



ControlLogix Analog I/O Modules

Catalog Numbers 1756-IF16, 1756-IF16K, 1756-IF6CIS, 1756-IF6I, 1756-IF8, 1756-IF8K, 1756-IR6I, 1756-IT6I, 1756-IT6I2, 1756-OF4, 1756-OF4K, 1756-OF6CI, 1756-OF6VI, 1756-OF8, 1756-OF8K



Allen-Bradley

by ROCKWELL AUTOMATION

User Manual

Original Instructions

Relationship Between Module Resolution, Scaling, and Data Format

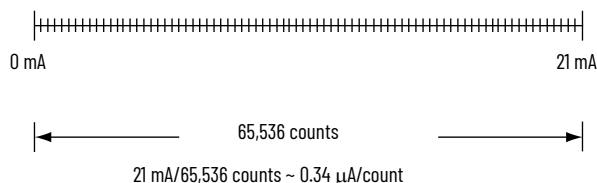
This section describes the close relationship between module resolution, scaling, and data format.

Module Resolution

Resolution is the smallest amount of change that the module can detect. Analog input modules are capable of 16-bit resolution. Output modules are capable of 13...16 bit resolution, depending on the module type.

The 16 bits represent 65,536 counts. This total is fixed but the operational range that you choose for your module determines the value of each count.

For example, the 1756-IF6I module has an available current range of 21 mA. If the range is divided by the number of counts to figure out the value of each count, one count is approximately 0.34 μ A.



IMPORTANT Module resolution is fixed. It does not change regardless of what data format you choose or how you scale your module in floating point mode. Resolution is based on the module hardware and the range selected. If you use a limited range sensor, you don't change the module resolution.

This table lists the range and resolution of the analog I/O modules.

Current Values Represented in Engineering Units

Module	Range	Number of Significant Bits	Resolution
1756-IF16, 1756-IF16K, 1756-IF8, and 1756-IF8K	+/- 10.25V 0...10.25V 0...5.125V 0...20.5 mA	16 bits	320 μ V/count 160 μ V/count 80 μ V/count 0.32 μ A/count
1756-IF6CIS	0 mA...21 mA	16 bits	0.34 μ A/count
1756-IF6I	+/- 10.5V 0...10.5V 0...5.25V 0...21 mA	16 bits	343 μ V/count 171 μ V/count 86 μ V/count 0.34 μ A/count
1756-IR6I	1...487 Ω 2...1000 Ω 4...2000 Ω 8...4020 Ω	16 bits	7.7 M Ω /count 15 M Ω /count 30 M Ω /count 60 M Ω /count
1756-IT6I and 1756-IT6I2	-12...+30 mV -12...+78 mV	16 bits	0.7 μ V/count 1.4 μ V/count
1756-OF4, 1756-OF4K, 1756-OF8, and 1756-OF8K	+/- 10.4V 0...21 mA	16 bits	320 μ V/count 325 nA/count
1756-OF6VI	+/- 10.5V	14 bits	1.3 mV
1756-OF6CI	0...21 mA	13 bits	2.7 μ A

For information regarding the module resolution of the ControlLogix High Resolution Analog I/O Modules, see publication [1756-UM540](#).

IMPORTANT Because these modules must allow for possible calibration inaccuracies, resolution values represent the available Analog to Digital or Digital to Analog counts over the specified range.

Integer mode

This mode provides the most basic representation of analog data. When a module multicasts data in the integer mode, the low and high signals of the input range are fixed.

IMPORTANT Scaling isn't available in integer mode. The low signal of your application range equals -32,768 counts while the high signal equals 32,767 counts.

In integer mode, input modules generate digital signal values that correspond to a range from -32,768...+32,767 counts.

Input Signal to User Count Conversion

Input Module	Available Range	Low Signal and User Counts	High Signal and User Counts
1756-IF16, 1756-IF16K, 1756-IF8, and 1756-IF8K	+/- 10V	-10.25V -32768 counts	10.25V 32,767 counts
	0...10V	0V -32768 counts	10.25V 32,767 counts
	0...5V	0V -32768 counts	5.125V 32,767 counts
	0...20 mA	0 mA -32768 counts	20.58 mA 32,767 counts
1756-IF6CIS	0...20 mA	0 mA -32768 counts	21.09376 mA 32,767 counts
1756-IF6I	+/- 10V	-10.54688V -32768 counts	10.54688V 32,767 counts
	0...10V	0V -32768 counts	10.54688V 32,767 counts
	0...5V	0V -32768 counts	5.27344V 32,767 counts
	0...20 mA	0 mA -32768 counts	21.09376 mA 32,767 counts
1756-IR6I	1...487 Ω	0.859068653 Ω -32768 counts	507.862 Ω 32,767 counts
	2...1000 Ω	2 Ω -32768 counts	1016.502 Ω 32,767 counts
	4...2000 Ω	4 Ω -32768 counts	2033.780 Ω 32,767 counts
	8...4020 Ω	8 Ω -32768 counts	4068.392 Ω 32,767 counts
1756-IT6I and 1756-IT6I2	-12...30mV	-15.80323 mV -32768 counts	31.396 mV 32,767 counts
	-12...78mV	-15.15836 mV -32768 counts	79.241 mV 32,767 counts

You can generate an analog signal at the screw terminals of an output module that corresponds to a range from -32,768...+32,767 counts.

