aquaDam

Dammed Real Time Water Quality Monitoring

ADASA

INNOVATIVE SOLUTIONS
FOR WATER & ENVIRONMENT

aquaDam

1. **INTRO**
    1. Introduction
    2. Applications
    3. Parameters
    4. Facilities
2. **aquaDam – THE EQUIPMENT**
    1. Introducing aquaDam
    2. Working Process
    3. Parts
    4. Options
3. **aquaDam – THE ENVIRONMENT**
    1. Typical installation
    2. References, cases of success
4. **aquaDam – LIVING**
    1. Maintence chart
    2. Analytical
    3. General

http://adasaproducts.com/.../aquadam

aquaDam

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aquaDam Intro

http://adasaproducts.com/.../aquadam

aquaDam

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Dammed Real Time WQM

- Determining the ideal depth for removal based on usage (drinking water, water irrigation, environmental flow, etc.).
- Minimizing costs and organoleptic problems in water treatment plants.
- Reservoir state characterization (stratification, admixture, ...).

PARAMETERS:

- **Temperature**
- **pH**
- **Conductivity**
- **Dissolved Oxygen**
- **Redox**
- **Turbidity**
- **Chlorophyll**
- **Depth**
- **Equivalent Disc Secchi**

- Automatic operation.
- **High autonomy level due to self-cleaning system.**

- Key information for reservoir water management, enabling the definition of the ideal depth for water extraction in real-time
- Automatic and remote operation. High autonomy, robustness and patented cleaning system
- Complete system: Measures to graphic profiles
- Historic record generated for all profiles developed
- Easily integrated into control and operational networks (water quality information systems and so on)
- Quick and easy setting-up

Power supply:	220 VAC/50 Hz Request other options (220 VAC/60 Hz)
Power consumption:	Complete system < 15 A Measurement system < 3 A Cleaning system (without catchment pump) < 4 A Cleaning water catchment pump < 8 A
Dimensions:	Arm option: 1120 x 2960 x 5000 or 7000 Compact option: 650 x 1880 x 1500
Weight:	From 400 to 500 Kg according to options.

Communications: Profibus DP, integrated GSM/GPRS Modem,

Front panel RS-232 port, RS-232 port / RS-485

Probes:

Temperature	0…50ºC
pH	0 … 14 uds pH
Redox	-2000 … +2000 mV
Conductivity	0 … 8000uS/cm
Oxygen	0 … 20 ppm O2
Turbidity	0 … 300 FAU
Chlorophyll	0 … 200 mg/l Chla
Depth	0 … 80 m
Secchi Disk	0 … 100%

Automatic operation cycle:

ADASA - aquaDam (Youtube)

1. Start profile operation - Multiparametrical probe starts down to the water, an initial cleaning process is carried out in order to clean the immersion point, (conf. time: T. Lim.)
2. The drum motor is activated until water is detected. And record the depth (point 0 m).
3. The probe continues to descend to the first selected depth point (conf. 0.5 to 5m).
4. At this level the drum-motor stopped, and a pause is initiated to stabilise the measurements (conf. 5 to 300 seconds). After this pause, the readings from all the sensors are recorded.
5. At the end of the measure, the drum motor activates again to down the next selected depth, and points 3 and 4 are repeated until all measurements are taken at all selected depths.
6. Once all the measurement has been taken, the drum motor activates to lift the probe until it is detected to be on top (rest position).
7. In the Rest position, a probe cleaning process is carried out.
8. The system stops, and waits until the next time selected for carrying out a new measurement cycle, returning to point 1. During this time, and each Cleaning Cycle, the cleaning system is activated to keep the probes in optimum working condition.

Main configuration:

- Time between measurement.
- Depth mesurements

Time - Configure the time between profiles :

- "Intervalo Fijo" **(Fixed Intervals):** This working mode includes the "*Intervalo medida" (Measurement Interval)*, which indicates **how often** the aforementioned measurement cycle takes place.

- "Horas Concretas" **(Specific Times):** In this working mode of operation are defined up to "*Horas medida n" (Measurement Times)*, which indicate the **specific times of day** at which the measurement cycles will start.

- **Manual or remote:** Forced a non programed profile

Depth - Configure the measurement points:

- "Inc Profun Fijo" **(Fixed Depth Increments):** In this mode of operation defines *"Incremento Fijo"* (fix increment), which indicate **at how many centimetres** the reading process for measurement will take place (up to 128 points), once the **water level** has been detected.
- "Prof Concreta" **(Specific Depths):** In this mode of operation defines "*Punto n" (n point) (up to 64)*, which indicate **at what depths** – relative to the **water level**, the measurements will be taken.

- "Inc Altura Fija" **(Set Height Increments):** This In this mode of operation defines *"Incremento Fijo"* (fix increment), which indicates how many centimetres there are **between the measurement readings** (up to 128 points), from **of rest position**.
- "Altura Concreta" **(Specific Heights):** In this mode of operation defines "*Punto n" (n point) (up to 64)* which indicate **the heights – relative to the of rest position** – at which measurements will be carried out.

Main construction options:

1. **Arm** – 4 or 6 m

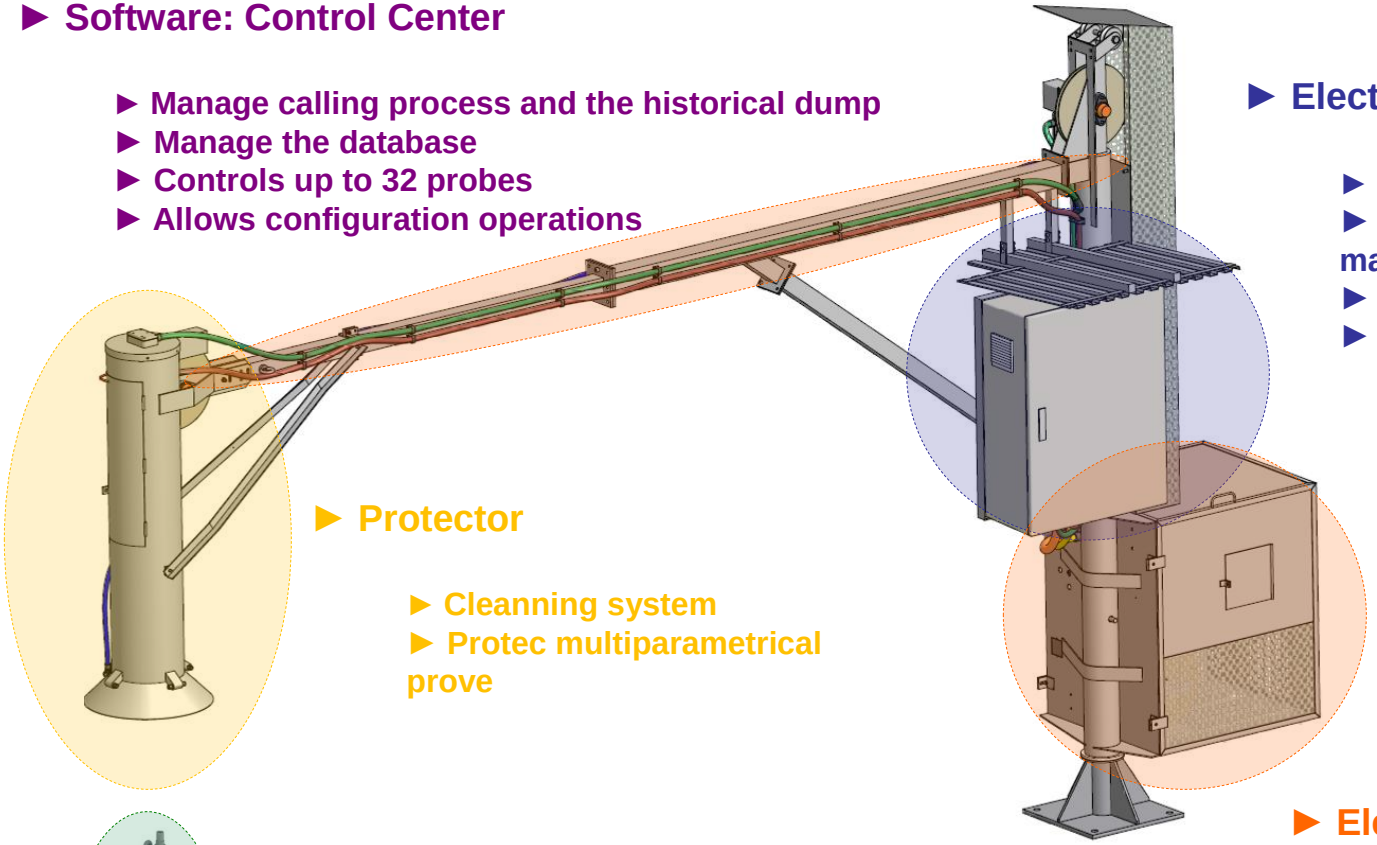
2. **Compact**

3. aquaDam Parts

ADASA

► Software: Control Center

- ► Manage calling process and the historical dump
- ► Manage the database
- ► Controls up to 32 probes
- ► Allows configuration operations

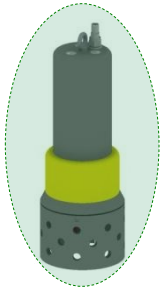


► Electro & Electronic

- ► Management & acquisition.
- ► Display and keyboard to maintenance operations,
- ► Engines management
- ► Communication modules

