EcoStruxure™

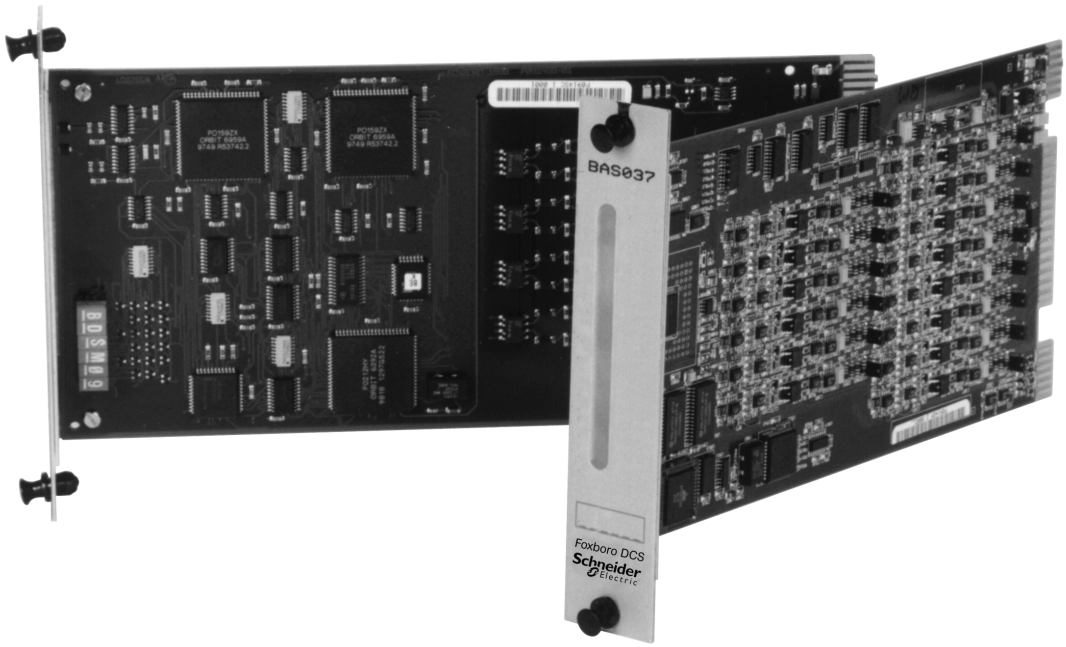
Foxboro™ DCS

Fieldbus Module for Migration of Bailey® Systems

PSS 41H-3MIGBAIL

Product Specification

May 2019



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Legal Information

Overview

EcoStruxure™ Foxboro™ DCS Fieldbus Modules (FBMs) allow migration from Bailey® Network 90 and INFI 90® process input and output (I/O) components to a Foxboro DCS process control system.

The Foxboro DCS FBM family provides a migration path from the Bailey systems process input and output components to Foxboro DCS display and supervisory functions. This can save significant cost over total system replacement by preserving existing process interface and wiring, and by minimizing process downtime.

No additional communication devices are required. No multi-vendor communication software licensing is required. The Foxboro DCS FBM family replaces the Bailey controller and/or slave module devices. Once integrated, the process is controlled entirely by the advanced Foxboro DCS algorithm set. Bailey DCS control devices are disconnected upon migration, so there is no undesirable interaction caused by the decommissioned system.

The Foxboro DCS FBM product includes appropriate connectors to enable integration of original process signals to Foxboro DCS, while keeping the field interface and wiring. It provides access to all process signals connected to the Bailey system by providing the connection between the Field Termination Units (FTU) and Foxboro DCS. All process signals become fully integrated into Foxboro DCS. Process data is used for operator display, history, alarming and control.

Operator functions and engineering configuration are accomplished by Foxboro DCS. Because all process values become part of Foxboro DCS, all configuration data is maintained by the system as native Foxboro DCS configurations.

This migration path provides plant operations with the power and flexibility of Foxboro DCS. All process values can be used plant wide for control, display, history, alarming, and information management from a single vendor source.