This table lists the conversions a generated digital signal to the number of counts.

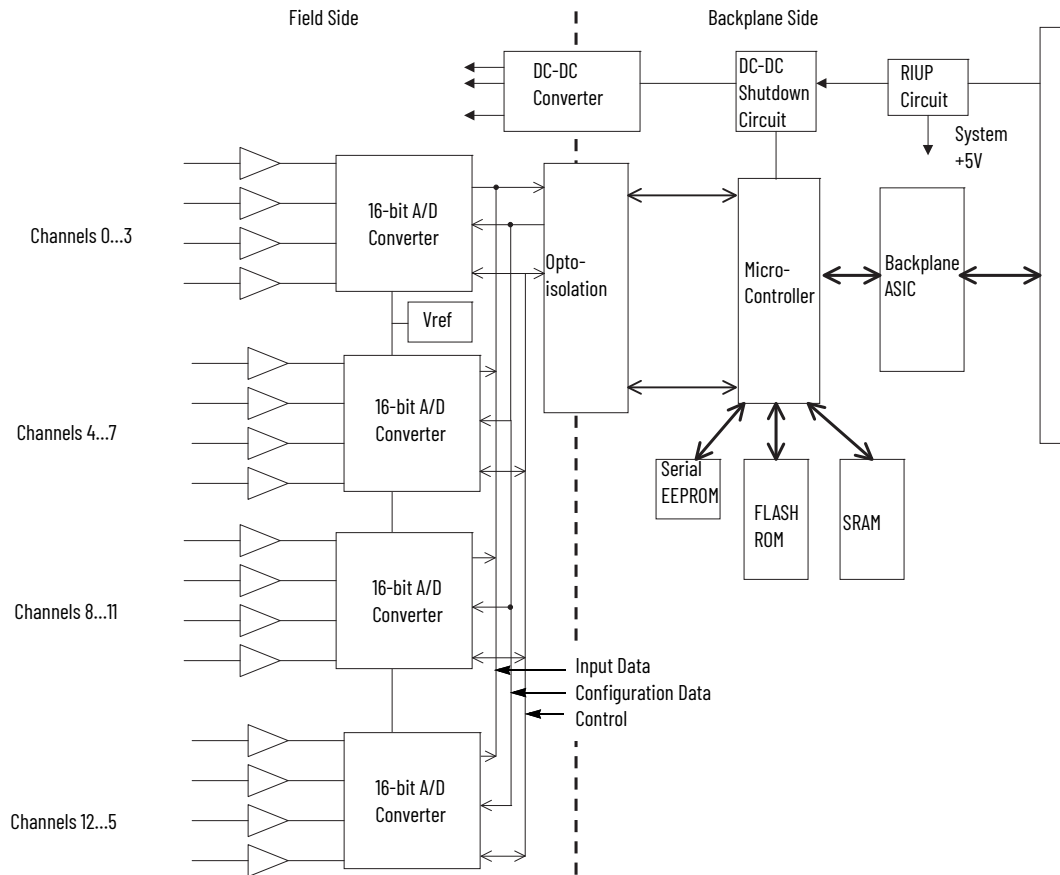
Output Signal to User Count Conversion

Output Module	Available Range	Low Signal and User Counts	High Signal and User Counts
1756-OF4, 1756-OF4K, 1756-OF8, 1756-OF8K	0...20 mA	0 mA -32,768 counts	21.2916 mA 32,767 counts
	+/- 10V	-10.4336V -32,768 counts	10.4336V 32,767 counts
1756-OF6CI	0...20 mA	0 mA -32,768 counts	21.074 mA 32,767 counts
1756-OF6VI	+/- 10V	-10.517V -32,768 counts	10.517V 32,767 counts

Use Module Block and Input Circuit Diagrams

This section shows the block diagrams for 1756-IF16 and 1756-IF16K series A and B modules.

1756-IF16/A, 1756-IF16K/A Module Block Diagram



1756-IF16/B, 1756-IF16K/B Module Block Diagram

