



ATSTORM



STORM DETECTOR

CONTENTS

1. PREVENTIVE PROTECTION	3
2. STORM DETECTOR	5
2.1 Sensors	6
2.2 Operations Box	7
3. INSTALLATION	9
4. ACCESSORIES	12
5. MAINTENANCE	14
6. REGULATIONS	14

1. PREVENTIVE PROTECTION

In normal conditions, there is a balance between positive and negative charges in the atmosphere, where the earth is more negatively charged than the atmosphere and the elements situated on the ground.

However, the formation of storm clouds creates a charge polarisation: the lower part of the cloud is charged negatively producing a positive charge on the ground and any elements on it. This can form an electrical charge in the atmosphere of more than 10's of kilovolts.

When the electrical field becomes very intense, the cloud begins to discharge the energy towards the ground. The path formed by this discharge is called the "downward leader" and produces a fast variation in the electrical field. This is the process of lightning formation.

In order to ensure an efficient preventive protection, it is necessary to detect the storm before this sudden electrical change takes place in the area to be protected. When it occurs, it is the lightning protection system that should carry the discharge and drive it safely down to earth. However, an early storm detection allows **active measures to be taken, in advance**, hence improving the lightning protection.



The **early detection** of the formation and evolution of storms is a preventive method that complements the physical protection of structures and equipments.

The availability of **reliable information** about the proximity of a storm permits temporary action in order to reduce risks and insure the most important services.

Storm detectors are equipments or systems that **provide monitorised information** about atmospheric electrical activity in real time in order to facilitate protection.

Preventive protection provides a **perfect complement for lightning protection systems** and its associated over voltages, however, it can never be considered as a substitute.

Storm detectors are particularly applicable to:

- People in open areas: jobs, sports or activities taking place outside, competitions, multitudinous events , farming activities, hunting and fishing.
- Protection of sensitive equipments: computer systems, electrical or electronical controls, emergency systems, alarms and securities.
- Prevention of losses in operations and industrial processes.
- Prevention of bad accidents involving dangerous substances (inflammable, radioactive, toxic and explosive).
- Protection of certain atmospheres or activities with a high danger of electrostatic discharges.
- Operations in which it is necessary to guarantee the continuity of basic services: telecommunications, generation, transport and distribution of energy, sanitary and emergency services.
- Infrastructures: harbours, airports, train stations, roads, motorways and cable railway.
- Civil and environmental protection: forest fires and different types of flooding.
- Health and safety at work.

2. STORM DETECTORS

The basic composition of the storm detector is made up of a sensor and an operations box.

The sensor is installed in an open area, where there are no elements that can disturb the electrical field.

Its measurement system is based on the SECC technology (Controlled field electrometric sensor), developed and patented by Aplicaciones Tecnológicas, S.A. to improve the detection of storms. This technology is characterised by being totally electronic and does not use any mobile or mechanical elements at all. It also detects any storms which are forming in the surrounding area where the detector is placed.

The detection box is placed in the interior of the structure and connected to the sensor, to which it provides an electricity supply as well as carrying out the functions of transmission and data recording.

All the measurement parameters can be programmed in a very easy way using the operations box, without having to use computers or any other automatic device.

Using a membrane keyboard and a display screen, and with a simple menu, all the necessary parameters can be introduced and the storm detector can then be used, according to the user's characteristics and needs.

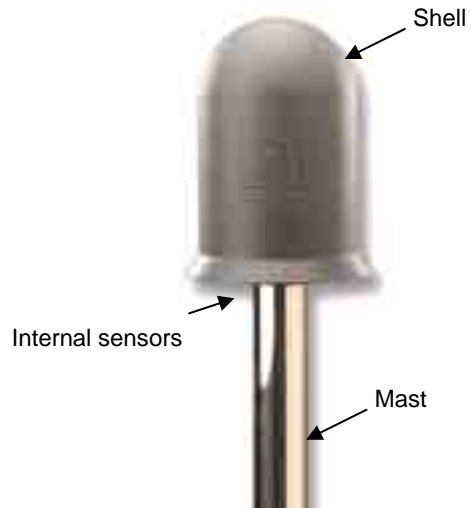
You can also specify the thresholds of the electrical fields for the three different levels of alarm, the length of time of the loud signal and the duration of a specific level of voltage which will activate and deactivate the alarm (which helps to avoid false alarms caused by birds, snowflakes or sharp radiofrequency signals that could momentarily affect the electric field).

Its versatility, reliability and robustness makes it a perfect tool for preventive protection against the effects of storms and atmospheric discharges. It takes the necessary measurements at the precise moments of danger, protecting people and equipment from the destructive effects of lightning.



2.1 SENSOR

It is able to detect the formation of a storm up to 10km away. Its design protects the measurement system from the inclemencies of the weather, improving how it works and lengthening its working life.



