Technical Information

# PlantCruise by Experion Specification
# Series 8 I/O

**PC03-490-100**
**Release 100**
**October 2011, Version 1**

Honeywell

## Revision History

| Revision | Date | Description |
|---|---|---|
| 1.0 | October 2011 | Release Publication |

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# 1. Product Introduction

## 1.1. PlantCruise by Experion System

As a member of Honeywell's Experion family, PlantCruise by Experion is specifically designed to meet the customer needs in emerging markets, through integrating state-of-the-art technology from the award-winning Experion Process Knowledge System (PKS) with innovative design of Series 8 I/O modules and cabinets, validated wider range of COTS options, easier engineering and maintenance capabilities, and integrator-friendly programs and tools. PlantCruise is the perfect platform for process, asset and business management with small to medium complexity, and enables customers to increase their profitability and productivity and accessibility to local support without sacrificing quality and reliability in an increasingly competitive environment.

## 1.2. Architecture Overview

The PlantCruise platform comprises many different integrated hardware and software solutions depending upon the needs of the application. This pictured architecture is a representation of many of the possible nodes that can be used in the PlantCruise architecture. Note that the architecture is highly scalable and not all nodes are necessary or required.

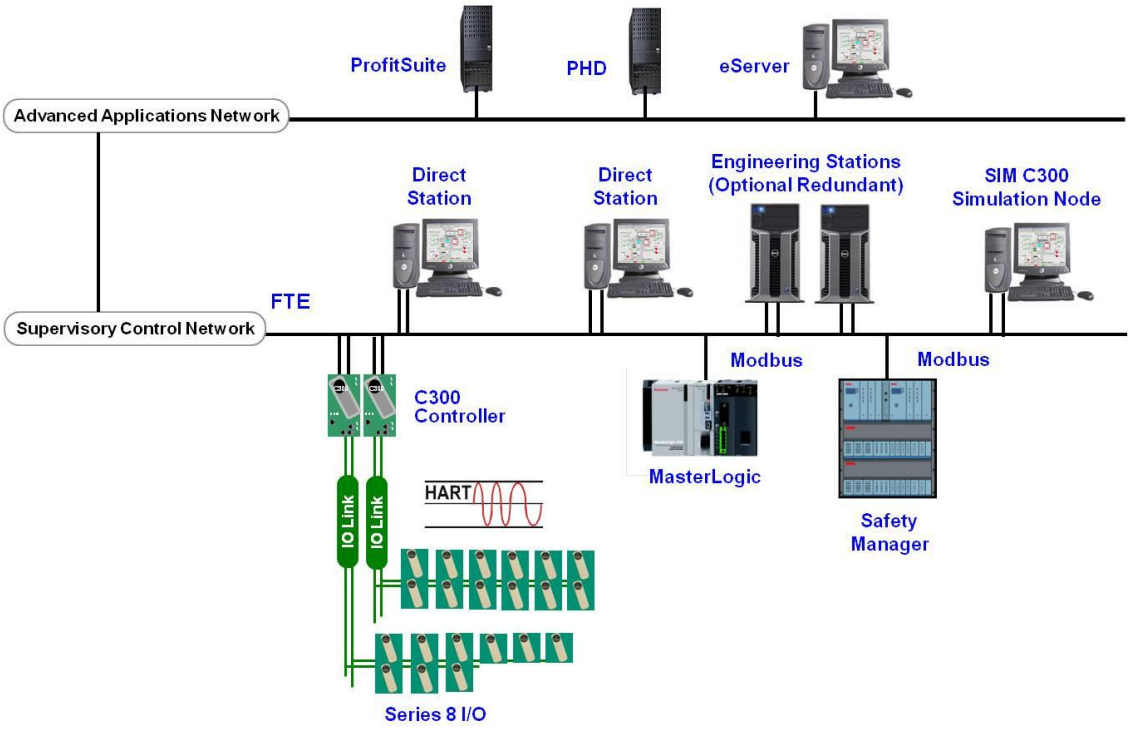



Figure 1. Sample PlantCruise Architecture

## 1.3. PlantCruise Series 8 I/O Overview

This document provides technical information to configure the PlantCruise Series 8 I/O and the C300 Controller, released with PlantCruise. The following Series 8 I/O items are included in this document.

