

## 5.19. Universal Input Output – CC-PUIO01

### Function

The Universal Input Output module interfaces with analog input, analog output, digital input, and digital output field devices.

### Notable Features

- Each channel user configurable as:
  - Analog Input
  - Analog Output
  - Digital Input
  - Digital Output
  - Pulse Input (channels 15-18)
  - Open Wire Detection
- Fast Scan (Priority I/O Module Scan)
- Electronic short circuit protection<sup>1</sup>
- Safe-state (FAILOPT) behaviors configurable on a per channel basis for Digital / Analog Output
- HART 7 support (analog IO)
- Extended Temperature Range -40 to +70°C module ambient

| Parameter                                                                                                                                                                                                                                                                                                        | Specification |               |     |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|---------------|-----|
| Universal Process IO Module                                                                                                                                                                                                                                                                                      | CC-PUIO01     |               |     |
| IOTA Model Numbers                                                                                                                                                                                                                                                                                               | CC-TUIO01     | Non Redundant | 12" |
|                                                                                                                                                                                                                                                                                                                  | CC-TUIO11     | Redundant     | 18" |
| Note 1: Each signal can be shorted in the field with no damage to the IOM or IOTA. Other channels on the same IOM will not be affected. AI, AO and DI channels are further protected and certified to support energy limited / nonincendive field wiring connections to Zone 2 / Division 2 hazardous locations. |               |               |     |

**Detail Specifications - Analog Input with HART**

| Parameter                                                         | Specification                                                             |
|-------------------------------------------------------------------|---------------------------------------------------------------------------|
| Input type                                                        | Current (2, 3, or 4 wire devices)                                         |
| Input Channels                                                    | 32 Maximum per module<br>(with or without open wire detect)               |
| A/D Converter Resolution                                          | 16 bit                                                                    |
| Input Range                                                       | 0-20 mA or 4-20 mA                                                        |
| Normal Mode Rejection Ratio, at 60 Hz                             | 12 dB                                                                     |
| Normal Mode Filter Response                                       | Single pole, -3 dB @ 16 Hz                                                |
| Crosstalk, dc to 60 Hz (channel-to-channel)                       | 60 dB                                                                     |
| Input Impedance                                                   | 250 $\Omega$ nominal                                                      |
| Maximum Input Voltage (any input referenced to common, no damage) | +36 VDC to -1.1 VDC <sup>(1)</sup>                                        |
| Input Scan Rate                                                   | 50 ms                                                                     |
| Hardware accuracy                                                 | 0.1% of full-scale (23.5 $\pm$ 2°C)<br>0.17% of full-scale (-40 to +70°C) |
| Transmitter Field Power Conditioning                              | Current limited to 24 mA                                                  |
| Input Filter                                                      | First-order low-pass 16 Hz                                                |
| Note 1: Return terminal is connected directly to Common (Ground)  |                                                                           |

**Detail Specifications - Pulse Input**

| Parameter           | Specification                                                          |
|---------------------|------------------------------------------------------------------------|
| Channels            | 15, 16, 17, 18                                                         |
| Frequency           | 0-10KHz                                                                |
| Minimum Pulse Width | 50 $\mu$ s                                                             |
| Duty Cycle          | Any Duty Cycle that meets the Minimum Pulse Width specification above. |

**Detail Specifications - Analog Output with HART**

| Parameter                                                                                                                | Specification                                                            |
|--------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------|
| Output Type                                                                                                              | 4-20 mA current loop                                                     |
| Output Channels                                                                                                          | 32 Maximum per module <sup>1</sup><br>(with or without open wire detect) |
| Output Ripple                                                                                                            | < 125 mV peak-to-peak at power line frequency, across 250 $\Omega$ load  |
| Output Temperature Drift                                                                                                 | 0.001% of Full Scale/°C                                                  |
| Output Readback Accuracy                                                                                                 | 0.25% of full scale                                                      |
| Output Current Linearity                                                                                                 | $\pm 0.05\%$ of Full Scale nominal                                       |
| Resolution                                                                                                               | 12 bit                                                                   |
| Calibrated Accuracy                                                                                                      | <0.5% of Full Scale (25°C) including linearity                           |
| Directly Settable Output Current Range                                                                                   | 0 mA to 23 mA                                                            |
| Maximum Resistive Load<br>(24 V supply = 22 VDC through 28 VDC)                                                          | 700 ohms                                                                 |
| Maximum Output Compliant Voltage<br>(24 V supply = 22 VDC through 28 VDC)                                                | 14 VDC                                                                   |
| Maximum Open Circuit Voltage                                                                                             | 24 VDC                                                                   |
| Response Time<br>(DAC input code to output)                                                                              | 2 ms                                                                     |
| Gap (0 mA) of Output to Field on Switchover                                                                              | 0 ms (both partners continuously active)                                 |
| Note 1: Please refer to the User's Guide for calculation method to determine channel usage versus operating temperature. |                                                                          |

