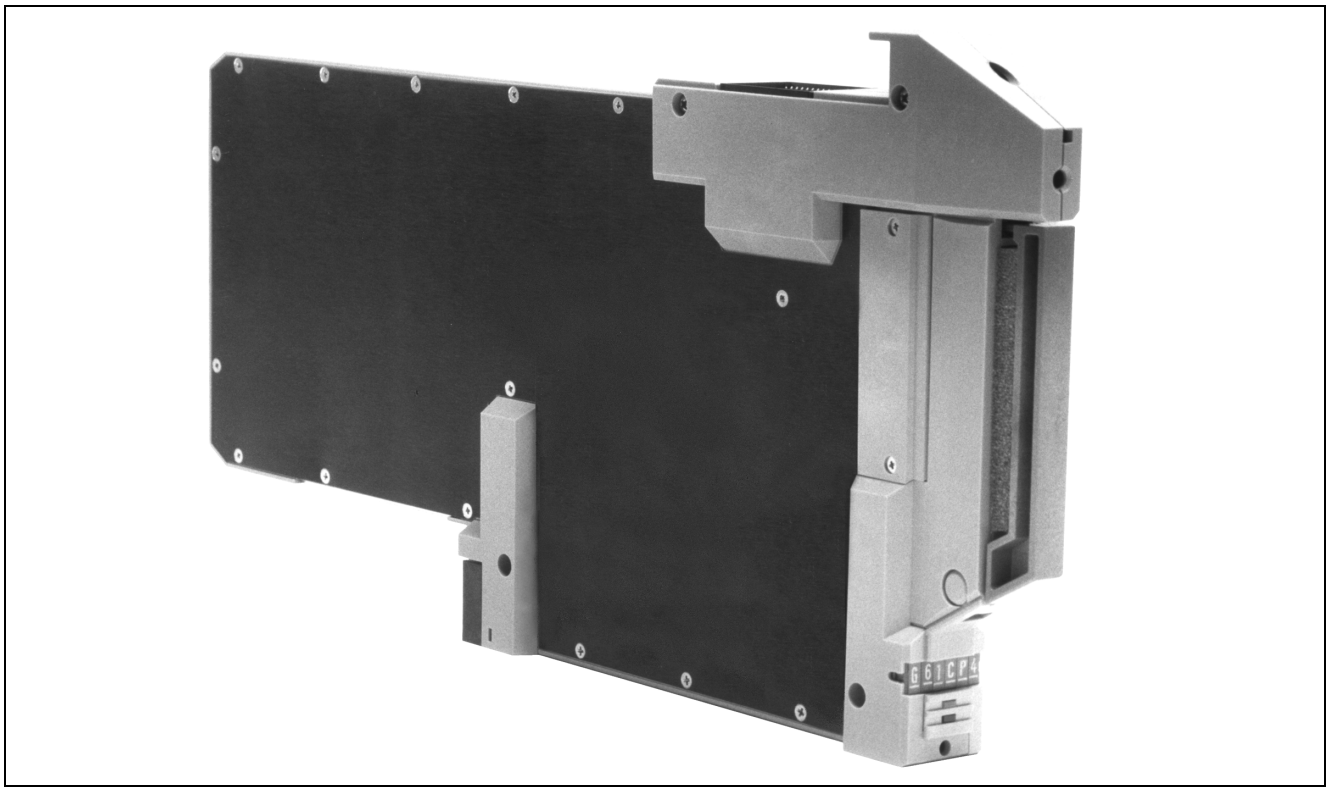
I/A Series® Hardware
Control Processor 60



The Control Processor 60 is an optionally fault-tolerant station that performs regulatory, logic, timing, and sequential control together with connected Fieldbus Modules (FBMs). It also performs data acquisition (via the Fieldbus Modules) and alarm detection and notification.

