



T30A Fixed Lightning Warning System



ALC SASU 1 Chemin de la Corneille F 91890 Videlles France
VAT/TVA FR88 839 754 116 – RCS EVRY 839 754 116 – SIRET 839 754 116 00011 -
APE 7112B

E-mail : sales@lightningconsultant.com
Web : www.lightningconsultant.com



System Overview

Xiamen Taihang fixed lightning warning instrument is a kind of system with high integrated software and hardware, which sets variety of functions such as atmospheric electric field monitoring, lightning incoming warning.ect into one. This system is based on the mode of two-dimensional or three-dimensional map, applies internet and Cloud Service System and owns the functions of thunderstorm event log, data inquiry, statistic analysis and warning processing etc.



Figure 1 T30A Fixed Lightning Warning Instrument



T30A fixed lightning warning system measures the atmospheric electric field intensity at the real time. Once the abnormal atmospheric field intensity is detected, the system will give out the warning information. False alarm rate has been largely decreased by the mathematical model such as discrete mathematics. This software supports data analyzing and data overlaying from atmospheric electric field equipment system, radar system and lightning location systems, etc. According to the cloud map combining these three systems, we can obviously figure out the movements of the lightning clouds, the incoming lightning area, the indication of the incoming lightning, the change of atmospheric electric field intensity of each point, the intensity of lightning, etc, which provides more exact information for meteorological observation. By networking, it can make cellular type pre-warning, and provide lightning warning information for the user group and owns the function of multi-level users' permission setting, which is convenient for different customers' inquiry.

Typical Installations

The T30A Lightning Warning System can be applied in the following situations:

- Military facilities
- Airport
- Near demolition and blasting operations
- Aerospace and missile facilities
- Where hazardous fuels or materials are handled
- Construction sites
- Recreational and amusement facilities
- Atmospheric research and forecasting center
- Oil storage and refineries
- etc

Product Features

T30A lightning warning system features include:

- Simple, proven and stable design;
- High quality components
- High reliability with low maintenance and long lifetime
- All weather, environment resistant, continuous and no-loss
- Forecasting and warning before the probable lightning happens in a very short time.
- Taking corresponding preventive action, warning of pre-planning and long range control according to the different warning level;
- Flexible site selection and convenient installation.

Operation theory

There is always a vertical electric field in the atmosphere. The electric field is low during clear weather, it's about 0V~200V per meter (V/m). In stormy weather, the field is much higher because there are electric charges in the lightning clouds. When a piece of lightning cloud forms, the electric field typically reverses its polarity and steadily increases. When the electric field increases to $\pm 2000\text{V/m}$, the probability of lightning is very high.



Although lightning occurrence is unpredictable, real-time detecting e-field provide a good method to know the possibility of lightning occurrence. The theory and operation of electric field is based on the basic laws of electromagnetism. Even though lightning can't be predicted, the lightning warning system provides the means for measuring the atmospheric electric field, which is necessary for providing the important information of the incoming lightning.

T30A Fixed Lightning Warning System

The T30A Fixed Lightning Warning Instrument detector is mounted outdoors, it's usually on rooftop where there is no intensive atmospheric electric field or wide ground to make sure it exposed to the atmospheric electric field. The data is sent through a long cable or wireless network to data collection and processing module from the detector. Then this module provides us information such as visual warning and forecasting information.

The figure 2 below shows a typical electric field warning system.

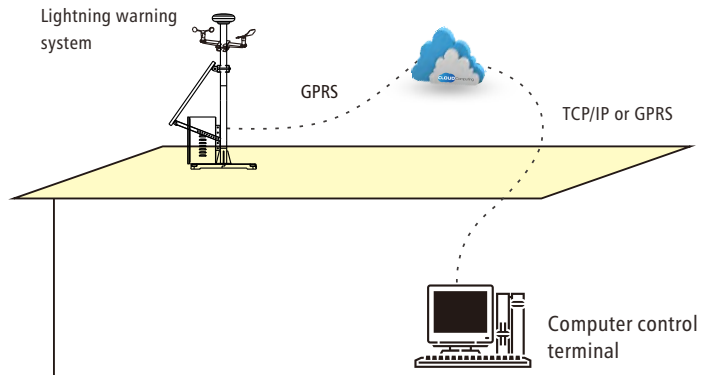


Figure 2 Fixed Lightning Warning System

Fixed Detector

This detector collects the real-time changes of the atmospheric electric field.

Data Collection and Processing Module

Data collection and processing module shall be installed near the fixed detector. If data transmission needs to be sent via cable, but need to inform manufacturer in advance.



