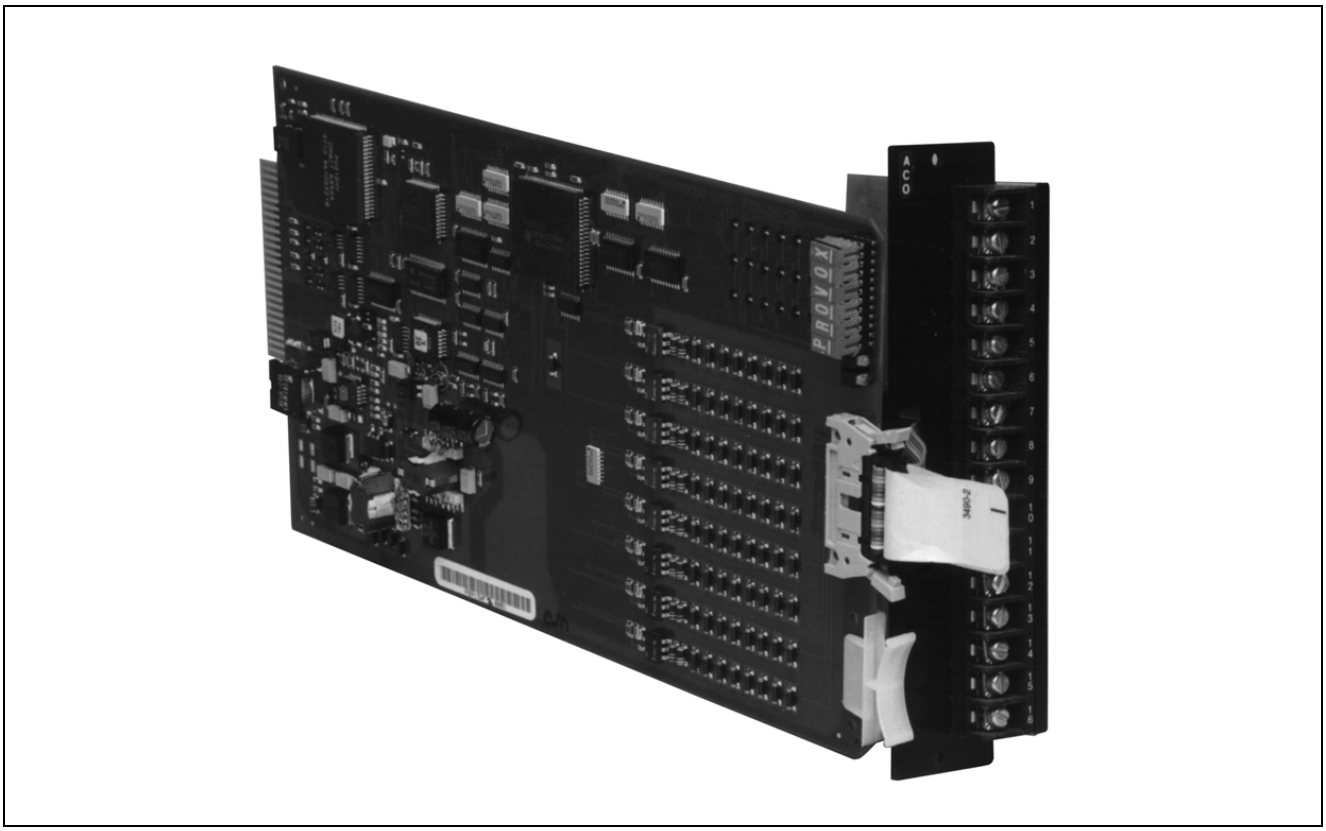
FOXBORO®

PSS 21H-7R6 B3

I/A Series® Hardware
DCS Integrator for Fisher® PROVOX® Systems



The I/A Series DCS Integrator for use with Fisher PROVOX systems is a translator that plugs directly into an existing electronic nest to replace Process Input and Output Module cards. This achieves significant advantages:

- Migrate from Proprietary DCS to a state-of-the-art open I/A Series system.
- Advanced I/A Series control with single point of configuration.
- More direct control performance than any gateway device could offer.
- Single vendor service and supply.