Features

- FBMs plug directly into an existing Bailey module mounting unit (nest) to replace controller and slave module cards
- Migration from proprietary DCS to a state-of-the-art open Foxboro DCS
- Advanced Foxboro DCS control with single point of configuration
- More direct control performance than any gateway device offers
- Single vendor service and supply

Fundamental Principle

Foxboro believes that it is only acceptable to interface with competing manufacturers' operating systems in two ways:

- Through high level public gateways
- At the lowest level, directly to field devices, without communicating with proprietary buses or components

The Foxboro migration product offerings adhere to this principle.

Product Descriptions

Foxboro DCS FBMs for Bailey systems allow migration to Foxboro DCS control, display, and application products while retaining original process terminations and field I/O wiring. All original process I/O capability of the Bailey Controller Module (CM), Analog Slave Module (ASM), Analog Output Module (AOM), Digital Slave Module (DSM), Controller Interface Slave Module (CIS), and Multifunction Controller Module (MFC) functions is replaced by direct Foxboro DCS control processor scanning and control.

FBMs plug directly into existing Bailey module mounting units in place of Bailey controller and slave module cards. The FBMs pass process measurement and output signals to and from a Foxboro DCS control processor, which provides control in place of the Bailey controllers. This saves customers significant cost over a total system replacement by preserving existing process interfaces and wiring, and by minimizing process downtime.

The FCP280 offers direct connection of the FBMs to the Fieldbus.

The FCP280 can be located in a nearby existing enclosure or Foxboro DCS enclosure and the fieldbus extended to connect the modules to the Fieldbus Isolators (BFBI) located in a Bailey MMU.

Migration with FCP280 and FBMs

The Field Control Processor 280 (FCP280) is a distributed, field-mounted controller module that supports up to 128 FBMs (depending on selected scan periods). The FCP280 supports up to four HDLC Fieldbuses and each HDLC Fieldbus can have a dedicated network with up to 64 FBMs (provided the total 128 FBM limit is not exceeded). The FCP280 connects to The Foxboro DCS Control Network (the control network) via optionally redundant 100 Mbps Ethernet fiber optic cables and Ethernet fiber switches. The FCP280 is an optionally fault-tolerant controller that communicates with connected FBMs to perform data acquisition and control using Foxboro DCS control algorithms.

The FCP280 mounts in a baseplate that supports a single module or a fault-tolerant module pair. A single/redundant FCP280 requires 24 V dc power from single/redundant power supplies. For the FBMs, one or more HDLC Fieldbus ports on the FCP280's baseplate connect to an optionally redundant 268 Kbps Fieldbus for communications to the FBMs and provide galvanic isolation between the 100 Mbps control network and the 268 Kbps local Fieldbus.

Fault-tolerant FCP280 modules connect to a pair of network adapters that connect to Ethernet switches in a redundant control network. The network adapters pair mount in the same baseplate as the FCP280s.

To support fault tolerance, a pair of FCP280s must be used for each FBM grouping. In non-fault tolerant configurations, only a single FCP280 is required for each grouping.

The maximum total cable length for the 268 Kbps Fieldbus is 60 m (198 ft) within a grouping. For more information on the FCP280, refer to PSS 41H-1FCP280.

Controller Module (CIS01, CIS02, COM01, COM02, COM03, COM04, QRC01, QRS01, QRS02)

A Controller Module (CM) connects directly to an Analog Controller Termination Unit. The CM processor card is removed and replaced by FBM BCOM17. This provides original I/O functionality of high level analog input, analog output, contact input, and contact output. The BCOM17 FBM is powered by the original module mounting unit power bus. See this table:

Model	Replaces	Description
BCOM17	IMCOM/03/04; NCOM01/02/03/04; IMQRC01; NQRC01; IMCIS01/02/12; NCIS01/02; IMQRS01/02/12; NQRS01/02	4AI (1 to 5 V dc, 4 to 20 mA) 2AO (1 to 5 V dc, 4 to 20 mA) 3DI (24 V dc,125 V dc,120 V ac) 4DO (24 V dc, 250 mA)

Analog Master (AMM) and Slave Modules (ASI, ASM, ASO)

Analog Master Modules are removed and replaced with FBM BAMM01. The Analog Slave Modules are removed and replaced by a corresponding FBM (see the next table). This provides original I/O functionality of high level analog input, low level analog thermocouple input, and low level analog RTD input.

