I/A Series® HARDWARE
Product Specifications

invensys
FoxPro

PSS 21H-1B9 B3

Field Control Processor 270 (FCP270)

The Field Control Processor 270 is a distributed, optionally fault-tolerant, field-mounted controller that performs process control and alarming functions according to a user-defined control strategy.

FEATURES

- Performs regulatory, logic, timing, and sequential control together with connected Fieldbus Modules (FBMs)
- Performs data acquisition and alarm detection and notification
- Supports up to 32 200 Series FBMs - referring to both Compact or standard types
- Supports up to 128 200 Series FBMs (Compact or standard) with a Fieldbus Expansion Module 100 (FEM100)
- Supports up to 64 of the 100 Series FBMs
- No Fieldbus Communication Module is required
- Connects to The MESH control network via standard fiber optic 100 Mbps Ethernet
- Uses a rugged, die cast aluminum housing for mounting in a non-vented field enclosure
- Can operate in Class G3 harsh environments
- Is CE certified for field mounting in enclosures
- Supports both the 2 Mbps or 268 Kbps HDLC fieldbuses simultaneously with the FBI200 or FBI100, allowing connections to both 200 Series and 100 Series FBMs (affects the total number of each type of FBM supported).
- Offers unique, patented, fault-tolerant operation using two control modules to greatly improve reliability relative to other process controllers
- Uses versatile control algorithms and a wide variety of FBMs to provide control capabilities for a broad range of process applications

- Supports time synchronization using optional external time from GPS satellites
- Offers on-line image update of a fault-tolerant FCP270 without shutting down the process
- Uses soft letterbugs configurable via the I/A Series® system Letterbug Configurator running on a Pocket PC
- Supports self-hosting mode with I/A Series software v7.4 or 7.5 or FoxboroEvo™ Control Core Services v9.0 or later

OVERVIEW

The Field Control Processor 270 (FCP270) is a distributed, optionally fault-tolerant, field-mounted controller module. The FCP270 performs regulatory, logic, timing, and sequential control together with connected Fieldbus Modules. It also performs data acquisition and alarm detection and notification. The FCP270 connects to The MESH control network via standard fiber optic 100 Mbps Ethernet.

The fault-tolerant version of the FCP270 consists of two processor modules. These modules install in adjacent FCP270 slots in a supported FCP270 baseplate for high speed communication between the modules (see Figure 1).