The I/A Series DCS Integrator family provides a migration path from Fisher PROVOX process input and output components to I/A Series display and supervisory functions. This can save significant cost over total system replacement by preserving existing process interface and wiring and minimizing process downtime.

No additional communication devices are required. No multi-vendor communication software licensing is required. The I/A Series DCS Integrator family replaces the Fisher PROVOX Controller and/or Slave Module devices. Once integrated, the process is controlled entirely by the advanced I/A Series algorithm set. Fisher PROVOX DCS control devices are disconnected upon migration, so there is no undesirable interaction caused by the decommissioned system.

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Product Specifications

The I/A Series DCS Integrator product includes appropriate connectors to enable integration of original process signals to I/A Series while keeping the field interface and wiring. It provides access to all process signals connected to the Fisher PROVOX system by providing the connection between the field termination assemblies (FTA) and the I/A Series system. All process signals become fully integrated into the I/A Series system. Process data is used for operator display, history, alarming and control.

Operator functions and engineering configuration is accomplished by the I/A Series system at any I/A Series operator workstation. Because all process values become part of the I/A Series system, all configuration data is maintained by the system as native I/A Series configurations.

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

BENEFITS OF INTEGRATION

- Cost effective
- Retains existing I/O and field wiring
- No need to wait, migrate to state-of-the-art open technology now
- Add advanced control to existing process immediately
- Single point of configuration
- No gateway bottlenecks and constraints.

FUNDAMENTAL PRINCIPLE

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

- through high level published-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

The Fisher PROVOX migration consists of new I/A Series DCS Integrators, new Fieldbus Isolators and necessary changes in I/A Series management, control and configuration software. This allows migration to I/A Series control, display and application products while retaining original process termination and field I/O wiring. All original process I/O capability of the Fisher PROVOX Control Units, I/O File Units, and Input/Output Units functions are replaced by integrator cards and direct I/A Series Control Processor scanning and control.

New I/A Series DCS Integrators plug directly into existing Fisher PROVOX Control Unit Packages and I/O File Units in place of Fisher PROVOX Input and Output Unit cards. These integrators pass process measurement and output signals to and from an I/A Series control processor. The I/A Series control processor provides control in place of the Fisher PROVOX Control Units. This saves customers significant cost over a total system replacement by preserving existing process interfaces and wiring and minimizing process downtime.

UOC, UOC+, IFC, MUX Subsystems

The I/O card file, used to house I/O cards, is reused to house the I/A Series Integrator cards. The original I/O card termination units mounted on the front of the I/O cards are reused. All I/O wiring connected to the I/O card termination units remains in place.

I/O units are removed and its termination assembly detached. Each unit is replaced by a corresponding I/A Series Integrator. The original termination assembly, including the undisturbed process wiring connections, is reattached to the new Integrator. This provides original I/O functionality of the process inputs and outputs. The Integrator is powered by the original Controller or Multiplexer Unit power bus. I/A Series Fieldbus provides communication to I/A Series control processors which take over all control and communication functions.

Regulatory Controller Units

Controller types consist of:

- Configurable
- Computing
- Interactive 2 Wide
- Interactive 3 Wide PIO
- Interactive 3 Wide DIO
- Interactive 4 Wide

I/A Series Integrator Kits replace the indicated controller card sets and are housed in original Controller Files. Original I/O wiring to the Controller file terminator panels stays in place. Power is derived from rack power supply. Each integrator is powered by its own dc to dc converter. Fieldbus Isolators are housed in depopulated Data Concentrator nest assemblies. I/A Series Fieldbus provides communication to I/A Series control processors which take over all control and communication functions.

microPROVOX (SR90)

The 20 Series (SR90) Controller is made up of three devices:

- Model 30 microPROVOX (MUX) Multiplexer Controller for monitoring of discrete, analog I/O and motor control through (DCDs) Discrete Control Devices.
- Model 50 microPROVOX (IFC) Integrated Function Controller for continuous control applications.
- Model 70 microPROVOX (UOC) Unit Operations Controller for batch applications.