The FBM is powered by the original power bus.

Model	Replaces	Description
BAMM01	NAMM01/02/03; IMAMM03	4 RTD
BASO37	IMASO01; NASO01; IMASO11	14AO (1 to 5 V, 4 to 20 mA)
BASM01	IMASM01; NASM01	16AI (4 to 20 mA, 1 to 5 V, 0 to 10 V, ±10 V dc)
BASM02	IMASM02; NASM02	8AI, Thermocouple
BASM03	IMASM03; NASM03	8AI, RTD Platinum, Nickel
BASM33	IMASM04; NASM04	8AI, RTD Copper
BASI03	IMASI03	16AI, High Level, TC, RTD
BASI01	IMASI01/02; NASI01/02; IMFBS01 IMFEC11/12	15AI (4 to 20 mA, 0 to 5 V, 1 to 5 V, 0 to 10 V, ±10 V, 0 to 1 V dc)

Analog Output Module (AOM)

Analog Output Modules are removed and replaced by a corresponding FBM BAOM37. The BAOM37 provides original I/O functionality of the analog output modules. The FBM is powered by the original power bus. See this table:

Model	Replaces	Description
BAOM37	IMAOM01; NAOM01	8AO (0 to 10 V, 1 to 5 V, 4 to 20 mA)

Logic Master Module (LMM)

Logic Master Modules provide contact inputs and contact outputs directly to termination units. Additional I/O is provided to the LMM by Digital Slave Modules and Contact Input Slave Modules. LMMs are removed and replaced by a corresponding FBM. This provides original I/O functionality of the LMM. The FBM is powered by the original power bus. See this table:

Model	Replaces	Description
BDSM9A	IMLMM02; NLMM01/02	8DI (24 V dc, 125 V dc, 120 V ac), 8DO (24 V dc)

Digital Slave Modules (DSI, DSM, DSO)

Digital Slave Modules are removed and replaced by a corresponding FBM. This provides original I/O functionality of the digital input and/or output. The FBM is powered by the original power bus. See this table:

Model	Replaces	Description
BDSI07	IMDSI02/12/ 13/14/15; NDSI01/02; NDSM02/03	16DI (24 V dc, 125 V dc, 120 V ac)
BDSM06	IMDSM04; NDSM04	8PI
BDSM9B	NDSM01; IMDSM05; NDSM05	16DI, 16DO, 24 V dc (groups of 8)
BDSO10	IMDSO01/15; NDSO01	8DO (24 to 240 V ac/solid-state relay)
BDSO26	IMDSO02/15; NDSO02	8DO (4 to 50 V dc/solid-state relay)
BDSO41	IMDSO03; NDSO03	8DO (5 to 160 V dc/solid-state relay)
BDSM09	IMDSO04/14; NDSO04	16DO (24 V dc/solid-state relay)

Multifunction Controller Module (MFC01, MFC02, MFC03)

A Multifunction Controller Module connects to various slave modules for process input and output. The MFC processor card is no longer needed and removed. Associated slave modules (ASM, DSM, PIM) are replaced as described in other sections of this document.

Pulse Input Slave Modules (PIM)

Pulse Input Slave Modules are removed and replaced by a corresponding FBM BDSM06. This provides original I/O functionality of the pulse inputs. The FBM is powered by the original module mounting unit power bus.

Sequence of Events Module

Sequence of Events modules are removed and replaced by FBM BSEM01. The Bailey IMSEM01 SEQ Master is no longer needed and removed. The Bailey IMSET01 Time Synchronizer and IMSED01 Digital Input modules are replaced with the BSEM01. This provides sequence of events functionality for all corresponding inputs. See this table:

Model	Replaces	Description
BSEM01	IMSET01; IMSED01	16DI Sequence of Events (24 V dc, 48 V dc, 120 V dc, 120 V ac)

Programmable Logic Controller Module (MPC01, MPC02)

A Programmable Logic Controller Module connects to the same slave modules for process input and output as the Multifunction Controller Module. The MPC processor card is no longer needed and removed. Associated slave modules (ASM, DSM, PIM, CIS) are replaced as described in other sections of this document.

