Date	2015 / 07 / 03	SR#	1-2086161081
Category	■FAQ □SOP	Related OS	N/A
Abstract	ADAM-4017P_ADAM-6017_ADAM-6217_The definition of span drift and zero drift		
Keyword	Analog input, Temperature Drift, Span Drift, Zero Drift		
Related Product	ADAM-4017,ADAM-4017P, ADAM-6017, ADAM-6018, ADAM-6217		

■ **Problem Description:**

This documentation the definition of span and zero drift.

■ **Brief Solution - Step by Step:**

Zero Drift Error

For ideal measurement, when input voltage was at the zero point and the environment temperature was 25°C, we founded out the read value would not be 0, because there was still a small offset voltage.

This offset voltage was caused by the feature of the module's internal component. We called this offset voltage "Offset Error" and it would cause the measuring inaccuracy, so we would use the calibration function to eliminate it at 25°C in ADVANTECH's factory.

However, Offset Error would be changed along with the variation of the environment temperature (Figure1). Thus, even we had calibrated it at 25°C environment, if the environment temperature was changed, users still would find out it's there.

Therefore, we used "Zero Drift" to define this variation of the offset voltage.
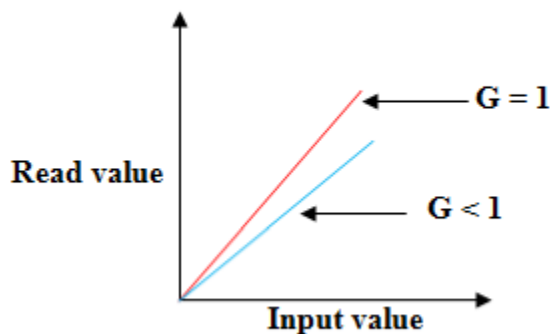
Figure 1

1
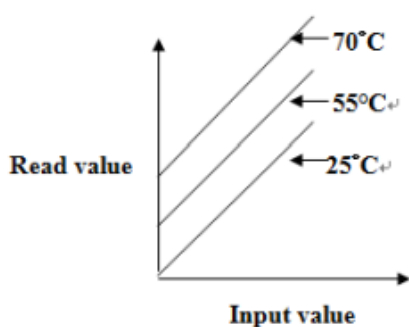
Span Drift Error

For voltage measurement in an ideal condition, we hope the read value that we get from ADAM-4118 or other AI module always 100% equal to the input voltage value, the ratio between the read value and the input voltage value would be 1(Gain=1) just like the red line shown in Figure 2.

Figure 2

In fact, the ratio between read value and input voltage value would not be 1 just like the blue line shown in Figure 2.

That means if the input voltage is 1V, the read value may be 0.92V or 0.9V. This kind of deviation we called "Gain Error".

It could be found out easily when the input voltage was close to the span value of the input range.

It was caused by the properties of the internal components, and it would cause the measuring inaccuracy, so we would use Span Calibration function to calibrate it at 25°C in ADVANTECH's factory.

But, it would be changed along with the variation of environment temperature just like Figure 3.

Figure 3
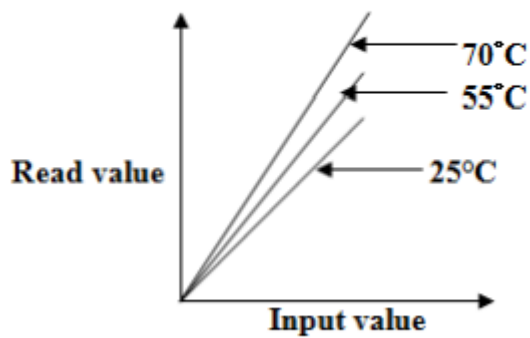
Thus, even we had calibrated it at 25°C environment, if the environment temperature was changed, users still would find out the deviation there.

Therefore, we used "Span Drift" to define this variation of the span voltage deviation.

You can find the information of "Span Drift" and "Zero Drift" of analog input module in our datasheet.

Common Specifications

General

- **Power Input** — Unregulated 10 ~ 30 V$_{DC}$
- **Connectors** — 2 x plug-in terminal block (#14 ~ 22 AWG)

Analog Input

- **Accuracy** — Voltage mode: ±0.1% or better
  Current mode: ±0.2% or better
- **Resolution** — 16-bit
- **Sampling Rate** — 10 sample/second (total)
- **Isolation Voltage** — 3,000 V$_{DC}$

- **Overvoltage Protection** — ±35 V$_{DC}$
- **CMR @ 50/60 Hz** — 120 dB
- **NMR @ 50/60 Hz** — 100 dB
- **Span Drift** — ±25 ppm/°C
- **Zero Drift** — ±6 µV/°C
- **Built-in TVS/ESD Protection**

Environment

- **Operating Humidity** — 5 ~ 95% RH
- **Operating Temperature** — -10 ~ 70°C (14 ~ 158°F)
- **Storage Temperature** — -25 ~ 85°C (-13 ~ 185°F)