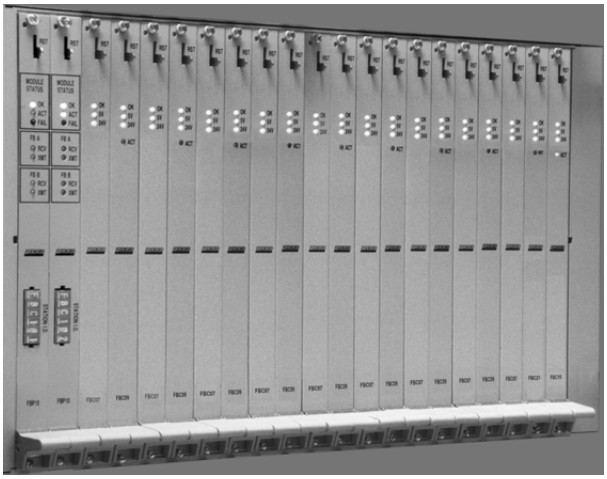
I/A Series® Hardware
Fieldbus Cluster I/O Subsystem



The I/A Series Fieldbus Cluster Input/Output Subsystem provides full support for analog measurement, digital sensing, and analog or discrete control capabilities. The Subsystem integrates with the I/A Series Control Processor or Personal Workstation via the I/A Series Fieldbus, and includes a multi-slot chassis configuration made up of a Fieldbus Processor (FBP10), Analog/Digital Fieldbus Cards (FBC), subsystem main power supply, and power monitor card.

The Fieldbus Cluster I/O Subsystem is configurable, gathering analog measurements with up to 12-bit accuracy, while simultaneously handling analog and digital input and output channels.

The I/A Series Fieldbus Cluster I/O Subsystem is offered in both non-redundant and redundant configurations. Each FBP10 in a redundant pair is individually addressable on the Fieldbus with a unique logical address. In a redundant configuration, the FBP10s provide switchover from the primary FBP10 to the redundant FBP10 and back again automatically.

The FBCs are suitable in applications where a high number of channels per card are required. They are ideal for non-isolated and isolated input signal gathering and data acquisition systems where high quantities of “points per cluster” areas are desired. The Subsystem is suitable for G1 (mild) corrosive environments. The FBCs may be optionally connected as redundant pairs.

Various input cards are available with one of the following three levels of isolation:

- Non-isolated - Each channel is referenced to ground and the card itself is referenced to ground.
- Group-isolated - Electrically separate card-to-card but not channel-to-channel on the same card.
- Isolated - Each channel is electrically separated from any other channel, card, group, building, site, etc.

ENCLOSURES

The Fieldbus Cluster I/O enclosure configurations present three distinct Euro card mounting options:

- The small configuration: a single 12 I/O slot steel chassis (ICH12), mounted in a 1600 mm (63-inch) high, NEMA 12, IP52 (vented) Metal Enclosure (ME12). See Figure 1.
- The medium configuration: a single 19 I/O slot steel chassis (ICH19), mounted in a 2000 mm (79-inch) high, NEMA 12, IP52 (vented) Metal Enclosure (ME19). See Figure 2.
- The larger configuration: three 19 I/O slot steel chassis (ICH19), mounted in a 2000 mm (79-inch) high, NEMA 12, IP52 (vented) Metal Enclosure (ME19X). See Figure 3.

The Industrial Chassis (ICH12) is an open 483 mm (19-inch) steel type chassis that houses an FBP10, up to 12 Fieldbus Cards, a Power Supply Monitor Card (PM20), and one (1) or two (2) subsystem main power supplies (IPM26 or IPM27). The ICH12 mounts into a NEMA 12, IP52 (vented) Metal Enclosure shown in Figure 1. The second power supply is for redundant power.

