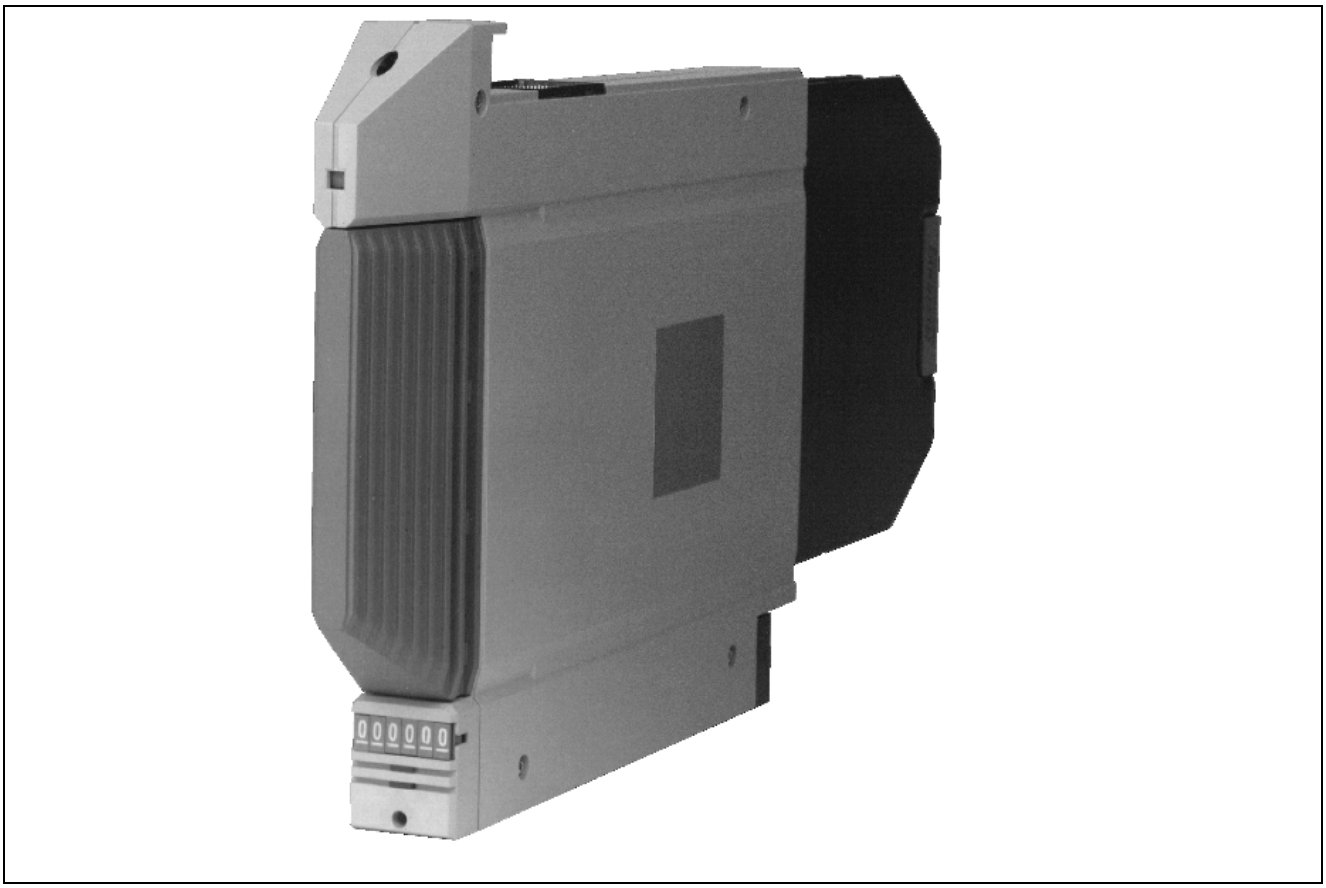
FOXBORO®

PSS 21H-1B1 B3

I/A Series® Hardware
Control Processor 10



The Control Processor 10 and the Tank Processor 10 are I/A Series stations which are physically identical, but which assume specific functions when initiated by system software.

The Control Processor 10 performs regulatory, logic, timing, and sequential control together with connected:

- Fieldbus Modules
- SPEC 200 Migration Integrator I/O
- SPEC 200 MICRO Migration Integrator I/O

It also performs data acquisition and alarm detection and notification.

