

I/A Series[®] Hardware Fieldbus Cluster Configurable Digital I/O Module and Signal Conditioners (FBC10)



CONFIGURABLE DIGITAL INPUT/OUTPUT MODULE

The I/A Series Fieldbus Cluster Digital Input/ Output Card, FBC10, consists of 64 digital input/output channels. Channels 1-32 are always inputs. Channels 33-64 are software-configurable as either inputs or outputs.

The FBC10 connects to four SCB16 Signal Conditioner Board assemblies via four woven ribbon cables. Signal Conditioning Modules plug into the SCB16 assemblies and provide per channel electrical isolation, allowing the user to mix different digital I/O signal ranges associated with a single FBC10. The SCB16 is powered from the FBC10. Optional external powering of the SCB16 with 5 V dc is possible with jumper selection in the FBC10 on a per segment connector basis.

FBC10s do not support redundant connection.

INPUT/OUTPUT SIGNAL CONDITIONERS

The I/A Series Fieldbus Input/Output Signal Conditioners (ISC/OSC) are submodules specifically used with the FBC10. These signal conditioning submodules, when connected to the FBC10 via the SCB16 assembly, provide isolated ac and/or dc I/O sensing and actuator control with on/off requirements to and from the I/A Series system. Each FBC10 card accepts up to 64 discrete input or output submodules.

The submodules combinations are 32, 40, 48, 56, and 64 inputs with the balance being output channels. A single submodule is required per input channel and per output channel.

The SCB16 assembly, refer to Figure 1, with up to 16 signal conditioning submodules, mounts into the I/A Series Metal Enclosure (ME12, ME19, or ME19X) as shown in Figure 2. Woven ribbon cables are used to connect the FBC10 card to the SCB16 assemblies, refer to Figure 3. Up to four SCB16 assemblies can be mounted on one SCB16 mounting panel and can be serviced by one, two, three, or four FBC10s.

The input signal conditioner provides per channel isolation and conditioning for digital inputs to the FBC10 module. It is mounted on a SCB16. One is required per input channel. The following is a list of the submodules currently available.

ISC01	12 to 32 V ac, 10 to 32 V dc
ISC02	35 to 60 V ac or V dc
ISC03	90 to 140 V ac or V dc
ISC04	180 to 280 V ac or dc
ISC05	4 to 16 V dc
OSC01	12 to 140 V ac
OSC02	24 to 280 V ac
OSC03	24 to 280 V ac, Normally Closed
OSC11	5 to 60 V dc
OSC12	5 to 200 V dc
OSC13	Dry Contact Relay, Normally Open, 0.5 A
OSC15	Dry Contact Relay, Normally Open, 5 A
OSC18	Dry Contact Relay, Normally Open, 8 A





Figure 1. SCB16 Assembly



Figure 2. Signal Conditioners and SCB16 in ME19X Metal Enclosure



Figure 3. SCB16 Channel and Ribbon Cable Segment Connector Correlation

FBC10 FUNCTIONAL SPECIFICATIONS

Voltage Input/Output

INPUT/OUTPUT CHANNELS 64 total INPUT/OUTPUT RATIOS 32/32 through 64/0 in groups of eight INPUTS/OUTPUTS Determined by Signal Conditioning Submodule FIELD CONNECTIONS To Signal Conditioning Submodules via SCB16 Assembly Terminals (Figure 1)

Power Requirements

INPUT VOLTAGE AND CURRENT 0.26 A for board logic 0.86 A to internally power ISC/OSC sockets +24 V dc at 0.005 A CONSUMPTION 5.88 W (maximum) at 5.25 V dc 0.12 W (maximum) at 24 V dc 6.00 W Total Consumption HEAT DISSIPATION 3.3 W (maximum)

FBC10 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 5 to 95% (noncondensing) ALTITUDE -300 to +12,000 m (-1,000 to +40,000 ft)

Contamination

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

FBC10 PHYSICAL SPECIFICATIONS

Mounting

ICH12, ICH19 Chassis, single slot

Field Termination Connections

SCB16 signal distribution backplane connection and ribbon cables connect FBC10 to four SCB16 backplanes. Field wiring connects to SCB16s.