► Protector

- ► Cleanning system
- ► Protec multiparametrical prove



► Multiparametrical Prove

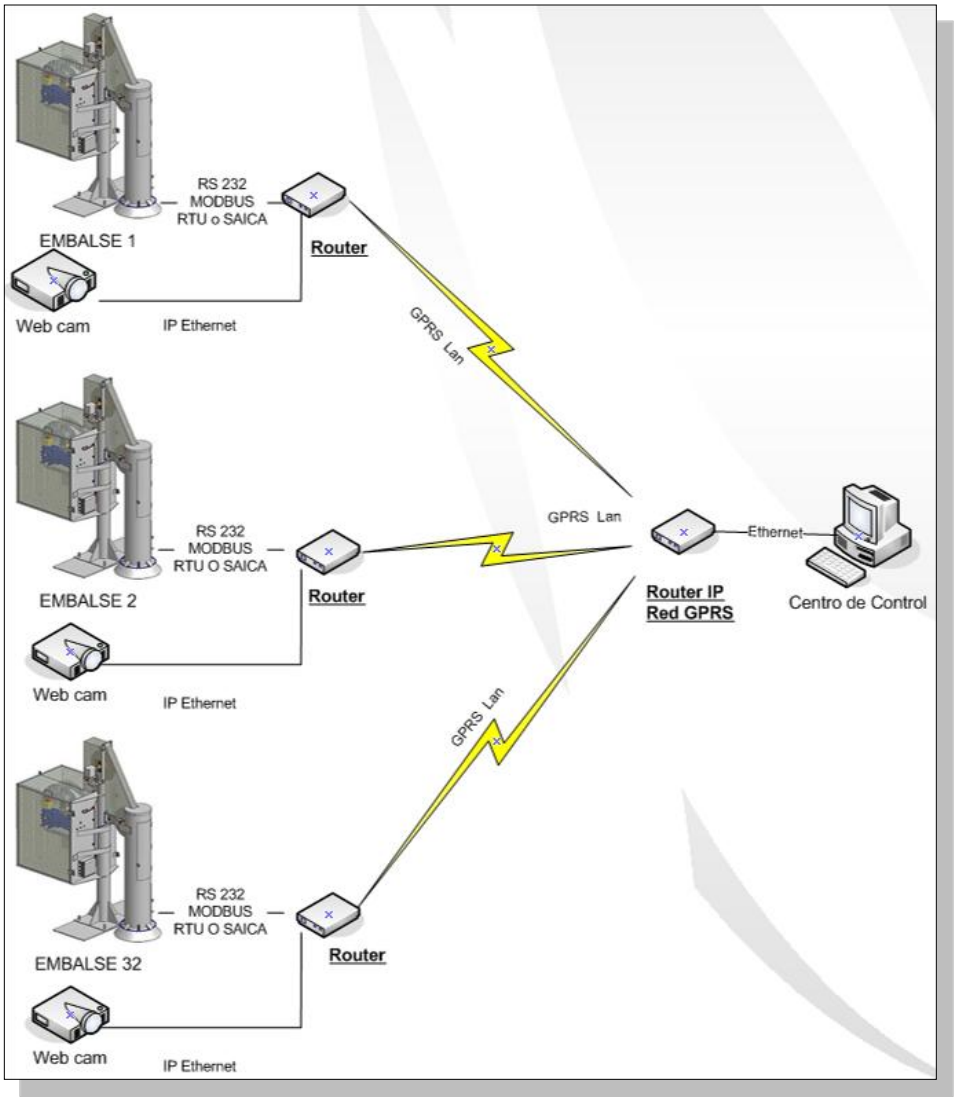
- ► Underwater prove
- ► Formed by sensor & acquisition electronics

► Electro & Mechanical

- ► Control the prove up/down
- ► Pivoting shaft
- ► Diferent Configurations

3. aquaDam Parts
Software & Control Center

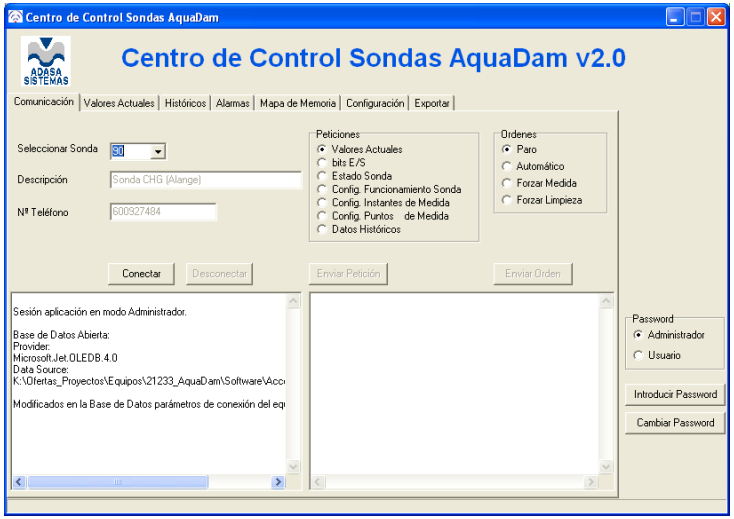
- **General:**
  - Managing remote data download.
  - MS ACCESS database.
  - Capable of managing up to 32 devices aquaDam.
  - Remote configuration of the equipment.
- **Communications**
  - Automatic call with reading current data and historical dump.
  - Tones, with selection of the operation to perform.
  - Shipping Orders (force measurement process, cleaning).
- **Management and operation**
  - Historical values.
  - Alarms. Configurable devices, parameters, limits.
  - Memory Map.



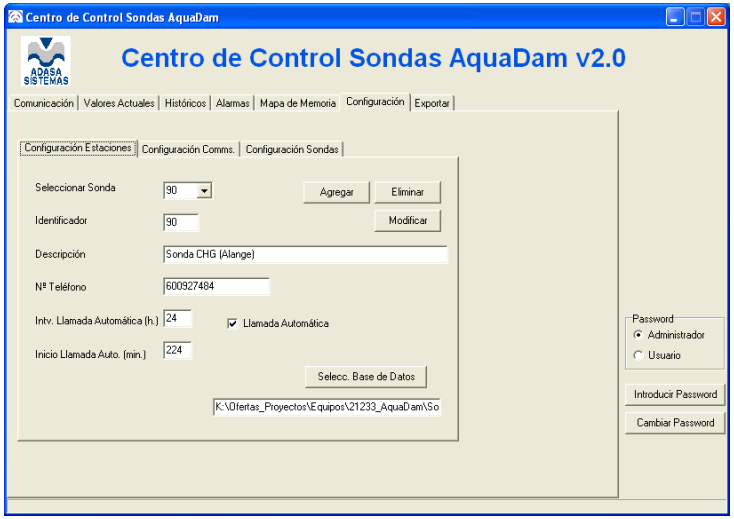
3. aquaDam Parts
Software & Control Center

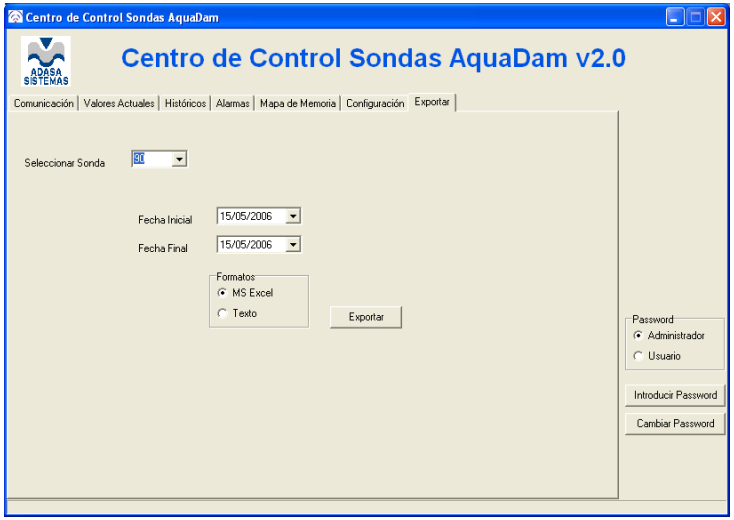
- **Communications:**
  - Automatic call, for reading actual data and dump historical
  - Manual call, to operate or configure.
  - Sent orders (profile, clean)

- **Visualization**
  - Historical values (text format)
  - Choose equipment.
  - Choose start data/time
  - Choose displaying values
  - Alarms
  - Memory map (all parameters accessible