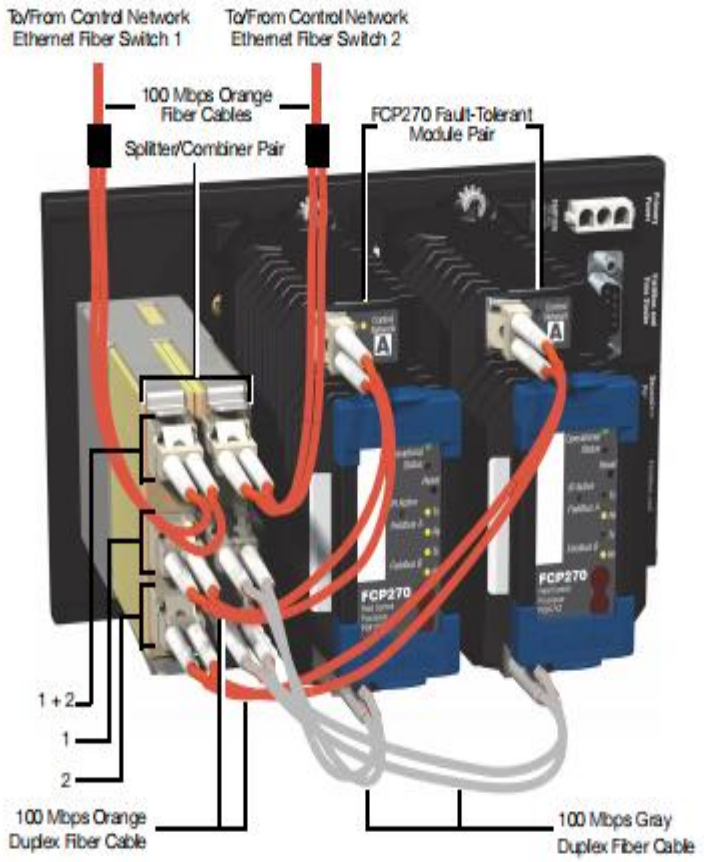


Figure 1. Fault-Tolerant FCP270 Module Pair Mounted on 2-Position Modular Baseplate

FUNCTIONAL SPECIFICATIONS

Processor Type

CONTROL PROCESSOR

Microprocessor-based AMD Elan 520 (running at 100 MHz) with stored programs, using high-speed communication capability. In addition, the CommControl™ ASIC with an internal 80186 controls the communication to the I/O Modules (FBMs).

Memory

SIZE

16 MB SDRAM
32 MB flash memory

ERROR DETECTION

ECC providing single-bit error detection and correction as well as multiple-bit error detection.

Process I/O Communications (with FBMs)

MODULE FIELDBUS

Type
HDLC

Transmission Rate
2 Mbps for 200 Series FBMs or
268 Kbps for 100 Series FBMs

Process I/O Capacity

2 MBPS HDLC FIELDBUS

200 Series FBMs
32 maximum without FEM100 modules or with FEM100 modules, control usage supports capability for up to 128 FBMs. Refer to *FCP270 Sizing Guidelines* (B0700AV) for sizing constraints.

Competitive Migration Modules
Refer to the device specific Product Specification Sheets

268 KBPS HDLC FIELDBUS

100 Series FBMs
64 maximum depending on control processor sizing constraints (refer to *FCP270 Sizing Guidelines* [B0700AV]).

Competitive Migration Modules
Refer to the device specific Product Specification Sheets

Process I/O Capacity (Cont.)

MIXED 2 MBPS HDLC/268 KBPS HDLC FIELDBUS

In addition to previous sizing constraints, the total number of 100 Series and 200 Series FBMs and/or competitive migration modules supported (mixed 96 modules maximum).

Memory Allocation for Blocks

5.8 MB

Maximum Number of Blocks Configured

The maximum number of blocks that can be configured for the FCP270 (or fault-tolerant FCP270 pair) is 4000.

Block Executions Per Second

10,000 blocks/second, maximum

Maximum Number of Blocks Processed

The number of blocks that can be processed per block processing cycle (BPC) time interval depends on scan periods and block type selection. These blocks include all types (control blocks, ECBs, compounds, data blocks, and so forth). For sizing guidelines, refer to *FCP270 Sizing Guidelines* (B0700AV).

Minimum Block Processing Cycle (BPC)

50 ms

Sequence Block Size

32 KB maximum for each block

Maximum Number of IPC Connections

131; 100 connections for source points; 30 connections for sink points; 1 connection for internal use only.

Maximum Number of OM Sink Lists

50

Maximum OM Scanner Database

12,000 points for BPC ≥ 200 ms
5,000 points for BPC ≤ 100 ms

Maximum Number of OM Sink Points

7,500

FUNCTIONAL SPECIFICATIONS (CONTINUED)

Configurable Block Periods
0.05, 0.1, 0.2, 0.5, 0.6, 1, 2, 5, 6, 10, 30 seconds
1, 5, 30, 60 minutes

Block Processing Cycle
0.05, 0.1, 0.2, 0.5 and 1.0 seconds, selectable at system configuration time

Time to Start Fault-Tolerant Modules
Less than 1 second

Internal Diagnostics
Self-checking performed at power-up. Run-time checks and the watchdog timer function performed during operation.

Infrared Communications
Letterbug assignment via the Letterbug Configurator. Letterbug or Hardware ID readout via the Letterbug Configurator.