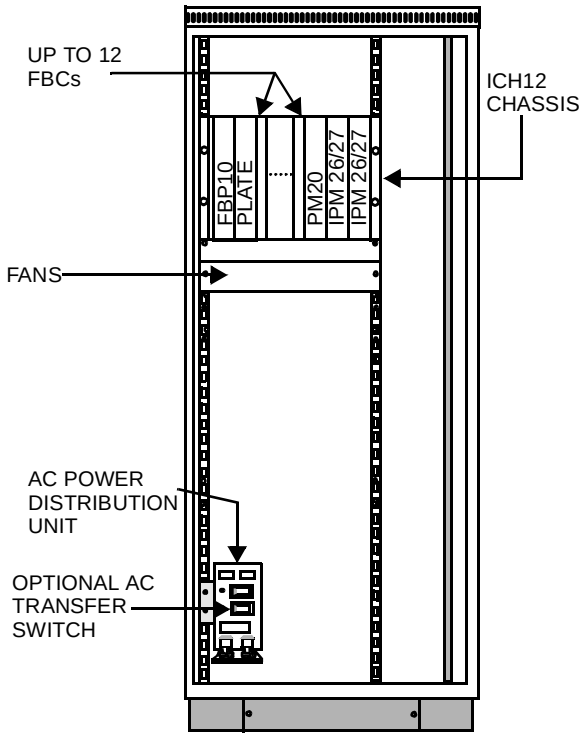


Figure 1.
ICH12, Small Configuration in an ME12 Enclosure

The Industrial Chassis (ICH19) is an open 483 mm (19-inch) steel type chassis that houses an FBP10 and up to 19 Fieldbus Cards. As a medium configuration, a single ICH19 mounts into a NEMA12, IP52 (vented) Metal Enclosure with a Power Supply Chassis (PCH06). The PCH06 contains up to two PM20 cards, up to six IPM26 or IPM27 main power supplies, a dc distribution assembly, power distribution wiring, and cables, as shown in Figure 2. Power loading is based on three power supplies. Up to three more power supplies allow for power redundancy.

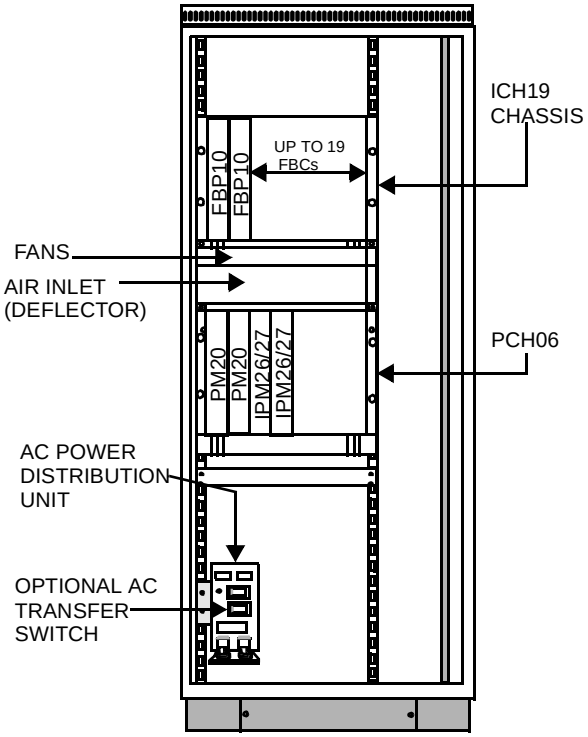


Figure 2.
ICH19, Medium Configuration in an ME19 Enclosure

The larger ICH19 configuration, as shown in Figure 3, contains up to three ICH19 chassis configurations in a metal enclosure. It contains up to two PM20 cards and up to six IPM26 or IPM27 main power supplies for power supply redundancy. Power loading is based on three power supplies. Up to three more power supplies allow for power redundancy. A second attached metal enclosure is required for termination of field signal wiring.

A customer-supplied cabinet is another enclosure option. It allows the ICH12 and ICH19 chassis to be mounted and mirror similar configurations offered with the NEMA 12 metal enclosure discussed above. The customer must then procure the ac power distribution unit, fan assemblies, and air deflector unit.

An optional ac main power transfer switch is available for use with two separately derived ac sources. This can be used for uninterruptable power where process critical applications are used.

Field wiring termination is accommodated by discrete wire type, plug type, or ring lug type termination cable assemblies that plug into the backplanes.