Hardware Components:

The Internet cable of the data collection and processing module shall be connected to the Hardware of the equipment:

This system is composed of 4 parts:

- 1) Fixed atmospheric electric field detector
- 2) Support components
- 3) Data Collection and Processing Module
- 4) Power Supply System

Fixed Atmospheric Detector

The Fixed atmospheric detector is shown as figure 3 below:



Figure 3 Fixed Detector



Site selection

T30A fixed lightning warning system will be installed in two sites separately. The fixed lightning warning equipment hardware is installed outdoor, while software display is indoors and processing module is installed indoors. Before installation, it's necessary to select a suitable location first to make sure good quality of the signal.

General site selection



The following sections cover the site criteria for the most two common sites: one is the rooftop and the other is the open field. Rooftop site is preferred.

Table 1: site requirements

Site requirements for all lightning warning instrument installations:
The data collecting and processing module must be inside the case to ensure its safety
The upright tube and case must be fixed at the corresponding locations stably.
The location of the installation must be convenient for servicing to guarantee its falling no damage to people.
Shall be in accordance with the standard of power supply system and data cable.
Shall be in accordance with the atmosphere as described in this chapter

It's important that the T30A lightning warning detector shall be tightened on the supporting pole. The table 2 gives out that some installation sites should be avoided of T30A lightning warning system installation.

Table 2: some problems of site installation

Lightning warning system shall not be installed in sites as below
Cooling towers for chilled water conditioning;
Air discharge vents;
Sustained exposure to atmospheric pollutants or exhaust from smoke stacks, vehicles and airplanes;
High towers or radio frequency emitters;
The elevation angle of equipment's location is not below 120°;
In 10m range of high voltage transmission.

Notice: If environment changes rapidly, such as nearby construction site, excessive dust, sand sandblasting areas, or areas subject to dust storms after installation, ashes accumulated on the solar panel and the detector should be cleaned regularly.



Rooftop sites



Rooftop installations are the preferred T30A fixed lightning warning system installations. The advantages of rooftop installations and similar elevated installations include:

- Convenience of location;
- Protection from damages of external force;
- Protection from inadvertent damages to the equipment;
- Providing a constant environment when long time running.

Flat roof is more suitable than peaked roof for lightning warning system installation.

All buildings affect the electric field. Buildings distort or compress the electric field (Figure 4), the electric field compression (enhancement) is greater near the edges of a roof than in the middle of the roof. So, we do not recommend install the fixed electric field detector near or on the edge of the roof (figure 5).