TECHNICAL DATA

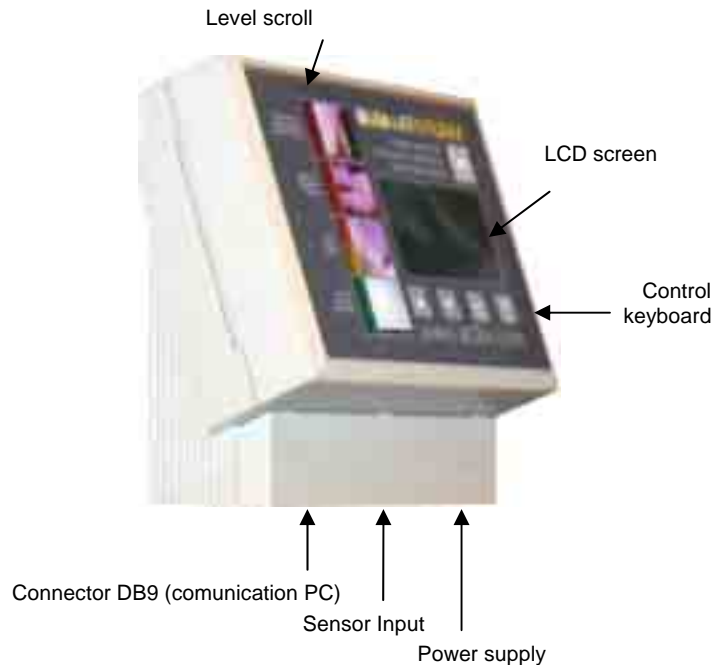
Dimensions	Ø 166 x 226 mm
Voltage DC	6 V _{DC}
Material of the shell	Polyester
Measurement range	-100 a +100 kV/m
Resolution	10 V/m
Detection range	10 km around the sensor
Max. Length of separation	100 m with optional cable (standard 25m)
Fixings	Fixings for diameter 1 ½"
Working temperature	-40 a 85 °C
Stamped	IP54

2.2 OPERATIONS BOX

The sensor is connected to an operations box accessible to the user which can be placed in an adequate place for its easy use and control. It emits different visual alarms and sounds according to the evolution of the storm. It can also be connected to any alarm mechanism, communication or electrical object.

The alarm's threshold for the storms can be programmed and allows the detector to warn automatically according to the evolution of the electrostatic field, which can vary according to the environment.

However, recommended applicable levels for particular installations can be used.



Level 0	< 3 kV/m	No warning
Level 1	3 a 5 kV/m	Warning
Level 2	4 a 7 kV/m	Emergency
STORM	6 a 12 kV/m	Maximum risk

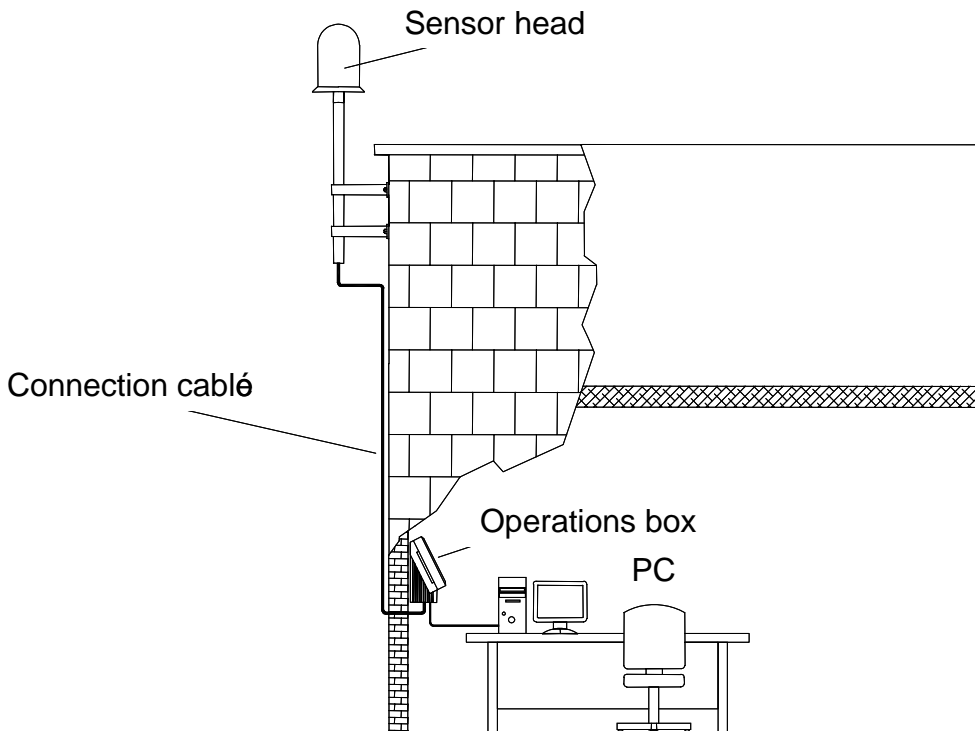
TECHNICAL DATA SHEET

DimensionS	300 x 280 x 140 mm
Weight	3 kg
Power source voltage	220 V _{AC} (+/- 15%)
Consumption	Max. 15 watts
Fixings	Fixings to the wall.
Stamped	IP53
Temperature (at rest)	-20°C a 70°C
Temperature (working)	-10°C a 100°C
Resolution	+/- 0,1°C
Display screen	Grafite screen + Alarm level scroll
Programming	Keyboard with 4 buttons
Communications	ModBus on RS232 (2 cables)
Relé outputs	Alarm, storm and fault: 250V _{AC} , 2A (block connector) External temperature: 600mA/ 48V _{DC} (SubD25)
Communication with PC	Output RS232