The Control Processor 60 supports two basic types of FBMs, those included in the DIN rail mounted FBM subsystem (FBM201, FBM202, and so forth), and Y-Module form factor FBMs (FBM01, FBM02, and so forth). The CP60 also supports communication with the Hydrostatic Interface Unit (HIU), Mass Flowmeter, Panel Display Stations, Cluster I/O Migration, SPECTRUM Migration, and Competitor Migration DCS Fieldbus Modules. For details, see “Devices Supported” on page 2.

The Control Processor 60 communicates with all associated devices via a 10 Mbps Ethernet trunk Fieldbus. The interface between the devices (FBMs) and the 10 Mbps Ethernet trunk Fieldbus is via Fieldbus Communications Modules (FCM10E or FCM10Ef modules) and/or DIN Fieldbus Converter Modules (DCM10E or DCM10Ef) or Fieldbus Isolators (FBI10E modules).

The non-fault-tolerant version of the Control Processor 60 is a single-width processor module. The fault-tolerant version consists of two single-width processor modules.

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Enhanced Reliability

The fault-tolerant Control Processor 60 configuration consists of two modules operating in parallel, with two separate connections to the I/A Series® Nodebus and the Ethernet trunk Fieldbus.

The two control processor modules, married together as a fault-tolerant pair, are designed to provide continued operation of the unit in the event of virtually any hardware failure occurring within one module of the pair. Both modules receive and process information simultaneously, and faults are detected by the modules themselves. One of the significant methods of fault detection is comparison of communication messages at the module external interfaces. Upon detection of a fault, self-diagnostics are run by both modules to determine which module is defective. The non-defective module then assumes control without affecting normal system operations.

To further ensure reliable communications, the fault-tolerant control processor performs error detection and address verification tests in its Nodebus and Fieldbus interfaces.

For enhanced reliability during maintenance operations, the Control Processor 60 is equipped with a recessed reset button, located at the front of the module. This feature allows you to manually force a module power off and on (rebooting) without removing the module from the enclosure.

Diagnostics

The Control Processor 60 uses three types of diagnostic tests to detect and/or isolate faults:

- Power-up self-checks
- Run-time and watchdog timer checks
- Off-line diagnostics.

Power-up self-checks are self-initiated when power is applied to the control processor. These checks perform sequential tests on the various control processor functional elements. Red and green indicators at the front of the control processor module reflect the successful (or unsuccessful) completion of the various phases of the control processor startup sequence.

The run-time and watchdog timer checks provide continuous monitoring of control processor functions during normal system operations. The operator is informed of a malfunction by means of printed or displayed system messages.

Off-line diagnostics can be temporarily used for performing comprehensive tests and checks on various control process functions and devices. Using the off-line diagnostics via System Management, a suspected fault in the control processor can be isolated and/or confirmed.

Devices Supported

The following devices are supported by the Control Processor 60.

- All DIN rail mounted subsystem FBMs (FBM201, FBM202, and so forth)
- All Y-Module form factor FBMs (FBM01, FBM02, and so forth)
- Foxboro Hydrostatic Interface Unit (HIU)
- Foxboro Mass Flowmeter
- Foxboro Panel Display Stations
- Cluster I/O using FBP10 Migration Integrator
- DCS Fieldbus Modules for Honeywell® TDC 2000 Systems (H2Mxx series of FBMs)
- DCS Fieldbus Modules for Honeywell® TDC 3000 Systems (H3Mxx series of FBMs)
- DCS Fieldbus Modules for the Bailey NET90® and INFI90® Systems
- DCS Fieldbus Modules for the Fisher PROVOX® Controller Series, Series 10 and Series 20 Systems
- DCS Fieldbus Modules for Westinghouse® Process Control WDPF® Systems
- SPECTRUM Migration Integrators (FBP11, FBP12, FBP13 and FBP14)
- SPEC 200™ Control Integrator FBMs
- SPEC 200 MICRO™ Control Integrator FBMs
- SPEC 200 CCM Control Integrator FBMs

The Foxboro Gas Chromatograph is not supported.

