

Product Information: ExTR Reference No. GB.FME.ExTR11.0006-00

Experion Series C input/output chassis-less mounted modules and field level network gateways provide the physical connection between an automation system and the process when used with the C300 Controller. Input/Output Modules and field terminations are combined in the same area. The Input/Output Modules are plugged into Input /Output Termination Assemblies to eliminate the need for a separate chassis to hold the electronics assemblies.

C300 Controller

The C300 Controller is constructed using the Series C form factor that employs an Input Output Termination Assembly (IOTA) and an electronics module which mounts and connects to the IOTA. One C300 Controller contains all of the control functionality and the communications functions with plug-in modules.

The C300 Controller may operate in both non-redundant and redundant configurations. Redundant operation requires a second identical controller and connecting cables, which is the typical configuration. The C300 Controller is connected to the associated I/O hardware by a pair of I/O Link Interface cables

The table below identifies the C300 Controller components and its associated components. The C300 Controller supports non-redundant and fully redundant operation. Redundancy is built in to the controller, so that just adding another controller and a redundancy cable; a redundant controller pair is achieved. Note that the 'CC' designation on the model number indicates the printed wiring boards are conformally coated for additional protection from the environment, (CU = uncoated).

Components	Description	Model No.
C300 Controller Module	A distributed process controller and I/O gateway for the Experion system. Module contains printed circuit assemblies, status indicators and a display, inside in a plastic housing. Module mounts to its Input Output Termination Assembly (IOTA). Supply Rating: 0.311A @ 24VDC	CC-PCNT01 CU-PCNT01
C300 Controller Input Output Termination Assembly (IOTA)	Provides the connection point for the C300 Controller module and all cable terminations to the controller, (FTE, IO Link, Redundancy, Battery and Time Source cable terminations). Provides 24Vdc power distribution to the controller module. Supply Rating: 0.311A @ 24VDC Note: The C300 Controller IOTA supports only one controller module.	CC-TCNT01 CU-TCNT01
9 Port FTE Control Firewall Module	Provides FTE distribution to in-cabinet network nodes. (C300 Controllers and Series C Modules) Supply Rating: 0.112A @ 24VDC	CC-PCF901 CU-PCF901
9 Port Control Firewall IOTA	Provides connection for eight FTE cables from in-cabinet controllers and Series CFIMs. The 9 th port provides an uplink to the FTE supervisory network. Provides 24Vdc power distribution to the control. Ethernet: 9 RJ-45 Connections Fiber-Optic: Model Ca-FSMx01 FTE Single Mode Fiber Module Supply Rating: 0.30mA@24VDC Model Ca-FMMx01 FTE Multi-Mode Fiber Module Supply Rating: 0.30mA@24VDC	CC-TCF901 CU-TCF901

The Series C modules comprise:

- **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.

Product Information: ExTR Reference No. GB.FME.ExTR11.0006-00

The Experion Series C I/O consists of the following I/O modules (IOM's):

High Level Analog Input /HART Input Module (16pt):

A 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.

Supply Rating: 0.195A @ 24VDC

Input Voltage: 24Vdc

Manufacturer's Declared Parameters			
Input / Output Model	CC-PAIH01 - High-Level Analog Input with HART CU-PAIH01 - High-Level Analog Input with HART		
IOTA Models	CC-TAIX01	Non Redundant	6"
	CU-TAIX01		
	CC-TAIX11	Redundant	12"
	CU-TAIX11		
Input Type	Voltage, current (2-wire or self-powered transmitters)		
Input Channels ⁽¹⁾	16 Channels (12 Single Ended / 4 Differential)		
Common Mode Rejection Ratio, dc to 60 Hz (500 Ω source imbalance)	70 dB		
Common Mode Voltage, dc to 60 Hz	-6 to +5 V peak		
A/D Converter Resolution	16 bits		
Input Range ⁽¹⁾	0 to 5 V, 1 to 5 V, 0.4 to 2 V, 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		
Maximum Normal Mode Input (differential inputs, no damage)	± 30 Volts		
Crosstalk, dc to 60 Hz (channel-to-channel)	-60 dB		
Input Impedance (voltage inputs)	> 10 M Ω powered		
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°C) ± 0.15% of full-scale (0 to 60°C)		
Transmitter Field Power Conditioning	Individually Protected Current Limiting Circuits for Class 1, Div 2 non-incendive interfacing. No fusing required		
<p>1) 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. For channels 13-16 the low-side input connection is normally connected to system common by a wire jumper on the IOTA. This jumper may be cut by the user to enable differential operation subject to operating within the CMV specification.</p>			

Product Information: ExTR Reference No. GB.FME.ExTR11.0006-00

Analog Output/HART Output Module (16pt):

The Analog Output Module supports both standard 4-20mA DC outputs and HART transmitter outputs.