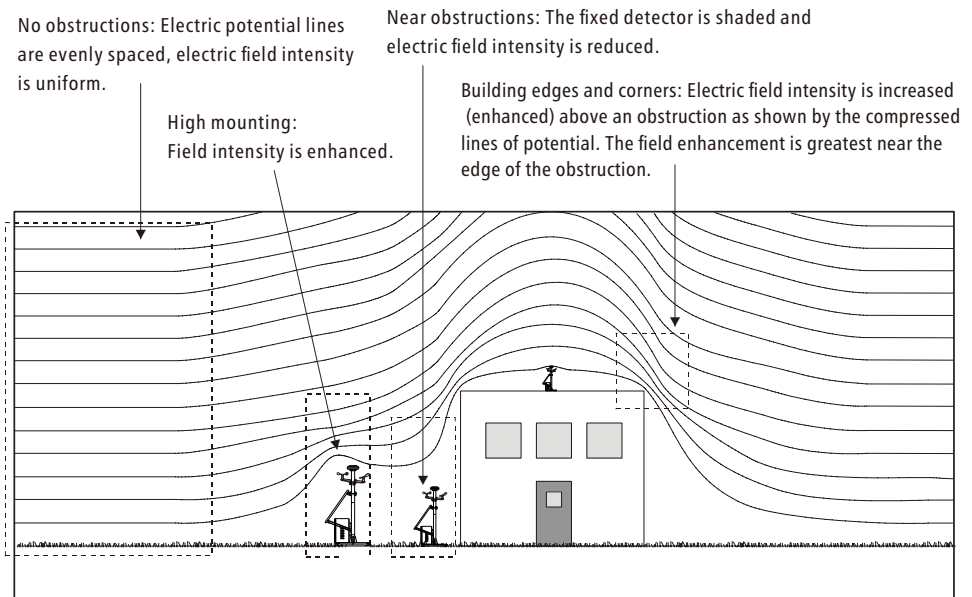


Figure 4 Electric Field Intensity is Increased

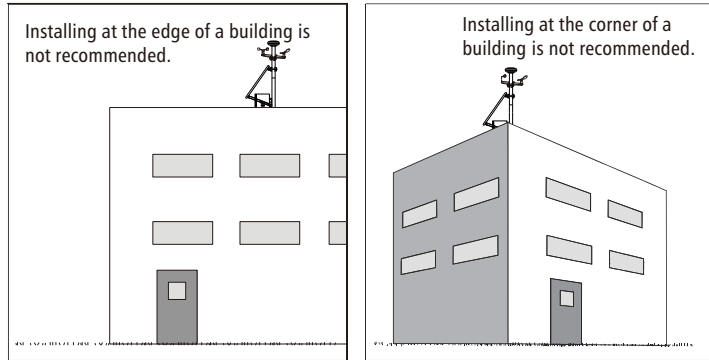


Figure5 Edges and Corners of a Building Will Enhance the Electric Field.

Preparation for installation on the roof

The fixed lightning warning instrument is designed primarily for rooftop mounting. The location should be open and the height of the parapet wall should not below 1m to make sure that there is no risk of injury of blowing down by wind. To prevent falling down by wind blowing, the tightening measures should be taken to the instrument, and there should be no obstacles such as towers, chimneys, trees and other tall objects (Figure 6).

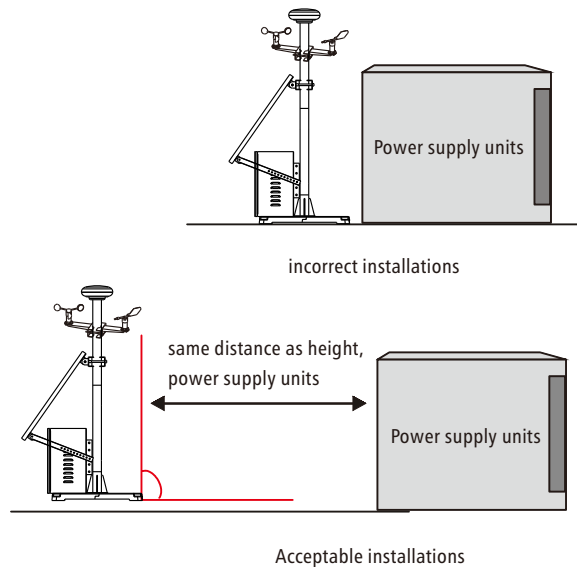


figure 6 rooftop installation site



The fixed atmospheric electric field detector has been calibrated to operate satisfactorily before delivery, which can satisfy the installation of normal height buildings.

Many factors affect the sensor calibration, including the above-mentioned factors and the height of building. Tall objects nearby may shield or block the sensor, which reduces the measuring accuracy.

Open Field Sites



If a rooftop site is not available, an alternative site such as no object blocked, no signal interruption and no other obstacles can be selected.

The installation site should be selected, as the distance to the nearest obstruction such as trees and shrubs, is three times the anticipated mature height of the object. For example: If a tree is expected to grow 20 feet (6.1 meters), it should be no closer to the detector than 60 feet (18.3 meters), regardless of the present tree height. Walls and non-growing structures should be three times as far away as they are tall (figure 7).

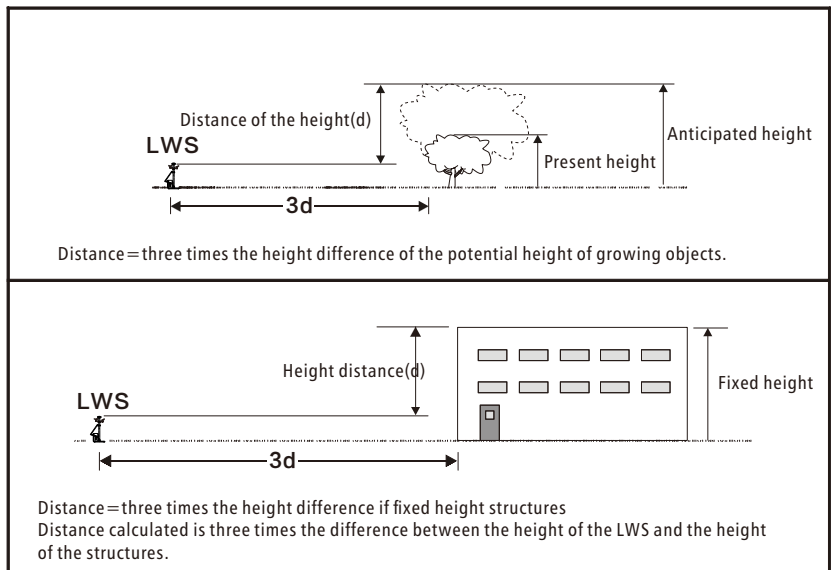


Figure 7: Determining distance to obstructions.