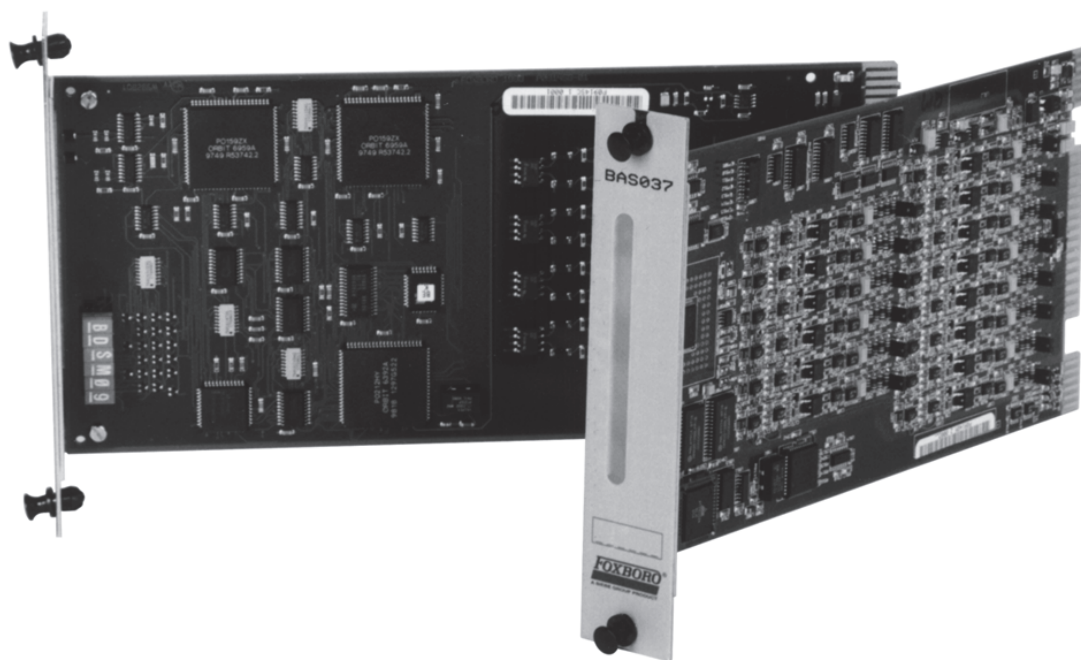


DCS FBM for Migration of Bailey® Systems



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

OVERVIEW

The Foxboro Evo system DCS FBM family provides a migration path from the Bailey systems process input and output components to Foxboro Evo 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 DCS FBM family replaces the Bailey controller and/or slave module devices. Once integrated, the process is controlled

entirely by the advanced Foxboro Evo algorithm set. Bailey DCS control devices are disconnected upon migration, so there is no undesirable interaction caused by the decommissioned system.

The Foxboro Evo DCS FBM product includes appropriate connectors to enable integration of original process signals to Foxboro Evo system 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 the Foxboro Evo system. All process signals become fully integrated

into the Foxboro Evo system. Process data is used for operator display, history, alarming and control.

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

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

FEATURES

Key features of the Foxboro Evo system DCS FBMs are:

- ▶ DCS 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 Evo system
- ▶ Advanced Foxboro Evo system 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 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 Evo system DCS FBMs for Bailey systems allow migration to Foxboro Evo 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 Evo control processor scanning and control.

DCS FBMs plug directly into existing Bailey module mounting units in place of Bailey controller and slave module cards. The DCS FBMs pass process measurement and output signals to and from a Foxboro Evo 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 following Foxboro Evo control processors can be implemented:

- ▶ Field Control Processor 280 (FCP280)
- ▶ Field Control Processor 270 (FCP270)
- ▶ Control Processor 60 (CP60)
- ▶ Z-Module Control Processor 270 (ZCP270) with FCM100E.

The FCP280 and FCP270 offer direct connection of the DCS FBMs to the Fieldbus, while the ZCP270 connects to the FBMs through the FCM100E modules. The CP60 requires redundant DCM10E or DCM10Ef modules to communicate with the DCS FBMs.

The FCP280, FCP270, ZCP270 and CP60 with the DCM10E/Ef modules can be located in a nearby existing enclosure or Foxboro Evo enclosure and the

fieldbus extended to connect the modules to the Fieldbus Isolators (BFBI) located in a Bailey MMU.

