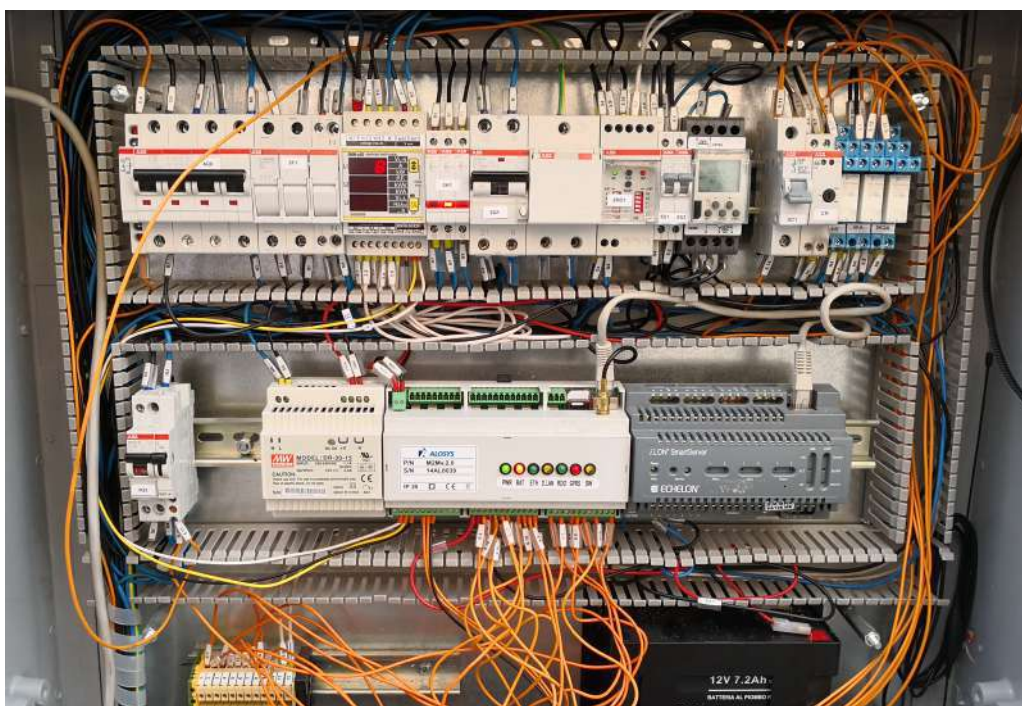
- system status on/off
- main switch status and power supply presence
- status of circuits switches under the switchboard
- switchboard electric appliances status
- system operating hours
- number of breakdowns in the system operation.
- current (IRMS) and voltage (VRMS) effective values
- active and reactive power
- fundamental and harmonics active power
- fundamental reactive power
- power factor
- mains frequency

The system is made of:

- a processor unit ARM9 400Mhz, 128Mbyte DDR2 RAM;
- a mass storage device via MicroSD slot;
- a SIM card slot;
- a GPRS connection modem;
- an RS485 layer for communication via Modbus protocol;
- a 10/100BT Ethernet controller;
- an SMA connector to support an external GSM antenna.
- Backup battery management and charging

Linux operating system is installed in a microSD.  
The MicroSD is set up on a DIN rail inside the electrical panel.

Example of ARYEL M2M installation inside the electrical panel.



## B/ ESTER REMOTE MANAGEMENT CENTRE

The Management Centre acquires, collects and processes data reports received by ARYEL M2M equipment located in the electrical panels distributed throughout the territory and enables remote controls.

The ESTER Remote Management Centre ensures:

- centralised management of public lighting system;
- multiple sites management from a single front-end;
- Systems data management;
- displaying of equipment geographical location;
- alarms and breakdowns real time monitoring;
- "trouble ticketing" alarm signals management;
- operating cycles configuration;
- systems maintenance management;
- statistical processing;
- periodic reporting according to needs.

