

# ***PROJECT REQUIREMENTS FOR SOLAR TRACKERS***



## **Document background**

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## 1.-Aim

The purpose of this document is to provide ADES clients with a series of recommendations to consider when planning a photovoltaic or solar farm to comply with all the essential requirements for the trackers to work properly, thereby facilitating the project stage as far as possible.

The present document has been drawn up on the basis of the working requirements of ADES Solar Trackers and the experience acquired by our company in its work with previous clients.

## 2.-Essential requirements for the correct performance of ADES Solar Trackers

### *2.1.- Non-solar electrical power supply.*

The electrical power supply for the ADES Solar Tracker has to be uninterrupted 24 hours a day and completely separate from the solar output. That is to say, it cannot be powered exclusively from the photovoltaic cells using the reverser to in turn power up the tracker's own solar panel.

This is absolutely essential since, if power is supplied from the cells, the energy obtained might not be sufficient on days when sunlight conditions are not appropriate to move the tracker into its protective position.

Likewise, in such circumstances, tracking is constantly reset due to faults in the voltage, so that instead of offering a proper supply, it is constantly attempting to return to the appropriate position.

### *2.2.- Independent power supply for wind protection system.*

The power supply for the ADES wind protection system (see annexe "Conditions for installing anemometer"), will also need to be kept separate from solar output, for safety reasons.

### *2.3.- Need for an earth connection.*

See document "FOUNDATION AND EARTHING CONNECTION MANUAL"

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## ***2.4.- Need for protection against shortcircuits and earthing contacts.***

Although each of the ADES Solar Tracker's electrical parts is protected inside its control cabinet, it is imperative to protect the power line to the trackers from shortcircuits and earthing contacts.

## ***2.5.- Need for power supply from initial stage of installation (generator).***

Normally, when the trackers are being installed, the electrical infrastructure is not ready and there is no power supply available, and therefore it will be necessary to have an electric generator with enough power. The size will depend on the power required by each tracker (0.5 kW) times the total number of trackers. This generator will remain installed and operative in the field, working as an emergency system in case of a failure in the mains.

## ***2.6.- Channelling restrictions.***

It is strictly forbidden for piping and conduits affecting the performance of the ADES Solar Trackers, such as the Power Line, Wind Line, or Communications Network, to be channelled immediately below the surface of the ground.

They should be channelled in such a way that they can be replaced or extended at a later date without any difficulty.

# **3.-Recommendations**

## ***3.1.- Auxiliary power supply system.***

ADES recommends having an auxiliary power supply system available that can be connected automatically if there is a fault in the mains.

This system will power the Solar Trackers and the wind protection system in the event of a fault in the mains, so that they can be placed in defence mode with the machines protected and inversion carried out.

Where such a system is not available, if the power failure is due to highly unfavourable causes, like a storm for instance, the fact that no power is supplied to the system protecting the trackers from the wind, or to the trackers themselves, means they will be exposed to strong gusts of wind that might harm the machine.

The power of the generator should be calculated using this formula:

$$P = \frac{0.5 \times \text{Number of trackers}}{0.8} \quad \text{in kilowatts}$$

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### **3.2.- Power supply during installation.**

In keeping with the previous recommendation, the same auxiliary power unit should be set up before the solar tracker is installed so that it can be put to use for this purpose. Otherwise, as indicated in the section on requirements, it will be necessary to have another power unit for the crane and other essential equipment.

It is important to stress the fact that if such a generator is made available, it will be possible to carry out final adjustments to the solar trackers before switching on the farm's power supply, resulting in savings in time and money for production.

### **3.3.- Distribution in rows.**

Where the farm is arranged in rows (always recommended) this should be done in such a way that one row is reserved for channelling the electrical infrastructure and the next one left free for access and installation of the ADES Solar Trackers:

Infrastructure row → Free row → Infrastructure row → Free row →....

### **3.4.- Electrical channels.**

ADES recommends that the entire electrical infrastructure be channelled through protective tubing with a diameter that is appropriate for the section of the conductor in question and according to prevailing legislation, allowing for the possibility that this might be extended at any time.

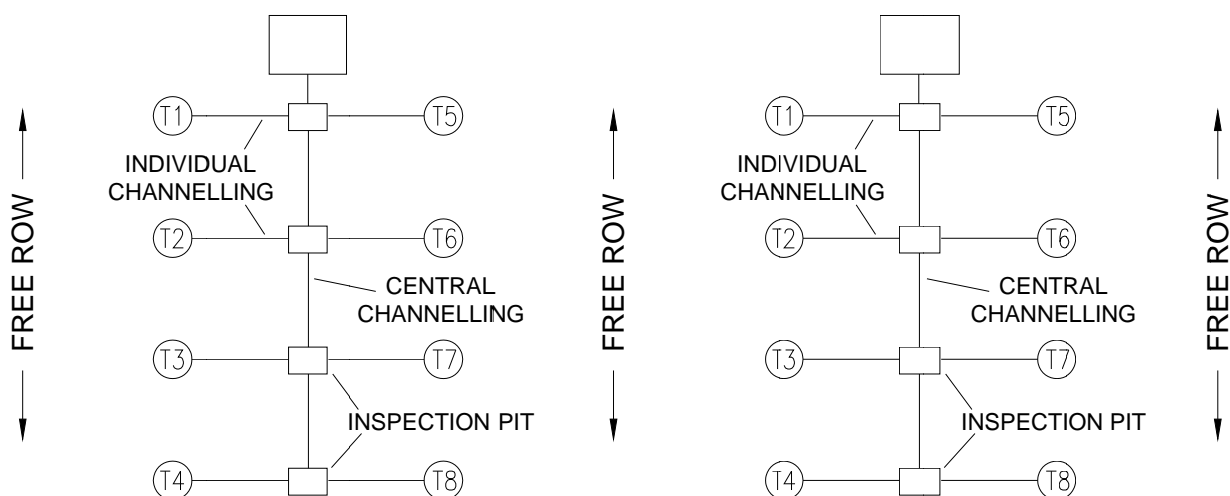
ADES also recommends leaving a guide wire in each tube, which can be used to incorporate future circuits and / or extension conductors, along with the installation of a reserve tube of at least 40 mm in diameter for unforeseen circumstances.

In those installations in which the inverters are located inside the tracker and therefore the output voltage to the meter-distribution-transformer control unit is three-phase sinusoidal power at 380V, the conductors transporting the energy from the solar panels can go in the same trough as the power lines for the trackers, power lines for the wind alarm system, conductors for optional circuits of the same type, etc.

In installations in which the inverters are located outside the tracker and therefore the output voltage to the units housing the inverters is direct current, it is better to use a completely different channel, separating the circuits transporting alternating current from those with direct current.

In installations where a communications system is to be set up, this must necessarily be channelled through separate protective tubing with a minimum diameter of 40mm, in compliance with the prevailing legislation for protective tubing. While, in principle, no communications network is intended to be installed, ADES recommends installing the tubing in which the power lines would be housed, as this will make it very simple to do so at a future date.

The method recommended by ADES for channelling the electrical infrastructure is as follows:



## 4.-Liability

Failure to implement the obligations imposed by ADES in the mode of execution for the infrastructure will be considered a serious fault, with the possibility of demanding the modification of the installation so that it conforms to the requirements established.

Not following the recommendations that have been established will not be considered as a serious fault, but ADES declines any liability for the malfunction of the trackers deriving from the omission of such recommendations.