Supply Rating: 0.46A @ 24VDC

Manufacturer's Declared Parameters			
Input / Output Model	CC-PAOH01 - High-Level Analog Output with HART CU-PAOH01 - High-Level Analog Output with HART		
IOTA Models	CC-TAOX01 CU-TAOX01	Non Redundant	6"
	CC-TAOX11 CU-TAOX11	Redundant	12"
Output Type	4-20 mA		
Output Channels	16		
Output Ripple	< 100 mV peak-to-peak at power line frequency, across 250 Ω load		
Output Temperature Drift	0.005% of Full Scale/°C		
Output Readback Accuracy	±4% of Full Scale		
Output Current Linearity	± 0.05% of Full Scale nominal		
Resolution	± 0.05% of Full Scale		
Calibrated Accuracy	± 0.35% of Full Scale (25 °C) including linearity		
Directly Settable Output Current Range	0 mA, 2.9 mA to 21.1 mA		
Maximum Resistive Load (24 V supply = 22 VDC through 28 VDC)	800 ohms		
Maximum Output Compliant Voltage (24 V supply = 22 VDC through 28 VDC)	16 V		
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)		

Product Information: ExTR Reference No. GB.FME.ExTR11.0006-00

Digital Input 24 VDC (32pt):

Digital input sensing for 24V signals

Supply Rating: 0.130A @ 24VDC

Manufacturer's Declared Parameters			
Input / Output Model	CC-PDIL01 - 24Volt Digital Input CU-PDIL01 - 24Volt Digital Input		
IOTA Models	CC-TDIL01 CU-TDIL01	Non Redundant	6"
	CC-TDIL11 CU-TDIL11	Redundant	12"
Input Channels	32		
Galvanic Isolation (any input terminal voltage referenced to common)	1500 VAC RMS or ± 1500 VDC		
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 K Ω		
Absolute Delay Across Input Filter and Isolation	5 ms \pm 20%		
Field Resistance for Guaranteed ON Condition	300 Ω max @ 15 VDC		
Field Resistance for Guaranteed OFF Condition	30 K Ω min @ 30 VDC		

Digital Input High Voltage (32pt):

Digital input sensing for 110 VAC, 220 VAC, 125VDC.

Parameter	Specification		
Input / Output Model	CC-PDIH01 – Digital Input High Voltage CU-PDIH01 – Digital Input High Voltage		
	120 VAC IOTA		240 VAC IOTA
IOTA Models	CC-TDI110 CU-TDI110	Non Redundant	9"
	CC-TDI120 CU-TDI120	Redundant	12"
Input Channels	32	32	
Galvanic Isolation	1500 VAC RMS or ± 1500 VDC		1500 VAC RMS or ± 1500 VDC
Isolation Technique	Optical		Optical
	120 VAC	125 VDC	240VAC
Digital Input Pwr. Range	90-132 VAC RMS	100-138 VDC	180-264 VAC RMS
Sense Current (ON condition)	1.0 mA minimum	1.2 mA minimum	1.11 mA minimum
Sense Current (OFF condition)	0.32 mA maximum	0.32 mA maximum	0.32 mA maximum
Pick Up Voltage (ON condition)	90 VAC RMS minimum	100 VDC minimum	180 VAC RMS minimum
Drop Out Voltage (OFF condition)	25 VAC RMS maximum	25 VDC minimum	50 VAC RMS maximum
Absolute Delay Across Input Filter and Isolation (Bounceless Input to logic level change)	25 ms maximum	10 ms maximum	25 ms maximum
Frequency Range	47-63 Hz	NA	47-63 Hz

Product Information: ExTR Reference No. GB.FME.ExTR11.0006-00

Digital Output Bussed 24 VDC (32 pt):

The Digital Output bussed 24VDC module provides reliable 24V digital output signals to control other processes. The DO24V can support high energy outputs to reduce the number of external components in the output loop.

