How to Measure AC Voltage and Calculate Frequency with An Oscilloscope

How to Measure AC Voltage and Calculate Frequency with Oscilloscope – Oscilloscope can basically be used as a measuring instrument to measure the amount of AC voltage and frequency by displaying the waveform of the measurement. The measured AC voltage will display the shape of the sine wave which then with the sine wave we calculate the frequency based on the wave period displayed.

Measuring AC Voltage with Oscilloscope

Ac voltage (Alternating Current) is often known as Alternating Voltage is an electricity whose current direction is always changing or going back and forth. In general, AC voltage is in the form of sinus waves. By using an oscilloscope, we can measure the AC voltage and can also see the appearance of the AC wave.

Read also **How to Use Multimeter**

Before taking measurements of AC Voltage on oscilloscope, make preparations by arranging the following:

1. On-kan Oscilloscope.
2. TIME/DIV switch rotated to 5msec (5 millisec)
3. The VOLT/DIV switch is rotated to 5 Volts (meaning 1 box or 1 Div on the Oscilloscope screen is 5 Volts).
4. Pair the Probe on the terminal you want to measure.
5. Calculate the AC Voltage based on the wave displayed. Examples such as the wave below:

6. The peak voltage is 2 squares or 2 DIVs, the VOLT / DIV switch that we set is 5 Volts then the calculation is 10 Volts (2 DIV x 5 Volts = 10 Volts)
7. While the peak voltage to the peak is 20 Volts with the following calculation: 4 DIV x 5 Volts = 20 Volts Then the result of measuring ac voltage is 20 Volts

4 DIV (vertical)

4 DIV (horizontal)

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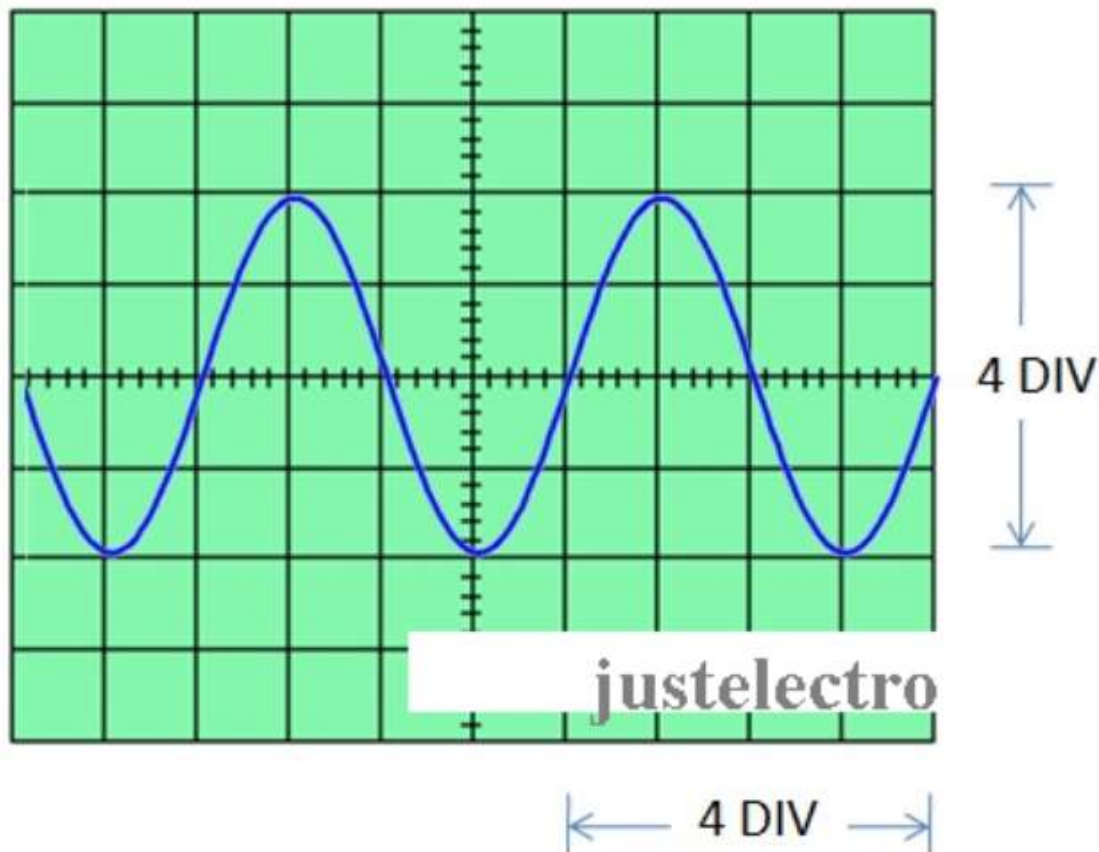
Measuring Frequency with an Oscilloscope

Frequency is the number of wave cycles in a second that is usually denoted by the symbol "F". The unit of frequency is Hertz (Hz). To measure the frequency of an oscilloscope, we need to know the period of a sine wave by looking at it from the oscilloscope screen. Perioda is the time it takes for a complete cycle of repetition. Perioda is usually denoted by "T", the unit of Perioda is the second. From the sine waves displayed oscilloscopes as in the image above, we can calculate the frequency.

Formula Calculates Frequency:

$F = 1 / T$

Where :F = Frequency (in Hz)T = Period (in second or second units), The perioda (T) calculation method is to multiply the number of division one wave cycle by the time value set on the TIME/DIV switch.

$F = 1 / (5ms \times 4\ Div)$

$F = 1 / 20ms$ (must be converted to second)

$F = 1 / 0.02\ second$ $F = 50\ Hz$