Technical Information

Series 8 Controller and I/O Specification

S803-150-110
Release 110
December 2015, Version 1.2

https://maxautoland.com/
manski@cambia.cn +86 18030205725

Revision History

Revision	Date	Description
1.0	January 2014	Release Publication
1.1	March 2015	TC/RTD update
1.2	December 2015	Series 8 RAM Charger Module part number corrected (-100)

https://maxautoland.com/
manski@cambia.cn +86 18030205725

Table of Contents

1. Product Introduction....1

1.1. C300 Controller Overview.... 1
1.2. Series 8 I/O Overview.... 3

2. Specifications....7

2.1. C300 Controller Specifications.... 7
2.1.1. C300 Hardware.... 7
2.1.2. C300 Supported Function Blocks.... 9
2.2. Series 8 IO Specifications.... 10
2.2.1. TC/RTD.... 10
2.2.2. Analog Input – Single Ended.... 12
2.2.3. Analog Input with HART – Single Ended.... 13
2.2.4. Analog Input with HART – Differential.... 14
2.2.5. Analog Output.... 15
2.2.6. Analog Output with HART.... 16
2.2.7. Digital Input Sequence of Events.... 17
2.2.8. Digital Input 24VDC.... 19
2.2.9. Digital Input Pulse Accumulation.... 20
2.2.10. Digital Output 24VDC.... 21
2.2.11. DO Relay Extension Board.... 23
2.2.12. Series 8 IO Function Matrix.... 24

https://maxautoland.com/
manski@cambia.cn +86 18030205725

1. Product Introduction

1.1. C300 Controller Overview

Honeywell's C300 Controller provides powerful and robust control for the distributed control system (DCS). The C300 is a node in operating Honeywell's field-proven deterministic Control Execution Environment (CEE) core software. The CEE software provides a superior control execution and scheduling environment. Control strategies for each controller node are configured and loaded through a common Control Builder, an easy and intuitive engineering tool.

In addition to a standard and robust library of pre-built function blocks and algorithms, the C300 Controller also supports Custom Algorithm Blocks (CABs). Custom Algorithm Blocks are similar in purpose and structure to the standard function blocks that are distributed with Control Builder. However, CABs have user-defined algorithms and data structures, allowing custom tailored strategies to be developed to specific requirements.

The C300 controller shares its hardware design with the Series 8 I/O, offering an innovative design that reduces footprint and installation and maintenance costs. The C300 controller module is mounted on the C300 Input Output Termination Assembly (IOTA). The C300 IOTA contains only passive devices such as FTE address switches. Figure 1 below depicts the IOTA components.

https://maxautoland.com/
manskincamera.cn +86 18030205725

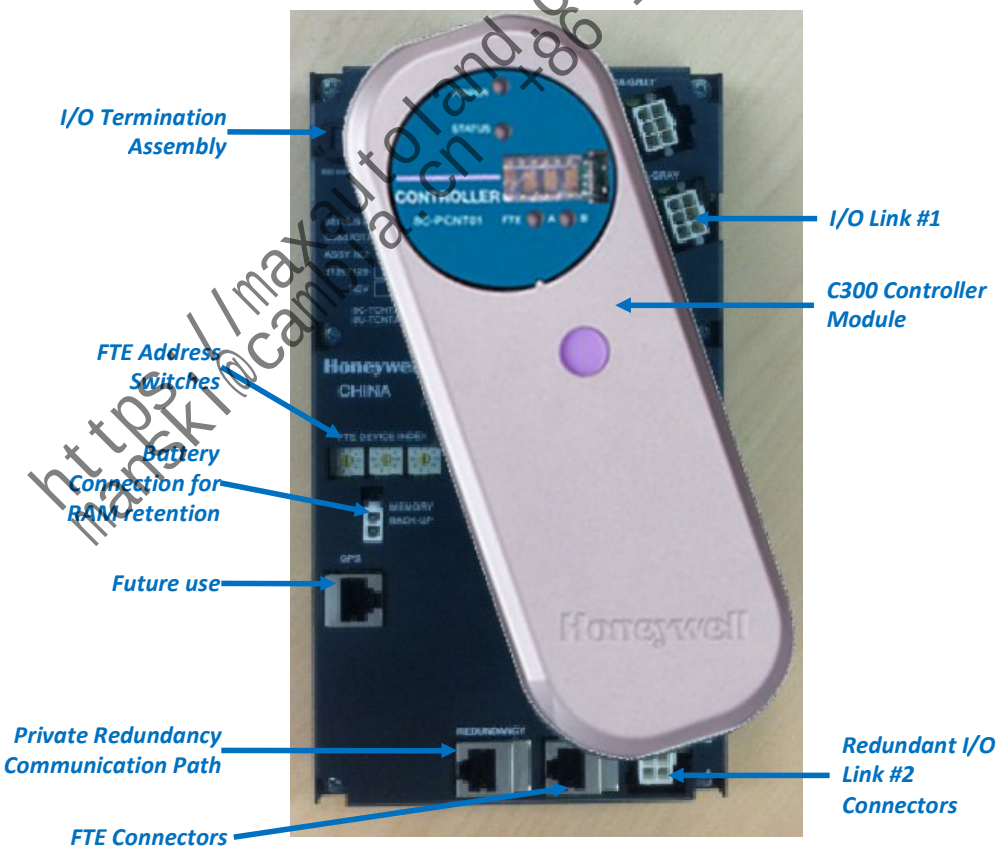


Figure 1 - C300 Controller

The Model Numbers of C300 controller are shown as below:

Model Number	Description
8C-PCNT02	Series 8 C300 Controller, coated
8U-PCNT02	Series 8 C300 Controller, uncoated
8C-TCNTA1	Series 8 C300 Controller I/O Termination Assembly(IOTA),coated
8U-TCNTA1	Series 8 C300 Controller I/O Termination Assembly(IOTA),uncoated
51305980-836	Cable, Redundant C300 Controller
51454475-100	Series 8 RAM Charger Module (C300 Memory Backup)
51202330-300	Cable, Battery RAM Charger, 30 in
51202330-200	Cable, Battery RAM Charger, 84 in
Redundancy is implemented with two modules/IOTAs and a redundancy cable (51305980-836). C300 Memory Backup is optional.	

https://maxautoland.com/
manski@cambia.cn +86 18030205725

1.2. Series 8 I/O Overview

This document provides technical information to configure the Series 8 I/O. The following Series 8 I/O items are included in this document.

