FCM100E Redundant Fieldbus Communications Module

The Redundant Fieldbus Communications Module (FCM100E) provides the communication interface between the Z-Module Control Processor 270 (ZCP270), 200 Series Fieldbus Modules (FBMs), 100 Series FBMs, and Migration products over The MESH control network.

FEATURES

- Redundant modules allow both modules to control the process. Role reversal is automatic on detected failures
- Interfaces The MESH control network (100 Mbps) to the 2 Mbps Module Fieldbus for 200 Series (or equivalent) FBMs or to the 268 Kbps Fieldbus for 100 Series (or equivalent) FBMs
- Direct multi mode fiber optic connection to The MESH control network
- Uses soft letterbug configurable via the I/A Series® Letterbug Configurator
- Harsh (Class G3 - ISA S71.04) contamination protection
- Monitored by standard I/A Series System Management displays
- An FCM100E communicates with up to 32 200 Series FBMs or up to 64 100 Series FBMs.
- “CE” logo marked on product.

OVERVIEW

The FCM100E (see Figure 1) communicates via a high-speed 100 Mbps network to the I/A Series ZCP270. The FCM100E module interfaces the 2 Mbps module Fieldbus used by the 200 Series (or equivalent) FBMs or the 268 Kbps Fieldbus used by the 100 Series (or equivalent) FBMs, to 100 Mbps Ethernet signals, and vice versa (see Figure 2).

The FCM100E installs in a DIN rail mounted Modular Baseplate for high speed communication to/from the FBMs and ZCP270 modules. A pair of FCM100E modules is installed to provide redundancy at the Fieldbus Module (FBM) level. Both modules are always active. In case of a module's failure, the other provides backup coverage until the failed module is returned to service.

Signal transmission distances up to 2 km (1.24 mi) are possible between FCM100E modules and the Ethernet switches, providing for wide distribution of the FBM equipment groupings. For more information, refer to *The MESH Control Network Architecture* (PSS 21H-7C2 B3).

A pair of FCM100E modules can be used for each FBM grouping. An FBM grouping can contain up to thirty-two 200 Series FBMs or up to sixty-four 100 Series FBMs

Redundant FCM100Es can be connected to The MESH control network, to a separate 100 Mbps fast Ethernet network, or directly to a ZCP270.

Each FCM100E module runs on a single fast Ethernet bus (A or B) only.

NOTE

The FCM100E does not support external time synchronization and SOE/TDR. These optional I/A Series components require the FCM100Et. Refer to PSS 21H-2Y10 B4 for more information.