Migration with FCP280 and DCS FBMs

The Field Control Processor 280 (FCP280) is a distributed, field-mounted controller module that supports up to 128 DCS 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 DCS FBMs (provided the total 128 FBM limit is not exceeded). The FCP280 connects to The Foxboro Evo 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 DCS FBMs to perform data acquisition and control using Foxboro Evo 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 DCS FBMs, one or more HDLC Fieldbus ports on the FCP280's baseplate connect to an optionally redundant 268 Kbps Fieldbus for communications to the DCS 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 DCS 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 31H-1FCP280.

Migration with FCP270 and DCS FBMs

The Field Control Processor 270 (FCP270) is a distributed, field-mounted controller module that supports up to 64 DCS FBMs (depending on selected scan periods). The FCP270 connects to The Foxboro Evo Control Network (the control network) via optionally redundant 100 Mbps Ethernet fiber optic cables and Ethernet fiber switches. The FCP270 is an optionally fault-tolerant controller that communicates with connected DCS FBMs to perform data acquisition and control using Foxboro Evo control algorithms.

The FCP270 mounts in a Modular Baseplate that supports a single module or a fault-tolerant module pair. The Modular Baseplate accepts only FCP270 modules. A single/redundant FCP270 requires 24 V dc power from single/redundant power supplies. The FCP270 connects to an optionally redundant 268 Kbps Fieldbus for communications to the DCS FBMs and provides galvanic isolation between the 100 Mbps control network and the 268 Kbps local Fieldbus.

Fault-tolerant FCP270 modules connect to a pair of fiber optic splitter/combiners that connect to Ethernet switches in a redundant control network. The splitter/combiner pair mounts in an assembly that fastens to the baseplate.

To support fault tolerance, a pair of FCP270s must be used for each DCS FBM grouping. In non-fault tolerant configurations, only a single FCP270 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 FCP270, refer to PSS 21H-1B9.

Migration with ZCP270/FCM100E and DCS FBMs

The Z-Module Control Processor 270 (ZCP270) is an optionally fault-tolerant, Z-form factor controller that supports up to 128 DCS FBMs (depending on selected scan periods) when used with the FCM100E module. The ZCP270 connects to the control network via optionally redundant 100 Mbps Ethernet fiber optic cables and Ethernet fiber switches. The ZCP270 communicates with connected DCS FBMs through the FCM100E to perform data acquisition and control using Foxboro Evo control algorithms.

The fault-tolerant version of the ZCP270 consists of two single-width processor modules. These modules install in adjacent ZCP270 slots in a 1x8 or 2x8 mounting structure and connect to a fault-tolerant connector to allow for high-speed communication between the modules. The mounting structure may connect directly to the FCM100E.

The FCM100E connects to an optionally redundant 268 Kbps Fieldbus for communications to the DCS FBMs and provides galvanic isolation between the 100 Mbps control network and the 268 Kbps local Fieldbus.

Fault-tolerant ZCP270 modules connect to a pair of fiber optic splitter/combiners that connect to Ethernet switches in a redundant control network. The splitter/combiner pair mounts in an assembly that fastens to an adjacent DIN rail.

To support redundancy, a pair of ZCP270s must be used for each DCS FBM grouping. In non-redundant configurations, only a single ZCP270 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 ZCP270, refer to PSS 21H-1B10. For more information on the FCM100E, refer to PSS 21H-2Y11 B4.

Migration with CP60 (and DCM10E/Ef) to DCS FBMs

The DCM10E is a communications interface which allows the DCS Fieldbus Modules to communicate with the CP60 via the high speed, optionally redundant, 10 Mbps Ethernet Fieldbus. The DCM10E converts 10 Mbps Ethernet signals used by the control station to 268 Kbps signals used by the DCS Fieldbus Modules, and vice versa. The DCM10E also provides galvanic isolation between the 10 Mbps Ethernet Fieldbus and the 268 Kbps local Fieldbus. The DCM10Es are used in pairs for redundancy. A DCM10E (or pair of DCM10Es) can support up to 64 DCS Fieldbus Modules. Up to 30 DCM10E pairs can be connected to the Ethernet Fieldbus. The maximum total number of DCS FBMs on one CP60 is 120 (depending on selected scan periods).