Mass

0.68 kg (1.5 lb)

Activity and Diagnostic Status (LEDs)

OK, Green – FBC10 operational 5 V, Green – 5.25 V dc power is available COM, Green – FBC10 has communication with FBP10 ACT, Amber - FBC10 is active with I/O

Ribbon Cable Assembly Lengths

5 ft (1.55 m) 10 ft (3.10 m)

SIGNAL CONDITIONER SUBMODULE FUNCTIONAL SPECIFICATIONS

Inputs Signal Conditioners

ISC01- 12 to 32 V ac or 10 to 32 V dc ISC02 - 35 to 60 V ac/dc ISC03 - 90 to 140 V ac/dc ISC04 - 180 to 280 V ac/dc ISC05- 4 to 16 V dc

Outputs Signal Conditioners

OSC01

12 to 140 V ac; 2 A maximum at 70°C, 3 A maximum at 45°C OSC02

24 to 280 V ac; 2 A maximum at 70°C, 3 A maximum at 45°C

OSC03

24 to 280 V ac (normally closed); 2 A maximum at 70°C, 3 A maximum at 45° C

OSC11

5 to 60 V dc; 2 A maximum at 70°C, 3 A maximum at 45°C

OSC12

5 to 200 V dc; 0.55 A maximum at 70°C, 1 A maximum at 45°C

OSC13

Dry Relay (normally open); 100 V dc/130 V ac maximum, 0.5 A maximum resistive

OSC15

Dry Relay (normally open); 30 V dc/250 V ac maximum, 5 A maximum resistive; 2 A maximum inductive

OSC18

Dry Relay (normally open); 30 V dc/250 V ac maximum, 8 A maximum resistive; 2 A maximum inductive

Isolation

ISC/OSC SUBMODULES 5000 V dc Signal Channel to Logic SCB16 ASSEMBLY 600 V dc Logic Channel to Logic Channel 5000 V dc Channel to Logic

Power Requirements (submodule loading not to

exceed 0.86 A per FBC10) POWER CONSUMPTION ISC01 through ISC05 12.0 mA maximum

> OSC01 through OSC13 12.0 mA maximum

OSC15 and OSC18 48.0 mA maximum

POWER DISSIPATION

See Table 1 and Table 3 HEAT DISSIPATION

See Table 2

Table 1. ISC Power Dissipation

Model	Watts (Nominal)	Watts (Maximum)				
ISC01	0.3	0.6				
ISC02	0.3	0.4				
ISC03	1.0	1.3				
ISC04	0.8	1.1				
ISC05	0.3	0.6				

Table 2. Total Heat Dissipation

Model	Maximum Heat Dissipation (Watts)
ISC01	0.65
ISC02	0.45
ISC03	1.35
ISC04	1.15
ISC05	0.65
OSC01	3.25
OSC02	3.25
OSC03	3.25
OSC11	3.25
OSC12	0.96
OSC13	0.35
OSC15	1.50
OSC18	3.50

I/O Module Loading Rules

 When set for internal power, each FBC10 I/O module can power up to 64 I/O modules of the following types:

ISC01, OSC02, ISC03, ISC04, ISC05 OSC01, OSC02, OSC03, OSC11, OSC12, OSC13

- For each OSC15 or OSC18 I/O module used, the total number of modules permitted must be reduced by three (for example, if eight OSC15 modules are used, the total number of modules permitted must be reduced by 3x8=24. Thus, the total number of modules permitted is (64-24=40) of which eight are the OSC15 and the other 32 may be any of those shown in #1).
- For each Greyhill 70G-OAC5RLY module used, the total number of modules permitted must be reduced by one (for example if eight 70G-OAC5RLY modules are used, the total

number of modules permitted must be reduced by eight. Thus, the total number of modules permitted is (64-8=56) of which eight are the 70G-OAC5RLY and the other 48 may be any of those shown in #1).

- 4. If some 70G-OAC5RLY and some OSC15 and OSC18 modules are used, the total number of modules must be reduced so that the current drain is no more than 768 mA. Thus, if 16 OSC15 and/or OSC18 modules are used, no additional modules may be internally powered from the FBC10.
- 5. If an external source of 5 V dc is provided and the FBC10 and the SCB16s are configured (with provided jumper settings) for external power, up to 64 I/O modules of any type may be used by each FBC10.