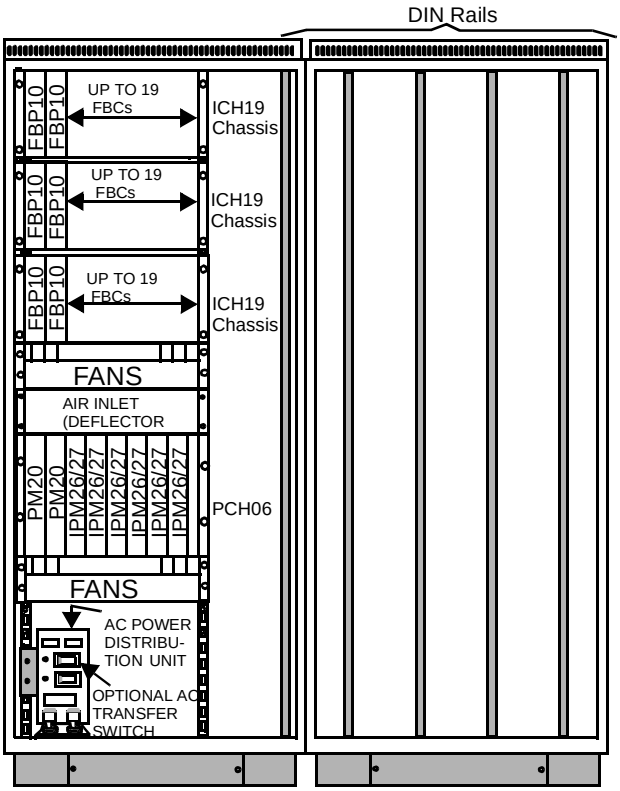


Figure 3. Larger Configuration, ME19X Enclosure

FIELDBUS PROCESSOR 10

The Fieldbus Processor 10 (FBP10) module provides communication between the Fieldbus Cards (FBCs) and the I/A Series Control Processor. Optionally available is redundancy for the FBP10 module. Each FBP10 module is individually addressable via the Fieldbus. If the primary FBP10 fails or is taken off-line, the secondary FBP10 automatically assumes control. It remains in control until the primary FBP10 returns on-line. Refer to Figure 4.

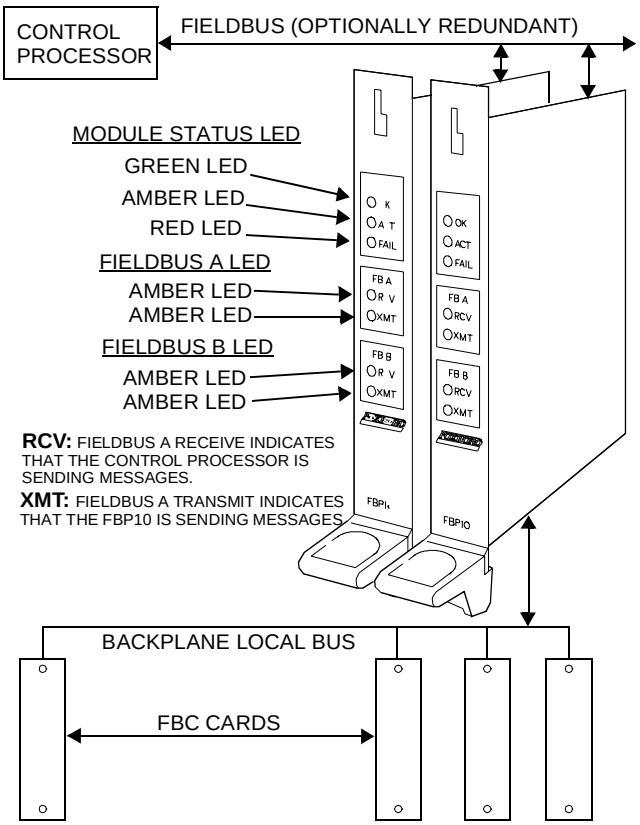


Figure 4. FBP10 Overview

FIELDBUS CARDS

The Fieldbus Cards support a variety of analog and digital I/O signals. The FBCs convert electrical I/O signals used by field devices to permit communication with these devices via the I/A Series Fieldbus.

The FBCs can be connected in a redundant configuration via the hardware except for FBC02 and FBC10. The redundant FBCs must be in adjacent slots and they are connected via a hardware adapter at the interface to the field devices. In an FBC redundant configuration, the FBP10 determines which FBC of the redundant pair is to supply the data to the Control Processor. This is done in the software by a predetermined set of conditions.

ANALOG FBCs

The analog FBCs support analog signal types and control functions. Equipped with accurate signal conditioning circuitry, the analog cards interface between process sensors and actuators. The analog I/O FBC types are:

FBC01	Non-isolated 32-channel 0 to 20 mA, analog input module with 12-bit resolution.
FBC02	Group-isolated single-ended, 32-channel thermocouple input card.
FBC04	Non-isolated 16-channel, 0 to 20 mA, analog output module with 10-bit resolution.
FBC17	Non-isolated 32-channel 0 to 10 V, analog input module with 12-bit resolution.
FBC21	Isolated 16-channel, 0 to 20 mA analog input module with 12-bit resolution. Provides transmitter power.