Fieldbus Modules

Fieldbus Modules (FBMs) provide the necessary conversion of digital I/O, analog I/O, and Intelligent Transmitter signals, allowing the corresponding signal values to be communicated to the control processor. A wide range of FBMs is available to perform the various types of signal conversion necessary to interface the control processor with field sensors and actuators.

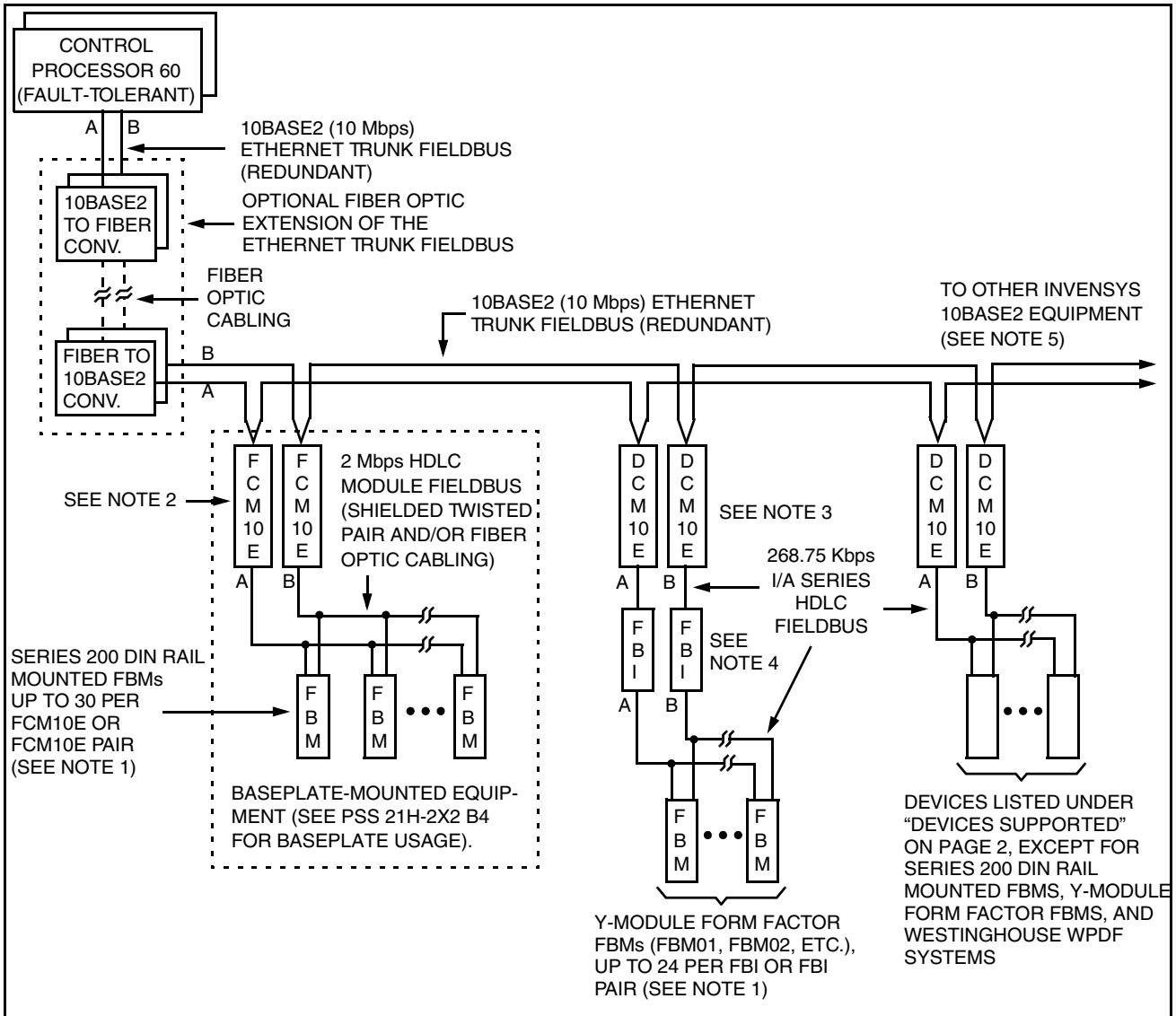
For further information on FBMs and other supported devices, refer to the FBM specific Product Specification Sheets.