The non-fault-tolerant version of the Control Processor 10 is a single-width processor module. The fault-tolerant version consists of two single-width processor modules.

The Tank Processor 10 interfaces Hydrostatic Interface Units (HIU's) and Fieldbus Modules to the I/A Series Nodebus, controlling the transfer of Hydrostatic Tank Gauging (HTG) parameter values and associated alarm data.

The Tank Processor 10 is a single-width processor module.

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Product Specifications

Enhanced Reliability

The control processor offers optional fault tolerance for enhanced reliability. The fault-tolerant control processor configuration consists of two parallel-operating modules with two separate connections to the Nodebus and to the 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. This constant, on-line redundancy does not require periodic transfer of the dynamic data base between the pair of modules, making it transparent to all application software. 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 ensure reliable communications, each single (non-fault-tolerant) control processor incorporates built-in redundancy, as well as error detection and address verification tests, in its Nodebus and Fieldbus interfaces.

Diagnostics

The control processor 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 non-successful) 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 are temporarily loaded into the system for the purpose of performing comprehensive tests and checks on various system stations and devices. Using the off-line diagnostics, a suspected fault in the control processor can be isolated and/or confirmed.

Fieldbus Modules

Fieldbus Modules provide connection of digital I/O, analog I/O, and Intelligent Transmitters to control processors. There are two types of Fieldbus Modules: main and expansion. Some of the main modules can be expanded using expansion modules.

A wide range of Fieldbus Modules is available to perform the signal conversion necessary to interface the control processor with field sensors and actuators. For further information on the Fieldbus Modules, refer to the Fieldbus Modules Product Specification Sheet (PSS).

Fieldbus Flexibility

The Control Processor 10 is used in three different Fieldbus configurations, which provide broad flexibility in Fieldbus implementation:

- Local Fieldbus (Figure 1) - Used only within the enclosure, the local bus can extend up to 10 m (30 ft). Up to 24 Fieldbus Modules (excluding expansion modules) attach directly to the local bus, which is redundant.

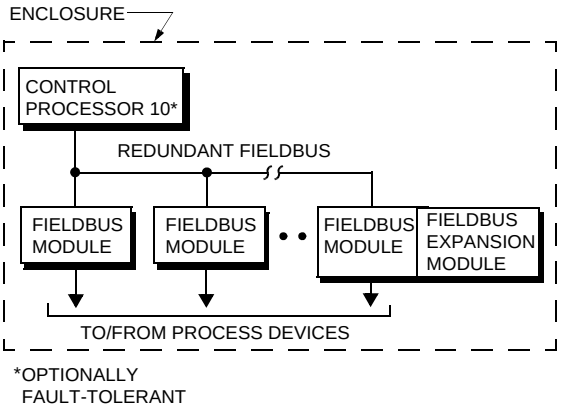


Figure 1. Local Fieldbus (Typical Configuration)

- Twinaxial (Dual-Conductor Coaxial) Fieldbus Extension (Figure 2) - Using twinaxial cable, the Fieldbus can optionally extend outside of the enclosure and can be up to 1,800 m (6,000 ft) in length. Up to 48 Fieldbus Modules (excluding expansion modules) attach to the extended bus through Fieldbus isolators. (Up to 24 Fieldbus Modules, excluding expansion modules, can connect to each isolator.) The twinaxial Fieldbus extension may be redundant.
- Fiber Optic Fieldbus Extension (Figure 3) -The fiber optic Fieldbus can optionally extend the distance as well as add application versatility and security. Overall Fieldbus length can be up to 20 km (12.4 mi). Like the twinaxial Fieldbus configuration, the fiber optic Fieldbus

configuration supports up to 48 Fieldbus Modules (excluding expansion modules), with up to 24 modules per isolator.