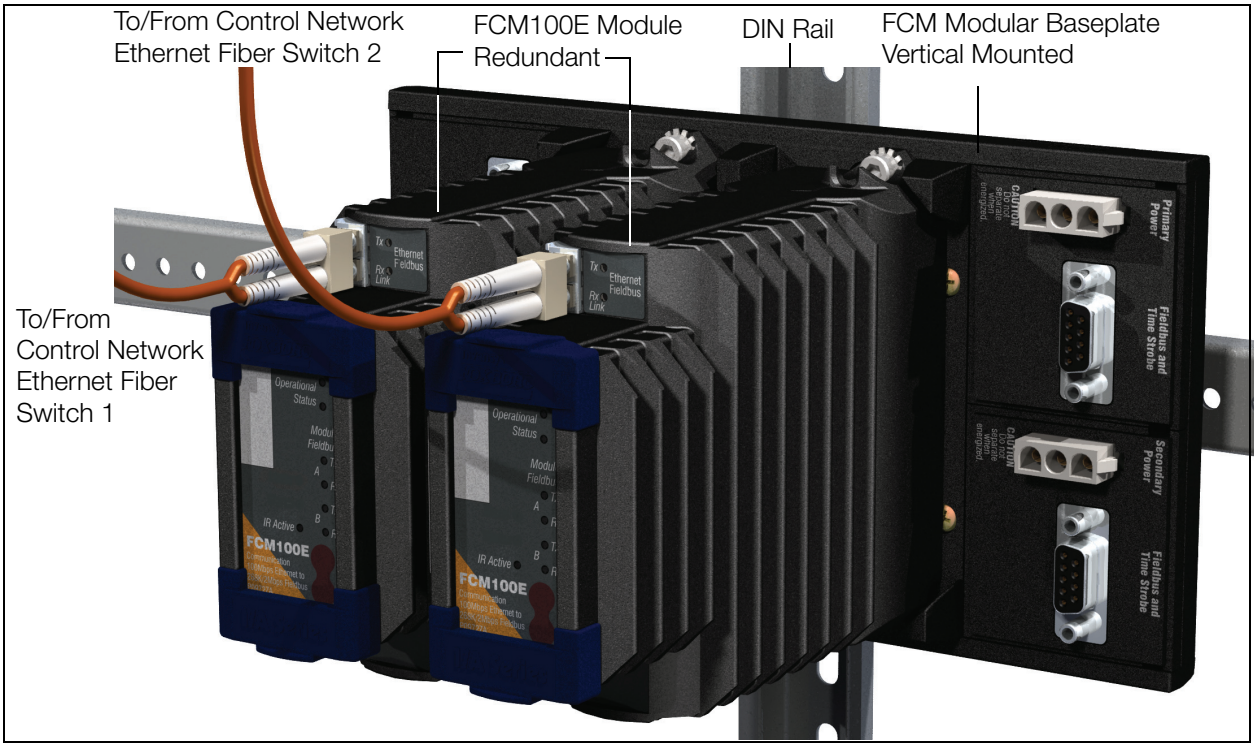

Figure 1. Redundant FCM100E Module on DIN Rail Mounted Modular Baseplate

FCM100E MODULE DESIGN

FCM100E modules have a compact design, with a rugged die cast aluminum exterior for physical protection of the electronics. Enclosures specially designed for mounting of the FCMs provide various levels of environmental protection for the FCM100E modules, up to harsh environments per ISA Standard S71.04.

The FCM100E can be removed/replaced from the baseplate without removing power. Light-emitting diodes (LEDs) incorporated into the front of the FCM100E indicate module Fieldbus communications activity and module status.

A single fast Ethernet connection is made between the FCM100E and the network, as shown in Figure 2. Both the redundant modules, with single fiber connections, connect to the network.

HIGH RELIABILITY

The redundancy of the module pair, coupled with the high coverage of faults, provides very high subsystem availability time.

Either module may be replaced without upsetting input or output communications to the other module. A module can be removed or replaced without removing power.

MODULAR BASEPLATE MOUNTING

The FCM100E mounts on various types of Modular Baseplates, which accommodate different quantities and types of modules: just FCM100Es, or a combination of FCM100Es and 200 Series FBMs. The Modular Baseplate is DIN rail mounted. The Modular Baseplate includes signal connectors for the FCM100Es, redundant independent dc power connections, and 2 Mbps module Fieldbus connections or connections to the 268 Kbps module Fieldbus using a Fieldbus splitter/terminator.

Redundant modules must be located in an odd slot and adjacent even slot on the baseplate (positions 1 and 2, 3 and 4, 5 and 6, or 7 and 8).

For more information on the various types of baseplates in an I/A Series system, refer to *DIN Rail Mounted Modular Baseplates* (PSS 21H-2W6 B4).

ETHERNET FIELDBUS COMMUNICATION

The I/A Series architecture uses The MESH control network with 100 Mbps data communications between the FCM100Es and ZCP270s (see Figure 2). Redundant FCM100Es can be connected to The MESH control network, to a separate 100 Mbps fast Ethernet network or directly to a ZCP270. The FCM100E transmits/receives communications on the Ethernet port of the redundant switched fast Ethernet. The network uses fiber optic cabling to provide extended distance and immunity to electromagnetic interference over that distance. The use of Fast Ethernet switches provides performance and cost savings over other network solutions.

MODULE FIELDBUS COMMUNICATION

The FCM100E supports either the 2 Mbps or 268 Kbps module Fieldbus. It connects to the 2 Mbps module Fieldbus for communication to all 200 Series DIN I/O FBMs, the Siemens® APACS+™ and Westinghouse® competitive migration modules Alternatively, it can connect to the 268 Kbps module Fieldbus, via a Fieldbus splitter/terminator, for communications to all 100 Series FBMs and several competitive migration modules (see “Devices Supported” on page 5).

The 2 Mbps module Fieldbus is redundant and all 200 Series modules can receive/transmit messages over both buses. The 268 Kbps Fieldbus is also redundant and all 100 Series modules can receive/transmit messages over both buses.

INSTALLATION ACCESSORIES

In IE16/32 plastic enclosures, where space is limited, mounting bracket kit P0931JD is available to install a pair of FCM100E modules on a 2-position horizontal baseplate (P0926KE) behind a side door. The enclosure is required to have the extended-style side door to use this kit. A bracket in the kit accommodates both older and newer revisions of the enclosures.

When mounted in the IE16/32 enclosure, the FCM100E baseplate can be powered from the enclosure power supplies through a PDU (P0904AU) using a special "Y" cable (P0972ZS). This "Y" cable has sufficient length to allow mounting outside the enclosure when the IE16/32 enclosure does not have sufficient space to accommodate the FCM100E and the associated baseplate.