Fieldbus Flexibility

The Control Processor 60 is used in two basic network configurations, which provide broad flexibility in I/O subsystem implementation:

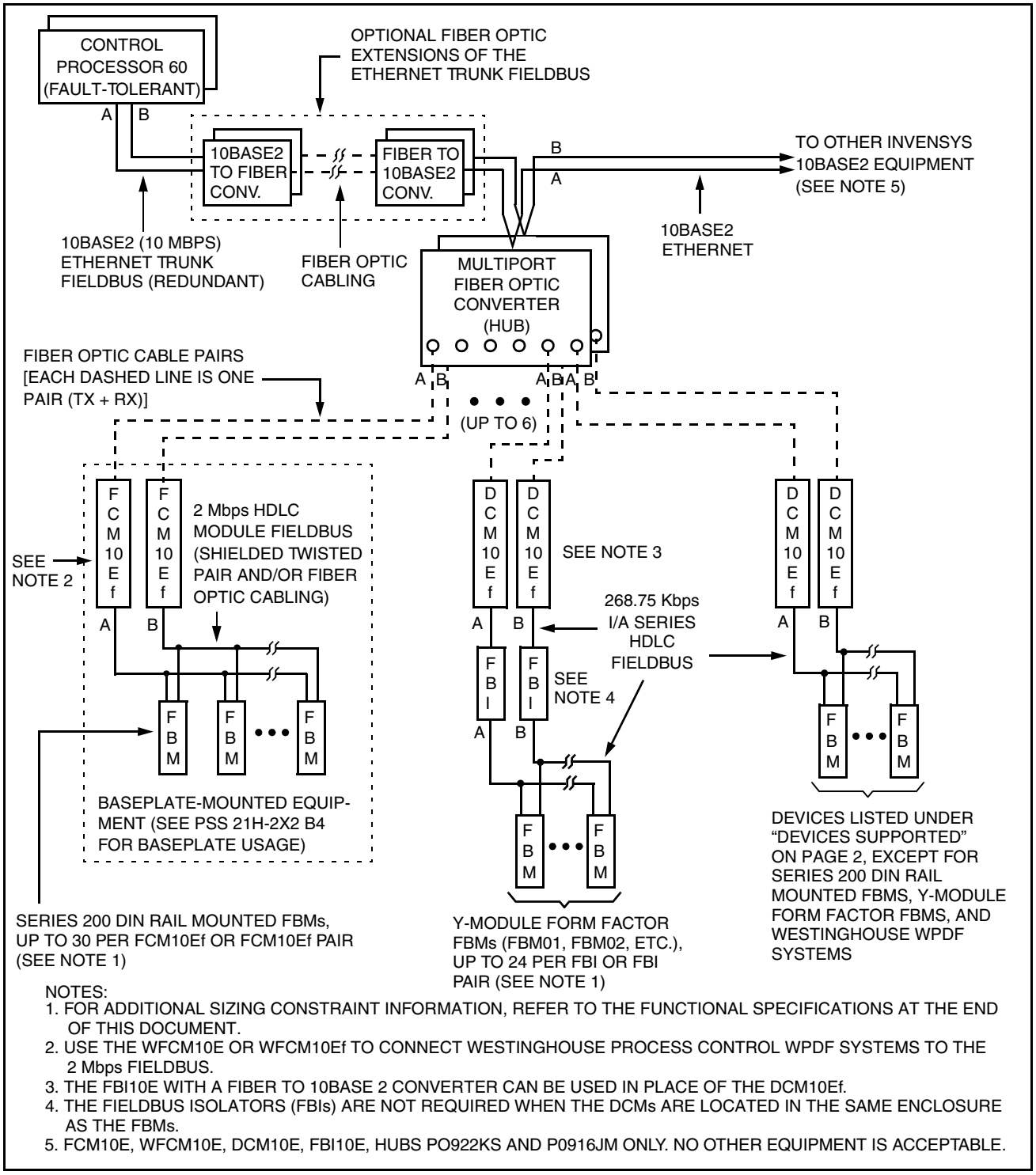
- Direct Network Configuration (Figure 1) – In this configuration, a direct connection is made between the control processor and the FCM(s) and/or DCM10E or FBI10E modules, with the possible option of a fiber optic extension.
- Active Star Network Configuration (Figure 2) – In this configuration, a multiport fiber optic converter (hub) further extends the overall Fieldbus distance, while adding application versatility and security.