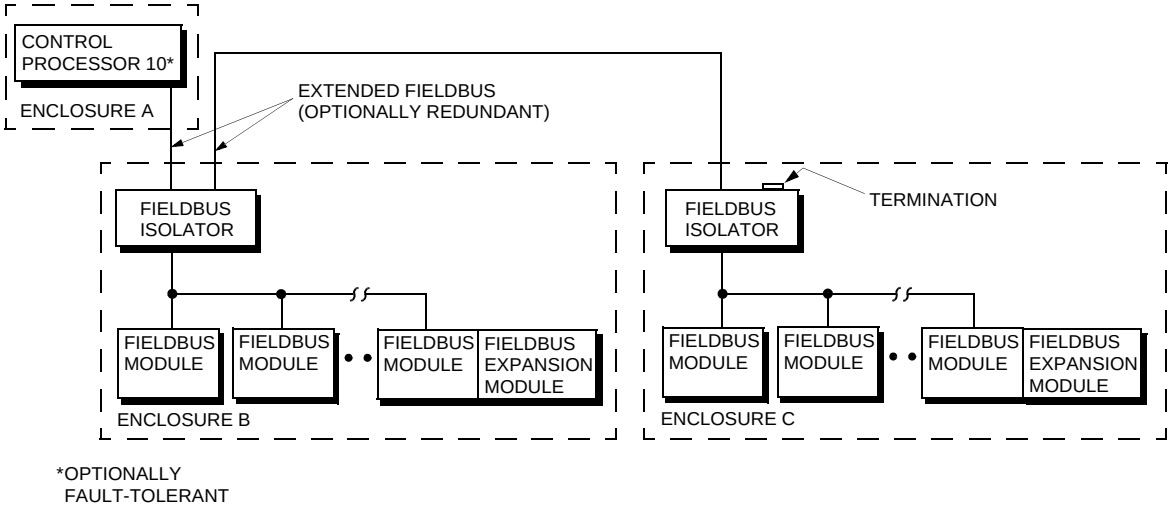
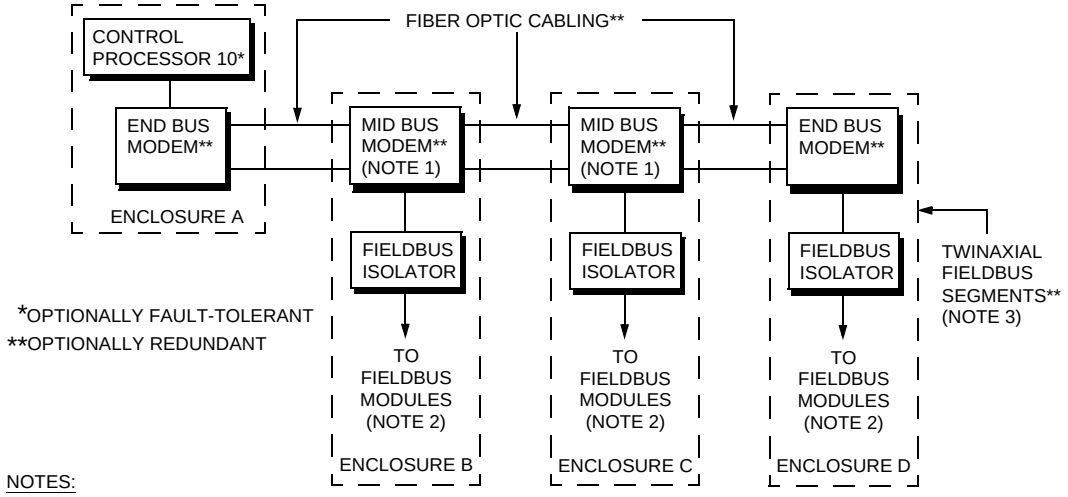


Figure 2. Twinaxial Fieldbus Extension (Typical Configuration)



NOTES:

1. THE MID BUS MODEMS ARE USED WHEN THE CONFIGURATION ENCOMPASSES MORE THAN TWO ENCLOSURES. THEY MAY ALSO BE USED AS REPEATERS, WHERE ADDED FIBER OPTIC CABLING DISTANCE IS REQUIRED.
2. CONNECTION OF THE FIELDBUS ISOLATORS TO THE FIELDBUS MODULES (FBM'S) IS SIMILAR TO THAT SHOWN IN FIGURE 2.
3. ANY TWINAXIAL FIELDBUS SEGMENT CAN BE EXTENDED TO SERVICE FBM'S IN ANOTHER ENCLOSURE. (TWINAXIAL CABLING BETWEEN ENCLOSURES IS SHOWN IN FIGURE 2.)

Figure 3. Fiber Optic Fieldbus Extension (Typical Configuration)

SPEC 200 Control Interfacing

For migration of SPEC 200 control to I/A Series systems, the Control Processor 10 interfaces via a single or redundant I/A Series Fieldbus with the SPEC 200 Control Integrator subsystem. This subsystem consists of individual Control Integrators, and Fieldbus Isolators attached within the SPEC 200 rack.