Other Devices

Network communications functions and operator interfaces are all replaced by standard Foxboro DCS interface functions. PLC and computer interfaces are replaced by standard Foxboro DCS Field Device System Integrator Modules (FDSI) modules, which provide both serial and Ethernet protocol interfaces. The original Bailey devices are decommissioned and removed from the original mounting units.

Migration is accomplished using the Bailey Migration Kit (P0915XY).

Functional Specifications - Common to All FBMs

Calibration Requirements	Calibration of the FBMs is not required.
Communication	Redundant IEEE P1118 Fieldbus
Process I/O Capacity	**Field Control Processor 280 (FCP280)**: 128 FBMs maximum (depending on scan periods) - up to 64 FBMs per HDLC Fieldbus. The FCP280 baseplate supports up to four HDLC fieldbuses.

BAMM01 Functional Specifications

Power Requirements	• Input Voltage: +5 V dc ±5%, ±15 V dc ±5% • Consumption: 8.0 W • Heat Dissipation: 8.0 W
Analog Input Channels (4)	• RTD: 1.0 kΩ to 1.6 kΩ • Rated Mean Accuracy: ±0.025% of span (±1.5 Ω) • Resolution: 12 to 15 bits, programmable • Isolation: 600 V ac between any channel and ground or between channels. **⚠⚠DANGER** **HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH** This does not imply that these channels are intended for permanent connection to hazardous voltage circuits. Connection of these channels to voltages greater than 30 V ac or 60 V dc violates electrical safety code requirements and may expose users to electric shock. **Failure to follow these instructions will result in death or serious injury.**

BAOM37 Functional Specifications

Power Requirements	• Input Voltage: +5 V dc ±5%, ±15 V dc ±5% • Consumption: 12.0 W • Heat Dissipation: 12.0 W
Analog Output Channels (8)	• Range: 0 to 10 V dc, 1 to 5 V dc, 0 to 20.4 mA dc • Rated Mean Accuracy: ±0.05% of span (mA range) ±0.15% of span (voltage ranges) • Resolution: 12 bits • Output Load: 735 Ω (maximum) mA range 1000 Ω (minimum) voltage ranges • Compliance Voltage: 18.6 dc nominal at 20 mA at I/O field terminals • Settling Time: 100 ms to settle within 1% band of steady state

BASI01 Functional Specifications

Power Requirements	• Input Voltage: +5 V dc ±5%, ±15 V dc ±5% • Consumption: 5.75 W • Heat Dissipation: 5.75 W
Analog Output Channels (15)	• Range: 0 to 20 mA dc, 1 to 5 V dc, 0 to 1 V dc, 0 to 5 V dc, 0 to 10 V dc, ±10 V dc • Rated Mean Accuracy: ±0.25% of span for 0 to 1 V dc range 0.10% of span for all other ranges • Resolution: 12 to 15 bits, programmable

BASI03 Functional Specifications

Power Requirements	• Input Voltage: +5 V dc ±5%, ±15 V dc ±5% • Consumption: 6.0 W • Heat Dissipation: 6.0 W
Analog Input Channels (16)	Independently configured • Range: TC, RTD, 0 to 100 mV, ±100 mV, 1 to 5 V dc, 0 to 5 V dc, 0 to 10 V dc, ±10 V dc • Rated Mean Accuracy: ±0.05% of span • Resolution: 12 bits • Isolation: 600 V ac between any channel and ground or between channels. **⚠⚠DANGER** **HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH** This does not imply that these channels are intended for permanent connection to hazardous voltage circuits. Connection of these channels to voltages greater than 30 V ac or 60 V dc violates electrical safety code requirements and may expose users to electric shock. **Failure to follow these instructions will result in death or serious injury.**

