

Data Acquisition

Signal Conditioning

29,184 views May 20, 2018 3:35

<https://www.youtube.com/watch?v=HSHJXXFigz8>

Sensor Fundamentals Data Acquisition Basics and Terminology

2,980 views Nov 5, 2020 35:17 From Mouser

https://www.youtube.com/watch?v=Xc8dP0PdC_4

Learn from our partner and DAQ expert NI the fundamental data acquisition concepts and terminology, essential sensor operating principles, and considerations for building a data acquisition system.

REMEMBER: Resolution, Range, Rate

Why using 4-20mA in industry

107,334 views Apr 15, 2017 3:38


<https://www.youtube.com/watch?v=ZWA3srIVwnw>

Why using 4-20mA in industry

How to read 4-20mA?

Electronics use Analog-to-Digital converters (ADC) to convert voltage signals to digital numbers which are understandable by the CPU.

As for current signals, they are converted to voltage signals like this:


$$4\text{mA} * 250 \text{ Ohms} = 1\text{v}$$
$$20\text{mA} * 250 \text{ Ohms} = 5\text{v}$$

1:17 / 3:38

Why using 4-20mA in industry

Why using 4-20 mA current signal instead of voltage?

Press **Esc** to exit full screen

Main reasons are:

- 1- Drop voltage:** very long cables have resistance and thus will make a voltage drop which will affect readings. However, currents do not have this.
- 2- Electromagnetic interference:** currents are more robust against noise from EMI.
- 3- Can detect open circuit:** if 0v (ground) is the minimum reading, you cannot determine if it is actually 0% reading or the wire is cut (open circuit). That is why 4mA is the minimum, thus 0mA will mean an open circuit.

1:23 / 3:38

Videos covering a wide range of practical embedded systems techniques.

[ECE 376 Embedded Systems 32 videos](#) 1,015 views Last updated on Jul 29, 2022

<https://www.youtube.com/playlist?list=PLAWu8xH2-DFsrrU5e5F7Z0P4Kw1736I04>

Examples

ECE 376 00 Syllabus (Fa22)

ECE 376.13 A2D Converters

PIC vs Arduino 17,415 views Apr 23, 2020 30:14

<https://www.youtube.com/watch?v=TdFsOoxbQq4>

Shannon Nyquist Sampling Theorem 73,505 views Dec 11, 2020 17:18

<https://www.youtube.com/watch?v=FcXZ28BX-xE>