- TC/RTD
- Analog Input – Single Ended
- Analog Input with HART – Single Ended
- Analog Input with HART – Differential
- Analog Output
- Analog Output with HART
- Digital Input Sequence of Events (SOE)
- Digital Input, 24 VDC
- Digital Input Pulse Accumulation
- Digital Output, 24 VDC
- DO Relay Extension Board

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 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 to power the field devices 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.

https://maxautoland.com/
manski@cambia.cn +86 18030205725

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 eyes 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 system 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.

https://maxautorand.com/
hanski@cambria.cn +86 13030205725

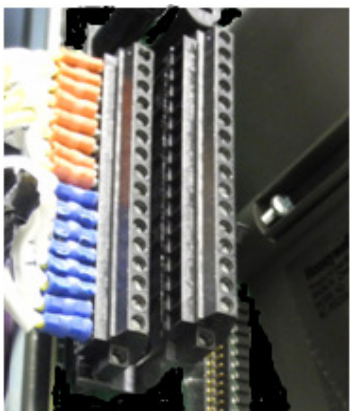
Series 8 I/O Sizing

In virtually all configurations, the C300 controller and Series 8 I/O provides useful, maintainable process equipment connections in a smaller footprint than traditional rack based 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

- **TC/RTD (16pt)** – Provides thermocouple (TC) and resistance temperature device (RTD) inputs.
- **Analog Input** – **Single Ended (16pt)** - The Analog Input Module supports analog inputs which are typically 4-20mA DC inputs for traditional devices, such as transmitters.
- **Analog Input with HART** – **Single Ended (16pt)** – The Analog Input Module supports both 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.
- **Analog Input with HART** – **Differential (16pt)** – The Analog Input Module supports Single Ended or Differential analog inputs, and HART inputs.
- **Analog Output (16pt)** – The Analog Output Module supports standard 4-20mA DC outputs.
- **Analog Output with HART (16pt)** – The Analog Output Module supports both standard 4-20mA DC outputs and HART outputs.



- **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 24 VDC (32pt)** – Digital input sensing for 24V signals
- **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 (32 pt)** – Current sinking digital outputs. Outputs are electronically short-circuited protected.
- **DO Relay Extension Board (32 pt)** – Digital output with NO or NC dry contacts. It can be used for low power or high power applications.

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.

IOTA 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.

https://maxautoland.com/ mansk1@camnia.cn +86 18630205725

Model Number	Description	Channels	Size	Red.
TC/RTD				
8C-TAIMA1	TC/RTD IOTA, Coated	16	9''	
8U-TAIMA1	TC/RTD IOTA, Uncoated			
Analog Input				
8C-TAIXA1	ANALOG INPUT IOTA Single Ended, Coated	16	6''	
8U-TAIXA1	ANALOG INPUT IOTA Single Ended, Uncoated			
8C-TAIDA1	ANALOG INPUT IOTA Differential, Coated		9''	
8U-TAIDA1	ANALOG INPUT IOTA Differential, Uncoated			
8C-TAIXB1	ANALOG INPUT IOTA Single Ended, Red, Coated		12''	√
8U-TAIXB1	ANALOG INPUT IOTA Single Ended, Red, Uncoated			√
8C-TAIDB1	ANALOG INPUT IOTA Differential, Red, Coated			√
8U-TAIDB1	ANALOG INPUT IOTA Differential, Red, Uncoated			√
Analog Output				
8C-TAOXA1	ANALOG OUTPUT IOTA, Coated	16	6''	
8U-TAOXA1	ANALOG OUTPUT IOTA, Uncoated			
8C-TAOXB1	ANALOG OUTPUT IOTA Red, Coated		12''	√
8U-TAOXB1	ANALOG OUTPUT IOTA Red, Uncoated			√

Digital Input				
8C-TDILA1	DIGITAL INPUT 24V IOTA, Coated	32	9''	
8U-TDILA1	DIGITAL INPUT 24V IOTA, Uncoated			
8C-TDILB1	DIGITAL INPUT 24V IOTA Red. Coated		12''	√
8C-TDILB1	DIGITAL INPUT 24V IOTA Red. Uncoated			√
Digital Output				
8C-TDODA1	DIGITAL OUTPUT IOTA, Coated	32	9''	
8U-TDODA1	DIGITAL OUTPUT IOTA, Uncoated			
8C-TDODB1	DIGITAL OUTPUT IOTA Red, Coated		12''	√
8U-TDODB1	DIGITAL OUTPUT IOTA Red, Uncoated			√

https://maxautoland.com/
manski@cambia.cn +86 18030205725

2. Specifications

2.1. C300 Controller Specifications

2.1.1. C300 Hardware

Specification		Limit
Processor		PowerPC 8270
Power requirement		24 VDC (provided through cables by the Series 8 power system)
Module current rating		320mA
IOTA Dimension		220 mm (9 “) height, 120 mm (4,75 “) width
Module Removal and Insertion Under Power		Supported
Supported I/O Types		Series 8
Supported I/O Links		2 I/O Links, each I/O Link configurable for Series 8.
Maximum Number of IO Modules per Controller		80 I/O Units (Redundant or Non-Redundant IOMs)
Maximum Number of IO Modules on each I/O link		40 I/O Units (Redundant or Non-Redundant IOMs)
Temperature	Operating Temperature	0 to 60 ℃
	Storage temperature	-40 to 85 ℃
Relative Humidity		5 to 95 % (non condensing)
Harsh Environment (ANSI/ISA- S71.04-1985 corrosion standard)		8C- model number designation support the harsh environment or G3 level
Control Capacity		
Execution Units		5500 Execution Units (single or redundant)
Tagged Objects		4095 objects
Memory Units		16000 Memory Units
Execution Period		50 msec – 2000 msec (adjustable per control strategy)
RAM Retention		50 hour through optional rechargeable battery pack (Optional)