BASM01 Functional Specifications

Power Requirements	• Input Voltage: +5 V dc ±5%, ±15 V dc ±5% • Consumption: 5.75 W • Heat Dissipation: 5.75 W
Analog Input Channels (16)	• Range: 0 to 20 mA dc, 1 to 5 V dc, 0 to 1 V dc, 0 to 5 V dc, 0 to 10 V dc, ±10 V dc • Rated Mean Accuracy: ±0.25% of span for 0 to 1 V dc range 0.10% of span for all other ranges • Resolution: 12 bits

BASM02 Functional Specifications

Power Requirements	• Input Voltage: +5 V dc ±5%, ±15 V dc ±5% • Consumption: 7.0 W • Heat Dissipation: 7.0 W
Analog Input Channels (8)	• Range: −10.5 to 71.419 mV dc, 0 to 100 mV dc, ±100 mV dc • Rated Mean Accuracy: ±0.035% of span (±0.5% for 0 to 100 mV) • Thermocouple Types: E, J, K, R, S, T (Chinese E, S) • Resolution: 12 to 15 bits, programmable • Isolation: 600 V ac between any channel and ground or between channels. **⚠⚠DANGER** **HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH** This does not imply that these channels are intended for permanent connection to hazardous voltage circuits. Connection of these channels to voltages greater than 30 V ac or 60 V dc violates electrical safety code requirements and may expose users to electric shock. **Failure to follow these instructions will result in death or serious injury.**

BASM03 Functional Specifications

Power Requirements	• Input Voltage: +5 V dc ±5%, ±15 V dc ±5% • Consumption: 8.0 W • Heat Dissipation: 8.0 W
Analog Input Channels (8)	• RTD: 0 to 320 Ω • Rated Mean Accuracy: ±0.025% of span (±0.08 Ω) • Resolution: 12 to 15 bits, programmable • Isolation: 600 V ac between any channel and ground or between channels. **⚠⚠DANGER** **HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH** This does not imply that these channels are intended for permanent connection to hazardous voltage circuits. Connection of these channels to voltages greater than 30 V ac or 60 V dc violates electrical safety code requirements and may expose users to electric shock. **Failure to follow these instructions will result in death or serious injury.**

BASM33 Functional Specifications

Power Requirements	• Input Voltage: +5 V dc ±5%, ±15 V dc ±5% • Consumption: 8.0 W • Heat Dissipation: 8.0 W
Analog Input Channels (8)	• RTD: 0 to 30 Ω • Rated Mean Accuracy: ±0.025% of span (±0.08 Ω) • Resolution: 12 to 15 bits, programmable • Isolation: 600 V ac between any channel and ground or between channels. **⚠⚠DANGER** **HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH** This does not imply that these channels are intended for permanent connection to hazardous voltage circuits. Connection of these channels to voltages greater than 30 V ac or 60 V dc violates electrical safety code requirements and may expose users to electric shock. **Failure to follow these instructions will result in death or serious injury.**

BASO37 Functional Specifications

Power Requirements	• Input Voltage: +5 V dc ±5%, ±15 V dc ±5% • Consumption: 15.4 W • Heat Dissipation: 15.4 W
Analog Output Channels (14)	• Range: 1 to 5 V dc, 4 to 20.4 mA dc • Rated Mean Accuracy: ±0.25% of span (4 to 20 mA range) ±0.15% of span (1 to 5 V dc range) • Resolution: 12 bits • Output Load: 750 Ω (maximum) 4 to 20 mA range 350 Ω (minimum) 1 to 5 V dc range • Compliance Voltage: 18.6 dc nominal at 20 mA at I/O field terminals • Settling Time: 100 ms to settle within 1% band of steady state