Note that the above controllers are decommissioned with Integration.

Controller I/O Card File

The control I/O subsystem cards interface the above controllers to the various process termination panels. The I/O cards interface to the termination panels through a 37-pin D-shell connector on the edge of the I/O card. The cards are installed in CP6701 I/O Card Files.

There are 14 I/O cards per card file and up to 16 card files per controller. The CP6701 I/O card files are reused to house the I/A Series Integrator cards.

There are three I/O card types used in the system:

- Discrete I/O Card
- Analog I/O Card
- External Interface Card
  The external interface card interfaces to serial devices such as PLCs and weight Scales. This function is handled by the I/A Series Integrator 30 within a separate enclosure. Standard software for the IG30 supports over 100 different devices and various interfaces.

The I/O card files are reused to house the Integrator cards. The I/A Series Integrator cards interface to the termination panels through a 37-pin D-shell connector on the edge of the I/O card. All I/O wiring connected to the I/O card termination panels remain in place. Power is derived from rack power supply. Each integrator has a dc to dc converter. Original power converters are not used. Fieldbus Isolators are housed in MUX, IFC, and UOC nest assemblies.

F1M01A, E, C, F (ANALOG INPUT) FUNCTIONAL SPECIFICATIONS

Power Requirements

INPUT VOLTAGE
21.0 to 29.0 V dc
CONSUMPTION
5.75 W
HEAT DISSIPATION
4.6 W

Communication

Redundant IEEE P1118 Fieldbus

Input Channels

INTEGRATOR MODEL

F1M01A
Eight Channels, single ended, 0 to 20.4 mA, 1 to 5 V dc

F1M01E
Eight Channels, single ended, 0 to 10 V dc

F1M01C
Four Channels, isolated, 0 to 20.4 mA, 1 to 5 V dc

F1M01F
Four Channels, isolated, 0 to 10 V dc

RATED MEAN ACCURACY
0.05% of span
RESOLUTION
12 to 15 bits, programmable (see Table 1)

Table 1. Configurable Specifications, F1M01A, E, C, F Analog Input Channels

Conversion Time (Seconds)	Update Time (Milliseconds)	Settling Time(a) (Seconds)	Linearity Error(b) (% of Range)	Resolution (Bits)
0.1	10	0.25	0.0125	12
0.2	10	0.50	0.0075	13
0.5	25	1.00	0.005	14
1.0	50	2.00	0.005	15

(a) Value settles within a 1% band of steady state for a 10 to 90% input step change.
(b) Monotonic; assures that the signal for Fieldbus communications either increases or remains the same for increasing analog input signals.

F1M02A, B, D, H (ANALOG INPUT) FUNCTIONAL SPECIFICATIONS

Power Requirements

INPUT VOLTAGE
21.0 to 29.0 V dc
CONSUMPTION
6.0 W
HEAT DISSIPATION
4.8 W

Communication

Redundant IEEE P1118 Fieldbus

Input Channels

INTEGRATOR MODEL:

F1M02A
Four Channels, isolated, 10.5 to 71.419 mV dc
0 to 65535 raw counts (full range of card)

F1M02B
Four Channels, isolated, 10.5 to 71.419 mV dc
Thermocouples: E, J

F1M02D
Four Channels, isolated, 10.5 to 71.419 mV dc
Thermocouples: K, T

F1M02H
Four Channels, isolated, 10.5 to 71.419 mV dc
Thermocouple: R

RATED MEAN ACCURACY
±0.035% of span (-10 to 71.4 V range)
RESOLUTION
12 to 15 bits, programmable (see Table 2)
ISOLATION
The module will withstand, without damage, a potential of 600 V ac applied for one minute between any channel and earth (ground), or between a given channel and any other channel.