DIGITAL FBCs

The digital FBCs consist of 32- and 64-channel types. Inputs can be either voltage monitoring or contact sensing.

The following are digital I/O FBC types:

FBC07A	Isolated 32-channel voltage input card.
FBC07B	Non-isolated 32-channel contact input card.
FBC09	Isolated 32-channel contact output card.
FBC10	Isolated 64-channel configurable digital input and digital output card.

FIELDBUS ARCHITECTURE

Each 12- and 19-slot chassis (ICH12 or ICH19) Fieldbus Cluster I/O Subsystem as shown in Figure 5 counts as one remote drop on the I/A Series Fieldbus architecture. Additional remote drops on the same Fieldbus can consist of other I/A Series modules or other Fieldbus Cluster I/Os. This allows a mix and match of I/A Series FBMs and FBCs on the same CP with consideration to capacity constraints (see sizing guidelines).

POWER CONFIGURATION

Power to the Fieldbus Cluster I/O Subsystem is supplied via the backplane. The IPM26 (230-240 V Nominal) or IPM27 (120 V) power supplies deliver load-leveled power. Each power supply picks up the load power in the event of a single power module failure. The supplies deliver all the necessary power to ensure operative reliability including thermal shutdown functions, undervoltage shutoff, current limiting, and input overvoltage protection circuitry.

The IPM26 is for 230-240 V Nominal, 50/60 Hz ac input. The IPM27 is for 120 V, 50/60 Hz ac input.

An optional ac Transfer Switch Assembly is available for ac powering from two separate ac sources (primary and secondary sources).

POWER MONITOR CARD – PM20

The Power Monitor Card (PM20) monitors the health of all power supply modules and reports their status to the FBP10. Communications between PM20 and FBP10 is a serial port asynchronous current loop.