The DCM10Ef Fieldbus Communications Module is a fiber optic communications interface which allows the DCS Fieldbus Modules to communicate with the CP60 over extended distances using fiber optic cabling. The DCM10Ef provides expanded networking, easy customizing, and greater overall cabling distances in a fiber optic network. This configuration is ideally suited for sites in which groups of DCS Fieldbus Modules are to be spread apart over greater distances. DCM10Ef modules are used with multiport fiber optic converters (hubs), which connect to the CP60 via the high speed, optionally redundant, 10 Mbps Ethernet Fieldbus. Up to six groupings of baseplate-mounted DCM10Ef modules and DCS Fieldbus Modules can be linked to each optionally redundant hub, for a maximum of 120 DCS Fieldbus Modules per CP60 (depending on selected scan periods).

To support redundancy, a pair of DCM10Ef modules must be used for each DCS Fieldbus Module grouping. In non-redundant configurations, only a single DCM10Ef is required for each grouping. Signal transmission distances up to 2 kilometers

(1.24 miles) are possible between the WFCM10Ef modules and hubs, providing for wide distribution of the DCS Fieldbus Module equipment groupings. Extended transmission distances using fiber optic cabling are also possible within the groupings, and between the hubs and the CP60.

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 a DCS FBM BCOM17. This provides original I/O functionality of high level analog input, analog output, contact input, and contact output. The BCOM17 DCS FBM is powered by the original module mounting unit power bus. See table below.

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

The DCS 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 DCS FBM BAOM37. The BAOM37 provides original I/O functionality of the analog output modules. The DCS FBM is powered by the original power bus. See table below.

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 DCS FBM. This provides original I/O functionality of the LMM. The DCS FBM is powered by the original power bus.

See table below.

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 DCS FBM. This provides original I/O functionality of the digital input and/or output. The DCS FBM is powered by the original power bus.

See table below.

Model	Replaces	Description
BDSI07	IMDSI02/12/ 13/14/15; NDSI01/02;N DSM02/03	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 DCS FBM BDSM06. This provides original I/O functionality of the pulse inputs. The DCS FBM is powered by the original module mounting unit power bus.

Sequence of Events Module

Sequence of Events modules are removed and replaced by a DCS 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 table below.

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 Evo interface functions. PLC and computer interfaces are replaced by standard Foxboro Evo 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 DCS FBMs

Calibration Requirements

Calibration of the DCS Fieldbus Modules is not required.

Communication

Redundant IEEE P1118 Fieldbus

Process I/O Capacity

FIELD CONTROL PROCESSOR 280 (FCP280)

128 DCS FBMs maximum (depending on scan periods) - up to 64 DCS FBMs per HDLC Fieldbus. The FCP280 baseplate supports up to four HDLC fieldbuses.

CONTROL PROCESSOR 60 (CP60)

64 DCS FBMs maximum (depending on scan periods)

FIELD CONTROL PROCESSOR 270 (FCP270)

64 DCS FBMs maximum (depending on scan periods)

Z-MODULE CONTROL PROCESSOR 270 (ZCP270) WITH FCM100E

128 DCS FBMs maximum (depending on scan periods)

BAMM01 FUNCTIONAL SPECIFICATIONS

Power Requirements

INPUT VOLTAGE

+5 V dc $\pm 5\%$, ± 15 V dc $\pm 5\%$

CONSUMPTION

8.0 W

HEAT DISSIPATION

8.0 W

Analog Input Channels (4)

RTD

1.0 k Ω to 1.6 k Ω

RATED MEAN ACCURACY

$\pm 0.025\%$ of span ($\pm 1.5 \Omega$)

RESOLUTION

12 to 15 bits, programmable

Analog Input Channels (4) (Continued)

ISOLATION

600 V ac between any channel and earth (ground) or between channels.

NOTE

This does not imply that these channels are intended for 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 electrical shock.