**Detail Specifications - Digital Input with OWD**

| Parameter                                                                                          | Specification                    |
|----------------------------------------------------------------------------------------------------|----------------------------------|
| Open Voltage                                                                                       | 24 VDC                           |
| Short Circuit Current                                                                              | 7 mA                             |
| Open Contact                                                                                       | 15 k $\Omega$ > 0.1 W            |
| Closed Contact                                                                                     | 5 k $\Omega$ > 0.25 W            |
| Closed contact detection                                                                           | 1.8mA < I < 6 mA <sup>1</sup>    |
| Open contact detection                                                                             | 0.7 mA < I < 1.8 mA <sup>2</sup> |
| Open wire detect                                                                                   | I < 0.7 mA                       |
| Input filter                                                                                       | First-order low-pass 16 Hz       |
| Note 1: At 24 VDC, equates to 8.57 K $\Omega$ > R > 4 K $\Omega$ (where R = total loop resistance) |                                  |
| Note 2: At 24 VDC, equates to 26.7 K $\Omega$ > R > 10 K $\Omega$                                  |                                  |

**Detail Specifications - Digital Input without OWD**

| Parameter                                                                           | Specification                                 |
|-------------------------------------------------------------------------------------|-----------------------------------------------|
| Open Voltage                                                                        | 24 VDC                                        |
| Closed contact current                                                              | 7 mA $\pm$ 5%, after open state detection     |
|                                                                                     | 3.5 mA $\pm$ 5%, after closed state detection |
| Closed contact detection                                                            | I > 2.81mA <sup>1</sup>                       |
| Open contact detection                                                              | I < 1.8mA <sup>2</sup>                        |
| Input filter                                                                        | First-order low-pass 16 Hz                    |
| Note 1: At 24 VDC, equates to R < 8.57 K $\Omega$ (where R = total loop resistance) |                                               |
| Note 2: At 24 VDC, equates to 26.7 K $\Omega$ > R > 10 K $\Omega$                   |                                               |

**Detail Specifications - Digital Output**

| Parameter                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Specification                                                                                      |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|
| Output Channels                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 32 Maximum per module (with or without open wire detect) <sup>4</sup>                              |
| Output Type                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Solid state source, short circuit proof <sup>3</sup>                                               |
| Load Current Off<br>Load Current On                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 0mA<br>1mA Minimum to 0.5A Maximum per channel <sup>2</sup><br>9 A Maximum per module <sup>1</sup> |
| On-State Voltage                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 24 V (typ), load current @ 0.5A                                                                    |
| Off-State Voltage                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 0v VDC (max)                                                                                       |
| Off-State Leak Current                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | < 0.1 mA                                                                                           |
| Gap (0 current) of Output to Field on Switchover                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | None (0ms) (applies to Redundancy only)                                                            |
| <p>Note 1: Dependent on actual channel configuration for the module and the environment. Please refer to the User's Guide for calculation method.</p> <p>Note 2: A Universal IO Channel configured for Digital Output can incorrectly report a Line Monitoring or "OP Fail" failure if the load current is less than 20mA.</p> <p>Note 3: Short circuit will be limited to less than 1.4 Amps within 2 microseconds, and to 750 mA within 10 microseconds. If the short period persists more than 10 mili seconds, the DO channel will be shutoff</p> <p>Note 4: Please refer to the User's Guide for calculation method to determine channel usage versus operating temperature.</p> |                                                                                                    |