Power Requirements

INPUT VOLTAGE (REDUNDANT VOLTAGE)
24 V dc typical

CONSUMPTION (PER NON-FAULT-TOLERANT MODULE)
8.5 W, maximum

Regulatory Compliance

ELECTROMAGNETIC COMPATIBILITY (EMC)

European EMC Directive 89/336/EEC
Meets: EN 50081-2 Emission standard
EN 50082-2 Immunity standard
EN 61326 Annex A (Industrial Levels)

CISPR 11, Industrial Scientific and Medical (ISM) Radio-frequency Equipment - Electromagnetic Disturbance Characteristics - Limits and Methods of Measurement
Meets Class A Limits

IEC 61000-4-2 ESD Immunity
Contact 4 kV, air 8 kV

IEC 61000-4-3 Radiated Field Immunity
10 V/m at 80 to 1000 MHz

IEC 61000-4-4 Electrical Fast Transient/Burst Immunity
±2 kV on I/O, dc power and communication lines

IEC 61000-4-5 Surge Immunity
±2 kV on ac and dc power lines; ±1 kV on I/O and communications lines

IEC 61000-4-6 Immunity to Conducted Disturbances Induced by Radio-frequency Fields
10 V (rms) at 150 kHz to 80 MHz on I/O, dc power and communication lines

IEC 61000-4-8 Power Frequency Magnetic Field Immunity
30 A/m at 50 and 60 Hz

PRODUCT SAFETY

Underwriters Laboratories (UL) for U.S. and Canada
UL/UL-C listed as suitable for use in UL/UL-C listed Class I, Groups A-D; Division 2; temperature code T4 enclosure based systems. These modules are also UL and UL-C listed as associated apparatus for supplying non-incendive communication circuits for Class I, Groups A-D hazardous locations when connected to specified I/A Series/Foxboro Evo system Fieldbus Modules as described in the *DIN Rail Mounted Subsystem User's Guide* (B0400FA). Communications circuits also meet the requirements for Class 2 as defined in Article 725 of the National Electrical Code (NFPA No.70) and Section 16 of the Canadian Electrical Code (CSA C22.1). Conditions for use are as specified in the *DIN Rail Mounted Subsystem User's Guide* (B0400FA).

EUROPEAN LOW VOLTAGE DIRECTIVE 73/23/EEC AND EXPLOSIVE ATMOSPHERES (ATEX) DIRECTIVE 94/9/EC
CENELEC (DEMKO) certified as EEx nAnL IIC T4 for use in CENELEC certified Zone 2 enclosure certified as associated apparatus for supplying non-incendive field circuits for Zone 2, Group IIC, potentially explosive atmospheres when connected to specified I/A Series system Fieldbus Modules as described in the *DIN Rail Mounted Subsystem User's Guide* (B0400FA).

FUNCTIONAL SPECIFICATIONS (CONTINUED)

SECURITY
Wurldtech Achilles Certification™ Level One

ENVIRONMENTAL SPECIFICATIONS(2)

Operating

TEMPERATURE
0 to +60°C (+32 to +140°F)

RELATIVE HUMIDITY
5 to 95% (Noncondensing)

ALTITUDE
-300 to +3,000 m (-1,000 to +10,000 ft)

CONTAMINATION
Class G3 (Harsh) as defined in ISA Standard, S71.04. Pollution degree 2 as defined in IEC 664-1.

VIBRATION
0.5 g (F to 500 Hz)

Storage

TEMPERATURE
-40 to +70°C (-40 to +158°F)

RELATIVE HUMIDITY
5 to 95% (Noncondensing)

ALTITUDE
-300 to +12,000 m (-1,000 to +40,000 ft)

PHYSICAL SPECIFICATIONS

Configuration
Single processor module. The fault-tolerant version consists of two processor modules, with an interconnecting fault-tolerant connector integral to the baseplate.