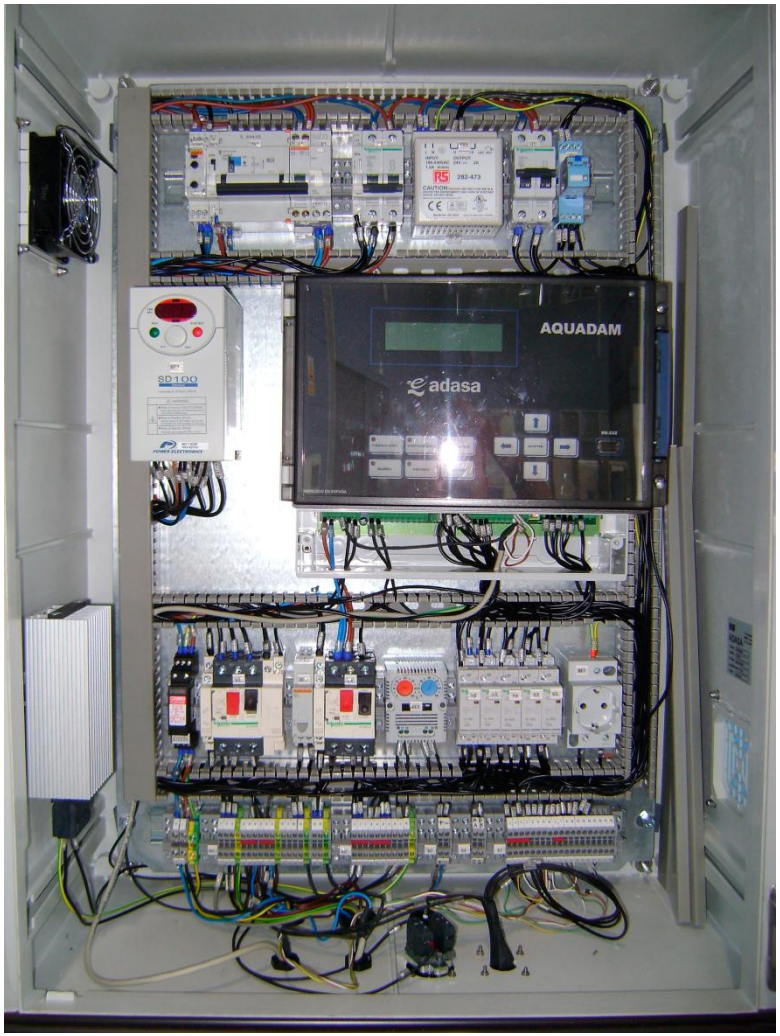


- **Settings:**
  - System settings:
    - ✓ Station number, telephone
    - ✓ Interval between calls
    - ✓ Cleaning time
    - ✓ Stabilization time
    - ✓ Rate speed
    - ✓ Maximum height
  - Profile setting:
    - ✓ Concrete hours
    - ✓ Fixed interval
  - Depth point conf.:
    - ✓ Fixed Depth
    - ✓ Depth increment
    - ✓ Fixed Height
    - ✓ Height increase
  - Exporting data (EXCEL or ACCESS)





3. aquaDam Parts
Electro & Electronic

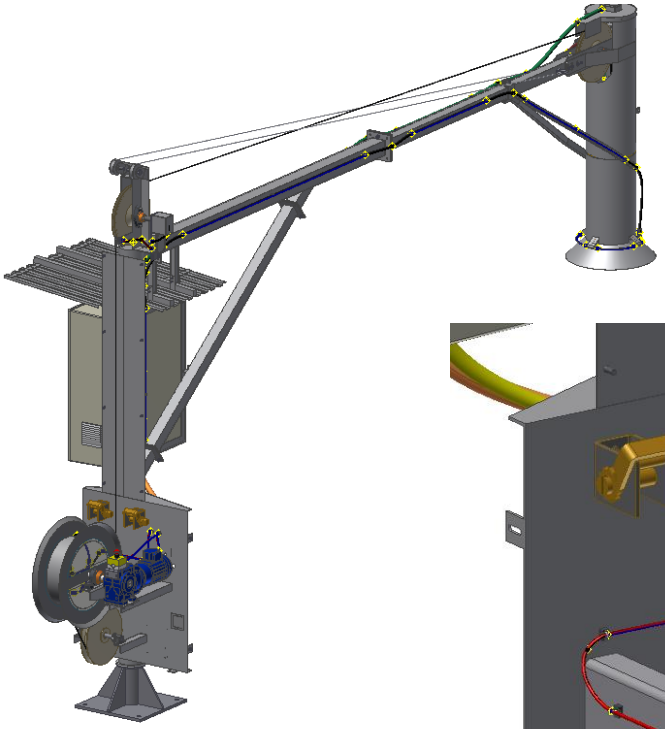


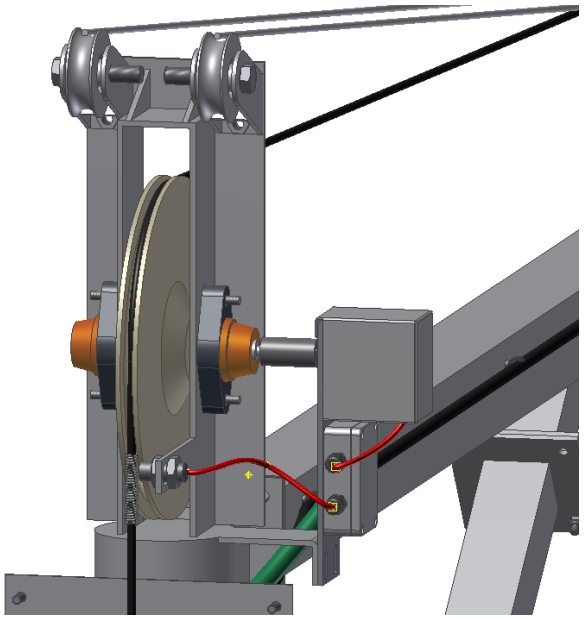
- **Electronic:**
  - aquaDam Controller (PLC).
  - Data management
  - Equipment control
  - Display & keyboard for maintenance operation

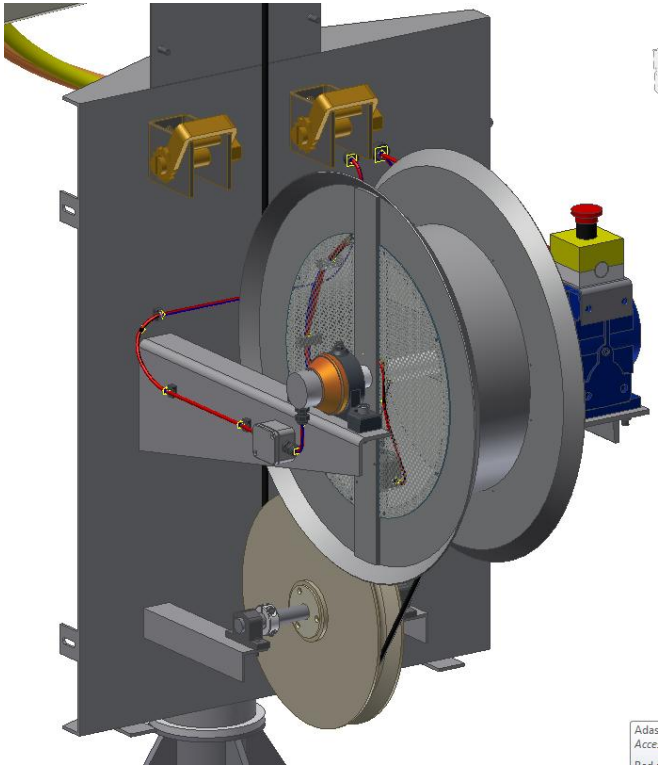
- **Electrical**
  - Pumps & motor control
  - Automatic restart RCD
  - Heather & fan
  - External pushbutton (maintenance)

3. aquaDam Parts Electro & Mechanical

- **Main Parts**
  - Frame
  - Motodrive
  - Cable elevation system
  - Encoder
  - Sensors
    - Bottom alarm
    - Emergency stop