https://maxautoland.com/
hanski@camora.cn +86 18030205725

Controller Communication	
Series 8 C300	Native peer to peer with other Series 8 C300s
Supervisory Control Network	Fault Tolerant Ethernet
Third party devices	Modbus Master
Agency certifications	CE
	FM Class I, Division 2, Group A, B, C, D; T4 Class I, Zone 2 AEx/ Ex nA II C T4
	CSA Class I, Division 2, Group A, B, C, D; T4 Class I, Zone 2, Ex nA II C T4

https://maxautoland.com/
manski@cambia.cn +86 18030205725

2.1.2. C300 Supported Function Blocks

Function Block
General Purpose (Utility)
Alarm Window
Annpanel
Dig Acq
EXECTIMER
First Out
Flag
Flag Array
Operator Message
Numeric
Numeric Array
Push
Text Array
Timer
Type Convert
PV Algorithms (Auxiliary)
PV Calculator
Summer
Counter
Dead Time
Enhanced PV Calculator
Enhanced General Linearization
Flow Compensation
General Linearlization
Lead / Lag
Rate of Change
Signal Selector
Totalizer
PV Handling
Data Acquisition
Auto Manual
Regulatory Control
Regulatory Calculator
Enhanced Regulatory Calculator
Fan Out (1 input / up to 8 outputs)
Override Selector (4 inputs)
PID (Proportional, Integral, Derivative)
PID with External Reset
PID with Feed Forward

Function Block
Profit Loop
Positional Proportional
Pulse Count
Pulse Length
Ramp / Soak
Ratio Bias
Ratio Control
Remote Cascade Support
Switch (8 input single pole)
Device Control
Device Control (multi input, multi output, multi state)
Custom Block Types
Custom Data Block
Custom Algorithm Block
Math
Absolute Value
Addition
Divide
Exponent
LN
LOG
Modulo
Multiply
Negate
Power
Rolling Average
Round
Square Root
Subtract
Truncate
Discrete Logic
2oo3 (2 out of 3 voting)
AND
CHECKBAD
CHECKBOOL
CHGEXEC
CONTACTMON
DELAY
EQ (Compare Equal)
FTRIG (Falling Edge Trigger)

Function Block
GE (Compare Greater than or Equal)
GT (Compare Greater Than)
LE (Compare Less than or Equal)
LIMIT
LT
MAX
MAXPULSE
MIN
MINPULSE
MUX
MUXREAL
MVOTE
NAND
NE
nOON
NOR
NOT
OFFDELAY
ONDELAY
OR
PULSE
QOR
ROL
ROR
RS
RTRIG
SEL
SELREAL
SHL
SHR
SR
STARTSIGNAL
TRIG
WATCHDOG
XOR
Power Related
GRPCAPRBK
HTMOTOR
LEVELCOMP
LTMOTOR
MAINIBV

Function Block
SOLENOID
VALVEDAMPER
Sequential Control Functions
Step
Transition
Synchronize
Handler
Phase
Container Block Types
Control Module
Sequential Control Module
Recipe Control Module
Unit Control Module
IO Related
Series 8 I/O
Interface Block Types
PCDI
Profibus Gateway Module

https://maxautoland.com/ manski@cambia.cn +86 18030205725

2.2. Series 8 IO Specifications

Specifications for Series-8 I/O modules are shown below.

2.2.1. TC/RTD

Function

The TC/RTD IOM module supports up to 16 channels of temperature inputs.

Notable Features

- TC and RTD operation
- Remote cold junction compensation capability
- 1 Second PV scanning with OTD protection
- Configurable OTD protection (See below)
- Temperature points can be added in 16 point increments

Temperature Support

The Temperature variable is collected from all points at a 1 second rate. The 1 second update includes a configurable check for Open Thermocouple Detection (OTD) (see below) before propagation of the temperature variable. All TC inputs include integral Cold Junction Compensation (CJC).

Sampling and Open Sensor Detect

The TC/RTD IOM supports a configuration parameter for Open Sensor Detect before PV delivery. With the OTD configuration active, the PV is sampled and held while an OTD cycle is performed within the same measurement window. If the OTD is negative, the PV is propagated up through the system. If the OTD is positive, the PV is set to NAN and the input channel soft failure is set. In this way, no inappropriate control action occurs for PV values that are invalid due to an open thermocouple. PV sampling/reporting incurs no added delays from OTD processing.

Detailed Specs – TC/RTD

Parameter		Specification	
Input / Output Module		8C-PAIMA1, TC/RTD, Coated	
		8U-PAIMA1, TC/RTD, Uncoated	
IOTA (16pt) PWA		8C-TAIMA1, Coated	9''
		8U-TAIMA1, Uncoated	9''
Input Type		Thermocouple and / or RTD	
Voltage Rating		24 VDC	
Module current rating		120m A	
Temperature	Operating Temperature	0 to 60 ℃	
	Storage Temperature	-40 to 85 ℃	
Module Removal and Insertion Under Power		Supported	
Input channels		16 fully-isolated channel-to-channel, channel-to-IOL, and channel-to-power supply common in 16 channel increments.	
Input scan rate		1 Second fixed by IOM (up to 16 channels/sec max.)	
Channel bandwidth		0 to 4.7 Hz (-3 dB)	
Nominal input range (TC only)		-20 to +100 millivolts	