Mounting
May be placed in device specific 2- or 4-position baseplates designed for horizontal or vertical mounting.
For the fault-tolerant FCP270, the two modules must be mounted in dedicated slots to allow for interconnecting fault-tolerant communication.

Dimensions - Module

HEIGHT
103 mm (4.04 in)
114 mm (4.50 in) including mounting lugs

WIDTH
51.5 mm (2.03 in)

DEPTH
147 mm (5.80 in)

Mass (Maximum)
0.6 kg (1.3 lb) for a single, non-fault-tolerant module.

Fiber Optic Cabling – Ethernet Switch to FCP270

CONNECTORS

Ethernet Switch Connector
One MT-RJ Connector
FCP270 or Splitter/Combiner Connector
Two ceramic type LC connectors with clip

FIBER OPTIC CABLE

Cable Material
Multimode fiber (MMF) 62.5/125 µm plenum
Cable Lengths
3 m (9.9 ft), 15 m (49.5 ft), 50 m (165 ft) greater than 50 m – user supplied
Maximum Length
2 km (6,560 ft) from the Ethernet switch to the FCP270.

(2) The environmental limits of this module may be enhanced by the type of enclosure containing the module. (Refer to the applicable Product Specification Sheet (PSS) which describes the specific type of enclosure that is to be used.)

PHYSICAL SPECIFICATIONS (CONTINUED)

Fiber Optic Cabling – Splitter/Combiner to FCP270

CONNECTORS
Two ceramic type LC connectors with clip on each end

FIBER OPTIC CABLE
Cable Media
Multimode fiber (MMF) 62.5/125 µm
Cable Lengths
0.5 m (1.6 ft), 1.0 m (3.3ft), 3.0 m (9.9 ft), 15 m (49.5 ft), 50 m (165 ft)
greater than 50 m – user supplied
Maximum Length
2 km (6,560 ft) total from the Ethernet switch to the FCP270, including the cabling to the splitter/combiner.

FCP270 Fieldbus without FCM2Fs
The cable length of the Fieldbus cannot exceed 60 m (198 ft) (see Figure 4).

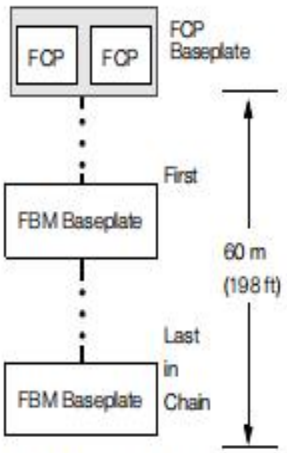


Figure 4. Fieldbus Cable Length Restrictions

PHYSICAL SPECIFICATIONS (CONTINUED)

FCP270 Fieldbus with FCM2Fs
Each FCP/FCM drives a segment of interconnected baseplates of up to 60 m (198 ft). Up to four pairs of FCM2Fxs can be used in a Fieldbus network (see Figure 5).

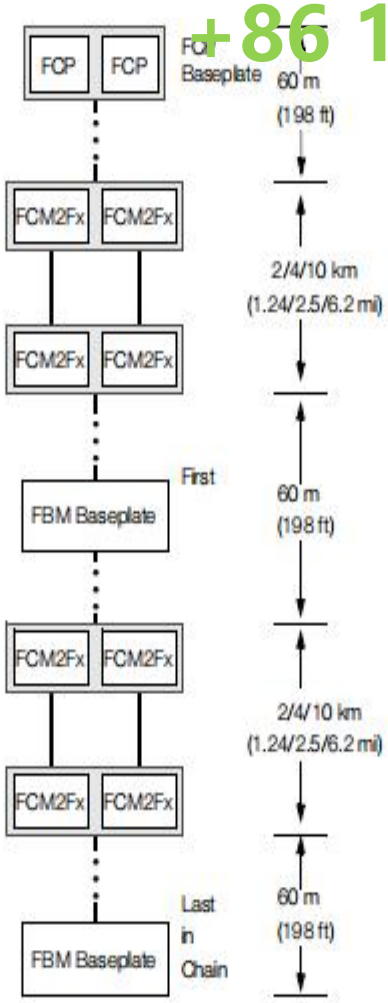


Figure 5. Fieldbus Cable Length Restrictions w/FCM2Fs Between FCP and FBM Baseplates, and Between Baseplates