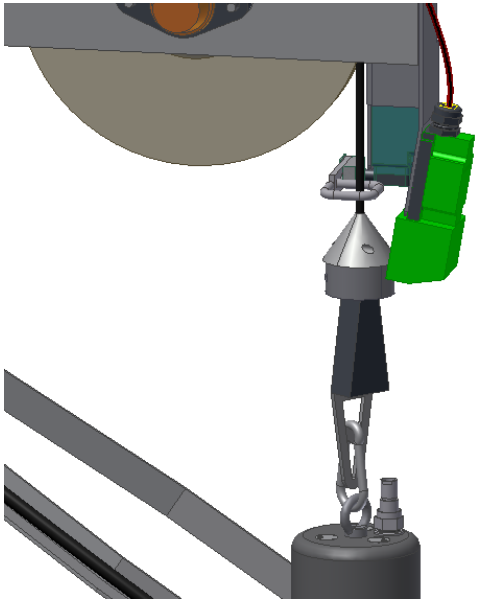


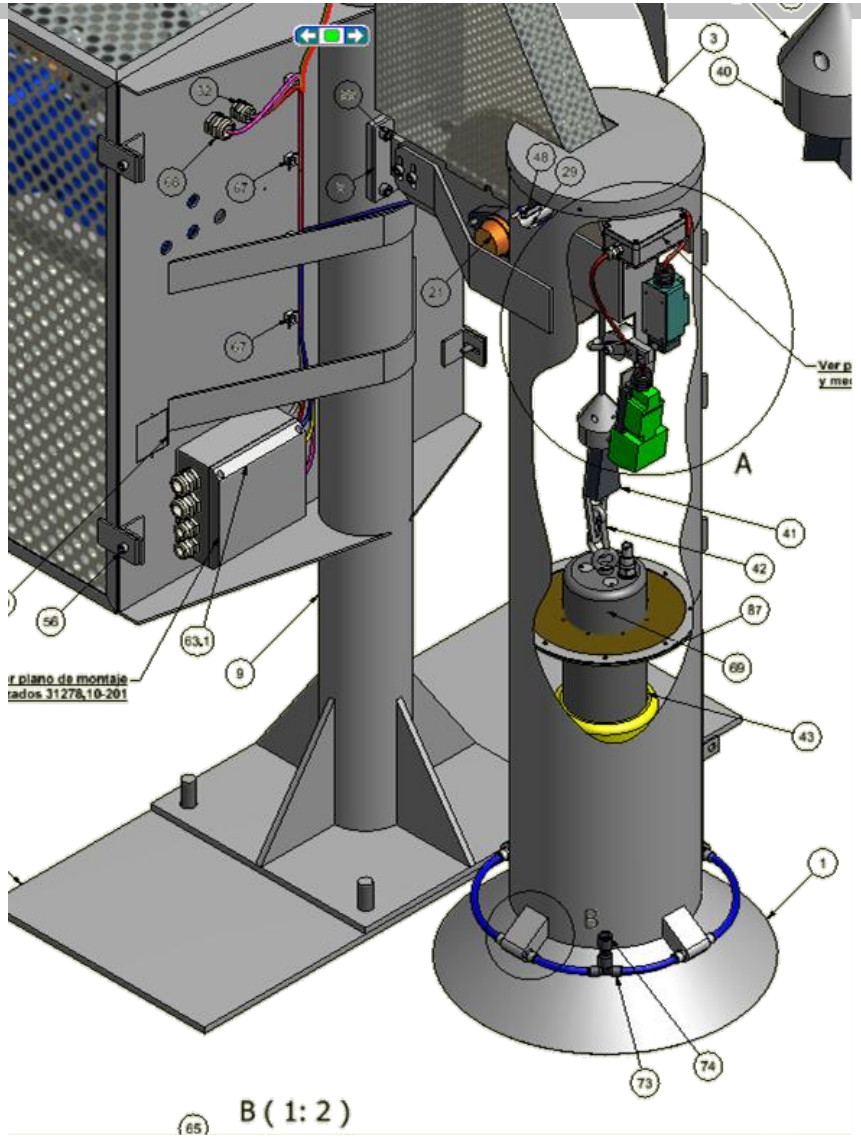




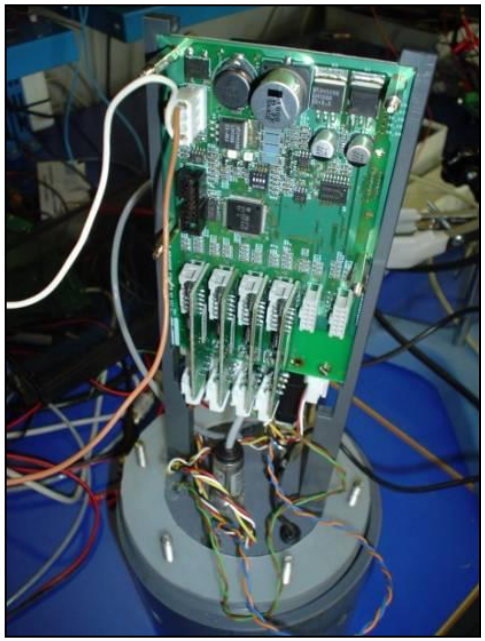
3. aquaDam Parts Protector

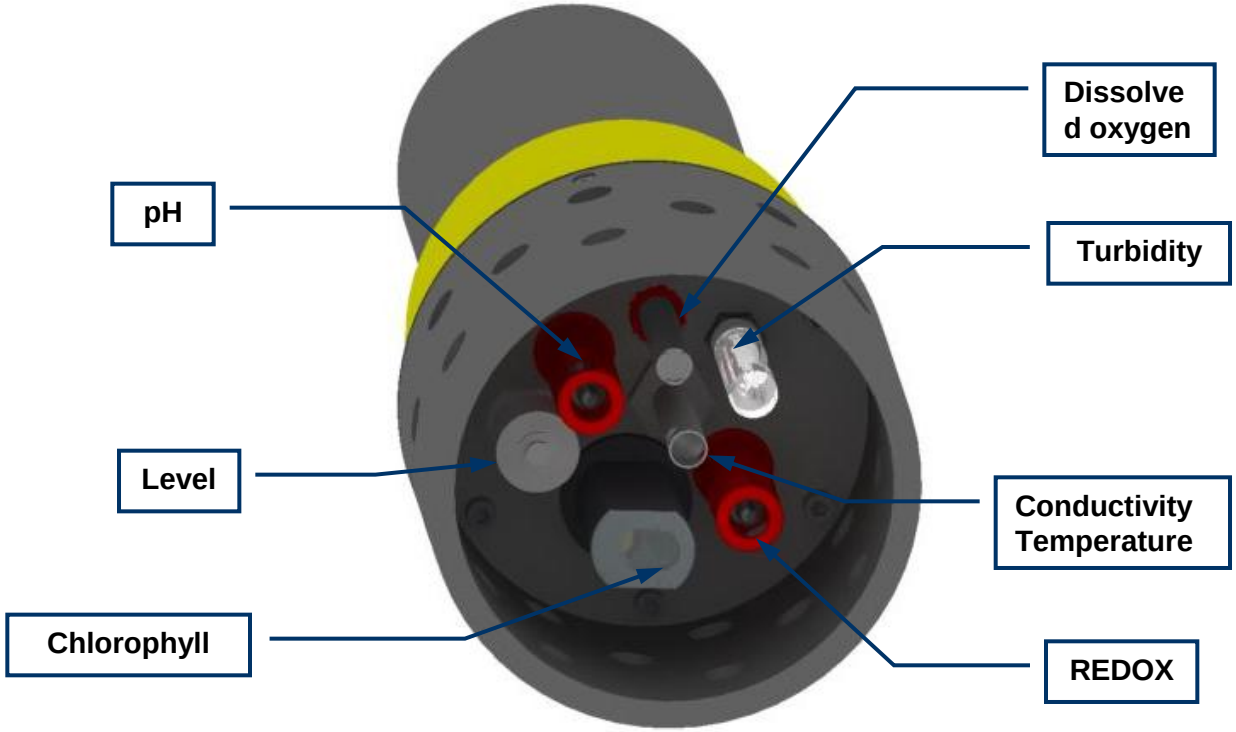
- **Main Parts**
  - Frame
  - Sensors
    - Rest position
    - Emergency stop
  - Cleanning system
    - Water nozzle



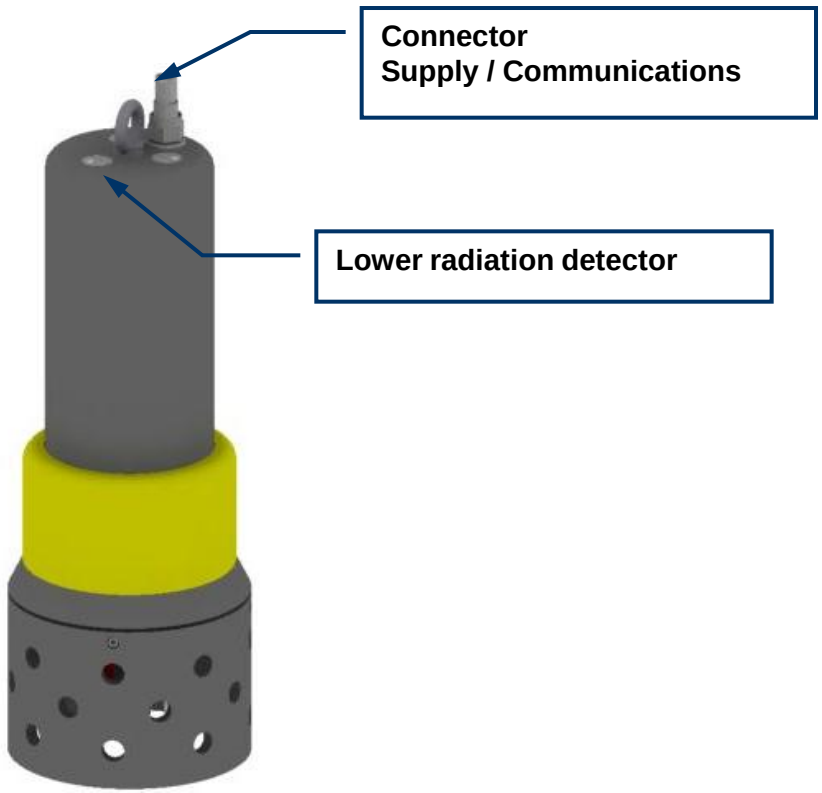


- PVC & inox316 body
- Main Parts
  - Proves
  - Protection





- **Main Parts**
  - Schhi leds detector
  - Connector
  - Elevation ring



4. Options

- **Frame:**
  - **4 meters arm**
  - **6 meter arm**
  - **Compact**

- **Multiparametrical Prove:**
  - Standard (Temperature, conductivity, pH, Redox, Oxygen)
  - + Clorophille
  - + Secchy equivalance

- **Cleaning system:**
  - Submersible pump + Salt tank (dam water)
  - Valve + Salt tank (circuit water)
  - Biocide tank + biocide dosificator + cleaning pump
  - Cleaning tank + cleaning pump

