

Advantech AE Technical Share Document

Date	2018/1/3	SR#	1-3360469371
Category	■FAQ □SOP	Related OS	N/A
Abstract	ADAM-6X17_How to deal with the noise interference on AI modules		
Keyword	AI noise, AI wiring, AI reading, vibration devices		
Related Product	ADAM-6017, ADAM-6217		

■ Problem Description:

In real application, where the ADAM module installed may have noise issue because of the incorrect wiring or usage. In this situation, the noise may affect the module and cause module get abnormal reading value or even make the module damaged. This document will discuss how to deal with the noise interference on AI module.

■ Answer:

To deal with the noise issue, we should find out where the noise comes from. Below is an example of ADAM-6017 with a voltage output sensor.

Here we will divide the wiring into different part to discuss and narrow down where might be the source of noise.

1. Noise from the sensor power source

If the power source of the sensor also uses to supply large equipment such as turbine or motor, it will cause the power source unstable and have voltage spike, which makes the power source unclean. In this situation, if there is isolation design between sensor power and signal output, this noise from sensor power source will goes directly to AI channel of ADAM.

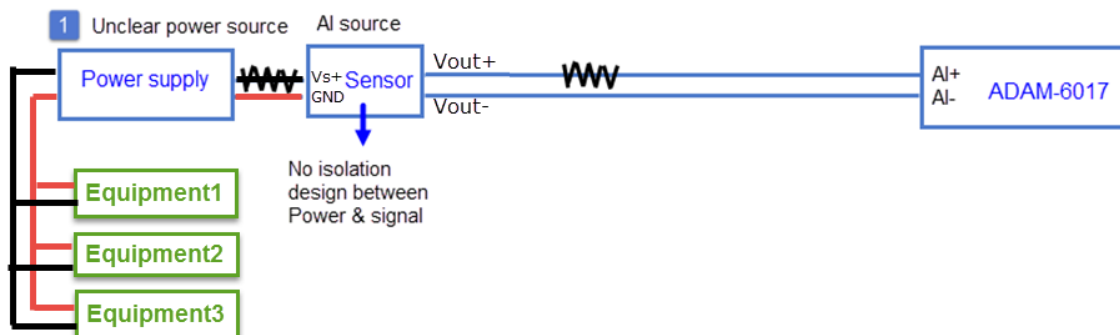


Figure 1 Unclear power noise affect AI signal

User can use oscillator to measure the waveform of power source, and use either surge protector or UPS regulator to get a stable power source. (Figure 2 and Figure 3)

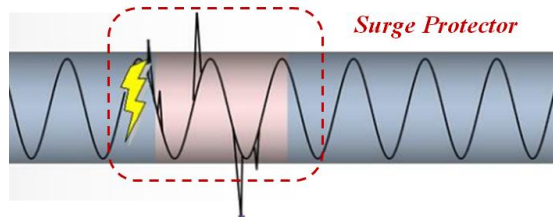


Figure 2 Surge Protector for voltage spike on power source

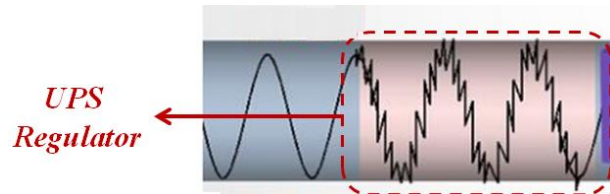


Figure 3 UPS regulator for harmonic interference power source

Suggestion:

1. Please use independent power supply for the AI sensor to reduce the noise coming from the power source.
2. User can use surge protector between the AI sensor and power source for removing voltage spike from power source
3. User can use UPS regulator between the AI sensor and power source for removing harmonic interference from power source.

2. Noise from the AI source

A. AI signal tied with other signal

If the wire connected to ADAM AI channel is tied with other wire with noise, then the AI signal will be affected due to **Electro Magnetic Interference(EMI)**. That's why using the correct wiring method is very important and can prevent AI signal interfered by other signals.

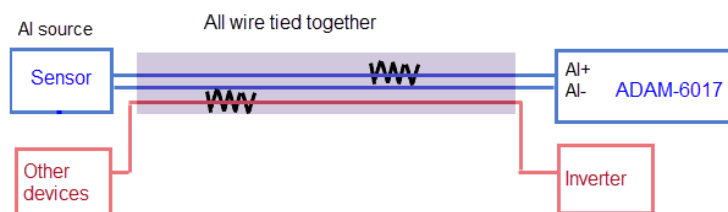


Figure 2 AI signal affect by other signal due to incorrect wiring method

Suggestion:

Do not tie all the signal wire together in one system. Please separate AI signal with other signal to prevent the noise goes directly into AI channel of the module.

B. Vibration devices near AI signal

When there is vibration device, such as motor, near AI signal, AI signal will also be interfered by the vibration devices. This is because those vibration devices such as motor will cause **Electro Magnetic Interference(EMI)** on AI signal. That's why the AI wiring should also prevent too close to the vibration device or the AI signal wire surround with the motor.

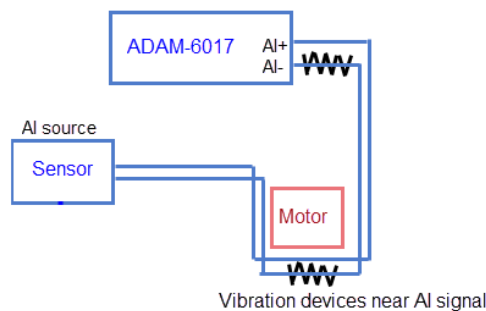


Figure 3 AI signal affect by vibration devices such as motor

Suggestion:

Please avoid AI signal too close to vibration devices. If customer cannot avoid it due to certain reasons, please use shield cable or even iron tube (more better) to protect AI signal that goes into ADAM module. Please note that the shielding cable should be connected to the earth ground (not module GND or other equipment GND). However, the shielding cable or iron tube can only reduce the noise effect on AI signal, the best way to solve this is to keep AI signal away from vibrating equipment.

In conclusion, to deal with the noise issue on AI module, please follow the rules below:

1. Use independent power supply for ADAM sensor
2. Protect the AI signal connected to AI channel of ADAM (no other signal bundled together, no vibration devices around)
3. Use independent grounding for each device, not common together.

By aware of the above rules, it can avoid the noise issue happened in ADAM module.