- Digital Input Sequence of Events
- Digital Input

- Digital Output
- Analog Input with HART
- Analog Input
- Analog Output with HART
- Analog Output
- Low Level Multiplexer – RTD & TC

**Definitions**

• Input Output Termination Assembly (IOTA): An assembly that holds the IOM and the connections for field wiring,

• Input Output Module (IOM): A device that contains most of the electronics required to perform a specific I/O function. The IOM plugs onto the IOTA.

**Features**

All Series 8 components feature an innovative design that supports enhanced heat management. This unique look provides a significant reduction in overall size for the equivalent function.

The unique features of Series 8 I/O include:

• I/O Module and field terminations are combined in the same area. The I/O Module is plugged into the IOTA to eliminate the need for a separate chassis to hold the electronics assemblies

• Two level “detachable” terminals for landing the field wiring in the enclosure, providing easier plant installation and maintenance.

• Field power is supplied through the IOTA, with no need for extra power supplies and the associated craft wired marshalling.

• Redundancy is accomplished directly on the IOTA without any external cabling or redundancy control devices, by simply adding a second IOM to an IOTA

• For both IOM and IOTA, coated (module numbers starting with 8C) and uncoated (module numbers starting with 8U) options are provided. Conformal coating material is applied to electronic circuitry to act as protection against moisture, dust, chemicals, and temperature extremes. Coated IOM and IOTA are recommended when electronics must withstand harsh environments and added protection is necessary.

The Series 8 inherits the innovative styling of Series C. This styling includes features to facilitate the effective use of control hardware in a systems environment. These features include:

• Vertical mounting allows for more effective wiring since most field wiring applications require entry from the top or bottom of the systems cabinet.

• An “information circle” allows for a quick visual cue to draw the Maintenance Technician’s eye to important status information.

• "Tilted" design allows for effective heat management within the cabinet enclosure. Since Series 8 allows for a significant increase in cabinet density, an effective heat management system is critical for high systems availability.

• Input and output circuits are protected from shorts to alleviate the need for in- line fusing, reducing installation and maintenance costs

Series 8 IOTAs combine multiple functions into a single piece of equipment:

• Single and redundant configurations

• On-board termination of process signals

• On-board signal conditioning

• On-board connection to appropriate networks (FTE, I/O LINK)

• Field power distribution without external marshalling

• IOM plugs into the IOTA and receives power from the IOTA

• The IOTA receives its power from a 24 VDC bus that is part of the IOTA carrier – the IOTA is simply screwed into the bussed power.

**Series 8 I/O Sizing**

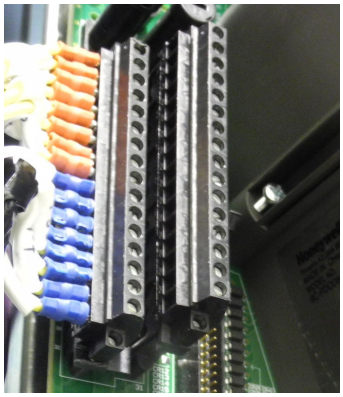
In virtually all configurations, the C300 controller and Series 8 I/O provides useful, maintainable process equipment connections in a smaller footprint than competitor systems. Installing Series 8 I/O modules contributes to overall total installed cost savings.

IOTA sizes vary based on the application. In general, an analog module has 16 points and resides on a 6-inch (152mm) IOTA for non-redundant applications and a 12-inch (304mm) IOTA for redundant applications. A discrete module has 32 points and resides on a 9-inch (228mm) IOTA for non-redundant applications and a 12-inch (304mm) IOTA for redundant applications. Specific information on the size of a particular module can be found in the Model Number Table.

**I/O Module Functions**

• **High Level Analog Input /HART Input Module (16pt)** – The High Level Analog Input Module supports both high level analog and HART inputs. Analog inputs are typically 4-20mA DC for both traditional and HART devices. HART data can be used for status and configuration. HART data, such as the secondary and tertiary variables, can also be used as process control variables.

• **High Level Analog Input (16pt)** - The High Level Analog Input Module supports high level analog inputs Analog inputs are typically 4-20mA DC for traditional devices.



• **Analog Output/HART Output Module (16pt**) – The Analog Output Module supports both standard 4-20mA DC outputs and HART transmitter outputs.