BCOM17 Functional Specifications

Power Requirements	• Input Voltage: +5 V dc ±5%, ±15 V dc ±5% • Consumption: 5.75 W • Heat Dissipation: 5.75 W
Analog Input Channels (4 Channels)	• Range: 1 to 5 V dc, 4 to 20 mA dc • Rated Mean Accuracy: ±0.05% of span • Resolution: 12 to 15 bits, programmable
Discrete Input Channels (3)	• Open Circuit Voltage: ◦ *Range 1* 24 V dc, 125 V dc, 120 V ac (supplied at termination panel) ◦ *Range 2* 24 V dc, 125 V dc (supplied at termination panel) • Short Circuit Current: ◦ *Range 1* 2.0 mA at 24 V dc; 6.0 mA at 125 V dc; 3.0 mA at 120 V ac ◦ *Range 2* 2.0 mA at 24 V dc; 6.0 mA at 125 V dc • On-State Resistance: 1 kΩ (maximum) • Off-State Resistance: 200 kΩ (minimum) • Input Switching Levels: Jumper Select ◦ *High Level Range 1* 20 V dc minimum (24 V dc) 100 V dc minimum (125 V dc) 100 V_{rms} minimum (120 V ac) ◦ *High Level Range 2* 10 V dc minimum (24 V dc) 35 V dc minimum (125 V dc) ◦ *Low Level Range 1* 10 V dc maximum (24 V dc) 50 V dc maximum (125 V dc) 50 V_{rms} maximum (120 V ac) ◦ *Low Level Range 2* 1.7 V dc maximum (24 V dc)

	5.6 V dc maximum (125 V dc)
Analog Output Channels (2)	• Range: 1 to 5 V dc, 4 to 20.4 mA dc • Rated Mean Accuracy: ±0.05% of span • Resolution: 12 bits • Output Load: 735 Ω (maximum) 4 to 20 mA range 1000 Ω (minimum) 1 to 5 V dc range • Compliance Voltage: 18.6 dc nominal at 20 mA at I/O field terminals • Settling Time: 100 ms to settle within a 1% band of steady state
Discrete Output Channels (4)	Isolated Solid State Switch • Applied Voltage: 21 to 27 V dc • Load Current: 0.25 A (maximum) • Off-State Leakage Current: 0.1 mA • Isolation: Discrete input channels and discrete output channels only: 600 V ac, channel to ground

BDSI07 Functional Specifications

Power Requirements	• Input Voltage: +5 V dc ±5% • Consumption: 5.0 W • Heat Dissipation: 5.0 W
Discrete Input Channels (16)	• Contact Input Range: Open (off) and Closed (on) • Open Circuit Voltage: 24 V dc, 125 V dc, 120 V ac (supplied at termination panel) • Short Circuit Current: 2.0 mA at 24 V dc 6.0 mA at 125 V dc 3.0 mA at 120 V ac • On-State Resistance: 1 kΩ (maximum) • Off-State Resistance: 200 kΩ (minimum) • Input Switching Levels: ◦ *High Level* 20 V dc minimum (24 V dc) 100 V dc minimum (125 V dc) 100 V_{rms} minimum (120 V ac) ◦ *Low Level* 10 V dc maximum (24 V dc) 50 V dc maximum (125 V dc) 50 V_{rms} maximum (120 V ac) • Isolation: 600 V ac between any channel and ground or between channels. **⚠⚠DANGER** **HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH** This does not imply that these channels are intended for permanent connection to hazardous voltage circuits. Connection of these channels to voltages greater than 120 V ac violates electrical safety code requirements and may expose users to electric shock. **Failure to follow these instructions will result in death or serious injury.**

BDSM06 Functional Specifications

Power Requirements	• Input Voltage: +5 V dc ±5% • Consumption: 4.5 W • Heat Dissipation: 4.5 W
Pulse Input Channels (8)	• Input Ranges: ◦ *Range 1* 5 V dc – Input Logic High 4 V dc minimum to 6 V dc maximum – Input Logic Low 0.0 V dc minimum to 1.0 V dc maximum ◦ *Range 2* 24 V dc – Input Logic High 21.6 V dc minimum to 27 V dc maximum – Input Logic Low 0.0 V dc minimum to 2.0 V dc maximum ◦ *Range 3* Preamps (channels 1 and 2 only) – Input Logic High +25 mV (peak) minimum to 5 V dc maximum – Input Logic Low −25 mV (peak) minimum to −5 V dc maximum • Counter Range: 0 to 50 K counts per second • Isolation: 600 V ac between any channel and ground or between channels. **⚠⚠DANGER** **HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH** This does not imply that these channels are intended for permanent connection to hazardous voltage circuits. Connection of these channels to voltages greater than 120 V ac violates electrical safety code requirements and may expose users to electric shock. **Failure to follow these instructions will result in death or serious injury.**