https://maxautoland.com/
manski@cambia.cn +86 18030205725

Parameter		Specification
Maximum normal mode continuous input non-damaging (any thermocouple type configured)		-10 to +10 volts (TC) -1 to +2 Volts @ 100 milliamps (RTD)
Gain error (-20 to +100 millivolt range)		0.050% full scale max
Temperature stability	TC, Millivolt inputs	+/-20 ppm per ℃ max
	RTD inputs	+/-20 ppm per ℃ max
Long term drift		500 ppm
Input impedance		1 megohm at dc (TC only)
CMV with respect to Power System common, dc to 60 Hz		Channel to Shield :+/-250 VDC or VAC RMS Channel to Channel: +/-33 VDC or VAC RMS
CMRR, 50 or 60 Hz (with 1000 ohms source impedance max.)		120 dB min
Voltage, channel-to-channel, dc to 60 Hz		+/-250 VDC or VAC RMS
Crosstalk, dc to 60 Hz		80 dB (120 dB at 50 and 60 Hz)
NMRR at 50/ 60 Hz		60 dB min
Line frequency integration		Fixed selection of 50 Hz or 60 Hz
RTD sensor excitation current		1 milliamp
Cold junction compensation range		-20 to +60 ℃ (+/-0.5 ℃ typical)
TC Linearization Accuracy (2)		± 0.05 Ω / ℃
Open Thermocouple Detection		Each conversion qualified, ≤ 1000 Ω = guaranteed no-trip ⩾ 1500 Ω guaranteed trip.
RTD Max Lead Resistance		15 Ω
Surge protection (sensor terminals)		EN 61000-4-5 (for Industrial locations, 1kV line to line, 2kV line to gnd.)
Surge protection (power/serial link with cable adapter option)		EN 61000-4-5 (for Industrial locations, 1kV line to line, 2kV line to gnd.)
Supported types (RTD)	Pt: 100 ohm DIN 4376	-180 to +800 ℃
	Pt: 100 ohm JIS C-1604	-180 to +650 ℃
	Ni: 120 ohm ED #7	-45 to +315 ℃
	Cu: 10 ohm SEER	-20 to +250 ℃
	Cu: 50 ohm SEER	-50 to +150 ℃
Supported thermocouple types	ANSI specification J	-200 to +1200 ℃
	ANSI specification K	-100 to +1370 ℃
	ANSI specification E	-200 to +1000 ℃
	ANSI specification T	-230 to +400 ℃
	ANSI specification B	+100 to +1820 ℃
	ANSI specification S	0 to +1700 ℃
	ANSI specification R	0 to +1700 ℃
Supported millivolt types		-20 to +100 millivolts
Agency certifications		CE
		FM APPROVED Class I, Division 2, Group A, B, C, D; T4 Class I, Zone 2 AEx/ Ex nA II C T4
		CSA Class I, Division 2, Group A, B, C, D; T4 Class I, Zone 2, Ex nA II C T4
(1): Linearization polynomials are 4th order and based on NIST Monograph 175, ITS90 and JIS C-1602-1995.		

https://maxautoland.com/
manski@cambia.cn +86 18030205725

2.2.2. Analog Input – Single Ended

Function

The Analog Input Module accepts current inputs from transmitters and sensing devices.

Notable Features

- Extensive self diagnostics
- Optional redundancy
- Fast loop scan
- Internal or external field power selection
- On board excitation power (no need for marshalling power)
- Galvanic Isolation

Detail Specifications – Analog Input

Parameter		Specification		
Input / Output Module		8C-PAINA1 - Analog Input – Single Ended, Coated		
		8U-PAINA1 - Analog Input – Single Ended, Uncoated		
IOTA Modules		8C-TAIXA1	Non Redundant, Coated	6”
		8U-TAIXA1	Non Redundant, Uncoated	6”
		8C-TAIXB1	Redundant, Coated	12”
		8U-TAIXB1	Redundant, Uncoated	12”
Input Type		current (2-wire or self-powered transmitters)		
Input Channels		16 Channels (All 16 Single Ended)		
Voltage Rating		24 VDC		
Module current rating		105m A		
Temperature	Operating Temperature	0 to 60 ℃		
	Storage temperature	-40 to 85 ℃		
A/D Converter Resolution		16 bits		
Module Removal and Insertion Under Power		Supported		
Input Range		4-20 mA (through 250 Ω)		
Normal Mode Rejection Ratio, at 60 Hz		19 dB		
Normal Mode Filter Response		Single-pole RC, -3 dB @ 6.5 Hz		
Crosstalk, dc to 60 Hz (channel-to-channel)		-60 dB		
Maximum Input Voltage (any input referenced to common, no damage)		± 30 Volts		
Input Scan Rate		50 ms		
Hardware Accuracy (@ CMV = 0 V)		± 0.075% of full-scale (23.5°± 2℃) ± 0.15% of full-scale (0 to 60℃)		
Galvanic Isolation (any input terminal voltage referenced to common)		1000 VAC RMS or ±1000 VDC		
Isolation Technique		Icoupler (in IOM)		
Agency certifications		CE		
		FM APPROVED Class I, Division 2, Group A, B, C, D; T4 Class I, Zone 2 AEx/ Ex nA II C T4		
		CSA Class I, Division 2, Group A, B, C, D; T4 Class I, Zone 2, Ex nA II C T4		

https://maxautoland.com/
manski@cambia.cn +86 18030205725

2.2.3. Analog Input with HART – Single Ended

Function

The Analog Input Module accepts current inputs from transmitters and sensing devices.

Notable Features

- Extensive self diagnostics
- Optional redundancy
- HART-capable
- Fast loop scan
- Internal or external field power selection
- On board excitation power (no need for marshalling power)
- Galvanic Isolation