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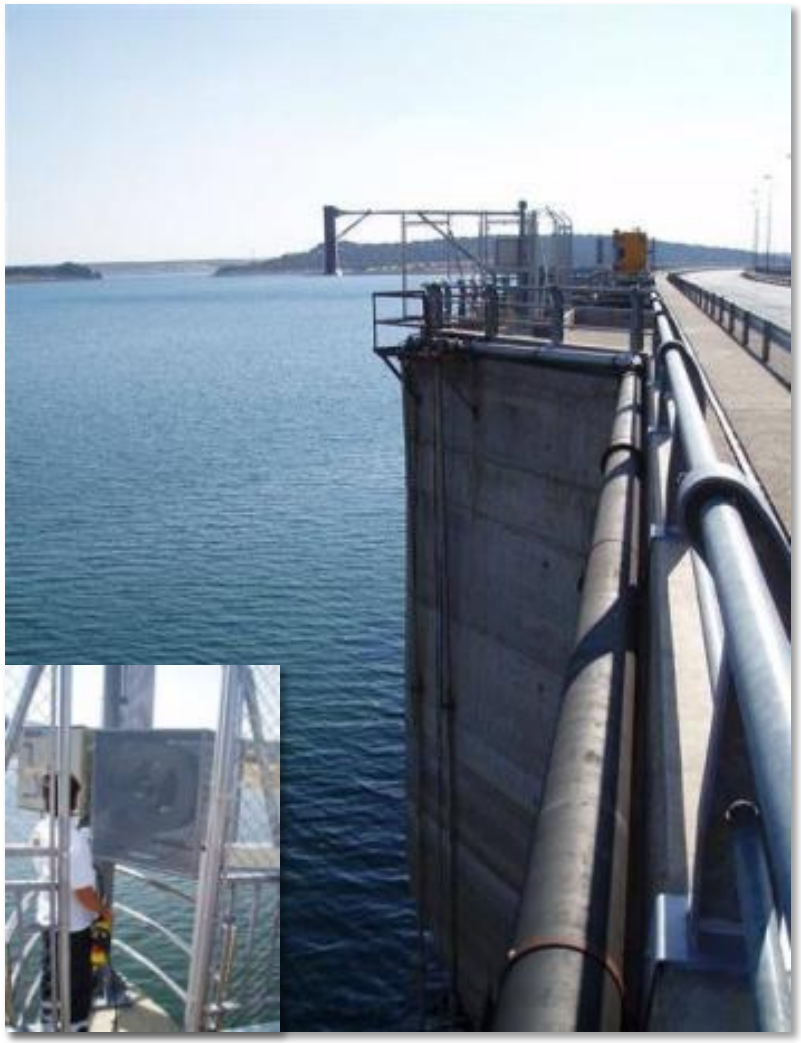
1. Typical Instalation



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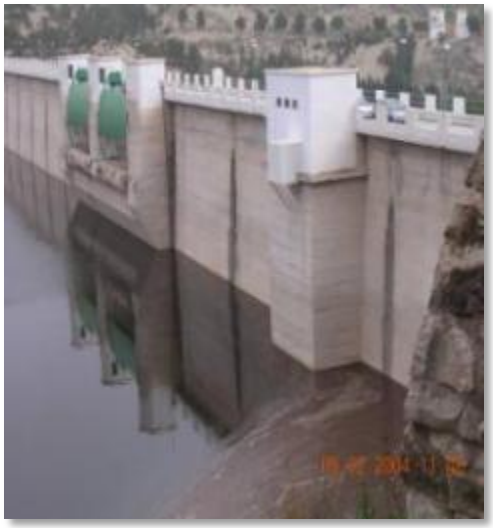

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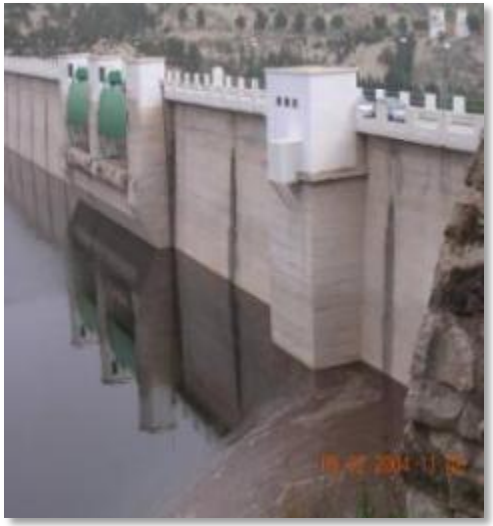

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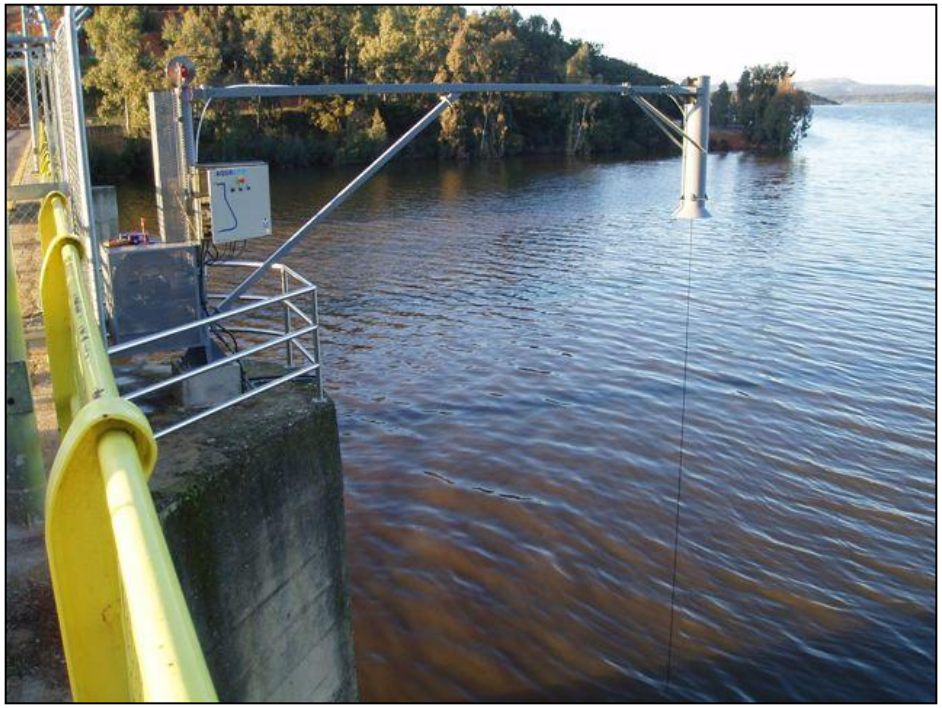
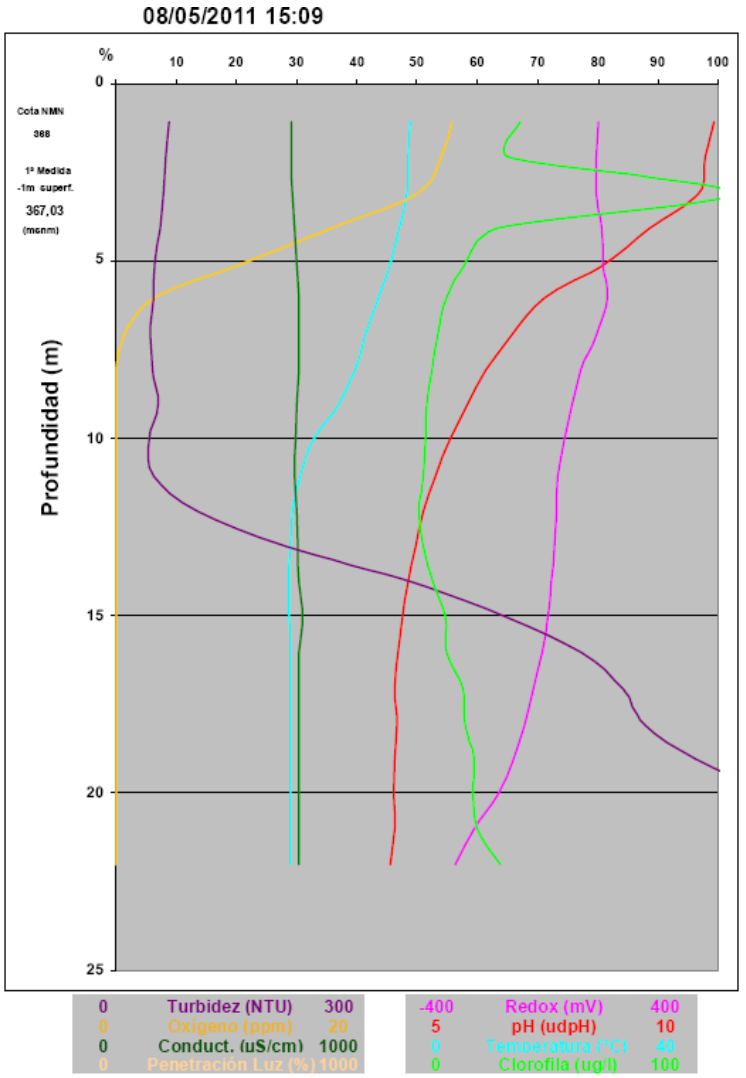
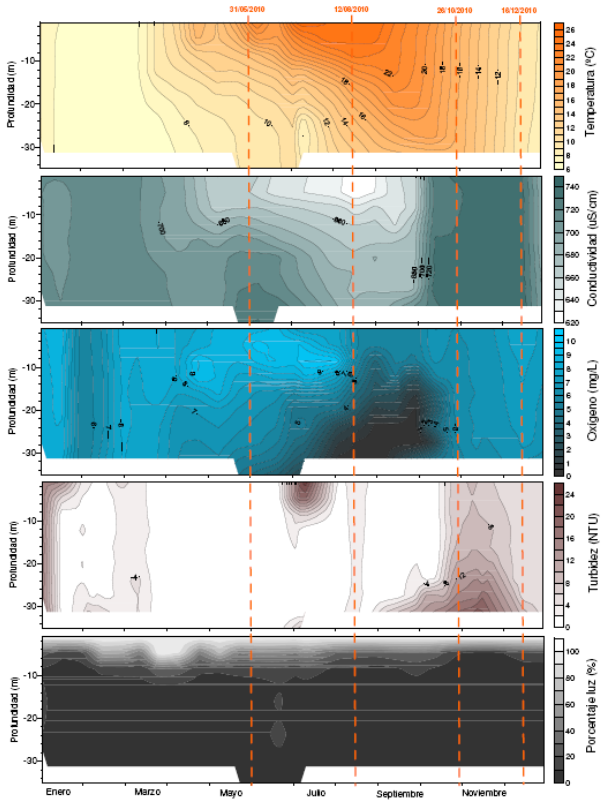