BAOM37 FUNCTIONAL SPECIFICATIONS

Power Requirements

INPUT VOLTAGE

+5 V dc $\pm 5\%$, ± 15 V dc $\pm 5\%$

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

Analog Output Channels (8) (Continued)

RATED MEAN ACCURACY

$\pm 0.05\%$ of span (mA range)

$\pm 0.15\%$ 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

BASIO1 FUNCTIONAL SPECIFICATIONS

Power Requirements

INPUT VOLTAGE

+5 V dc $\pm 5\%$, ± 15 V dc $\pm 5\%$

CONSUMPTION

5.75 W

HEAT DISSIPATION

5.75 W

Analog Input 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

$\pm 0.25\%$ of span for 0 to 1 V dc range

0.10% of span for all other ranges

RESOLUTION

12 to 15 bits, programmable

BASIO3 FUNCTIONAL SPECIFICATIONS

Power Requirements

INPUT VOLTAGE

+5 V dc $\pm 5\%$, ± 15 V dc $\pm 5\%$

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

$\pm 0.05\%$ of span

RESOLUTION

12 bits

ISOLATION

600 V ac between any channel and earth
(ground) or between channels.

NOTE

This does not imply that these channels are intended for 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 electrical shock.

BASM01 FUNCTIONAL SPECIFICATIONS

Power Requirements

INPUT VOLTAGE

+5 V dc $\pm 5\%$, ± 15 V dc $\pm 5\%$

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

$\pm 0.25\%$ 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 $\pm 5\%$, ± 15 V dc $\pm 5\%$

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

$\pm 0.035\%$ of span ($\pm 0.5\%$ 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 earth
(ground) or between channels.

NOTE

This does not imply that these channels are intended for 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 electrical shock.

BASM03 FUNCTIONAL SPECIFICATIONS

Power Requirements

INPUT VOLTAGE

+5 V dc $\pm 5\%$, ± 15 V dc $\pm 5\%$

CONSUMPTION

8.0 W

HEAT DISSIPATION

8.0 W

Analog Input Channels (8)

RTD

0 to 320 Ω

RATED MEAN ACCURACY

$\pm 0.025\%$ of span (± 0.08 Ω)

Analog Input Channels (8) (Continued)

RESOLUTION

12 to 15 bits, programmable

ISOLATION

600 V ac between any channel and earth (ground) or between channels.

NOTE

This does not imply that these channels are intended for 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 electrical shock.

BASM33 FUNCTIONAL SPECIFICATIONS

Power Requirements

INPUT VOLTAGE

+5 V dc $\pm 5\%$, ± 15 V dc $\pm 5\%$

CONSUMPTION

8.0 W

HEAT DISSIPATION

8.0 W

Analog Input Channels (8)

RTD

0 to 30 Ω Cu

RATED MEAN ACCURACY

$\pm 0.025\%$ of span (± 0.08 Ω)

Analog Input Channels (8) (Continued)

RESOLUTION

12 to 15 bits, programmable

ISOLATION

600 V ac between any channel and earth (ground) or between channels.

NOTE

This does not imply that these channels are intended for 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 electrical shock.

BAS037 FUNCTIONAL SPECIFICATIONS

Power Requirements

INPUT VOLTAGE

+5 V dc $\pm 5\%$, ± 15 V dc $\pm 5\%$

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

$\pm 0.25\%$ of span (4 to 20 mA range)

$\pm 0.15\%$ 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 $\pm 5\%$, ± 15 V dc $\pm 5\%$

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

$\pm 0.05\%$ 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 k Ω (maximum)

OFF-STATE RESISTANCE

200 k Ω (minimum)

Discrete Input Channels (3)

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)

INPUT SWITCHING LEVELS (CONTINUED)

Jumper select

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

$\pm 0.05\%$ 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 earth (ground)

BDSI07 FUNCTIONAL SPECIFICATIONS

Power Requirements

INPUT VOLTAGE

+5 V dc $\pm 5\%$

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 k Ω (maximum)

OFF-STATE RESISTANCE

200 k Ω (minimum)

Discrete Input Channels (16) (Continued)

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

Between any channel and earth (ground),
600 V ac

NOTE

This does not imply that these channels are intended for 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 electrical shock.

BDSM06 FUNCTIONAL SPECIFICATIONS

Power Requirements

INPUT VOLTAGE

+5 V dc $\pm 5\%$

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

INPUT RANGES (CONTINUED)

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

Input to earth (ground) 600 V ac all 3 ranges;

Input to Input, 600 V ac for ranges 1 and 2 only

NOTE

This does not imply that these channels are intended for 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 electrical shock.