BDSM09 Functional Specifications

Power Requirements	• Input Voltage: +5 V dc ±5% • Consumption: 2.3 W • Heat Dissipation: 5.0 W
Discrete Output Channels (16)	Isolated • Applied Voltage: 21 to 27 V dc • Load Current: 0.25 A (maximum) • Off-State Leakage Current: 0.10 mA • Isolation: Between any channel and ground, 600 V ac. **⚠⚠DANGER** **HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH** This does not imply that these channels are intended for permanent connection to hazardous voltage circuits. Connection of these channels to voltages greater than 120 V ac violates electrical safety code requirements and may expose users to electric shock. **Failure to follow these instructions will result in death or serious injury.**

BDSM9A Functional Specifications

Power Requirements	• Input Voltage: +5 V dc ±5% • Consumption: 5.0 W • Heat Dissipation: 5.0 W
Discrete Input Channels (8)	• Contact Input Range: Open (off) and Closed (on) • Open Circuit Voltage: 24 V dc, 125 V dc, 120 V ac (supplied at termination panel) • Short-Circuit Current: 2.0 mA at 24 V dc; 6.0 mA at 125 V dc; 3.0 mA at 120 V ac • On-State Resistance: 1 kΩ (maximum) • Off-State Resistance: 200 kΩ (minimum) • Input Switching Levels: ◦ *High Level* 20 V dc minimum (24 V dc) 40 V dc minimum (125 V dc) 100 V_{rms} minimum (120 V ac) ◦ *Low Level* 10 V dc maximum (24 V dc) 20 V dc maximum (125 V dc) 50 V_{rms} maximum (120 V ac) • Applied Voltage: 21 to 27 V dc • Load Current: 0.25 A (maximum) • Off-State Leakage Current: 0.10 mA • Isolation: Between any channel and ground, 600 V ac. **⚠⚠DANGER** **HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH** This does not imply that these channels are intended for permanent connection to hazardous voltage circuits. Connection of these channels to voltages greater than 120 V ac violates electrical safety code requirements and may expose users to electric shock. **Failure to follow these instructions will result in death or serious injury.**

BDSM9B (16 DI/DO in Groups of 8) Functional Specifications

Power Requirements	• Input Voltage: +5 V dc ±5% • Consumption: 5.0 W • Heat Dissipation: 5.0 W
Discrete Output Channels (16)	• Contact Input Range: Open (off) and Closed (on) • Open Circuit Voltage: 24 V dc (supplied at termination panel) • Short-Circuit Current: 2.0 mA at 24 V dc; 6.0 mA at 125 V dc; 3.0 mA at 120 V ac • On-State Resistance: 1 kΩ (maximum) • Off-State Resistance: 200 kΩ (minimum) • Input Switching Levels: ◦ *High Level* 20 V dc minimum ◦ *Low Level* 10 V dc maximum • Applied Voltage: 21 to 27 V dc • Load Current: 0.25 A (maximum) • Off-State Leakage Current: 0.10 mA • Isolation: Between any channel and ground, 600 V ac. **⚠⚠DANGER** **HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH** This does not imply that these channels are intended for permanent connection to hazardous voltage circuits. Connection of these channels to voltages greater than 120 V ac violates electrical safety code requirements and may expose users to electric shock. **Failure to follow these instructions will result in death or serious injury.**

BDSO10 Functional Specifications

Power Requirements	• Input Voltage: +5 V dc ±5% • Consumption: 2.6 W • Heat Dissipation: 6.0 W
Discrete Output Channels (8)	Isolated • Applied Voltage: 24 to 240 V ac • Load Current: 1.0 A at 70°C • Off-State Leakage Current: 17.5 mA at 240 V ac 25°C • Isolation: 600 V ac between any channel and ground or between channels. **⚠⚠DANGER** **HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH** This does not imply that these channels are intended for permanent connection to hazardous voltage circuits. Connection of these channels to voltages greater than 30 V ac or 60 V dc violates electrical safety code requirements and may expose users to electric shock. **Failure to follow these instructions will result in death or serious injury.**