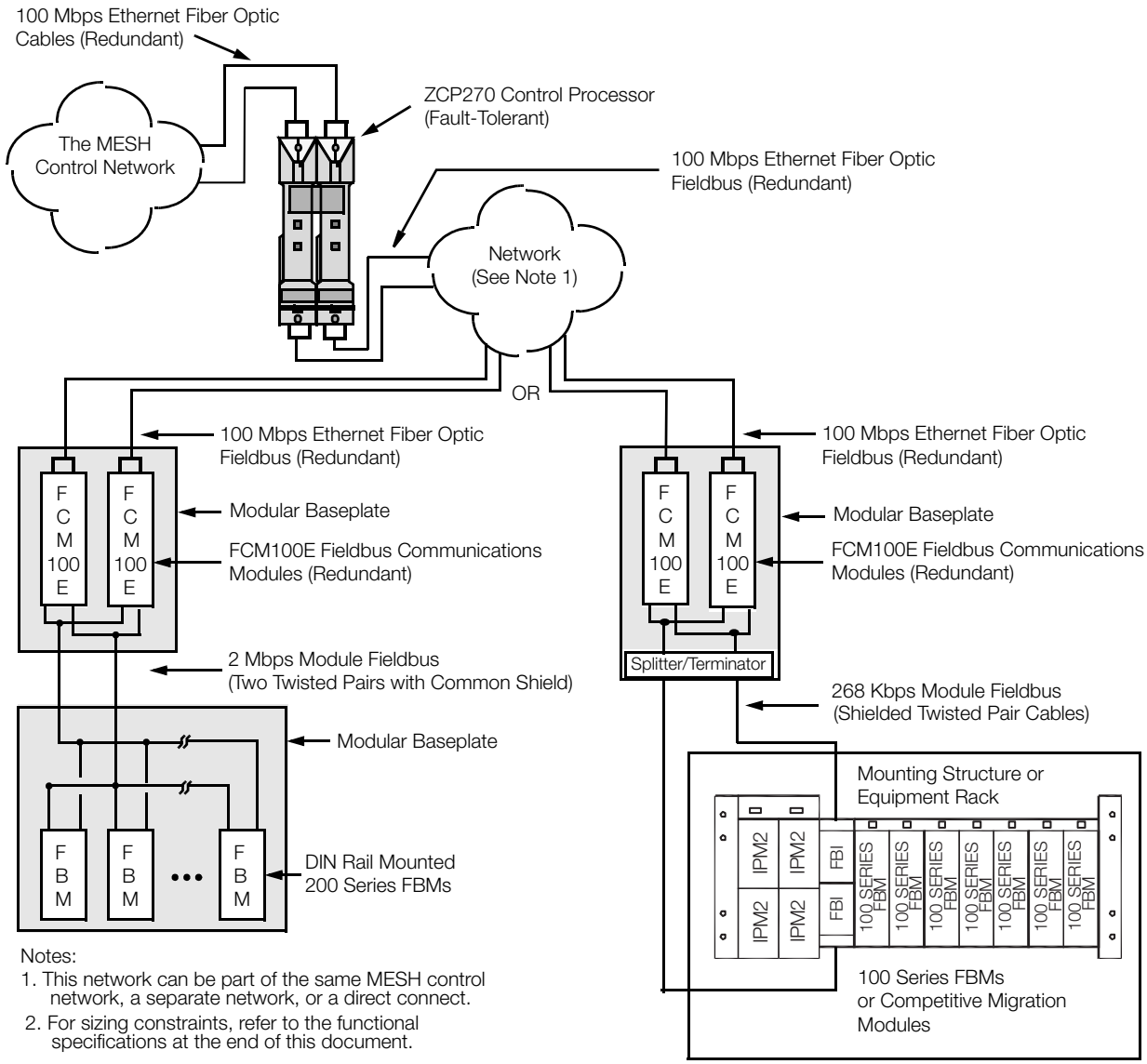

Figure 2. Typical FCM100E Network Configuration (Simplified)

DEVICES SUPPORTED

The FCM100E supports the following devices on the 2 Mbps module Fieldbus:

- All 200 Series DIN rail mounted FBMs (FBM201, FBM202, and so forth)
- Field Device Systems Integrator (FDSI) modules
- Intrinsically Safe I/O Subsystem (ISCM)
- DCS Fieldbus Modules for ABB/Taylor MOD300 Systems
- DCS Fieldbus Modules for Siemens APACS+ systems
- DCS Fieldbus Modules for Westinghouse WPDF systems.

The FCM100E supports the following devices on the 268 Kbps Fieldbus:

- 100 Series FBMs (FBM01, FBM02, and so forth)
- Fieldbus Cluster I/O via FBP10 Fieldbus processor module
- Foxboro® Hydrostatic Interface Unit (HIU)
- Foxboro Mass Flowmeter
- Foxboro Panel Display Stations
- SPECTRUM™ Migration Integrators
- SPEC 200™ Control Integrators
- SPEC 200 MICRO™ Control Integrators
- SPEC 200 CCM Control Integrators
- DCS Fieldbus Modules for Honeywell® TDC 2000 and TDC 3000 systems
- DCS Fieldbus Modules for Bailey® Net90 and Infi90 systems
- DCS Fieldbus Modules for Fisher's PROVOX® Series 10, Series 20 and Controller Series systems.