Detail Specifications – Analog Input with HART – Single Ended

Parameter		Specification		
Input / Output Module		8C-PAIHA1 - Analog Input with HART, Coated		
		8U-PAIHA1 - Analog Input with HART, Uncoated		
IOTA Modules		8C-TAIXA1	Non Redundant, Coated	6”
		8U-TAIXA1	Non Redundant, Uncoated	6”
		8C-TAIXB1	Redundant, Coated	12”
		8U-TAIXB1	Redundant, Uncoated	12”
Input Type		current (2-wire or self-powered transmitters)		
Input Channels		16 Channels (All 16 Single Ended)		
A/D Converter Resolution		16 bits		
Voltage Rating		24 VDC		
Module current rating		110 mA		
Temperature	Operating Temperature	0 to 60 ℃		
	Storage temperature	-40 to 85 ℃		
Input Range		4-20 mA (through 250 Ω)		
Module Removal and Insertion Under Power		Supported		
Normal Mode Rejection Ratio, at 60 Hz		19 dB		
Normal Mode Filter Response		Single-pole RC, -3 dB @ 6.5 Hz		
Crosstalk, dc to 60 Hz (channel-to-channel)		-60 dB		
Maximum Input Voltage (any input referenced to common, no damage)		± 30 Volts		
Input Scan Rate		50 ms		
Hardware Accuracy (@ CMV = 0 V)		± 0.075% of full-scale (23.5°± 2℃) ± 0.15% of full-scale (0 to 60℃)		
Galvanic Isolation (any input terminal voltage referenced to common)		1000VAC RMS or ±1000 VDC		
Isolation Technique		Icoupler (in IOM)		
Agency certifications		CE		
		FM C US APPROVED Class I, Division 2, Group A, B, C, D; T4 Class I, Zone 2 AEx/ Ex nA II C T4		
		CSA Class I, Division 2, Group A, B, C, D; T4 Class I, Zone 2, Ex nA II C T4		

http://maxautoland.com/ +86 18032057125 market@cambria.cn

2.2.4. Analog Input with HART – Differential

Function

The Analog Input Module accepts current inputs from transmitters and sensing devices.

Notable Features

- Extensive self diagnostics
- Optional redundancy
- No Open Wire Detection
- Supports either Single Ended / Differential Inputs
- HART-capable
- Fast loop scan

Detail Specifications – Analog Input with HART – Differential

Parameter	Specification		
Input / Output Module	8C-PAIH54 - Analog Input with HART- Differential (16), Coated		
	8U-PAIH54- Analog Input with HART- Differential (16), Uncoated		
IOTA Modules	8C-TAIDA1	Non Redundant, Coated	9”
	8U-TAIDA1	Non Redundant, Uncoated	9’’
	8C-TAIDB1	Redundant, Coated	12”
	8C-TAIDB1	Redundant, Uncoated	12’’
Input Type	Supports either single ended or Differential current / voltage inputs with one type of IOTA		
Input Channels(1)	16 Channels (All 16 Single Ended / Differential)		
A/D Converter Resolution	16 bits		
Input Range	1 to 5 V, 4-20 mA (through 250 Ω)		
Voltage Rating	24 VDC		
Module current rating	310 mA		
Normal Mode Rejection Ratio, at 60 Hz	19 dB		
Module Removal and Insertion Under Power	Supported		
Temperature – Operating Temperature	0 to 60 ℃		
Temperature – Storage temperature	-40 to 85 ℃		
Normal Mode Filter Response	Single-pole RC, -3 dB @ 6.5 Hz		
Crosstalk, dc to 60 Hz (channel-to-channel)	-60 dB		
Maximum Input Voltage (any input referenced to common, no damage)	± 30 Volts		
Input Scan Rate	50 ms		
Hardware Accuracy (@ CMV = 0 V)	± 0.075% of full-scale (23.5°± 2℃) ± 0.15% of full-scale (0 to 60℃)		
Agency certifications	CE		
	FM APPROVED Class I, Division 2, Group A, B, C, D; T4 Class I, Zone 2 AEx/ Ex nA II C T4		
	CSA Class I, Division 2, Group A, B, C, D; T4 Class I, Zone 2, Ex nA II C T4		
Each channel's 250-Ohm load resistor is connected to the input terminal through a wire jumper on the IOTA. This jumper should be cut by the user on channels to be used with voltage transmitters.			

https://maxautoland.com/
manski@cambia.cn +86 18030205725

2.2.5. Analog Output

Function

The Analog Output (AO) Module delivers high-level constant current to actuators and recording/indicating devices.

Notable Features

- Extensive self diagnostics
- Optional redundancy
- Safe-state (FAILOPT) behaviors configurable on a per channel basis

FAILOPT

Series 8 AO module supports the FAILOPT parameter on a per channel basis. The user can configure each channel to either HOLD LAST VALUE, or SHED to a SAFE VALUE. The Output will always go to zero, the safe state, if the IOM device electronics fails.

Open-wire Detection

This Series 8 IO function can detect and annunciate open field wire with a Channel Soft Failure indication.

Detail Specifications – Analog Output

Parameter		Specification		
Input / Output Module		8C-PAONA1 - Analog Output, Coated		
		8U-PAONA1 - Analog Output, Uncoated		
IOTA Modules		8C-TAOXA1	Non-Redundant, Coated	6”
		8U-TAOXA1	Non-Redundant, Uncoated	6”
		8C-TAOXB1	Redundant, Coated	12”
		8U-TAOXB1	Redundant, Uncoated	12”
Output Type		4-20 mA		
Output Channels		16		
Output Ripple		100 mV peak-to-peak at power line frequency, across 250 Ω load		
Load Resistance		50-800Ω		
Voltage Rating		24 VDC		
Module current rating		190 mA		
Temperature	Operating Temperature	0 to 60 ℃		
	Storage temperature	-40 to 85 ℃		
Resolution		± 0.05% of Full Scale		
Module Removal and Insertion Under Power		Supported		
Calibrated Accuracy		± 0.2% of Full Scale (25°C) including linearity		
Directly Settable Output Current Range		2.9 mA to 21.1 mA		
Maximum Open Circuit Voltage		22 V		
Response Time (DAC input code to output)		settles to within 1% of final value within 80 ms		
Gap (0 mA) of Output to Field on Switchover		10 ms maximum (applies to Redundancy only)		
Agency certifications		CE		
		FM Class I, Division 2, Group A, B, C, D; T4 Class I, Zone 2 AEx/ Ex nA II C T4		
		CSA Class I, Division 2, Group A, B, C, D; T4 Class I, Zone 2, Ex nA II C T4		

https://maxautoland.com/ manski@cambria.cn +86 19030205725

2.2.6. Analog Output with HART

The Analog Output (AO) Module delivers high-level constant current to actuators and recording/indicating devices.