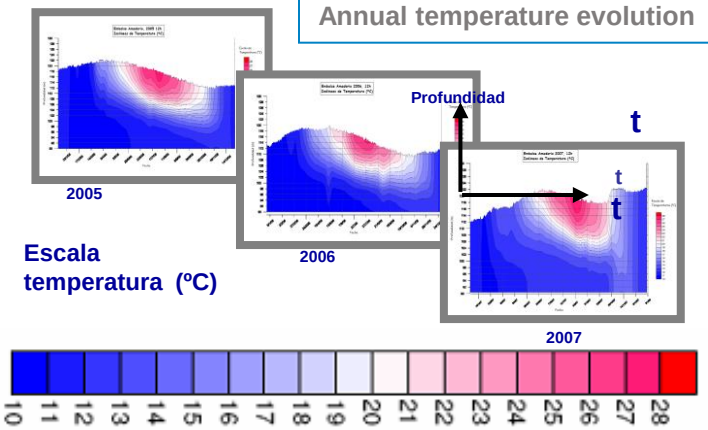
1. Typical Instalation

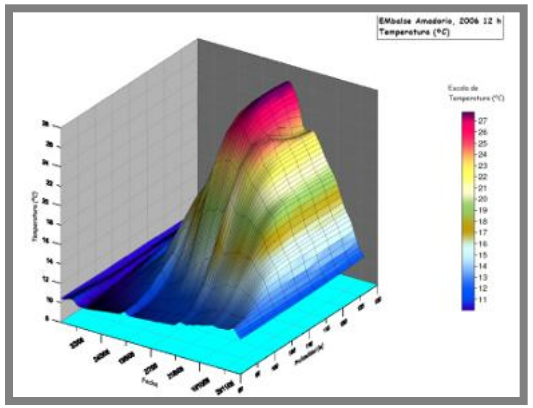
- Cientifical information for investigation



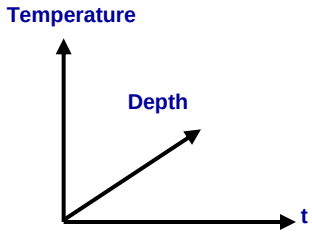
Annual representation for temperature, conductivity, oxygen, turbidity and secchi eq. profiled with aquaDam

Annual temperature evolution





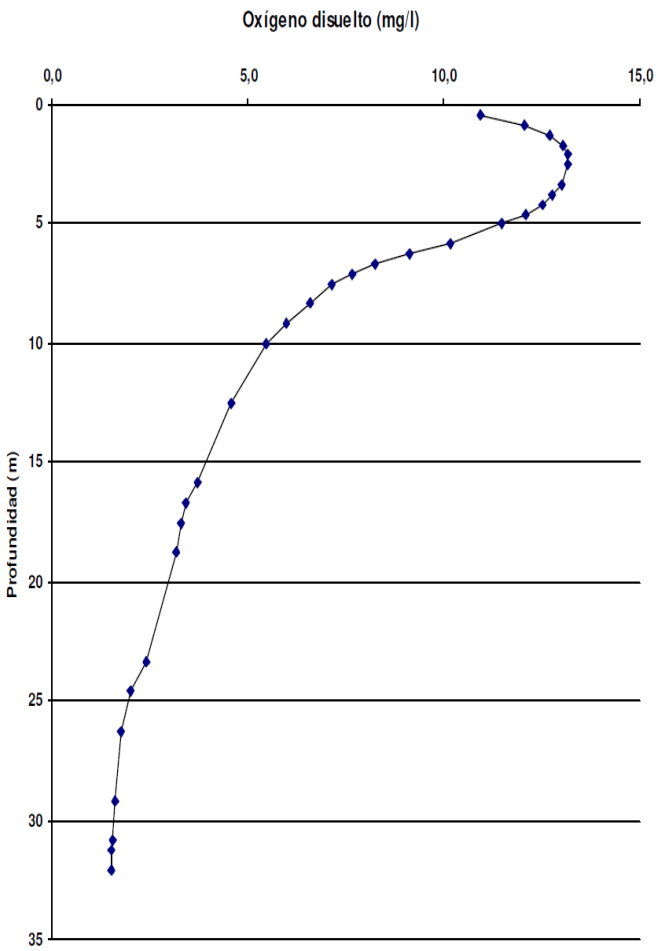
2006

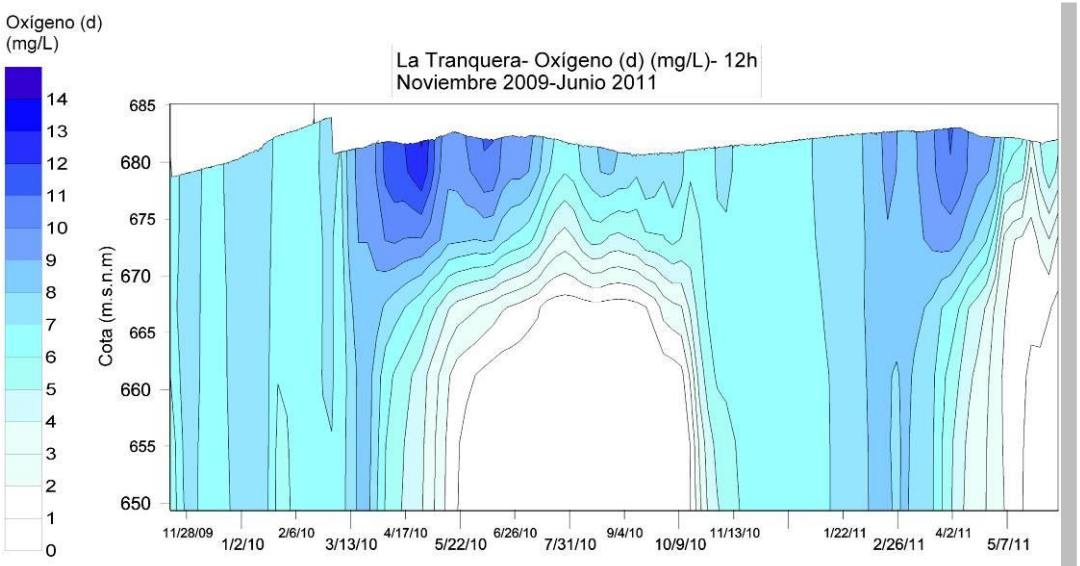


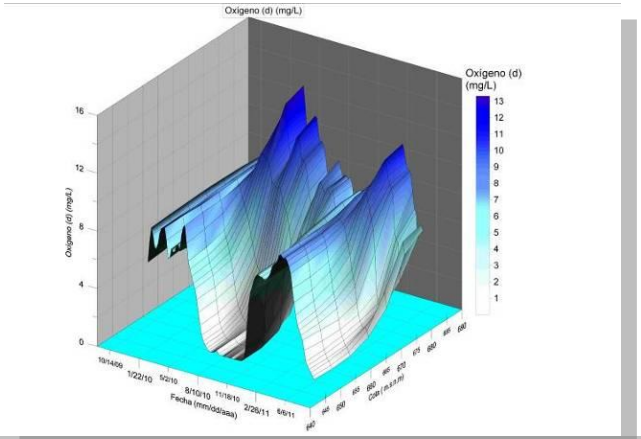
3d representation for temperatura evolution