3. INSTALLATION

- The sensor works using the SECC technology (Controlled field electrometric sensor), which allows it to measure the electrostatic field without the use of mechanical elements.

It should be installed away from any objects that can disturb the electrical field, such as trees, metallic structures or energy sources. The sensor works at any height where it may be situated. In addition, the configuration of its two sensors means that the calibration according to the height where it is situated is not needed.



- The Operations Box is installed in the inside of the structure, where it can be controlled conveniently by its user. All its functions can be programmed in an easy way using a display screen with a membrane keyboard.

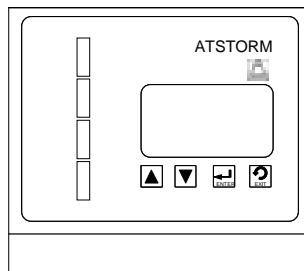
The panel is joined to the sensor by means of a direct cable. A standard cable of 25 metres is provided but this can be lengthened to 100 metres if necessary. This cable provides the electrical supply, the connection to earth and the transmission and acquisition of data. It is fed directly by the network, (220V_{AC}).

The programming is simple and user friendly allowing the easy use of all the functions of interest to the user.

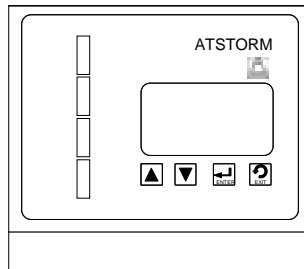
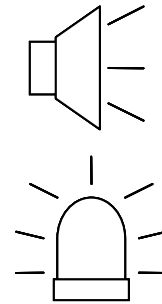
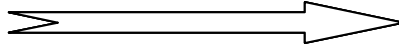
- ✓ Alarm levels
- ✓ Alarm signals (existence and duration of the alarm signal)
- ✓ Start and end of the alarm setup



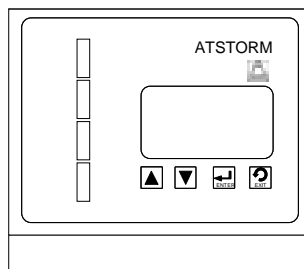
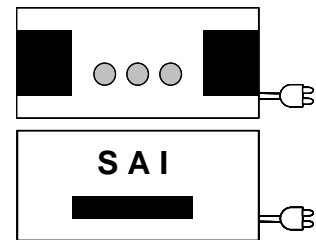
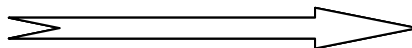
In addition, it has a **plug** (of 2A, 220V) which allows the connection to any alarm, measurement mechanism, etc.



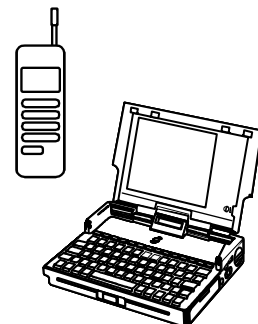
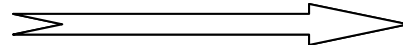
VISUAL
AND SOUND
ALARM



UNINTERRUPTED
POWER SUPPLY



TELECOMMUNICATION
SYSTEMS



4. ACCESSORIES

- The storm detector has specific **software** which allows it, furthermore, to keep a long term control of the evolution of the electrical field and the incidence of storms in the area.



The user can programme the sensitiveness of the storm detector so that it does not make false alarms. The software allows you to be able to determine that the alarm goes off when the electrical field remains high for a certain amount of time.

- In situations where there is no electrical supply, Aplicaciones Tecnológicas, S.A. provides a group of **gas bottles** to supply the equipment.



Forest watch towers



Isolated military posts



Areas of difficult access

5. MAINTENANCE

No maintenance is needed

6. REGULATIONS

The storm detector complies by installation regulations of low voltage and electrical safety.

- Low voltage Electrotechnical Regulation (RBT2002)
- EN 61010: Low voltage electricity safety.
- EN 61000: Electromagnetic compatibility.



TECHNOLOGIES OF LIGHTNING PROTECTION



Parque Tecnológico de Valencia
Calle Nicolás Copérnico, 4
46980 Paterna - VALENCIA (SPAIN)
Tel. (+34) 961 318 250 - Fax. (+34) 961 318 206
E-mail: atsa@at3w.com
Web: <http://www.at3w.com>