Notable Features

- Extensive self diagnostics
- Optional redundancy
- HART-capable, multivariable devices
- Safe-state (FAILOPT) behaviors configurable on a per channel basis

Safe-state Behavior (FAILOPT)

Series 8 AO module supports the FAILOPT parameter on a per channel basis. The user can configure each channel to either HOLD LAST VALUE, or SHED to a SAFE VALUE. The Output will always go to zero, the safe state, if the IOM device electronics fails.

Open-wire Detection

This Series 8 IO function can detect and annunciate open field wire with a Channel Soft Failure indication.

Detail Specifications – Analog Output with HART

Parameter		Specification		
Input / Output Module		8C-PAOHA1 - Analog Output with HART, Coated		
		8U-PAOHA1 - Analog Output with HART, Uncoated		
IOTA Modules		8C-TAOXA1	Non-Redundant, Coated	6”
		8U-TAOXA1	Non-Redundant, Uncoated	6”
		8C-TAOXB1	Redundant, Coated	12”
		8U-TAOXB1	Redundant, Uncoated	12”
Output Type		4-20 mA		
Output Channels		16		
Output Ripple		< 100 mV peak-to-peak at power line freq, across 250 Ω load		
Load Resistance		50-800Ω		
Voltage Rating		24 VDC		
Module current rating		205 mA		
Temperature	Operating Temperature	0 to 60 ℃		
	Storage temperature	-40 to 85 ℃		
Resolution		± 0.05% of Full Scale		
Module Removal and Insertion Under Power		Supported		
Calibrated Accuracy		± 0.2% of Full Scale (25°C) including linearity		
Directly Settable Output Current Range		2.9 mA to 21.1 mA		
Maximum Open Circuit Voltage		22 V		
Response Time(DAC input code to output)		settles to within 1% of final value within 80 ms		
Gap (0 mA) of Output to Field on Switchover		10 ms maximum (applies to Redundancy only)		
Agency certifications		CE		
		FM C US APPROVED Class I, Division 2, Group A, B, C, D; T4 Class I, Zone 2 AEx/ Ex nA II C T4		
		CSA Class I, Division 2, Group A, B, C, D; T4 Class I, Zone 2, Ex nA II C T4		

https://maxautoland.com/
manski@cambia.cn +86 18030205725

2.2.7. 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
- Optional redundancy
- Internal or external field power selection
- On board excitation power (no need for marshalling power)
- Direct / Reverse Input Indication
- Galvanic Isolation

https://maxautoland.com/
marketing@cambia.cn +86 18030205725

Detail Specifications – Digital Input Sequence of Events

Parameter		Specification		
Input / Output Module		8C-PDISA1 - Digital Input Sequence of Events, Coated		
		8U-PDISA1 - Digital Input Sequence of Events, Uncoated		
IOTA Modules		8C-TDILA1	Non Redundant, Coated	9”
		8U-TDILA1	Non Redundant, Uncoated	9”
		8C-TDILB1	Redundant, Coated.	12”
		8U-TDILB1	Redundant, Uncoated	12”
Input Channels		32		
Input Channel Scanning (PV)		Normal = 20ms ; Fast = 5ms		
Digital Input Resolution for Sequence of Events (SOE)		1ms		
Voltage Rating		24 VDC		
Module current rating		95 mA		
Temperature	Operating Temperature	0 to 60 ℃		
	Storage temperature	-40 to 85 ℃		
Galvanic Isolation (any input terminal voltage referenced to common)		1000 VAC RMS or ±1000 VDC		
Module Removal and Insertion Under Power		Supported		
Isolation Technique		Optical (in IOM)		
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
Agency certifications	CE
	FM C US APPROVED Class I, Division 2, Group A, B, C, D; T4 Class I, Zone 2 AEx/ Ex nA II C T4
	CSA Class I, Division 2, Group A, B, C, D; T4 Class I, Zone 2, Ex nA II C T4

https://maxautoland.com/
manski@cambia.cn +86 18030205725

2.2.8. 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
- Galvanic isolation (System to Field only with external user supplied power)

Detail Specifications – Digital Input 24VDC

Parameter		Specification		
Input / Output Module		8C-PDILA1 - Digital Input 24VDC, Coated		
		8U-PDILA1 - Digital Input 24VDC, Uncoated		
IOTA Modules		8C-TDILA1	Non Redundant, Coated	9”
		8U-TDILA1	Non Redundant, Uncoated	9”
		8C-TDILB1	Redundant, Coated	12”
		8U-TDILB1	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)		
Voltage Rating		24 VDC		
Module current rating		95 mA		
Temperature	Operating Temperature	0 to 60 ℃		
	Storage temperature	-40 to 85 ℃		
DI Power Voltage Range		18 to 30 VDC (For user supplied field power)		
Module Removal and Insertion Under Power		Supported		
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%		
Agency certifications		CE		
		FM APPROVED C US Class I, Division 2, Group A, B, C, D; T4 Class I, Zone 2 AEx/ Ex nA II C T4		
		CSA® Class I, Division 2, Group A, B, C, D; T4 Class I, Zone 2, Ex nA II C T4		

https://maxautoland.com/
mansk1@cambia.cn +86 18030205725

2.2.9. Digital Input Pulse Accumulation

Function

The Digital Input Pulse Accumulation accepts 24VDC signals as discrete inputs. The first 16 channels can be configured either as Digital Input or Pulse accumulation to support Pulse Accumulation and frequency measurement on per channel basis.

