3. C300 Controller

3.1. Overview

The Experion Series 8 C300 controller forms the heart of the Experion control system and deterministically executes control strategies, batch operations, interfaces to local and remote I/O and directly hosts custom programmable applications. The compact controller design does not require any additional Interface / communication modules and all control execution and communications are contained in the controller module.

The C300 controller runs the filed proven, deterministic Control Execution Environment (CEE) which is the core C300 software that provides powerful and robust control for the distributed control system (DCS). The control strategies are configured and loaded to the C300 controller through the Control Builder, an easy and intuitive engineering tool.

The C300 Controller is constructed using the Series 8 form factor that employs an Input Output Termination Assembly (IOTA) and an electronics module which mounts and connects to the IOTA. One C300 Controller module and its IOTA contains all of the control and communication functionalities. The C300 IOTA contains only passive devices such as FTE address switches, FTE cable connectors and I/O Link cable connectors. Figure 1 below depicts the IOTA components.

The C300 Controller may operate in both non-redundant and redundant configurations. Redundant operation require a second identical controller with its own IOTA and connecting redundancy cable. The C300 Controller supports Series 8 I/O modules. Two IO Link interfaces, which are redundant, provide connection between the C300 controller and associated I/O modules. The IO Link interface connectors are on the C300 IOTA.

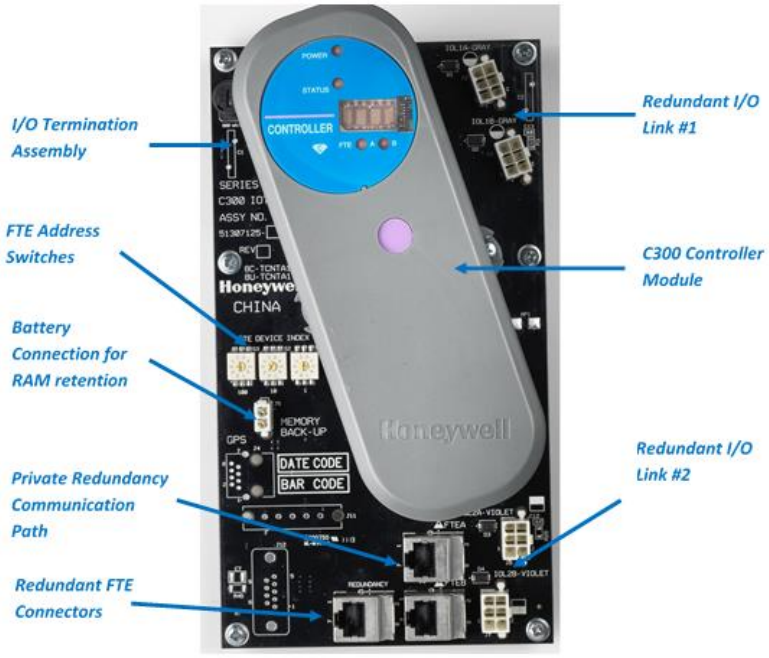

Figure 1 - C300 Controller

3.2. Model Numbers

The Model Numbers of C300 controller are shown as below:

Model Number	Description
8C-PCNT03	Series 8 C300 Controller, Coated [1,3,4]
8C-TCNTA1	Series 8 C300 Controller I/O Termination Assembly(IOTA), Coated [1]
51305980-836	Cable, Redundant C300 Controller [2]

Note 1 – Conformal coating applied on the module and the IOTA

Note 2 – Redundancy is implemented with two modules/IOTAs and a redundancy cable (51305980-836)

Note 3 – Optional rechargeable battery pack for C300 Memory Backup is available, details are provided in section 5.4

Note 4 – 8C-PCNT02 part number is replaced by 8C-PCNT03. The new controller (8C-PCNT03) is compatible with all current and previous PC/LX releases.

3.3. C300 Controller Specifications

3.3.1. C300 Control Execution Environment (CEE)

The C300 CEE provides an execution and scheduling environment in which Control Modules (CMs) and Sequential Control Modules (SCMs) execute user-configured control strategies. The CEE also support peer to peer communications with other C300 controllers and communication modules like Foundation Fieldbus and Profibus. The C300 CEE is configured using the Control Builder Engineering environment. The Control builder provides a graphical engineering environment where engineers can configure the Experion system and create control strategies by using the various function blocks available in the Library. The C300 CEE based control strategies can be configured with minimum execution rates of 50 msec.

3.3.2. C300 Hardware Specifications

Specifications	Limit
Power requirement	24 V (provided through cables by the Series 8 power system)
IOTA Dimension	220 mm (9 “) height, 120 mm (4,75 “) width
Program Memory	16MB
Processor	PowerPC 8270, 400 MHz, 32-bit
Features	
Module Removal and Insertion Under Power	Supported
Conformal Coated	Yes, G3 level of Harsh Environment (ANSI/ISAS71.04-1985 corrosion standard)
Redundancy	IOTA based design, no single point of failure for IOM, Termination, and Communication links (Downlink and Uplink)
RAM Retention	50 hour through rechargeable battery backup pack (Optional)

Programing Language	Function Block Design (FBD) via Experion Control Builder
Supported I/Os and Uplink Communication	
Supported I/O type	Series 8
Supported I/O Links	2 I/O Links, each I/O Link configurable for Series 8 I/Os
Supported I/O Link Speed	750 kbps
Supported number of I/O Modules per Controller	80 I/O Units (Redundant or Non-Redundant IOMs)
Supported number of I/O Modules per I/O Link	40 I/O Units (Redundant or Non-Redundant IOMs)
Maximum number of I/Os per Controller	2560 [1]
Number of Uplink (FTE) Connection	Dual uplink FTE ports, 100Mbps speed
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, configurable)
Controller Communication	
CEE-based Platforms	Native peer to peer with other Series 8 C300s, C200 and ControlEdge UOC controllers [2]
Supervisory Control Network	Fault Tolerant Ethernet (FTE)
Third party devices	Modbus Master
Modbus TCP devices	PCDI function block
Modbus RTU or ASCII	Via Modbus TCP/IP conversion gateway
Ethernet/IP	Native peer to peer
Foundation Fieldbus	Via Fieldbus Interface Module (FIM) gateway
Profibus DP	Via Profibus Gateway Module (PGM)
Optional C300 Memory Backup	
51454475-100	Series 8 C300 RAM Charger Module
51202330-300	Cable, Battery RAM charger, 30 in
51202330-200	Cable, Battery RAM charger, 84 in