Honeywell 8C-PDILA1 51454471-175

32-Channel 24 VDC Digital Input Module



Honeywell 8C-PDILA1 51454471-175 is the coated Series 8 standard digital input module for collecting equipment and process on/off states in an Experion control system. Its 32 channels accept nominal 24 VDC discrete signals and make those states available to the control application. Internal diagnostics support data integrity, while direct or reverse input indication allows the displayed state to follow the configured signal logic. Optional redundancy is supported. The standard DI role is important when selecting this model, because sequence-of-events recording and pulse accumulation belong to separately identified Series 8 input models.

Technical Specifications

Product Identity	
Product family	Series 8 I/O
Functional Configuration	
I/O function	24 VDC digital input
Input channels	32
ON sense threshold	13 VDC minimum or 3 mA minimum
OFF sense threshold	5 VDC maximum or 1.2 mA maximum
Isolation technique	Optical, in the IOM
System-to-field isolation	1000 VAC RMS or ±1500 VDC; external user-supplied field power required
Nonredundant IOTA	8C-TDILA1, coated, 9 in
Redundant IOTA	8C-TDILB1, coated, 12 in
Performance & Power	
Voltage rating	24 VDC
DI power range	18–30 VDC
Module current rating	95 mA
Input impedance	4.2 kΩ
Input filter and isolation delay	5 ms ±20%
Environment	
Protection of electronics	Conformal coating

Selected original manufacturer material follows on pages 3–7.

Compatibility & Selection Guide

System compatibility. The 8C-PDILA1 belongs to Honeywell’s Series 8 I/O platform used with the C300 controller. It supports direct or reverse input indication, onboard excitation, internal or external field power and optional redundancy. System-to-field isolation is available when external user-supplied power is used. If the application requires 1 ms event time tags or pulse accumulation, verify the dedicated function model rather than selecting on channel count alone.

Wiring & Installation Reference

Field connection checks

Field input · 24 VDC discrete · 18–30 VDC DI power

ON / OFF · ≥13 VDC / ≤5 VDC · Or ≥3 mA / ≤1.2 mA

IOTA · 8C-TDILA1 / 8C-TDILB1 · Nonredundant / redundant

IOTA and configuration

1. Match the IOTA and redundancy. Use 8C-TDILA1 for nonredundant operation or 8C-TDILB1 for redundant operation. These are the documented termination assemblies for 8C-PDILA1.

2. Confirm field power. Check the internal or external field-power selection and the 18–30 VDC DI power range. The system-to-field isolation option requires external user-supplied power.

3. Check signal margins. Check the connected device against the ON and OFF thresholds. Honeywell lists 300 Ω maximum field resistance at 15 VDC for guaranteed ON and 30 kΩ minimum at 30 VDC for guaranteed OFF.

Installation precautions

Isolation condition. Do not assume isolated operation from the module name alone; the specified system-to-field isolation depends on the external field-power arrangement.

Response requirements. Include the specified 5 ms ±20% input filter and isolation delay when checking whether the application can detect short discrete signals.

View field connection reference (PDF) — page 7 · View IOTA installation reference (PDF) — page 4

2. Platform Environmental Specifications

2.1. General Environmental Characteristics

This section relates to the physical characteristics applicable to Series 8 C300 controller and all Series 8 I/O components. Where applicable, specifications state limits within an approved cabinet and to the cabinet skin.

Consideration	Operating Limit [1]	Transportation and Storage Limits [1a]
Ambient Temp Range	External: 0 to 50°C [2] Internal : 0 to 60°C [3]	-40 to 85°C
Temp. Rate of Change	<= 1°C/min	<=5°C/min
Relative Humidity [3]	5 to 95% (non-condensing) [4]	5 to 95% (non-condensing) [4]
Barometric Pressure Altitude	-300 to +3000 m	Any
Corrosives	G3 Standard (ISA S71.04) - Denoted by “8C-“ model number in this doc	G3 Standard (ISA S71.04) - Denoted by “8C-“ model number in this doc
Vibration (3 axes)	Sinusoidal (5 to 10 Hz) 2.54mm/0.100in Max (10 to 150 Hz) 0.5 g max. (0-Pk)	Random Vertical Shipping Axis 5 to 300 Hz 1.07 g (rms) Longitudinal and Transverse 10 to 500 Hz, 0.74 g (rms) 60 Minutes each axis
Mechanical Shock (3 Axes)	Site Induced: Terminal Peak Sawtooth waveform 4g max. @25ms	N/A

Note 1 – Operating Limits define the range of operating conditions within which the system is designed to operate. Performance characteristics are defined when operating in this state. Please see ANSA/ISA D 51.1 Process Instrumentation Terminology for more information.

Note 1a – Transportation and Storage Limits define the range of conditions to which the system may be subjected without permanent damage to the equipment. Performance is not guaranteed in this state. Please see ANSA/ISA D 51.1 Process Instrumentation Terminology for more information.

Note 2 – This rating applies to the external ambient temperature of the Standard 2000mm enclosure with doors closed.

Note 3 – This rating applies to the internal ambient temperature of the Standard 2000mm enclosure with the doors closed. New version of the C300 controller(8C-PCNT05) and Memory Backup Assembly module (50182539-001) support an extended temperature range from 0°C to 70°C.

Note 4 – The maximum relative humidity spec applies up to 40°C. Above 40°C the RH spec is de-rated to 55% to maintain constant moisture content.