1. Typical Instalation

- La Tranquera - Exemple oxygen mesurements

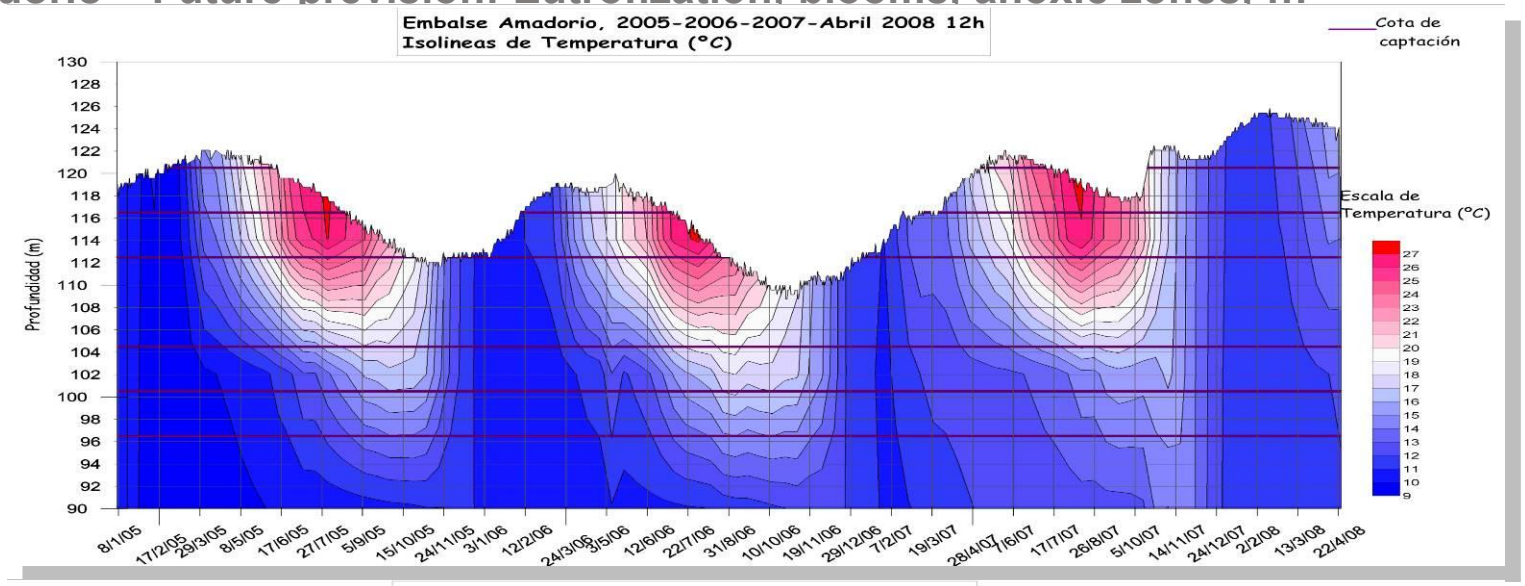


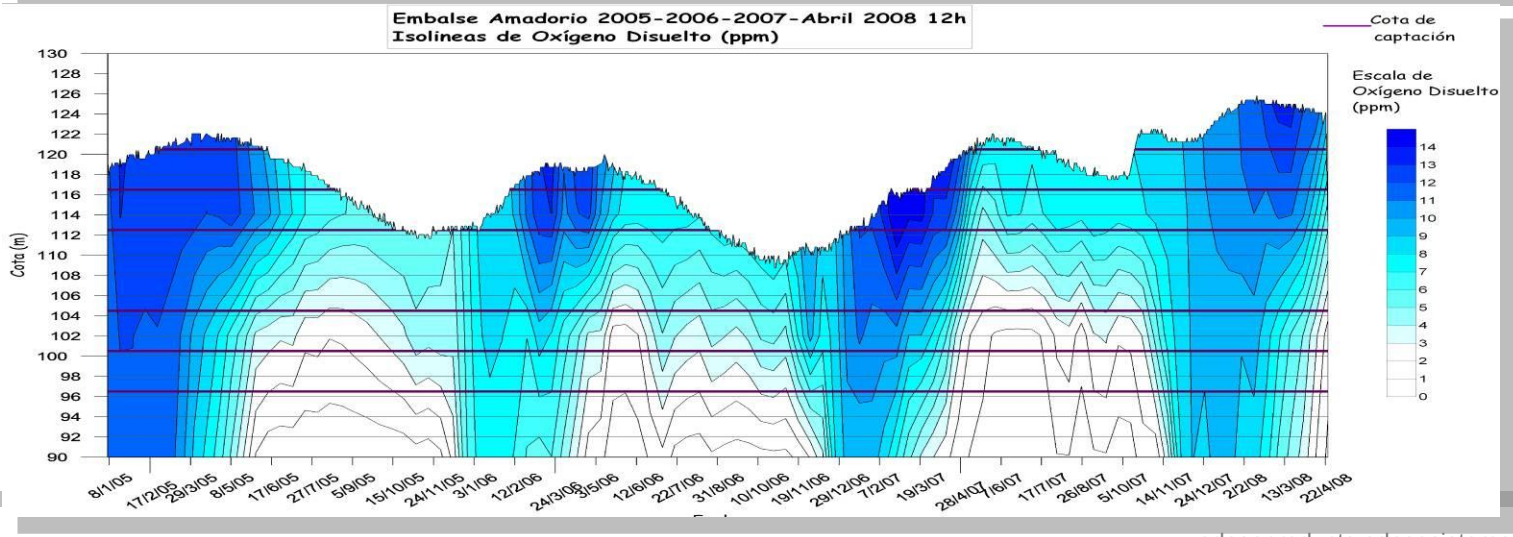




1. Typical Instalation

- Amadorio – Future previsión: Eutrofization, blooms, anoxic zones, …

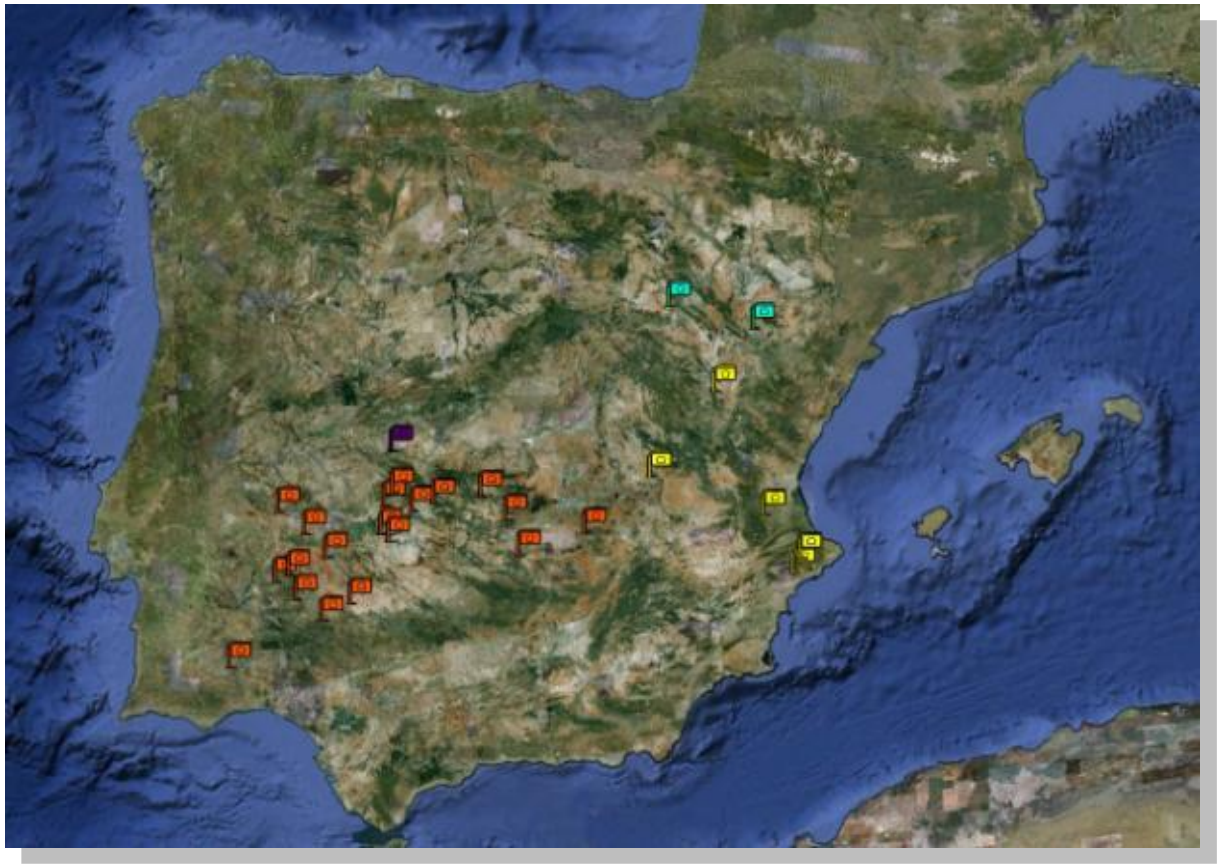




27 aquaDam in Spain

CH GUADIANA

Peñarroya
Gasset
Vega Jabalón
Torre Abraham
Cijara
García de Sola
Orellana
Zújar
Cancho del Fresno
Gargáligas
Llerena
Alange
Canchales
Nogales
Villar del Rey
Aguijón
Tentudía
Valuengo
Chanza