Parameter	Specification			
Input / Output Model	CC-PDOB01 – 24Volt Digital Output , Field Isolated, Bussed output CU-PDOB01 – 24Volt Digital Output , Field Isolated, Bussed output			
IOTA Models	CC-TDOB11	Non Redundant	6"	
	CU-TDOB11	Redundant	12"	
Output Channels	32			
Load Voltage	30 VDC Maximum			
Load Current		Per Channel	Per 8 Channels	Per Module
(A group of 8 channels consists of channels: 1-8, 9-16, 17-24, and 25-32)	One Short Condition ⁽¹⁾	0.5A	3A	6A
	Two Short Condition ⁽¹⁾	0.5A	1.5A	6A
Galvanic Isolation	1500 VAC RMS or \pm 1500 VDC			
On-State Voltage	24 V (typ), load current @ 0.5A			
Off-State Voltage	0v VDC (max) (3.3VDC (max) indicated under no-load condition)			
Off-State Leak Current	0.5 μ A (max)			
Turn-On/Turn-Off Time	10 ms (max)			
Gap (0 current) of Output to Field on Switchover	10 ms maximum (applies to Redundancy only)			
⁽¹⁾ One / Two Short Condition parameter denotes the maximum current that can be passed through the DO with the short condition indicated before the short protection mechanism disables the function. As an example, the DO can drive a maximum of 1.5A per 8 channels with two channels shorted before the short protection mechanism will disable all 8 channels affected.				

Product Information: ExTR Reference No. GB.FME.ExTR11.0006-00

Relay Digital Output (32 pt):

Digital output with NO or NC dry contacts. Can be used for low power or high power applications.

Parameter	Specification		
Input / Output Model	CC-PDOB01 – 24Volt , Field Isolated, Bussed output CU-PDOB01 – 24Volt, Field Isolated, Bussed output		
IOTA Models	CC-TDOR01, CU-TDOR01	Non Redundant	6"
	CC-TDOR11, CU-TDOR11	Redundant	12"
	CC-SDOR01, CU-SDOR01	Redundant	12"
Output Channels	32 isolated Form A (SPST/NO) or Form B (SPST/NC) contacts (jumper selectable per output)		
Maximum Load Voltage	250 VAC (RMS)/125 VDC		
Maximum Steady State Load Current per Output	Current → Voltage 3 A → 250 VAC (resistive) 3 A → 125 VAC (resistive) 3 A → 30 VDC (resistive) 1 A → 48 VDC (resistive) 0.2 A → 125 VDC (resistive) 2 A → 250 VAC (Inductive – 0.4 power factor) 2 A → 125 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 (1)		
Galvanic Isolation	1500 VAC RMS or ±1500 VDC		
Turn On Time	20 ms maximum		
Turn Off Time	20 ms maximum		
Contact Life	Operations → % of Max. Load 10,000,000 → (Mechanical Life) 200,000 @ 3 A (100%) 120Ω + 0.03°F for each channel		
1) The minimum 10 mA 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.			

Product Information: ExTR Reference No. GB.FME.ExTR11.0006-00

Temperature Multiplexer (64pt):

Provides thermocouple (TC) and resistance temperature device (RTD) inputs. The Multiplexer supports up to four, field proven PMIO FTAs.

Parameter		Specification
Input / Output Model		CC PAIM01, CU PAIM01
PMIO IOTA Models		CC-TAIM01, CU-TAIM01
PMIO FTA Models (1)		CC-TAMR04, CU-TAMT04 CC-TAMR04, CU-TAMT04 MC-TAMR04, MC-TAMT04 MU-TAMR04, MU-TAMT04
Input Type		Thermocouple and / or RTD
Input channels		64 fully-isolated channel-to-channel, channel-to-PM, and channel-to-power supply common in 16 channel increments.
Input scan rate		1 Second fixed by IOM (up to 64 channels/sec max.)
Channel bandwidth		0 to 4.7 Hz (-3 dB)
Nominal input range (TC only)		-20 to +100 millivolts
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 deg C max
	RTD inputs	+/-20 ppm per deg C 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		+/-250 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 deg C (+/-0.5 deg C typical)
TC Linearization Accuracy (2)		$\pm 0.05 \Omega / \text{deg C}$
Open Thermocouple Detection		Each conversion qualified, $\leq 1000 \Omega$ = guaranteed no-trip $\geq 1500 \Omega$ 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.)
Maximum cable distance IOTA to FTA using cable adapter		1000 feet 16 gauge wire, two twisted pair per FTA
Supported types (RTD)		
	Pt: 100 ohm DIN 4376	-180 to +800 deg C
	Pt: 100 ohm JIS C-1604	-180 to +650 deg C
	Ni: 120 ohm ED #7	-45 to +315 deg C
	Cu: 10 ohm SEER	-20 to +250 deg C
Supported thermocouple types		
	ANSI specification J	-200 to +1200 deg C
	ANSI specification K	-100 to +1370 deg C
	ANSI specification E	-200 to +1000 deg C
	ANSI specification T	-230 to +400 deg C
	ANSI specification B	+100 to +1820 deg C