A note on the transportation of Batteries:

Some Government agencies have regulations that may prohibit air transport of Lithium Batteries.

4. Series 8 I/O Hardware

4.1. Overview and Features

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

Both Series 8 IOM and IOTA are available with Conformal Coated feature. The term ‘Coated’ stands for hardware with conformal coating material applied to electronic circuitry for protection against moisture, dust, chemicals, and temperature extremes. Coated IOM and IOTA are recommended when electronics must withstand harsh environments and need to have added protection.

The unique features of the 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 can be supplied through the IOTA, with no need for extra power supplies and the associated craft wired marshalling
- Redundancy is available directly on the IOTA without any external cabling or redundancy control devices, by simply adding a second IOM to an IOTA
- The innovative styling is one of its unique features. This styling includes features to facilitate the effective use of control hardware in a systems environment. These features include:
    - Vertical mounting for more effective wiring since most field wiring applications require entry from the top or bottom of the systems cabinet
    - An “information circle” for a quick visual cue to draw the Maintenance Technician’s eye to important status information
    - “Tilted” design for effective heat management within the cabinet enclosure. Since Series C 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 through cables from header board



4.2. 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. Two versions Single ended and Differential type are available.
- **High Level Analog Input w/o HART (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 w/o HART (16pt) –** The Analog Output Module supports standard 4-20mA DC outputs.
- **Digital Input 24 VDC (32pt) –** Digital input sensing for 24V signals
- **Digital Input Sequence of Events (32pt) –** Accepts 24VDC discrete signals as discrete inputs. The inputs can be time tagged to support 1ms resolution Sequence of Events.
- **Digital Input Pulse Accumulation (32pt) –** Accepts 24VDC discrete signals as discrete inputs. The first 16 channels can be configured as Pulse accumulation to support Pulse Accumulation and frequency measurement on per channel basis. Channels 17 – 32 can be configured as DI.
- **Digital Output 24 VDC (32pt) –** Current sinking digital outputs. Outputs are electronically short-circuit protected.
- **DO Relay Extension Board (32pt) –** Digital output with NO or NC dry contacts. It can be used for low power or high power applications.
- **Low Level Analog Input – RTD & TC (16pt) –** Provides thermocouple (TC) and resistance temperature device (RTD) inputs.

4.3. 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 existing competitors and Honeywell equivalent products. 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 is described in the Model Number Table.

4.3.1. 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 12 AWG / 2.5 mm^2 stranded wire.

4.3.2. 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. Below section also provides an overview of various available IO modules, IOTA, IOTA size and redundancy features.

I/O Module (Coated)	IOTA (Coated)	Description	Circuits	Size (in “)	Red.
8C-PAIH54		High-level AI HART, Differential	16		√
	8C-TAIDA1	AI IOTA		9	
	8C-TAIDB1	AI IOTA Redundant		12	√
8C-PAIHA1		High-level AI HART, Single-ended	16		√
8C-PAINA1		High-level AI w/o HART, Single-ended	16		√
	8C-TAIXA1	AI IOTA		6	
	8C-TAIXB1	AI IOTA Redundant		12	√
8C-PAIMA1		Low-level AI – RTD & TC	16		
	8C-TAIMA1	Low-level AI IOTA		9	
8C-PAOHA1		Analog Output HART	16		√
8C-PAONA1		Analog Output w/o HART	16		√
	8C-TAOXA1	AO IOTA		6	
	8C-TAOXB1	AO IOTA Redundant		12	√
8C-PDILA1		Digital Input 24V	32		√
8C-PDISA1		Digital Input Sequence of Events	32		√
8C-PDIPA1		Digital Input 24V Pulse Accumulation	32		√
	8C-TDILA1	DI 24V IOTA		9	
	8C-TDILB1	DI 24V IOTA Redundant		12	√
8C-PDODA1		DO 24V Bussed Out	32		√
	8C-TDODA1	DO 24V Bussed IOTA		9	
	8C-TDODB1	DO 24V Bussed IOTA Redundant		12	√
	8C-SDOX01	DO Relay Extension [1]		15	√

Note 1- DO Relay Extension board is used along with DO IO module with IOTA (Redundant or non-redundant). Refer Section 4.4.11 for more details.

4.4.7. Digital Input 24VDC

Function

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

Notable Features

- Extensive self-diagnostics for data integrity
- Optional redundancy
- Internal / External field power selection
- On board excitation power (no need for marshalling power)
- Direct / Reverse Input indication
- Galvanic isolation

Detailed Specification- Digital Input 24VDC (8C-PDILA1)

Parameter	Specification		
Input / Output Module	8C-PDILA1 - Digital Input 24VDC, Coated		
IOTA Modules	8C-TDILA1	Non Redundant, Coated	9”
	8C-TDILB1	Redundant, Coated	12”
Input Channels	32		
Galvanic Isolation (any input terminal voltage referenced to common) [1]	1000 VAC RMS or ±1500 VDC for System		
Isolation Technique	Optical (In IOM)		
Voltage Rating	24 VDC		
DI Power Voltage Range	18-30 VDC		
Module current rating	95 mA		
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%		
Field Resistance for Guaranteed ON Condition	300 Ω max @ 15 VDC		
Field Resistance for Guaranteed OFF Condition	30 KΩ min @ 30 VDC		
Module Removal and Insertion Under Power	Supported		
Note 1 – System to Field type isolation, option available only with external user supplied power			