CH TAJO

Valdecañas

CH JUCAR

Amadorio
Arquillo de S. Blas
Guadalest
Alarcón
Tous

CH EBRO

Cova Foradada
La Tranquera

aquaDam

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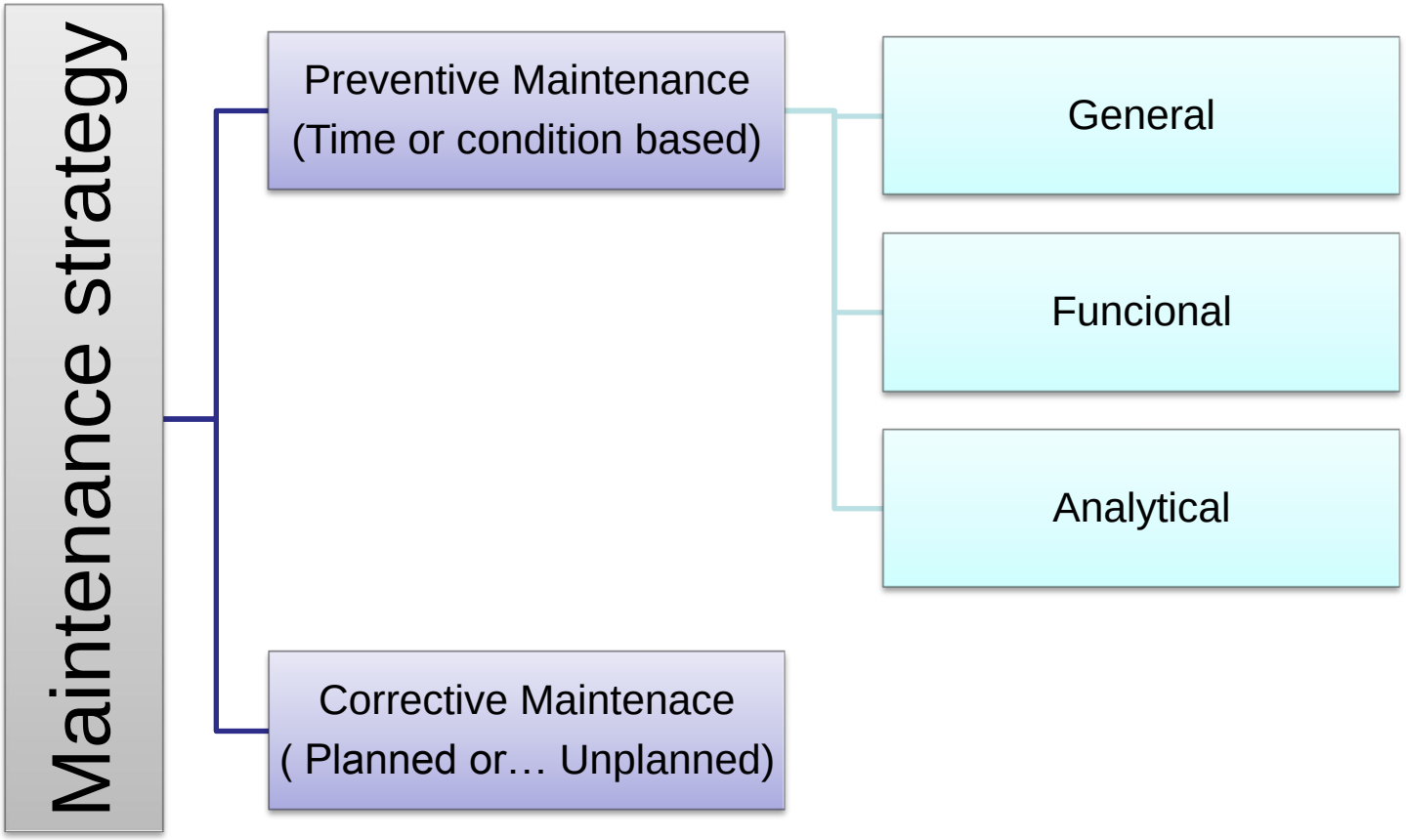
1. Maintenance Chart



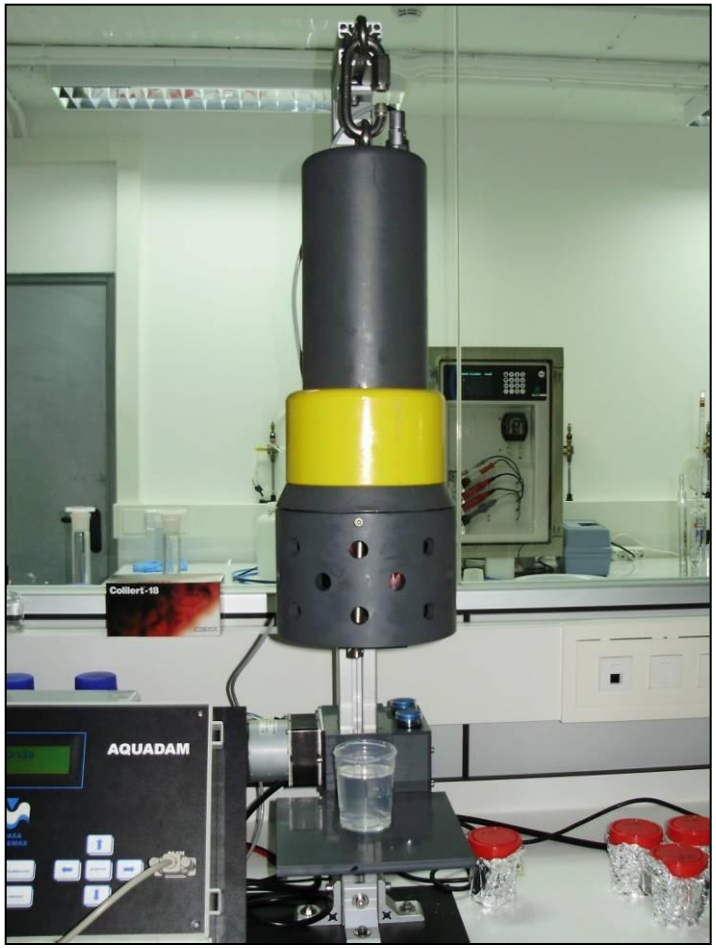
1. Maintenance Chart

	Component	Action	Best Practices	Frecuency	Dificulty	Time (min)
General	General	Normal operation conditions	General Visual inspection to detect incidents	Mounthly	Basic	20
	General	Frame - Cleaning	Check that there is no oxide points. Clean and repaint	Annual	Basic	60
	General	Checking	Checking torque of screws, connectros, gaskets and caps.	6 Mounth	Basic	30
Funcional	Cleaning system	Check & clean	Check normal functionClean sechi leds. Clean sechi leds.	2 Mounth	Basic	15
	Multiparametrical	Check rest position	Check rest position sensor and cable stop sensor	6 Month	Basic	15
	Communications	Check	Check normal function	3 Mounth	Basic	5
Analytical	Probes	Verification	Verification of sensors Calibation if necessary	Mounthly / 2 weeks	Medium	60
	Probes	Calibration	Calibration equipment - Calibration of sensors. Intercalate with probes verification	Mounthly	Medium	120
	Oxygen Probe	Electrolyte replacement	Refill electrolyte and check the membrane	Semestral	Basic	5
	Oxygen Probe	Membrane replacement	Refill electrolyte and replace the membrane	Anual	Medium	5
	pH Probe	Replacement	Replace the probe	Anual	Medium	30
	Redox Probe	Replacement	Replace the probe	Anual	Medium	30

1. Maintenance
Tools and equipment

- Cellular phone , Laptop, photo camera
- RS-232 crossover cable, DB-9.
- Generic tools.
- Torque wrench (For 9 Nm), preferably lever type or ratchet, with extension and hexagonal 5 point socket.
- Vaseline gel & lubricating grease spray (“3 in 1”).
- Foldaway table & chair
- Variety of cleaning materials (broom, brush, cloth, surface cleaner, paper or rags).
- Distilled water.
- Disposable Pasteur pipettes.
- Container used for collecting & carrying waste.
- *aquaDam* maintenance kit available, which is comprised of the following elements:
    - pH standards: 3 100 ml bottles.
    - REDOX standard: 250 ml. bottle.
    - Conductivity standard: 100 ml bottle.
    - Oxygen membrane.
    - Electrolyte.
    - Portable analyzers for checks: pH, REDOX, Conductivity, Temperature, Dissolved oxygen.
    - Accessory for containing the standards and calibrating.
    - Stirrer
    - Instruction manual and general drawing (or guide drawing).
    - Paint for touching up the structure (RAL 7046 satin).

2. Analytical Maintenance



3. General Maintenance

General	General	Normal operation conditions	General Visual inspection to detect incidents	Mounthly	Basic	20
	General	Frame - Cleaning	Check that there is no oxide points. Clean and repaint	Annual	Basic	60
	General	Checking	Checking torque of screws, connectros, gaskets and caps.	6 Mounth	Basic	30
Funcional	Cleaning system	Check & clean	Check normal function . Clean sechi leds.	2 Mounth	Basic	15
	Multiparametrical	Check rest position	Check rest position sensor and cable stop sensor	6 Month	Basic	15
	Communications	Check	Check normal function	3 Mounth	Basic	5

- **General inspection points:**
  - **Check all the emergency stop**
  - **Check the sensors (rest, emergency stop, bottom)**
  - **Clean leds secchi**
  - **Check the tensioning of the tensor cables. (Arm version)**
  - **Check manual operation.**

4. Equipment Configuration & control

- Configuration (Page 28)
- Probe calibration (Page 33) (Lab.)
- System Menu (Page 40)

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