CAUTION

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.

Table 2. Configurable Specifications, F1M02A, B, D, H Analog Input Channels

Integration Period (Seconds)	Update Time (Milliseconds)	Settling Time(a) (Seconds)	Linearity Error(b) (% of Range)	Resolution (Bits)
0.1	10	0.4	0.0125	12
0.2	10	0.6	0.0075	13
0.5	25	1.2	0.005	14
1.0	50	2.1	0.005	15

(a) Value settles within a 1% band of steady state for an input step change of 0 to 60 mV.
(b) Monotonic; assures that the signal for Fieldbus communications either increases or remains the same for increasing analog input signals.

F1M03 (ANALOG INPUT, 4 RTD) FUNCTIONAL SPECIFICATIONS

Power Requirements
INPUT VOLTAGE
21.0 to 29 V dc
CONSUMPTION
6.0 W
HEAT DISSIPATION
4.8 W

Communication
Redundant IEEE P1118 Fieldbus

Input Channels
INTEGRATOR MODEL:
F1M03
Four Channels, 0 to 320 Ω, 100 Ω Platinum, 100 Ω, 0.3850 Ω/°C Temp Coefficient 100 Ω, 0.3902 Ω/°C Temp Coefficient 100 Ω, 0.3920 Ω/°C Temp Coefficient

RATED MEAN ACCURACY
±0.025% of span (±0.08 Ω) Platinum
RESOLUTION
12 to 15 bits, programmable (see Table 3)

Table 3. Configurable Specifications, F1M03, 0 to 320 Ω Platinum RTD Analog Input Channel

Integration Period (Seconds)	Update Time (Milliseconds)	Settling Time(a) (Seconds)	Linearity Error(b) (% of Range)	Resolution (Bits)
0.1	10	0.4	0.0125	12
0.2	10	0.6	0.0075	13
0.5	25	1.2	0.005	14
1.0	50	2.1	0.005	15

(a) Value settles within a 1% band of steady state for an input step change of 30 to 320 Ω
(b) Monotonic; assures that the signal for Fieldbus communications either increases or remains the same for increasing analog input signals.

F1M04A, B (ANALOG OUTPUT) FUNCTIONAL SPECIFICATIONS

Power Requirements
INPUT VOLTAGE
21.0 to 29.0 V dc
CONSUMPTION
6.0 W
HEAT DISSIPATION
4.8 W

Communication
Redundant IEEE P1118 Fieldbus

Output Channels
INTEGRATOR MODEL
F1M04A
Four Channels, single ended, 0 to 20.4 mA, 1 to 5 V dc, Output Load (Maximum) = 735 W

F1M04B
Four Channels, single ended, 0 to 5.1 V dc, Output Load (Maximum) = 3000 Ω

RATED MEAN ACCURACY
0.05% of span
LINEARITY ERROR
0.025% of span (monotonic)
RESOLUTION
12 bits
COMPLIANCE VOLTAGE
18.6 V dc nominal at 20 mA at I/O field terminals
SETTLING TIME
100 ms to settle within a 1% band of steady state for a 10 to 90% output step change

F1M06 (PULSE INPUT) FUNCTIONAL SPECIFICATIONS

Power Requirements
INPUT VOLTAGE
21.0 to 29.0 V dc
CONSUMPTION
6.0 W
HEAT DISSIPATION
4.8 W

Communication
Redundant IEEE P1118 Fieldbus

Input Channels
FOUR CHANNELS
Optically isolated input
CONTACT RANGE
Open (off) and Closed (on)
OPEN CIRCUIT VOLTAGE
30 V dc maximum
SHORT CIRCUIT CURRENT
20 mA (30 V dc)

Input Channels (Cont.)
ON-STATE RESISTANCE
1.5 KΩ (maximum)
OFF-STATE RESISTANCE
100 KΩ (minimum)
ISOLATION
The module will withstand, without damage, a potential of 600 V ac applied for one minute between any channel and earth (ground), or between a given channel and any other channel.

