Migrating to a 1756sc-IF8U

Sometimes customers have an application designed using one or more 1756 Analog Input modules, and then discover:

- The mix of voltage, current, thermocouple or RTD/resistance requires several input card types, and there is a high channel spare rate which increases the cost.
- The design has changed and a few more of a mix of input types need to be added, and there are not enough spare Analog Input channels of all required types in the existing configuration, so more cards need to be purchased.
- Running a signal through a 4-20mA transmitter adds inaccuracy and calibration headaches, and it would be better to run the signal directly into an Analog Input.

These customers should consider using the Spectrum Controls 1756sc-IF8u instead, which provides full universal analog capability in one I/O module and can replace analog input, thermocouple, and RTD modules without compromising performance or price.

- Use any combination of input types at one time.
- Accuracy is comparable with dedicated analog modules.
- Each channel is individually programmable for input type, user scaling and alarm settings.

The 1756sc-IF8u is a **Universal** Analog Input module. Rather than only having input types of voltage/current or only input types of TC/RTD/Resistance, the 1756sc-IF8u has available all 5 of these input types selectable on a channel by channel basis.

The 1756sc-IF8u has **32** input types available in 5 categories:

- 9 Thermocouple types (J, K, T, B, E, R, S, N, C)
- 6 RTD types (PT385/3916, Ni618/672, NiFe518, Cu426)
- 6 Resistance selections (250, 500, 1000, 2000, 3000, 4000 ohms)
- 2 Current selections (0-20 mA, 4-20 mA)
- 6 Voltage selections (±50 mV, ±150 mV, 0-5 V, 1-5 V, 0-10 V, ±10 V)

Here are some wiring and programming considerations when designing the 1756sc-IF8u into a new system or to replace a previous design using other 1756 Analog Input modules.

For wiring:

- See the Rockwell knowledgebase article ID: QA26801 1756sc-IF8U Wiring
- Keep in mind that the 1756sc-IF8u inputs are Single-Ended only.
- Review the Installing And Wiring section (Chapter 2) in the IF8u manual.
- Spectrum Controls manufactures a 1492 IFM wiring system product specifically for the 1756sc-IF8u – see:

- o Spectrum Controls Technical note *Pre-Wired Cable and IFM Options for Spectrum 1756 Analog Modules*
  - o Rockwell knowledgebase article ID: QA11293 *Wiring 1756SC-IF8U module with 1492-ACABLExxSC cable and 1492-IFM40F module*
- Analog cable signal integrity requirements are identical to any other 1756 Analog Input module. Refer to Rockwell publication 1770-in041 Industrial Automation Wiring and Grounding Guidelines.

For programming:
- RPI/RTS selection is identical to any other 1756 Analog Input module.
- The 1756sc-IF8u has 5 types of input ranges, with 2 to 9 selections within each input range. For comparison, the 1756-IF8 has 2 types of input ranges with 1 or 3 selections within each input range. All input range selections included in the IF8 are available with the IF8u.
- Analog signal scaling and Alarm configuration is similar to any other 1756 Analog Input module.
- The 1756sc-IF8u modules convert signal data into a REAL data type in the Controller tags, there is no option for INT data type.

Major 1756sc-IF8U specifications to note:
- The 1756sc-IF8u does not do differential voltage or current.
- Acceptable terminal blocks: 1756-TBCH/TBS6H (36 position)
- Calibration: auto-calibrates at power-up and at a user definable period during run mode
- Input Overvoltage Protection:
  - o ±14.5 VDC continuous
  - o 250W pulsed for 1 msec.
- Input Overcurrent Protection:
  - o 28 mA continuous
  - o 40 mA, 1mS pulsed, 10% duty cycle maximum
- Isolation:
  - o 1000 VDC continuous between inputs and chassis ground/backplane.
  - o 12.5 VDC continuous between channels
- Recommended Cable:
  - o for thermocouple inputs: Shielded twisted pair thermocouple extension wire
  - o for mV, V or mA inputs: Belden #8761 (2C+Shld) or equivalent
  - o for RTD inputs: Belden #9533 (3C+Shld), #83503 (4C+Shld) or equivalent
- Available Input Ranges:
  - o Thermocouple: J, K, T, B, E, R, S, N, C, CJC (0°C to 90°C/ 32°F to 194°F)
  - o RTD:
    - ▪ Platinum (385): 100Ω, 200Ω, 500Ω, 1000Ω
    - ▪ Platinum (3916): 100Ω, 200Ω, 500Ω, 1000Ω
    - ▪ Copper (426): 10Ω
    - ▪ Nickel (618): 100Ω, 200Ω, 500Ω, 1000Ω

- ▪ Nickel (672): 120Ω
        - ▪ Nickel/Iron (518): 604Ω
    - o Voltage Input Ranges: ±50 mV, ±150 mV, 0-5 V, 1-5 V, 0-10 V, ±10 V
    - o Current Input Ranges: 0-20 mA, 4-20 mA
    - o Resistance Input Ranges: 250Ω, 500Ω, 1000Ω, 2000Ω, 3000Ω, 4000Ω
- Resolution: 16 to 21 bits (filter dependent)
- There are 5 filter settings for each channel: 50/60Hz, 10, 100, 250 & 1000Hz
- Input Impedance:
    - o >1MΩ; thermocouple, voltage, RTD
    - o <250Ω, current
- Thermal Dissipation: 3.00 Watts, maximum
- Certifications: UL/cUL Listed ANSI ISA 12.12.01 (Class I, Div 2, Groups ABCD), CE

Spectrum Controls publications:
- 0300191-05 manual 1756sc-IF8u
- Pre-Wired Cable and IFM Options for Spectrum 1756 Analog Modules

Rockwell KB about the 1756sc-IF8U:
- ID: QA26801 1756sc-IF8U Wiring
- ID: QA11293 Wiring 1756SC-IF8U module with 1492-ACABLExxSC cable and 1492-IFM40F module
- ID: QA15417 1756sc-IF8u Default Scaling and Engineering Unit Values for RTDs and Thermocouples
- ID: IN27360 1756sc-IF8U Calibration
- ID: QA24634 Wiring a potentiometer to the 1756sc-IF8U
- ID: QA53388 1756sc-IF8U Analog Input Module with mixed input types on the same module
- ID: QA21360 1756SC-IF8U and CJC
- ID: QA26608 Error codes for 1756sc-IF8U

Rockwell Logix Publications:
- 1756-TD002 CLX IO Specifications Technical Data
- 1756-UM009 ControlLogix Analog I/O Modules User Manual
- 1756-PM004 Logix 5000 Controllers I/O and Tag Data
- 1770-4.1 Industrial Automation Wiring and Grounding Guidelines