BDSO26 Functional Specifications

Power Requirements	• Input Voltage: +5 V dc ±5% • Consumption: 3.0 W • Heat Dissipation: 8.0 W
Discrete Output Channels (8)	Isolated • Applied Voltage: 4 to 50 V dc • Load Current: 1.5 A at 70°C • Off-State Leakage Current: 1.0 mA at 70°C • Isolation: 600 V ac between any channel and ground or between channels. **⚠⚠DANGER** **HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH** This does not imply that these channels are intended for permanent connection to hazardous voltage circuits. Connection of these channels to voltages greater than 30 V ac or 60 V dc violates electrical safety code requirements and may expose users to electric shock. **Failure to follow these instructions will result in death or serious injury.**

BDSO41 Functional Specifications

Power Requirements	• Input Voltage: +5 V dc ±5% • Consumption: 3.0 W • Heat Dissipation: 6.0 W
Discrete Output Channels (8)	Isolated • Applied Voltage: 5 to 160 V dc • Load Current: 0.5 A at 70°C • Off-State Leakage Current: 2.0 mA at 70°C • Isolation: 600 V ac between any channel and ground or between channels. **⚠⚠DANGER** **HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH** This does not imply that these channels are intended for permanent connection to hazardous voltage circuits. Connection of these channels to voltages greater than 30 V ac or 60 V dc violates electrical safety code requirements and may expose users to electric shock. **Failure to follow these instructions will result in death or serious injury.**

BSEM01 Functional Specifications

Power Requirements	• Input Voltage: +5 V dc ±5% • Consumption: 5.75 W • Heat Dissipation: 5.75 W
Discrete Input Channels (8)	• Contact Input Range: Open (off) and Closed (on) • Open Circuit Voltage: 24 V dc, 48 V dc, 125 V dc, 120 V ac (supplied at termination panel) • Short-Circuit Current: 2.0 mA at 24 V dc 4.0 mA at 48 V dc 6.0 mA at 125 V dc 3.0 mA at 120 V ac • On-State Resistance: 1 kΩ (maximum) • Off-State Resistance: 200 kΩ (minimum) • Input Switching Levels: ◦ *High Level* 20 V dc minimum (24 V dc) 40 V dc minimum (48 V dc) 100 V dc (125 V dc); 100 V_{rms} minimum (120 V ac) ◦ *Low Level* 10 V dc maximum (24 V dc) 20 V dc maximum (48 V dc) 50 V dc maximum (125 V dc) 50 V_{rms} maximum (120 V ac) • Isolation: Between any channel and ground, 600 V ac. **⚠⚠DANGER** **HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH** This does not imply that these channels are intended for permanent connection to hazardous voltage circuits. Connection of these channels to voltages greater than 120 V ac violates electrical safety code requirements and may expose users to electric shock. **Failure to follow these instructions will result in death or serious injury.**

BFBE2 (Fieldbus A/B Switch Extender) Functional Specifications

Maximum Number of FBMs Driven	40
Maximum Length of Local Bus	9 m (30 ft)
Maximum Input Power Voltage	5.25 V dc
Maximum Operating Current	325 mA
Maximum Power Dissipation	1.70 W
Minimum Isolation Voltage	2500 V rms
Holdup Time at 5 V dc	250 ms

BFBI (Fieldbus Isolator) Functional Specifications

Maximum Number of FBMs Driven	40
Maximum Length of Local Bus	9 m (30 ft)
Maximum Input Power Voltage	5.25 V dc
Maximum Operating Current	325 mA
Maximum Power Dissipation	2.75 W
Minimum Isolation Voltage	2500 V rms
Holdup Time at 5 V dc	250 ms

WARNING: This product can expose you to chemicals including lead and lead compounds, which are known to the State of California to cause cancer and birth defects or other reproductive harm. For more information, go to www.p65warnings.ca.gov/.

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As standards, specifications, and design change from time to time, please ask for confirmation of the information given in this publication.

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