• **Analog Output (16pt**) – The Analog Output Module supports standard 4-20mA DC outputs.

• **Digital Input 24 VDC (32pt)** – Digital input sensing for 24V signals

- **Digital Output 24 VDC (32 pt)** – Current sinking digital outputs. Outputs are electronically short-circuit protected.

- **Temperature Multiplexer (64pt).** – Provides thermocouple (TC) and resistance temperature device (RTD) inputs. The Multiplexer supports up to four, field proven termination assemblies FTAs.
- **Digital Input Sequence of Events -** Accepts 24VDC discrete signals as discrete inputs. The inputs can be time tagged to support 1ms resolution Sequence of Events

**Series 8 Field Connections**

Series 8 Field connections use a standard modular connector. The connector modularity allows for removal and insertion of the field wiring. This significantly reduces installation and maintenance procedures and can assist in field check out. Series 8 field connectors accept up to 12ga AWG / 2.5mm stranded wire.

**I/O Module Sizes**

IOTA Sizing is nominal (6in = 152mm, 9in =228mm, 12in =304mm). I/O modules are associated with their respective IOTAs in the table below. The I/O Module is supported by one or more IOTAs.

| I/O Module | IOTA | Description | Circuits | Size | Red. |
|---|---|---|---|---|---|
| 8C-PAIH51<br>8U-PAIH51<br>8C-PAIN01<br>8U-PAIN01 | | High-level AI HART<br>High-level AI w/o HART | 16 | | √ |
| | 8C-TAIX51 | AI IOTA, Coated | | 6 | |
| | 8U-TAIX51 | AI IOTA, Uncoated | | 6 | |
| | 8C-TAIX61 | AI IOTA, Red, Coated | | 12 | √ |
| | 8U-TAIX61 | AI IOTA, Red, Uncoated | | 12 | √ |
| 8C-PAIM01<br>8U-PAIM01 | | PMIO LL Mux | 64 | | |
| | 8C-TAIM01 | PMIO LL Mux IOTA, Coated | | 6 | |
| | 8U-TAIM01 | PMIO LL Mux IOTA, Uncoated | | 6 | |
| | **FTA** | | | | |
| | MC-TAMT04 | LL Mux TC FTA | 16 | 12 | |
| | MC-TAMR04 | LL Mux RTD FTA | 16 | 12 | |
| 8C-PAOH51<br>8U-PAOH51<br>8C-PAON01<br>8U-PAON01 | | Analog Output 16pt HART<br>Analog Output 16pt w/o HART | 16 | | √ |
| | 8C-TAOX51 | AO IOTA, Coated | | 6 | |
| | 8U-TAOX51 | AO IOTA, Uncoated | | 6 | |
| | 8C-TAOX61 | AO IOTA Red., Coated | | 12 | √ |
| | 8U-TAOX61 | AO IOTA Red., Uncoated | | 12 | √ |
| 8C-PDIL51<br>8U-PDIL51 | | Digital Input 24V | 32 | | √ |
| | 8C-TDIL51 | DI 24V IOTA, Coated | | 9 | |
| | 8U-TDIL51 | DI 24V IOTA, Uncoated | | 9 | |
| | 8C-TDIL61 | DI 24V IOTA Red. Coated | | 12 | √ |
| | 8C-TDIL61 | DI 24V IOTA Red. Uncoated | | 12 | √ |

| I/O Module | IOTA | Description | Circuits | Size | Red. |
|---|---|---|---|---|---|
| 8C-PDOD51<br>8U-PDOD51 | | Digital Output | 32 | | √ |
| | 8C-TDOD51 | DO IOTA, Coated | | 9 | |
| | 8U-TDOD51 | DO IOTA, Uncoated | | 9 | |
| | 8C-TDOD61 | DO IOTA Red, Coated | | 12 | √ |
| | 8U-TDOD61 | DO IOTA Red, Uncoated | | 12 | √ |
| 8C-PDIS01<br>8U-PDIS01 | | Digital Input Sequence of Events | 32 | | √ |
| | 8C-TDIL01 | DI SOE IOTA, Coated | | 9 | |
| | 8U-TDIL01 | DI SOE IOTA, Uncoated | | 9 | |
| | 8C-TDIL11 | DI SOE IOTA Red, Coated | | 12 | √ |
| | 8C-TDIL11 | DI SOE IOTA Red, Uncoated | | 12 | √ |