The Trouble Ticketing system traces the breakdown life cycle until the return of service.

Tracked alarms list:

- Electrical panel reachability alarm - Electrical panel not reachable
- Electrical panel doors opening alarm - Door Open
- Power supply alarm - Lack of network (General On)
- Power supply alarm - General Switch Off
- UPS alarm - UPS Disconnected
- UPS alarm - UPS Exhausted
- Auxiliary switches alarm - Active Protection
- Remote Control alarm – Inactive (or Idle) Remote Control
- Lighting points power line alarm - Line KO
- Night power supply - Night KO
- Battery panel alarm - Fault
- Battery panel alarm - Battery disconnected
- Multimeter module alarm - Fault

The **ESTER Remote Centre Management** is based on an Open Source software platform. The front- end side is web-based and uses the Model-View-Controller (MVC) architectural pattern, very common in software development and able to separate the presentation logic from the business and processing logic.

The **ESTER Remote Centre Management** has a three-tier architecture and the following three levels:

- Presentation logic
- Processes development
- Data persistence management

The back-end is made of:

- A MySQL Database;
- A series of Perl developed daemons, retrieved from a Chron Job, implementing a Listener to receive Aryel data, and a Parser to decode the received data and enter them in the Database that will then be queried by the front-end.

The Front-end is based on:

- Webserver Apache with CGI-BIN, plugin Php, Mysql, SSL and Perl.
- Programming languages used: Php, Javascript and HTML.
- Features: Visualization, Alarms monitoring and reporting, Provisioning and Configuration.
- A fully graphical web-oriented user interface allows to validate access to operations according to profiles and authorisations issued.

Google Maps APIs are used to display geolocated spots on the map.