	Additional Dissipation in Watts due to Output Currents of:																	
	0.1 A		0.25 A		0.5 A		1.0 A		1.5 A		2.0 A		3.0 A *		5.0 A		8.0 A	
Model	Nom.	Max.	Nom.	Max.	Nom.	Max.	Nom.	Max.	Nom.	Max.	Nom.	Max.	Nom.	Max.	Nom.	Max.	Nom.	Max.
OSC01	0.07	0.08	0.18	0.21	0.38	0.45	0.82	0.94	1.32	1.50	1.81	2.09	2.72	3.14	-	-	-	-
OSC02	0.07	0.08	0.18	0.21	0.38	0.45	0.82	0.94	1.32	1.50	1.81	2.09	2.72	3.14	-	-	-	_
OSC03	0.07	0.08	0.18	0.21	0.38	0.45	0.82	0.94	1.32	1.50	1.81	2.09	2.72	3.14	-	-	-	-
OSC11	0.07	0.08	0.18	0.21	0.38	0.45	0.82	0.94	1.32	1.50	1.81	2.09	2.72	3.14	-	-	-	-
OSC12	0.07	0.08	0.18	0.21	0.38	0.45	0.76*	0.90*	-	-	-	-	-	-	-	-	-	-
OSC13	-	0.002	-	0.013	-	0.05	-	-	-	-	-	-	-	-	-	-	-	—
OSC15	-	0.001	-	0.003	-	0.013	-	0.05	-	0.12	-	0.20	-	0.45	-	1.25	-	—
OSC18	-	0.001	-	0.003	_	0.013	_	0.05	-	0.12	_	0.20	-	0.45	_	1.25	-	3.2

Table 3. OSC Power Dissipation

*For these current ratings, the ambient air around the Signal Conditioner Modules (within enclosure) is limited to 45°C maximum.

NOTE

The output modules (except OSC15 and OSC18) are protected against overcurrents by fuses. Due to their size, the fuses are rated for use in circuits with maximum fault currents of 40 A.

Input Signal Conditioner	Input Impedance	On-State	Off-State
ISC01	1.5 KOhms	10 to 32 V dc	1 mA at 3 V
		12 to 32 V ac	
ISC02	10 KOhms	35 to 60 V dc	0.2 mA at 7 V
		35 to 60 V ac	
ISC03	28 KOhms	90 to 140 V ac	1.4 mA at 40 V
ISC04	70 KOhms	180 to 280 V ac	1.0 mA at 45 V
ISC05	300 Ohms	4 to 16 V dc	0.7 mA at 1 V

Table 4. ISC Power Dissipation

SCB16 AND ISC/OSC ENVIRONMENTAL SPECIFICATIONS

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)

Light Emitting Diodes (LEDs)

Each SCB16 has a LED indicating it has 5 V dc available to it. Each ISC and OSC has an LED indicating it is active.

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

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

SCB16 AND ISC/OSC PHYSICAL SPECIFICATIONS

Mounting

ISC/OSC SUBMODULES SCB16 Assembly SCB16 ASSEMBLY Metal Enclosure (ME12 or ME19) on a single mounting panel Metal Enclosure (ME19X) on up to nine mounting panels Customer-supplied cabinet on a mounting panel (each mounting panel mounts four SCB16s) Mass ISC/OSC SUBMODULES 27 g (0.06 lb)

SCB16 ASSEMBLY 0.22 kg (0.5 lb) without modules MOUNTING PANEL 2.42 kg (5.33 lb) without SCB16s

TERMINOLOGY

- 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.

The Foxboro Company 33 Commercial Street Foxboro, Massachusetts 02035-2099 United States of America <u>http://www.foxboro.com</u> Inside U.S.: 1-508-543-8750 or 1-888-FOXBORO (1-888-369-2676) Outside U.S.: Contact your local Foxboro Representative.

Fox, Foxboro, I/A Series, and Micro-I/A are trademarks of The Foxboro Company.

Copyright 1995-1999 by The Foxboro Company All rights reserved

MB 021

Printed in U.S.A.