Either configuration supports up to 120 Fieldbus Modules. (For configuration purposes, the HIUs, Mass Flowmeters and Panel Display Stations count as FBMs.) For maximum cabling distances, refer to the "Functional Specifications" at the end of this PSS.



NOTES:
1. FOR ADDITIONAL SIZING CONSTRAINT INFORMATION, REFER TO THE FUNCTIONAL SPECIFICATIONS AT THE END OF THIS DOCUMENT.
2. USE THE WFCM10E TO CONNECT WESTINGHOUSE PROCESS CONTROL WPDF SYSTEMS TO THE 2 Mbps FIELDBUS.
3. THE FBI10E CAN BE USED IN PLACE OF THE DCM10E.
4. THE FIELDBUS ISOLATORS (FBIs) ARE NOT REQUIRED WHEN THE DCMs ARE LOCATED IN THE SAME ENCLOSURE AS THE FBMs.
5. FCM10E, WFCM10E, DCM10E, FBI10E, HUBS PO922KS AND P0916JM ONLY. NO OTHER EQUIPMENT IS ACCEPTABLE.

Figure 1. Typical Direct Network Configuration



NOTES:
1. FOR ADDITIONAL SIZING CONSTRAINT INFORMATION, REFER TO THE FUNCTIONAL SPECIFICATIONS AT THE END OF THIS DOCUMENT.
2. USE THE WFCM10E OR WFCM10Ef TO CONNECT WESTINGHOUSE PROCESS CONTROL WPDF SYSTEMS TO THE 2 Mbps FIELDBUS.
3. THE FBI10E WITH A FIBER TO 10BASE 2 CONVERTER CAN BE USED IN PLACE OF THE DCM10Ef.
4. THE FIELDBUS ISOLATORS (FBIs) ARE NOT REQUIRED WHEN THE DCMs ARE LOCATED IN THE SAME ENCLOSURE AS THE FBMs.
5. FCM10E, WFCM10E, DCM10E, FBI10E, HUBS PO922KS AND P0916JM ONLY. NO OTHER EQUIPMENT IS ACCEPTABLE.

Figure 2. Typical Active Star Network Configuration

FUNCTIONAL SPECIFICATIONS

Processor Type
CONTROL PROCESSOR
Microprocessor-based AMD 486 DX5 (running at 133 MHz) with stored programs, using high-speed communication capability.
NODEBUS PROCESSOR
82596CA LAN Coprocessor
FIELDBUS PROCESSOR
AMD 386 Ethernet Processor

Memory
SIZE
8 MB storage
ERROR DETECTION
ECC providing single-bit error detection and correction.