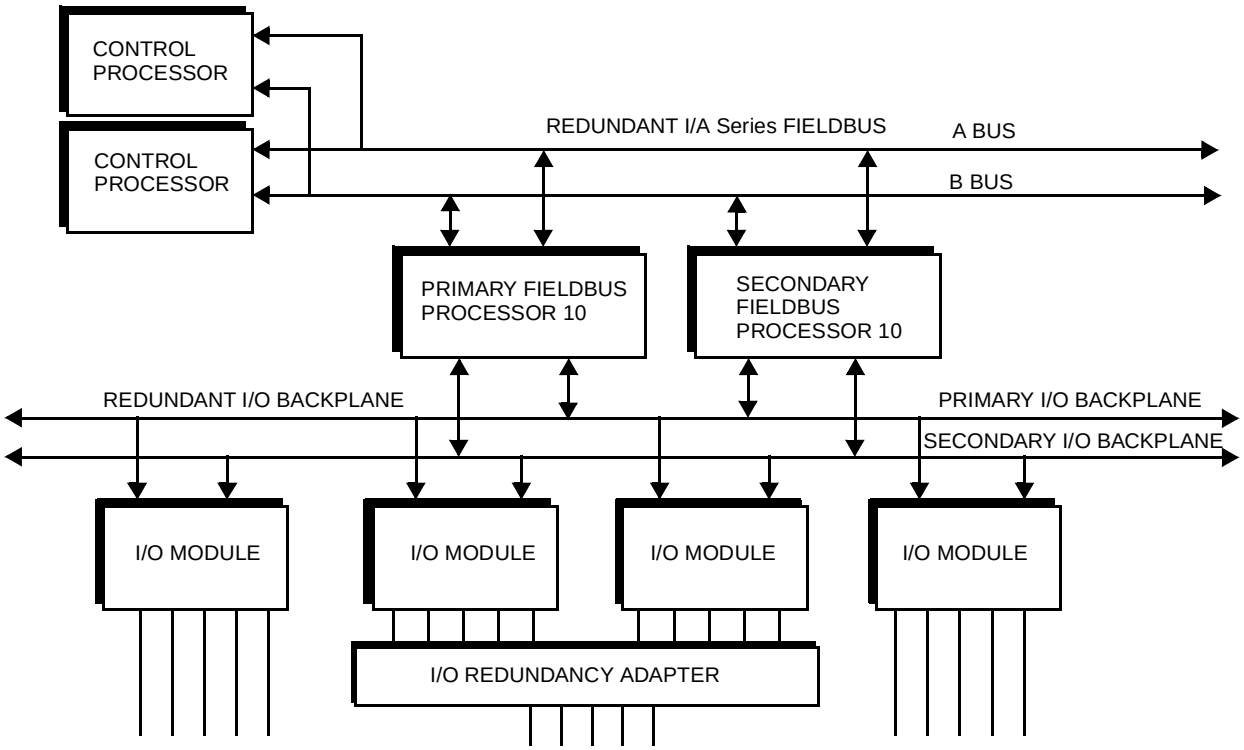


Figure 5. Typical Fieldbus Cluster I/O Architecture

Refer to the following Product Specification Sheets for detailed information on the Fieldbus Cluster I/O Subsystem.

PSS 21H-2V1 B4	Isolated 16-Channel Analog Input Fieldbus Card, 0 to 20 mA (FBC21)
PSS 21H-2V2 B4	Non-Isolated 32-Channel Analog Input Fieldbus Card, 0 to 20 mA (FBC01)
PSS 21H-2V4 B4	Non-Isolated 16-Channel Analog Output Fieldbus Card, 0 to 20 mA (FBC04)
PSS 21H-2V6 B4	32-Channel Digital Input Fieldbus Card, Contact/dc (FBC07A and FBC07B)
PSS 21H-2V7 B4	Isolated 32-Channel Digital Output Fieldbus Card, Contact/Relay (FBC09)
PSS 21H-2V9 B4	Non-Isolated 32-Channel Analog Input Fieldbus Card, 0 to 10 V, (FBC17)
PSS 21H-2V5 B4	Isolated 64-Channel Configurable Digital Input and Digital Output Card (FBC10) with Signal Conditioner Submodules (ISC01–11, OSC01–13)
PSS 21H-2V3 B4	Group-Isolated (Single-Ended) 32-Channel Thermocouple Input Card (FBC02)
PSS 21H-5F1 B3	I/A Series ac Transfer Switch

Table 1. Physical Dimensions (inches)

Unit	Height	Width	Depth
ICH12 with I/O cable	10.50	19	14
ICH19 with I/O cable	10.50	19	14
Fan Assembly	3.50	19	7
PCH06 with power cable	10.50	19	11
dc Distribution Panel	14.75	5	2
ac Transfer Switch	8	2.75	1.25
ac Distribution Panel	12.63	4.75	3

FIELDBUS PROCESSOR - FBP10

FUNCTIONAL SPECIFICATIONS

Processor Type
80C 186EC Microprocessor, 16C32 Fieldbus Controller

Memory
512 kB RAM, 512 kB Flash EEPROM

Communications
FIELDBUS
Redundant RS485/IEEE 1118 coaxial communications at 268 k baud rate

Process I/O Capacity
ICH12 - 12 FBCs maximum, up to 768 points per FBP10
ICH19 - 19 FBCs maximum, up to 1216 points per FBP10

Isolation
Isolated Fieldbus Interface

Power Requirements
PROCESSOR INPUT VOLTAGE
+5.25 V dc ± 0.25 V dc, 1.0 A
+24 V dc ± 0.6 V dc, 0.06 A
CONSUMPTION
5.3 W (maximum) @ 5.25 V dc
1.4 W (maximum) @ 24 V dc
6.7 W Total Dissipation

Minimum Scan Rate
500 msec

ENVIRONMENTAL SPECIFICATIONS

Operating
TEMPERATURE
0 to +70°C (32 to +158°F)
RELATIVE HUMIDITY
20 to 80% (Noncondensing)
ALTITUDE
-300 to +3,000 m (-1,000 to +10,000 ft)
ENCLOSURE EXTERNAL OPERATING TEMPERATURE RANGE
0 to +50°C (32 to +122°F)

Storage
TEMPERATURE
-40 to +70°C (40 to +158°F)
RELATIVE HUMIDITY
20 to 80% (Noncondensing)
ALTITUDE
-300 to +12,000 m (-1,000 to +40,000 ft)

Contamination
Class G1 (Mild) as defined in ISA Standard, S71.04

PHYSICAL SPECIFICATIONS

Mounting
ICH12, ICH19 Chassis, single slot

Mass
0.4 kg (0.9 lb)