Control is via the software resident in the Control Integrator and in the SPEC 200 I/O Equipment Control Blocks (ECBs) operating at the CP level. Figure 4 illustrates a typical configuration with multiple Control Integrators in the SPEC 200 subsystem. (Refer to PSS 21H-7R1 B3, SPEC 200 Control Integrators for additional information.)

SPEC 200 MICRO Control Interfacing

For migration of SPEC 200 MICRO control to I/A Series Systems, the Control Processor 10 interfaces via a single or redundant I/A Series Fieldbus with the SPEC 200 MICRO Control Integrator subsystem. This subsystem consists of individual Control Integrators, and Fieldbus Isolators attached within the SPEC 200 rack (NCM or SPEC 200 2ANU).

Control is via the software resident in the Control Integrator and in the SPEC 200 I/O Equipment Control Blocks (ECBs) operating at the CP level. Figure 5 illustrates a typical configuration with multiple Control Integrators in the SPEC 200 subsystem. (Refer to PSS 21H-7R2 B3, SPEC 200 MICRO Control Integrators for additional information.)

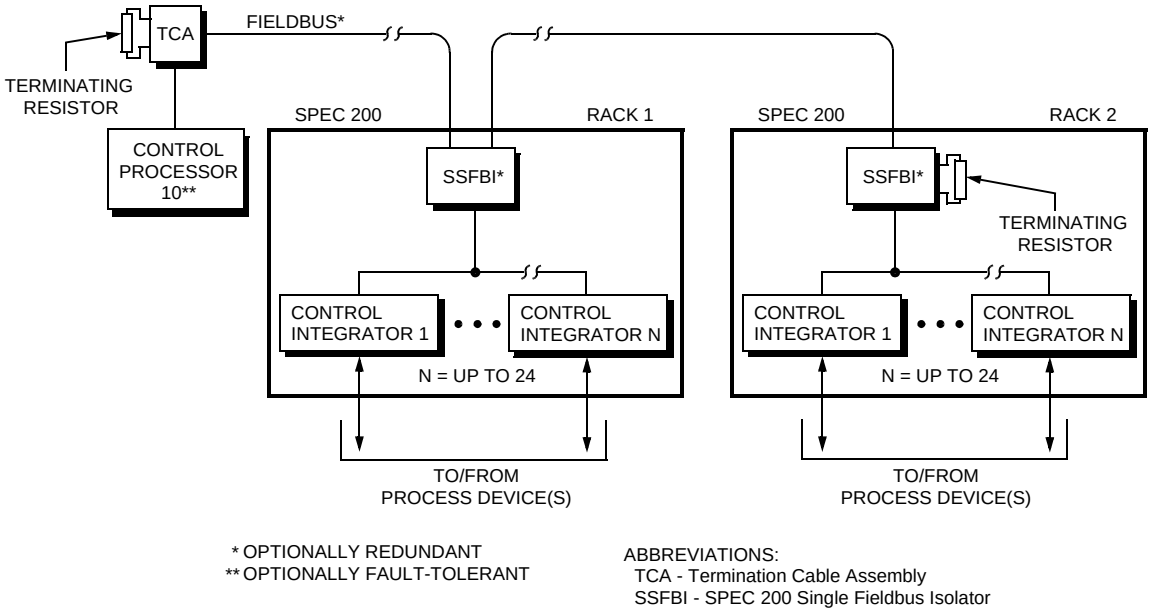


Figure 4. Twinaxial Fieldbus SPEC 200 Control Subsystem Interface Configuration (Typical Configuration)