CAUTION

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.

COUNTER RANGE
0 to 12.5 K counts per second

F1M07 (DISCRETE INPUT) FUNCTIONAL SPECIFICATIONS

Power Requirements
INPUT VOLTAGE
21.0 to 29.0 V dc
CONSUMPTION
2.3 W
HEAT DISSIPATION
2.0 W

Communication
Redundant IEEE P1118 Fieldbus

Input Channels
EIGHT CHANNELS
Contact input or 0 to 30 V dc or 0 to 150 V ac
CONTACT RANGE
Open (off) and Closed (on)
OPEN CIRCUIT VOLTAGE
5 V dc (jumper select input source or power bus)
SHORT CIRCUIT CURRENT
1.6 mA
ON-STATE RESISTANCE
1 KΩ (maximum)
OFF-STATE RESISTANCE
100 KΩ (minimum)
ISOLATION
The module will withstand, without damage, a potential of 600 V ac applied for one minute between any channel and earth (ground), or between a given channel and any other channel.

CAUTION

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.

FILTER TIME
Configurable (4, 8, 16, or 32 ms)

F1M09 (DIGITAL OUTPUT) FUNCTIONAL SPECIFICATIONS

Power Requirements
INPUT VOLTAGE
21.0 to 29.0 V dc
CONSUMPTION
2.3 W
HEAT DISSIPATION
2.3 W

Communication
Redundant IEEE P1118 Fieldbus

Output Channels
EIGHT CHANNELS
Type A FTA, solid state switch
Type Internal Relay FTA
Contact Out
Type External Relay FTA
Contact Out
APPLIED VOLTAGE
30 V dc (maximum) at FTA
LOAD CURRENT
1.0 A (maximum)
OFF-STATE LEAKAGE CURRENT
0.25 mA
ISOLATION
The module will withstand, without damage, a potential of 600 V ac applied for one minute between any channel and earth (ground), or between a given channel and any other channel.

CAUTION

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.

F1SFIA/F1SFIB (FIELDBUS ISOLATOR) FUNCTIONAL SPECIFICATIONS

Maximum Number of DCS Integrators Driven
40

Maximum Length of Local Bus
9 m (30 ft)

Maximum Input Power Voltage (Normal Operation)
+30 V dc

Maximum Operating Current @ -5%
100 mA

Maximum Power Dissipation @ +5%
2.75 W

Minimum Isolation Voltage
2500 V rms

Holdup Time @ 24 V dc
250 ms (As provided by the Fisher power supply)

Table 4. Input Signal Voltage, External Bus Side (Normal Operation)

Difference between HI and LO level for signals FBEX or FBEX', as referenced to isolated ground (EXTREF).	0.33 to 3.0 V P-P
Differential across signals FBEX and FBEX'.	0.66 to 6.0 V P-P
Absolute input limits before damage, as referenced to isolated ground (EXTREF) for FBI w/o termination cable assembly.	-7 to +7 V dc
Output common mode range.	-1 to +3 V
External bus output signal voltage (nominal differential, terminated with 55 Ω).	6.0 V P-P

Table 5. Input Signal Voltage, Local Bus Side (Normal Operation)

Difference between HI and LO level for signals FBEX or FBEX', as referenced to ground (GND).	1.2 to 3.0 V P-P
Differential across signals FBEX and FBEX'.	2.4 to 6.0 V P-P
Absolute input limits before damage, as referenced to GND.	-7 to +12 V dc
Output common mode range.	-1 to +3 V

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