Process I/O Communications (with FBMs)
ETHERNET TRUNK FIELDBUS
Type
10Base2
Transmission Rate
10 Mbps
MODULE FIELDBUS, VIA FCM
Type
HDLC, EIA RS-485
Transmission Rate
2 Mbps
MODULE FIELDBUS, VIA FBI10E OR DCM10E
Type
HDLC, EIA RS-485
Transmission Rate
268.75 Kbps

Cable Lengths – Ethernet Trunk Fieldbus
ETHERNET TRUNK FIELDBUS(a), 10BASE2
COAXIAL CABLING ONLY
185 m (607 ft) maximum(b)
FIBER OPTIC EXTENSION (BETWEEN BNC TO FIBER-ST CONVERTERS)
2 km (1.24 mi) maximum, each extension(b)
MAXIMUM ETHERNET TRUNK SEGMENTS
Three 10Base2, joined by two fiber optic extensions
FIBER DISTANCE FROM HUB TO FCM10Ef, DCM10Ef, OR FIBER CONVERTER FOR FBI10E
2 km (1.24 mi) maximum(b)

Cable Lengths – Module Fieldbus
DIN RAIL MOUNTED FBMS
Refer to PSS 21H-2W1 B3
Y-MODULE FORM FACTOR FBMS
10 m (30 ft)

Cable Lengths – Combined
CONTROL PROCESSOR 60 TO FURTHEST FBM (USING COMBINED COAXIAL AND FIBER OPTIC CABLING)
20 km (12.4 mi)

Process I/O Capacity
FIELDBUS MODULES(c)
- 120 FBMs maximum per Control Processor 60, depending on selected scan periods.(d)
- 30 FBMs maximum per FCM10E or FCM10Ef module or redundant module pair
- 36 FBMs maximum per WFCM10E or WFCM10Ef module or redundant module pair
- 24 FBMs maximum per FBI10E or FBI module, or redundant module pair

FCM/DCM/WFCM/FBI MODULES
30 (maximum total) FCM10E, FCM10Ef, DCM10E, DCM10Ef, WFCM10E, WFCM10Ef, or FBI10E modules, all of one kind or in any combination, per Ethernet trunk Fieldbus

Maximum Blocks Configured
The maximum number of blocks that can be configured for use with the CP60 (or redundant CP60 pair) is 4000. (The number of blocks used depends on scan periods and block type selection.) The blocks in question include all types (control blocks, ECBs, compounds, data blocks, and so forth).

Power Requirements
INPUT VOLTAGE (REDUNDANT VOLTAGE)
39 V dc typical
CONSUMPTION (SINGLE MODULE)
15 W, maximum

Indicators
Red and green light-emitting diodes (LEDs) indicate operational status.

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

(a) The Ethernet trunk Fieldbus connects between the Control Processor 60 and the FCMs and/or DCM10E or FBI10E modules in the Direct Network Configuration (Figure 1), and between the Control Processor 60 and the hub(s) in the Active Star configuration (Figure 2).
(b) In any specific application, individual maximum cable lengths may be affected by (limited by) the overall maximum allowable cable length (20 km) between the Control Processor 60 and the farthest FBM.
(c) For configuration purposes, HIUs, Mass Flowmeters, Panel Display Stations, etc. are counted as FBMs.
(d) Refer to *Control Processor 60 (CP60) Sizing Guidelines and Excel Workbook* (B0400BK).

ENVIRONMENTAL SPECIFICATIONS(a)

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)

Storage

TEMPERATURE
-40 to +70° C (-40 to +158° F)
RELATIVE HUMIDLY
5 to 95% (noncondensing)
ALTITUDE
-300 to +12,000 m (-1,000 to +40,000 ft)

(a) The environmental ranges can be extended by the type of enclosure containing the module. [Refer to the applicable Product Specification Sheet (PSS) which describes the specific enclosure that is to be used.]

PHYSICAL SPECIFICATIONS

Configuration

Single-width processor module. The fault-tolerant version consists of two single-width processor modules, with an interconnecting fault-tolerant connector.

Mass (Maximum)

1.7 kg (3.75 lb) for a single, non-fault-tolerant module.

Mounting

May be placed in any of the following I/A Series mounting structures:

- 1x8 Mounting Structure
- Industrial Enclosures, Structural Foam or Metal
- Field Enclosure, Structural Foam or Metal

In the fault-tolerant version, the two modules must be mounted in adjacent mounting structure slots to allow for installation of the interconnecting fault-tolerant connector.

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