BDSM09 FUNCTIONAL SPECIFICATIONS

Power Requirements

INPUT VOLTAGE

+5 V dc $\pm 5\%$

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)

Discrete Output Channels (16) (Continued)

OFF-STATE LEAKAGE CURRENT

0.10 mA

ISOLATION

Between any channel and earth (ground),
600 V ac

NOTE

This does not imply that these channels are intended for 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 electrical shock.

BDSM9A FUNCTIONAL SPECIFICATIONS

Power Requirements

INPUT VOLTAGE

+5 V dc $\pm 5\%$

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 k Ω (maximum)

OFF-STATE RESISTANCE

200 k Ω (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)

INPUT SWITCHING LEVELS (CONTINUED)

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 earth (ground),
600 V ac

NOTE

This does not imply that these channels are intended for 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 electrical shock.

BDSM9B (16 DI/DO IN GROUPS OF 8) FUNCTIONAL SPECIFICATIONS

Power Requirements

INPUT VOLTAGE

+5 V dc $\pm 5\%$

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 (supplied at termination panel)

Discrete Input Channels (16) (Continued)

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 k Ω (maximum)

OFF-STATE RESISTANCE

200 k Ω (minimum)

INPUT SWITCHING LEVELS

High Level

20 V dc minimum

Low Level

10 V dc maximum

BDSM9B (16 DI/DO IN GROUPS OF 8) FUNCTIONAL SPECIFICATIONS (CONTINUED)

Discrete Output Channels (16) (Continued)

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 earth (ground),
600 V ac

NOTE

This does not imply that these channels are intended for 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 electrical shock.

BDS010 FUNCTIONAL SPECIFICATIONS

Power Requirements

INPUT VOLTAGE

+5 V dc $\pm 5\%$

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

Discrete Output Channels (8) (Continued)

OFF-STATE LEAKAGE CURRENT

17.5 mA at 240 V ac 25°C

ISOLATION

600 V ac between any channel and earth (ground) or between channels.

NOTE

This does not imply that these channels are intended for 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 electrical shock.

BDS026 FUNCTIONAL SPECIFICATIONS

Power Requirements

INPUT VOLTAGE

+5 V dc $\pm 5\%$

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

Discrete Output Channels (8) (Continued)

OFF-STATE LEAKAGE CURRENT

1.0 mA at 70°C

ISOLATION

600 V ac between any channel and earth (ground) or between channels.

NOTE

This does not imply that these channels are intended for 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 electrical shock.

BDSO41 FUNCTIONAL SPECIFICATIONS

Power Requirements

INPUT VOLTAGE

+5 V dc $\pm 5\%$

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

Discrete Output Channels (8) (Continued)

OFF-STATE LEAKAGE CURRENT

2.0 mA at 70°C

ISOLATION

600 V ac between any channel and earth (ground) or between channels.

NOTE

This does not imply that these channels are intended for 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 electrical shock.

BSEM01 FUNCTIONAL SPECIFICATIONS

Power Requirements

INPUT VOLTAGE

+5 V dc $\pm 5\%$

CONSUMPTION

5.75 W

HEAT DISSIPATION

5.75 W

Discrete Input Channels (16)

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 k Ω (maximum)

OFF-STATE RESISTANCE

200 k Ω (minimum)

Discrete Input Channels (16) (Continued)

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 dc maximum (120 V ac)

ISOLATION

Between any channel and earth (ground),
600 V ac

NOTE

This does not imply that these channels are intended for 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 electrical shock.

BFBE2 (FIELDBUS A/B SWITCH EXTENDER) FUNCTIONAL SPECIFICATIONS

Maximum Number of DCS 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 DCS 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



Invensys Systems, Inc.
38 Neponset Avenue
Foxborough, MA 02035-2037
United States of America
www.schneider-electric.com

Global Customer Support
Inside U.S.: 1-866-746-6477
Outside U.S.: 1-508-549-2424
Website: <https://support.ips.invensys.com>

Copyright 2014-2016 Invensys Systems, Inc.
All rights reserved.
Invensys is now part of Schneider Electric.

Schneider Electric, Invensys, Foxboro, and Foxboro Evo are trademarks owned by Schneider Electric S.E, its subsidiaries and affiliates.
All other trademarks are the property of their respective owners.

MB 031

0416