Activity and Diagnostic Status LEDs
MODULE STATUS
OK
Green - Power on and operational
ACT
Amber - Module is on-control
FAIL
Red - Module fail

FIELDBUS A AND B STATUS:
RCV
Amber - Messages transmitting on fieldbus by Control Processor
XMT
Amber - FBP10 transmitting messages onto the Fieldbus

FIELDBUS CLUSTER I/O SYSTEM POWER SUPPLIES - IPM27, IPM26

FUNCTIONAL SPECIFICATIONS

IPM27 - ac Mains Input
VOLTAGE
120 V ac
RANGE
102 to 132 V ac
FREQUENCY
50/60 Hz, ±5%

IPM26 - ac Mains Input
VOLTAGE
230/240 V ac
RANGE
195 to 264 V ac
FREQUENCY
50/60 Hz, ±5%

Outputs per Power Supply
+5.25 V dc, 25 A maximum and +24 V dc, 3.6 A maximum

Consumption					
	Typical ac Input Consumption at Full Load				
Power Module	Input Volts	Input VA	Input Watts	Power Factor	Internal Dissipation
IPM27	120 V ac	456 VA	301 W	0.66	83.4 W
IPM26	230 V ac	528 VA	293 W	0.55	75.4 W

ENVIRONMENTAL SPECIFICATIONS

Operating
TEMPERATURE
0 to +50°C (32 to +122°F)
RELATIVE HUMIDITY
20 to 80% (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
20 to 80% (Noncondensing)
ALTITUDE
-300 to +12,000 m (-1,000 to +40,000 ft)

Contamination
Class G1 (Mild) as defined in ISA Standard, S71.04

PHYSICAL SPECIFICATIONS

Mounting
ICH12 or PCH06 (in dedicated slots)

Agency Certification
Designed to comply with requirements of IEC-950 and CSA C22.2 Nos. 950 and 234M. Contact The Foxboro Company for detailed information on agency certification states.

Mass
IPM27/IPM26
2.05 kg (4.5 lbs)

POWER MONITOR CARD - PM20

FUNCTIONAL SPECIFICATIONS

Status Monitoring

- Mains 1
- Power Supply Module (IPM27/26) one or two in the ICH12 chassis (used in ME12) or slots one to six in the PCH06 power supply chassis (used in ME19 or ME19X)
- Bus bars for voltage ranges in dc power distribution
- External digital (binary) input signal

Output

- A 1 kHz TTL logic signal upon loss of ac main or dc power supply output
- Serial message communications to FBP10 giving power status information

Power Requirements

PM20 INPUT
+5.25 V dc ± 0.25 V dc at 0.17 A
+24 V dc ± 0.6 V dc at 0.035 A
CONSUMPTION
0.89 W @ 5.25 dc
0.84 W @ 24 V dc
1.73 W Total Dissipation

ENVIRONMENTAL SPECIFICATIONS

Operating

TEMPERATURE
0 to +70°C (32 to +158°F)
RELATIVE HUMIDITY
20 to 80% (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
20 to 80% (Noncondensing)
ALTITUDE
-300 to +12,000 m (-1,000 to +40,000 ft)

Contamination

Class G1 (Mild) as defined in ISA Standard, S71.04

PHYSICAL SPECIFICATIONS

Mounting

ICH12, dedicated slot 15
PCH06, dedicated slot 1 (or 2 and 1)

Mass

0.6 kg (1.3 lb)

Status LED

OK
Green - Power applied to PM20 and watchdog timer has not timed out

FIELDBUS CLUSTER I/O SYSTEM FAN ASSEMBLIES SPECIFICATIONS

Fan Assembly - 120 V
ac INPUT VOLTAGE (V RMS)
120 V
ac INPUT CURRENT (AMPS RMS)
0.57 A
ac INPUT
68 VA
ac INPUT POWER
50 W
ac INPUT POWER FACTOR
0.73

Fan Assembly - 230/240 V
ac INPUT VOLTAGE (V RMS)
230/240 V
ac INPUT CURRENT (AMPS RMS)
0.29 A
ac INPUT
68 VA
ac INPUT POWER
50 W
ac INPUT POWER FACTOR
0.73

PHYSICAL SPECIFICATIONS

Mass
3.74 kg (8.25 lbs)

Mounting
19-inch rack

Size - Fan Assembly
88.9 mm (3.5 in), 2 units high

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