Notable Features

- Extensive internal diagnostics for data integrity
- Optional redundancy
- Internal / External field power selection
- Galvanic isolation (System to Field only with external user supplied power)
- Support Pulse Accumulation & frequency measurement
- Channels 1-16 can support Pulse accumulation on per channel basis
- Channels 17-32 can be configured as DI

Detail Specifications – Digital Input Pulse Accumulation

Parameter		Specification		
Input / Output Module		8C-PDIPA1 - 24VDC Digital Input Pulse Accumulation, Coated		
		8U-PDIPA1 - 24VDC Digital Input Pulse Accumulation, Uncoated		
IOTA Modules		8C-TDILA1	Non Redundant, Coated	9”
		8U-TDILA1	Non Redundant, Uncoated	9”
		8C-TDILB1	Redundant, Coated	12”
		8U-TDILB1	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)		
Voltage Rating		24 VDC		
Module current rating		105 mA		
Temperature	Operating Temperature	0 to 60 ℃		
	Storage temperature	-40 to 85 ℃		
DI Power Voltage Range		18 to 30 VDC (For user supplied field power)		
Module Removal and Insertion Under Power		Supported		
Signal Type (Pulse Accumulation)		Accumulation Type (0-1KHz, for minimum 30% DUTY CYCLE devices)		
Minimum Pulse Width		300 uSec		
Individual Channel SCAN Time		300 uSec		
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%		
Agency certifications		CE		
		FM APPROVED Class I, Division 2, Group A, B, C, D; T4 Class I, Zone 2 AEx/ Ex nA II C T4		
		CSA Class I, Division 2, Group A, B, C, D; T4 Class I, Zone 2, Ex nA II C T4		

https://maxautoland.com/
manski@cambia.cn +86 18030205725

2.2.10. Digital Output 24VDC

Function

The Digital Output bussed 24VDC (DO24V) module can switch reliable 24V digital output signals to control other process equipment as well as solenoid valves and interposing relays.

Notable Features

- Extensive internal diagnostics to ensure data integrity
- Optional redundancy
- Safe-state (FAILOPT) behaviors
- Latched, pulsed or pulse-width modulated output (per channel)
- Galvanic Isolation (System to Field only with external user supplied power)

Bussed 24VDC DO

The Digital Output Bussed 24VDC has provisions for both internal and external field power excitation. As a bussed output device, all of the outputs share a common return (ground). All outputs get their power from the same source, which can be either the system power supply or an externally connected 24V power supply. When selection is from an external source, outputs can be galvanically isolated from the Series 8 power system. A wiring option on the IOTA determines if outputs are referenced to the Series 8 system power or an external field power source.

Safe-state Behavior (FAILOPT)

Series 8 DO module will support FAILOPT parameter on a per channel basis. The output can be directed by configuration to either HOLD THE LAST VALUE, or SHED to a SAFE VALUE. The safe value can be configured by the user.

https://maxautoland.com/
manski@cambia.cn +86 18030205725

Detail Specifications – Digital Output 24VDC

Parameter		Specification		
Input / Output Module		8C-PDODA1 - Digital Output 24 VDC, Field Isolated, Bussed output, Coated		
		8U-PDODA1 - Digital Output 24 VDC, Field Isolated, Bussed output, Uncoated		
IOTA Module Numbers		8C-TDODA1	Non Redundant, Coated	9”
		8U-TDODA1	Non Redundant, Uncoated	9”
		8C-TDODB1	Redundant, Coated	12”
		8U-TDODB1	Redundant, Uncoated	12”
Output Channels		32		
Output Type		Source		
Voltage Rating		24 VDC		
Module current rating		105mA		
Temperature	Operating Temperature	0 to 60 ℃		
	Storage temperature	-40 to 85 ℃		
Load Voltage		30 VDC Maximum		
Module Removal and Insertion Under Power		Supported		

Load Current Short circuit protection for DO channel would be using series FUSEs in the output channel. One FUSE per Eight channels. Total FOUR (4) fuses for 32 channels on DO IOTA	100mA per channel (Max)
Galvanic Isolation	1000 VAC RMS for System – to – Field isolation for user supplied field Power only No System- to-Field isolation for internal system power used for field sensing
On-State Voltage	24 VDC (typ) (load current @ 0.1A max)
Off-State Voltage	0v VDC
Off-State Leak Current	5 µA (max)
Turn-On/Turn-Off Time	10 ms (max)
Gap (0 current) of Output to Field on Switchover	None (0ms) (applies to Redundancy only)
Agency certifications	CE
	FM C US APPROVED Class I, Division 2, Group A, B, C, D; T4 Class I, Zone 2 AEx/ Ex nA II C T4
	CSA Class I, Division 2, Group A, B, C, D; T4 Class I, Zone 2, Ex nA II C T4

https://maxautoland.com/
manski@cambia.cn +86 18030205725

2.2.11. DO Relay Extension Board

Function

The Digital Output Relay provides a dry contact for isolated low voltage / low current or high voltage / high current discrete output applications. Each relay supports a Form-A or Form-B output based on jumper configuration. The Relay IOTA uses the Digital Output 24V (DO24V) IOM with a special IOTA to support the Relay IOTA. All characteristics of the DO24V IOM are incorporated here.

Notable Features

- Galvanic isolation
- Isolated Dry Contact
- Counter EMF Snubbing Circuit
- LED indication for each channel ON condition

Detail Specifications – DO Relay Extension Board

Parameter		Specification		
IOTA Module Numbers		8C-SDOX01	Relay Extension, Coated	12”
		8U-SDOX01	Relay Extension, Uncoated	
Output Channels		32 isolated Form C (SPDT) or Form B (SPST/NC) contacts (jumper selectable per output)		
Contact Type		Au over AgSnO2		
Maximum Load Voltage		250 VAC (RMS)/125 VDC		
Maximum Steady State Load Current per Output		Current / Voltage 5A / 125 / 250 VAC (resistive) 3 A / 30 VDC (resistive) 1 A / 48 VDC (resistive) 0.2 A / 125 VDC (resistive) 2 A / 125 / 250 VAC (inductive = 0.4 power factor) 1 A / 30 VAC (inductive L/R = 100 ms) 0.3 A / 48 VAC (inductive L/R = 100 ms) 0.1 A / 125 VAC (inductive L/R = 100 ms)		
Minimum Load Voltage		5 VDC (1)		
Minimum Load Current		10 mA or 100mA (1)		
Voltage Rating		24 VDC		
Module current rating		1010 mA		
Module Removal and Insertion Under Power		Supported		
Temperature	Operating Temperature	0 to 60 ℃		
	Storage temperature	-40 to 85 ℃		
Isolation (Channel-to-channel, and channel-to-logic common)		1500 VAC RMS or ±1500 VDC		
Turn On Time		20 ms maximum		
Turn Off Time		20 ms maximum		
Contact Life		Operations % of Max Load 10,000,0000 (Mechanical Life) 200,000 @ 3 A (100%)		
Agency certifications		CE		
		FM C US APPROVED Class I, Division 2, Group A, B, C, D; T4 Class I, Zone 2 AEx/ Ex nA nC II C T4		
		CSA Class I, Division 2, Group A, B, C, D; T4 Class I, Zone 2, Ex nA nC II C T4		
Note 1: The minimum 10mA load current and 5 VDC load voltage specified are only valid if the contact has not been previously used in high current / high voltage applications. Once a relay contact is used in a high current / high voltage application, the minimum load current is 100mA.				