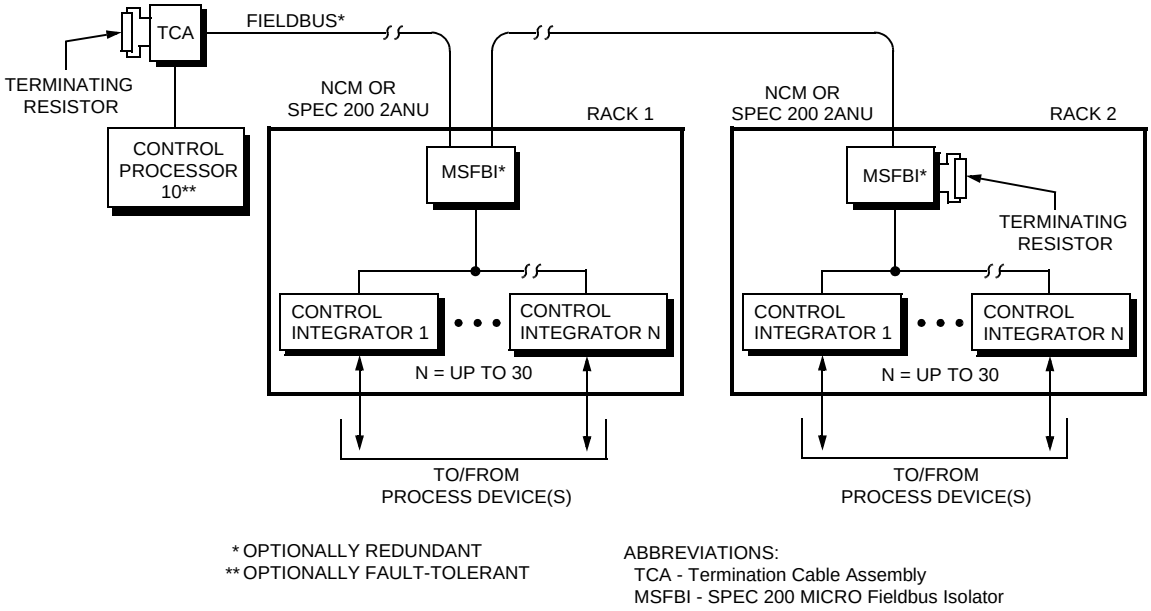


Figure 5. Twinaxial Fieldbus SPEC 200 MICRO Control Subsystem Interface Configuration (Typical Configuration)

FUNCTIONAL SPECIFICATIONS

Processor Type

Microprocessor-based, with stored programs, using high-speed communication capability.

Memory

SIZE

896K byte storage for programs and data.

ERROR DETECTION

Parity provides single-bit error detection for each byte.

Process I/O Communications

LOCAL TWINAXIAL* FIELDBUS

Type

EIA RS-485

Distance

10 m (30 ft)

Transmission Rate

268.75 Kbps

EXTENDED TWINAXIAL* FIELDBUS**

Type

EIA RS-485

Distance

1800 m (6000 ft)

Transmission Rate

268.75 Kbps

FIBER OPTIC FIELDBUS***

Type

Optical

Distance

20 km (12.4 mi)

Transmission Rate

268.75 Kbps

Process I/O Capacity

LOCAL FIELDBUS
(CONTROL PROCESSOR 10 ONLY)

24 Fieldbus Modules[1] maximum

EXTENDED FIELDBUS (TWINAXIAL OR FIBER OPTIC)

Control Processor 10

48 Fieldbus Modules[1] maximum (24 maximum on any one Fieldbus isolator).

Tank Processor 10

Up to 24 HIU's and FBM's in combination.

Power Requirements

INPUT VOLTAGE (REDUNDANT VOLTAGE)

39 V dc

CONSUMPTION (PER NON-FAULT-TOLERANT MODULE)

15 W, maximum

Indicators

Red and green light-emitting diodes (LED's) indicate operational status.

Internal Diagnostics

Self-checking performed at power-up. Runtime checks and watchdog timer function performed during operation.

[1]Excluding expansion module.

*The twinaxial Fieldbus uses a dual-conductor coaxial cable.

**Fieldbus Isolator(s) required.

***Fiber Optic Modem(s) required.

ENVIRONMENTAL SPECIFICATIONS*

(Pertain to Control Processor 10 and Tank Processor 10)

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 HUMIDITY
5 to 95% (Noncondensing)
ALTITUDE
–300 to +12,000 m (–1,000 to +40,000 ft)

Environmental Contamination Level

Class G3 (Harsh) as defined in ISA Standard S71.04

* 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 to be used.)

PHYSICAL SPECIFICATIONS

(Pertain to Control Processor 10 and Tank Processor 10)

Configuration

CONTROL PROCESSOR 10
Single-width X-Module. The fault-tolerant version consists of two single-width X-Modules.
TANK PROCESSOR 10
Single-width X-Module.

Mounting

May be placed in any mounting structure slot. In the fault-tolerant version (Control Processor 10) the two modules must be mounted in adjacent mounting structure slots.

Mass (Maximum)

2.2 kg (4.9 lb) for a single, non-fault-tolerant module.

The Foxboro Company
33 Commercial Street
Foxboro, Massachusetts 02035-2099
United States of America
Telephone 1-888-FOXBORO
(1-888-369-2676)

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