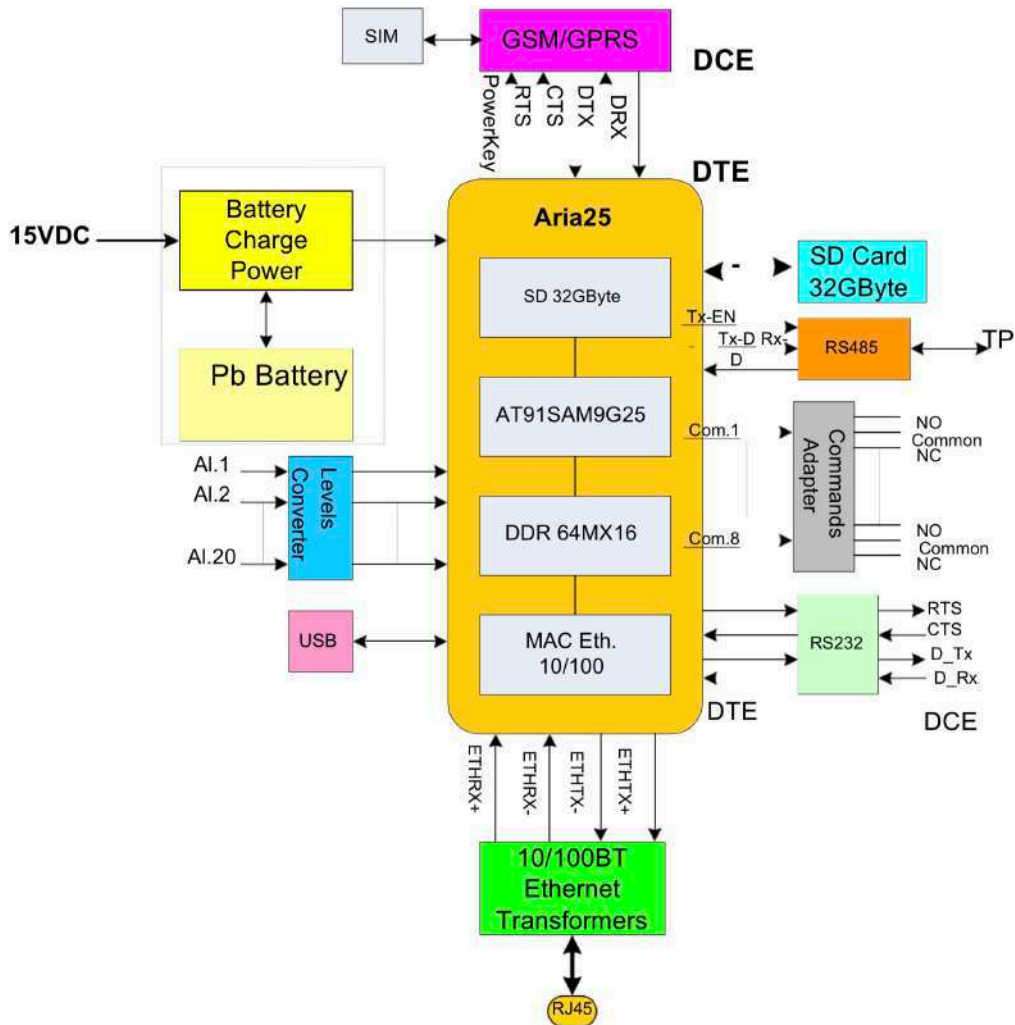
### ATTACHMENT 1- ARYEL M2M TECHNICAL SPECIFICATIONS

<b>LONG RANGE COMMUNICATION PROTOCOL</b>	GSM/GPRS
<b>GSM/GPRS</b>	Second GSM 05.05 ver. 5.3.0.§ 4.1.1
<b>POWER OUTPUT</b>	Power class 4 (2W per GSM 900) Power class 1 (1W per GSM 1800)
<b>HOST PROTOCOL</b>	AT Command Hayes GSM 07.07 and GSM 07.05
<b>GSM DATA</b>	CSD transmission rates: 2.4,4.8,9.6,14.4 kbps- V21; V22bis; V.26ter; V.32; V34 e V.110 e Autobauding
<b>GPRS DATA</b>	GPRS data downlink transfer: max. 85.6 kbps λ GPRS data uplink transfer: max. 85.6 kbps λ Coding scheme: CS-1, CS-2, CS-3 and CS-4 λ PAP protocol for PPP connect λ Integrate the TCP/IP protocol. λ Support Packet Broadcast Control Channel (PBCCH)
	Class B max 85,6 kbps (downlink) 42,8kbps (uplink);
	Coding scheme CS1÷CS4
	USSD, manage of stack TCP/IP and PPP protocol

<b>SMS</b>	MT, MO, CB, Text and PDU mode SMS storage: SIM card
<b>SECURITY PROTOCOL</b>	Secure Sockets Layer (SSL) 3.0
<b>NMS PROTOCOL</b>	Agent SNMP 3.0
<b>INTERFACES</b>	RS485 – RS232
	Ethernet 10/100BT
<b>ENCRYPTION/DECRYPTION</b>	Implemented using SNMP V3.0 (AES 128 bits)
<b>COMMUNICATION PROTOCOLS WITH THE CENTRAL PROCESSING SYSTEM</b>	Standard Protocols and/or OpenSource on TCP/IP
<b>UMTS</b>	no
<b>ASSEMBLY SYSTEM</b>	DIN rail
<b>I/O PORTS</b>	20 Input ports opto-isolated, 8 Output relay ports, 2 analogic input
<b>MEASURES</b>	60mm x 160mm x 90mm



Picture 1 - ARYEL M2M Block diagram



## DECLARATIONS OF CONFORMITY

It complies with the following EU Directives:

- 2014/30/UE (Electromagnetic compatibility)
- 2011/65/UE (RoHS)

In accordance with the following harmonised standards

- EN55032 (2015); EN 55024 (2010) + A1 (2015)

Certificate of Patent for Industrial Innovation no. 0001351037