https://maxaurolandson.en.alibaba.com/ 18018030265725 hanski@cambria.cn

2.2.12. Series 8 IO Function Matrix

The following tables assist in selecting I/O Modules and IOTAs with similar functional characteristics:

AI Function Matrix

IOM	NR IOTA	Red IOTA	Function	
			AI 4-20 mA	HART
8C-PAIHA1 8U-PAIHA1	8C-TAIXA1 8U-TAIXA1	8C-TAIXB1 8U-TAIXB1	♦ ♦	♦ ♦
8C-PAINA1 8U-PAINA1	8C-TAIXA1 8U-TAIXA1	8C-TAIXB1 8U-TAIXB1	♦ ♦	
8C-PAIH54 8U-PAIH54	8C-TAIDA1 8U-TAIDA1	8C-TAIDB1 8U-TAIDB1	♦ ♦	♦ ♦

TC/RTD Function Matrix

IOM	NR IOTA	Red IOTA	Function	
			TC	RTD
8C-PAIMA1 8U-PAIMA1	8C-TAIMA1 8U-TAIMA1	NA NA	♦ ♦	♦ ♦

AO Function Matrix

IOM	NR IOTA	Red IOTA	Function	
			AIO 4-20 mA	HART
8C-PAOHA1 8U-PAOHA1	8C-TAOXA1 8U-TAOXA1	8C-TAOXB1 8U-TAOXB1	♦ ♦	♦ ♦
8C-PAONA1 8U-PAONA1	8C-TAOXA1 8U-TAOXA1	8C-TAOXB1 8U-TAOXB1	♦ ♦	

https://maxautoland.com/
mansi@cambia.cn +86 18030205725

DI Function Matrix

IOM	NR IOTA	Red IOTA	Function		
			DI	SOE	PA
8C-PDILA1 8U-PDILA1	8C-TDILA1 8U-TDILA1	8C-TDILB1 8U-TDILB1	♦ ♦		
8C-PDISA1 8U-PDISA1	8C-TDILA1 8U-TDILA1	8C-TDILB1 8U-TDILB1		♦ ♦	
8C-PDIPA1 8U-PDIPA1	8C-TDILA1 8U-TDILA1	8C-TDILB1 8U-TDILB1			♦ ♦

DO Function Matrix

IOM	NR IOTA	Red IOTA	Relay Extension	Source
8C-PDODA1 8U-PDODA1	8C-TDODA1 8U-TDODA1	8C-TDODB1 8U-TDODB1	8C-SDOX01 8U-SDOX01	♦ ♦

https://maxautoland.com
manski@cambia.cn +86 18030205725

All other products and brand names shown are trademarks of their respective owners.

This document contains Honeywell proprietary information. It is published for the sole usage of Honeywell Process Solutions' customers and prospective customers worldwide. Information contained herein is to be used solely for the purpose submitted, and no part of this document or its contents shall be reproduced, published, or disclosed to a third party without the express permission of Honeywell International Inc..

While this information is presented in good faith and believed to be accurate, Honeywell disclaims the implied warranties of merchantability and fitness for a particular purpose and makes no express warranties except as may be stated in its written agreement with and for its customer.

In no event is Honeywell liable to anyone for any indirect, special or consequential damages. The information and specifications in this document are subject to change without notice.

https://maxautoland.com/
manski@cambia.cn +86 18030205725

Sales and Service

For application assistance, current specifications, pricing, or name of the nearest Authorized Distributor, contact one of the offices below.

ASIA PACIFIC

Honeywell Process Solutions,
(TAC) hfs-tac-support@honeywell.com

Australia
Honeywell Limited
Phone: +(61) 7-3846 1255
FAX: +(61) 7-3840 6481
Toll Free 1300-36-39-36
Toll Free Fax:
1300-36-04-70

China – PRC - Shanghai
Honeywell China Inc.
Phone: (86-21) 5257-4568
Fax: (86-21) 6237-2826

Singapore
Honeywell Pte Ltd.
Phone: +(65) 6580 3278
Fax: +(65) 6445-3033

South Korea
Honeywell Korea Co Ltd
Phone: +(822) 799 6114
Fax: +(822) 792 9015

EMEA

Honeywell Process Solutions,
Phone: + 80012026455 or
+44 (0)1344 656000

Email: (Sales)
FP-Sales-Apps@Honeywell.com
or
(TAC)
hfs-tac-support@honeywell.com

AMERICA'S

Honeywell Process Solutions,
Phone: (TAC) 1-800-423-9883 or
215/641-3610
(Sales) 1-800-343-0228

Email: (Sales)
FP-Sales-Apps@Honeywell.com
or
(TAC)
hfs-tac-support@honeywell.com

Specifications are subject to change without notice.

https://maxautoland.com/
manski@cambia.cn +86 18030205725

For more information
To learn more about Experion™
visit www.honeywellprocess.com
Or contact your Honeywell Account Manager

Process Solutions
Honeywell
1250 W Sam Houston Pkwy S
Houston, TX 77042

Honeywell Control Systems Ltd
Honeywell House, Skimped Hill Lane
Bracknell, England, RG12 1EB

Shanghai City Centre, 100 Jungi Road
Shanghai, China 20061

www.honeywellprocess.com

S803-150-110, Ver.1.2
December 2015
©2015 Honeywell International Inc.