Product Information: ExTR Reference No. GB.FME.ExTR11.0006-00

Parameter	Specification
	ANSI specification S 0 to +1700 deg C
	ANSI specification R 0 to +1700 deg C
	JAPAN TYPE R' 0 to +1770 deg C
Supported millivolt types	-20 to +100 millivolts
FTA dimensions (1)	2.5 D x 4.9 W x 12.1 L (inches) 63.5 D x 124.46 W x 307.34 L (millimeters)
(1) : FTAs are PMIO FTAs. These must be installed in FTA channels. These are similar to but not identical to Series C channels. The TPC will support this configuration. Refer to PM20-660 for FTA power, environmental and approval certifications details not covered in this document.	
(2): Linearization polynomials are 4th order and based on NIST Monograph 175, ITS90 and JIS C-1602-1995.	

Fieldbus – 4 Nets:

Parameter	Specification	
Input / Output Model	CC-PFB401 – Fieldbus 4 – Nets CU-PFB401 – Fieldbus 4 – Nets	
IOTA Models	CC-TFB402, CU-TFB402	Non Redundant
	CC-TFB412, CU-TFB412	Redundant
Load Voltage	24 VDC	
Load Current	0.196A	
Other Technical Information	Ethernet: 2 RJ-45 Connections (Redundant version contains 4) FF Wiring: 24VDC (external) / 350 mA total	

Product Information: ExTR Reference No. GB.FME.ExTR11.0006-00

Experion Series C System Components' List

Modules	Description
CU-CBDS01	Series C, Single Access Cabinet
CU-CBDD01	Series C, Dual Access Cabinet
CC-MCAR01	IOTA Carrier Channel Assembly
Ca-PCNT01	C300Control Processor
Ca-TCNT01	C300Control Processor IOTA
Ca-PAIH01	Hi-level AI HART
CA-TAIX01	Hi-level AI HART IOTA
Ca-TAIX11	Hi-level AI HART IOTA - Redundant
Ca-PAOH01	AO 16pt HART
Ca-TAOX01	AOIOTA
Ca-TAOX11	AO IOTA - Redundant
Ca-PDIL01	DI24V
Ca-TDIL01	DI24VIOTA
Ca-TDIL11	DI 24V IOTA - Redundant
Ca-PDOB01	DO 24V Bussed Out
Ca-TDOB01	DO 24V Buss IOTA
Ca-TDOB11	DO 24V Buss IOTA - Redundant
Ca-TDOR01	DO Relay IOTA
Ca-TDOR11	DO Relay IOTA - Redundant
Ca-SDOR01	DO Relay Extension Board
Ca-PFB401	Fieldbus - 4 Nets
Ca-TFB402	Fieldbus IOTA - 4 Nets
Ca-TFB412	Fieldbus IOTA - Redundant - 4 Nets
Ca-PAIM01	PMIOLLMux
Ca-TAIM01	PMIO LLMux IOTA
Ca-TAMT04	LLMuxTCFTA
Ca-TAMR01	LLMux RTD FTA
Ca-PCF901	Control Firewall (8 port + 1 uplink)
Ca-TCF901	Control Firewall IOTA
Ca-FSMx01	FTE Single Model Fiber Module
Ca-FMMx01	FTE Multi-Model Fiber Module
Ca-PDIH01	Digital Input High Voltage
Ca-TDI110	DI 110 Vac IOTA
Ca-TDI120	DI110 Vac IOTA - Redundant
Ca-TD1220	DI 220 Vac IOTA
Ca-TDI230	DI 220 Vac IOTA - Redundant
Ma-TAMT04	Low Level Multiplexer Thermocouple Field Termination Assembly
Ma-TAMR04	Low Level Multiplexer RTD Field Termination Assembly

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