PHYSICAL SPECIFICATIONS (CONTINUED)

FCP270 Fieldbus and Expanded Fieldbuses (1-4) without FCM2Fs

The cable length of the Fieldbus cannot exceed 60 m (198 ft) (see Figure 6).

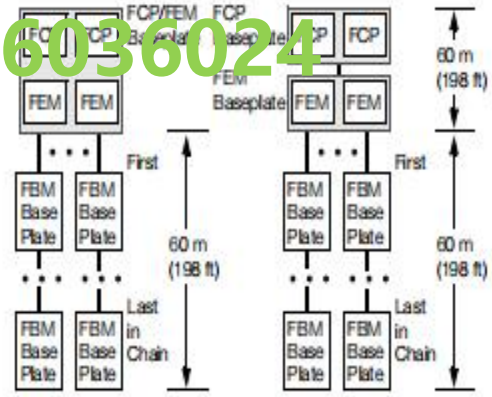
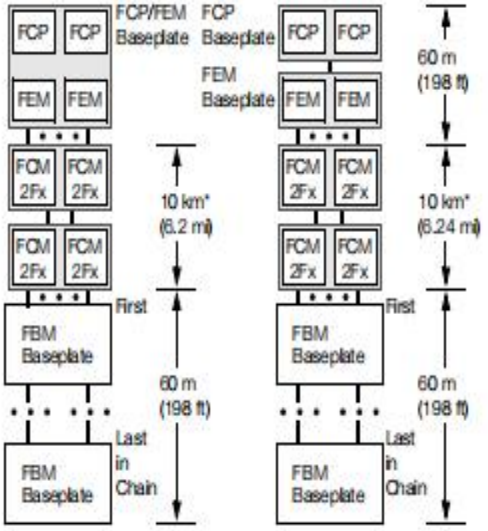


Figure 6. Expanded Fieldbus Cable Length Restrictions

FCP270 Fieldbus and Expanded Fieldbuses (1-4) with FCM2Fs

Each FCP/FCM drives a segment of interconnected baseplates of up to 60 m (198 ft). Up to four pairs of FCM2Fxs can be used in each Expanded Fieldbus network (see Figure 7).



* 20 km distance is allowed through the use of four pairs of FCM2F10s, as shown in Figure 5 above.

Figure 7. Expanded Fieldbus Cable Length Restrictions w/FCM2Fs

PHYSICAL SPECIFICATIONS (CONTINUED)

Cabling – 268 Kbps Fieldbus

MAXIMUM LENGTH

Without FBI200/FBI100

1 km (3200 ft) maximum, from Modular Baseplate to 100 Series FBMs in last Mounting Structure

With FBI200/FBI100

With FCP270 and 100 Series FBMs Only

Between FCP270 and FBI200/100 - 60 m (198 ft) maximum

From FBI200/100s to 100 Series FBMs in last Mounting Structure - 1830 m (6000 ft) maximum

With FCP270, 100 Series and 200 Series FBMs

Total Length of Cabling between FCP270 and FBI200/100 Plus the Total Length of the 2 Mbps Module Fieldbus (for 200 Series FBMs) - 60 m (198 ft) maximum

From FBI100s to 100 Series FBMs in last Mounting Structure - 1830 m (6000 ft) maximum

CABLE

Twinaxial, shielded

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Global Customer Support
Inside U.S.: 1-866-746-6477
Outside U.S.: 1-508-549-2424 or contact your local Invensys representative.
Website: https://support.ips.invensys.com