

Total Station

Total station represented as one of the most important surveying instruments and also it is considered a basic device In the ground surveying works, because of its accuracy and high productivity compared to conventional devices, It shortens the time and work by two to three times

Total Station: Is a device that combines an electronic unit to measure distances denoted by (*EDM*) and an electronic unit to measure angles denoted by *Electronic Theodolite* in an integrated unit another an external unit can be attached to the device to record information and measurements known as *Data Collector*, it is a special card to record information through the control panel and thus dispense with handwriting on the tradition field notebook.

The device can read the horizontal angles, the vertical angles and the slope distances from Single Setup for a number of points and through the internal processor and the control panel these measurements can be reduced to horizontal and vertical distances and coordinates for different point locations these measurements are usually downloaded on computers through software compatible with the device.

Then make the necessary corrections and extract many data in the maps form or regular tables.

Types of total station:

There are several types of total station vary in design depending on the companies producing them, these are examples of some of these devices was shown in the Figure (1-a) and Figure (1-b)



topcon



sokkia



Leica

Figure (1-a)



Trimble



geodimeter

Figure (1-b)

Total Station Working Idea

The operation idea of electronic distance measurement depends on the time of the waves' journey they are either photovoltaic waves or microwave waves by knowing the speed of the wave in the air, the *distance* traveled by the wave is calculated using the equation below

$$\text{Distance} = 0.5 [\text{time of the journey} \times \text{the speed of the wave}]$$

As for the *electronic angles*, the device contains two circles horizontal and vertical circle through which the required angles can be identified and recorded automatically and then displayed or have a special card to record information and not to measure it through the keyboard available in the device.

Components of the Total Station

Total station consist from the following units as shown in figure below