## 2.6. Digital Input Sequence of Events

**Function**

The Digital Input Sequence of Events (DISOE) accepts 24VDC discrete signals as discrete inputs. The inputs can be time tagged to support 1ms resolution Sequence of Events

**Notable Features**

- Three modes of operation:
  - Normal (20ms PV scan)
  - Sequence of Events (1ms resolution SOE,20ms PV scan)
  - Low Latency (5ms PV scan)
- Extensive internal diagnostics for data integrity
- Open Wire Detection (in Normal mode only)
- Optional redundancy
- Internal or external field power selection
- On board excitation power (no need for marshalling power)
- Supplies Non-incendive field power
- Direct / Reverse Input Indication
- Galvanic Isolation

**Open-Wire Bad PV Detection**

This Series 8 IO function can detect and annunciate an open field wire. In addition, a seemingly valid PV from a channel diagnosed as having an open wire will provide a status of "invalid" (thus preventing incorrect control action).

**Detail Specifications – DISOE**

| Parameter | Specification | | |
|---|---|---|---|
| Input / Output Model | 8C-PDIS01 - Digital Input Sequence of Events, Coated<br>8U-PDIS01 - Digital Input Sequence of Events, Uncoated | | |
| IOTA Models | 8C-TDIL01 | Non Redundant, Coated | 9" |
| | 8U-TDIL01 | Non Redundant, Uncoated | 9" |
| | 8C-TDIL11 | Redundant, Coated. | 12" |
| | 8U-TDIL01 | Redundant, Uncoated | 12" |
| Input Channels | 32 | | |
| Input Channel Scanning (PV) | Normal = 20ms ; Fast = 5ms | | |
| Digital Input Resolution for Sequence of Events (SOE) | 1ms | | |
| Galvanic Isolation (any input terminal voltage referenced to common) | 1500 VAC RMS or ±1500 VDC | | |
| Isolation Technique | Optical (in IOM) | | |

| Parameter | Specification |
|---|---|
| DI Power Voltage Range | 18 to 30 VDC |
| ON Sense Voltage/Current | 13 VDC (min) or 3 mA (min) |
| OFF Sense Voltage/Current | 5 VDC (max) or 1.2 mA (max) |
| Input Impedance | 4.2 KΩ |
| Absolute Delay Across Input Filter and Isolation | 5 ms ± 20% |
| Field Resistance for Guaranteed ON Condition | 300 Ωmax @ 15 VDC |
| Field Resistance for Guaranteed OFF Condition | 30 KΩmin @ 30 VDC |

## 2.7. Digital Input 24VDC

**Function**

The Digital Input 24VDC accepts 24VDC signals as discrete inputs.

**Notable Features**

- Extensive internal diagnostics for data integrity
- Optional redundancy
- Internal / External field power selection
- Can supply Non-incendive field power (For internal power only)
- Galvanic isolation (System to Field only with external user supplied power)

**Detail Specifications – Digital Input 24VDC**

| Parameter | Specification | | |
|---|---|---|---|
| Input / Output Model | 8C-PDIL51 - 24Volt Digital Input, Coated<br>8U-PDIL51 - 24Volt Digital Input, Uncoated | | |
| IOTA Models | 8C-TDIL51 | Non Redundant, Coated | 9” |
| | 8U-TDIL51 | Non Redundant, Uncoated | 9” |
| | 8C-TDIL61 | Redundant, Coated | 12” |
| | 8U-TDIL61 | Redundant, Uncoated | 12” |
| Input Channels | 32 | | |

| | |
|---|---|
| Galvanic Isolation (any input terminal voltage referenced to common) | 1000 VAC RMS for System – to – Field isolation for user supplied field Power |
| Isolation Technique | Optical (In IOM) |
| DI Power Voltage Range | 18 to 30 VDC (For user supplied field power ) |
| ON Sense Voltage/Current | 13 VDC (min) or 3 mA (min) |
| OFF Sense Voltage/Current | 5 VDC (max) or 1.2 mA (max) |
| Input Impedance | 4.2 KΩ |
| Absolute Delay Across Input Filter and Isolation | 5 ms ± 20% |