LED INDICATORS

Light-emitting diodes (LEDs) on the front of the FCM100E module provide visual indication of the:

- FCM100E operational status
- Communications activity of module Fieldbus A and B
- Ethernet transmit/receive - receive LED also indicates link status
- Infrared communications activity.

FUNCTIONAL SPECIFICATIONS

Process I/O Communications

MODULE FIELDBUS COMMUNICATIONS

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

ETHERNET FIELDBUS COMMUNICATIONS

Transmission Rate
100 Mbps

Process I/O Capacity

2 Mbps FIELDBUS

Cable Length
60 m (198 ft) maximum
200 Series FBMs
32 (maximum) Fieldbus Modules per FCM100E depending on control processor sizing constraints (refer to *ZCP270 Sizing Guidelines* (B0700AW).)

268 Kbps FIELDBUS

Cable Length
1830 m (6000 ft) maximum
100 Series FBMs
64 (maximum) Fieldbus Modules per FCM100E depending on control processor sizing constraints (refer to *ZCP270 Sizing Guidelines* (B0700AW).)
Competitive Migration Modules
Refer to the device specific Product Specification Sheets

Infrared Communications

Letterbug assignment via I/A Series Letterbug Configurator. Letterbug or Hardware ID readout via I/A Series Letterbug Configurator.

Power Requirements

INPUT VOLTAGE RANGE

21 to 42 V dc

CONSUMPTION

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
2kV on ac and dc power lines; 1kV 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

FUNCTIONAL SPECIFICATIONS (CONTINUED)

Regulatory Compliance (Cont.)

PRODUCT SAFETY

Underwriters Laboratories (UL) for U.S. and Canada

UL/UL-C listed as suitable for use in UL/UL-C listed Class 1, Groups A-D; Division 2; temperature code T5 enclosure based systems. These modules are also UL and UL-C listed as associated apparatus for supplying non-incendive communication circuits for Class 1, Groups A-D hazardous locations when connected to specified I/A Series processor modules as described in the *I/A Series 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 *I/A Series 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 nA 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 processor modules as described in the *I/A Series DIN Rail Mounted Subsystem User's Guide* (B0400FA).

Calibration Requirements

Calibration of the module is not required.

ENVIRONMENTAL SPECIFICATIONS (a)

Operating

TEMPERATURE
0 to +70°C (32 to +158°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)

Contamination

Suitable for Class G3 (Harsh) environments as defined in ISA Standard S71.04, based on exposure testing according to EIA Standard 364-65, Class III.

Vibration

0.75 g from 5 to 500 Hz

(a) 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

Mounting

The redundant installation consists of two modules. A single module can also be used.

FCM100E mounts on a Modular Baseplate. The Modular Baseplate can be mounted on a DIN rail or on a 19-inch rack using a mounting kit. Refer to PSS 21H-2W6 B4 for details.

FCM100E can be placed in a horizontal or vertical version of a 2, 4, or 8-position Modular Baseplate. The two modules must be mounted in an odd slot and adjacent even slot on the Modular Baseplate (positions 1 and 2, 3 and 4, 5 and 6, or 7 and 8).

Mass

0.6 kg (1.3 lb) approximate (each module)

FCM100E Part Number

P0972ZA

Accessories Part Numbers

2-POSITION HORIZONTAL BASEPLATE MOUNTING KIT
P0931JD

"Y" POWER CABLE FOR FCM100E IN IE16/32
P0972ZS

Dimensions

HEIGHT
103 mm (4.04 in)
114 mm (4.5 in) including mounting lugs

WIDTH
51.5 mm (2.03 in)

DEPTH
147 mm (5.80 in)

Fiber Optic Cabling: FCM100E to Network

FIBER OPTIC CABLE

Cable Material
MMF 62.5/125 um

Cable Lengths
3 m (9.9 ft) up to 2 km (6,560 ft), greater than 50m (165 ft)- user supplied

CONNECTORS

FCM100E
One type LC fiber optic connector

Connector Optical Insertion Loss
Equal to or less than 0.5 db

FOR MORE INFORMATION

For more information refer to the following Product Specification Sheets (PSS):

PSS Number	Title
PSS 21H-7C2 B3	The MESH Control Network Architecture
PSS 21H-1B10 B3	Z-Module Control Processor 270 (ZCP270)
PSS 21H-2W1 B3	DIN Rail Mounted Subsystem Overview
PSS 21H-2W6 B4	DIN Rail Mounted Modular Baseplates
PSS 21H-2Y6 B4	Intrinsically Safe I/O Subsystem

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