

FAC-2100 SERIES FEATURES:

- Aluminum/steel construction—fully sealed enclosure
- -20°C to +65°C (-4°F to +149°F) operating range
- Meets MIL-STD-901D for high impact shock
- Meets MIL-STD-167B for vibration
- Meets MIL-STD-461E for EMI
- Large array of I/O connections
- RS-232 and RS-485 networking support
- Prominent displays and intuitive user-interface
- Versatile and easy-to-use graphical programming environment (*Design Pad G3* software package)
- Available with mil-spec miniature cylindrical connectors



PRODUCT DESCRIPTION

The Fairmount Automation Controller Series, Model 2100 (*FAC-2100*) is a general-purpose, highly configurable, multi-loop process controller. Its aluminum-steel construction makes the controller extremely rugged—it is specifically designed for operation in environments susceptible to extreme shock, vibration, temperature, humidity, pollution, corrosion, and/or dirt and grit.

The *FAC-21000* digital process controller is equipped with a large array of I/O capabilities. It combines the analog functionality of a standard process controller, with the digital functionality normally associated with Programmable Logic Controllers (PLC). In its standard configuration, the *FAC-2100* has three analog inputs, two analog outputs, two universal digital inputs, eight standard digital inputs, two digital outputs, two form-C relays, and three solid-state relays.

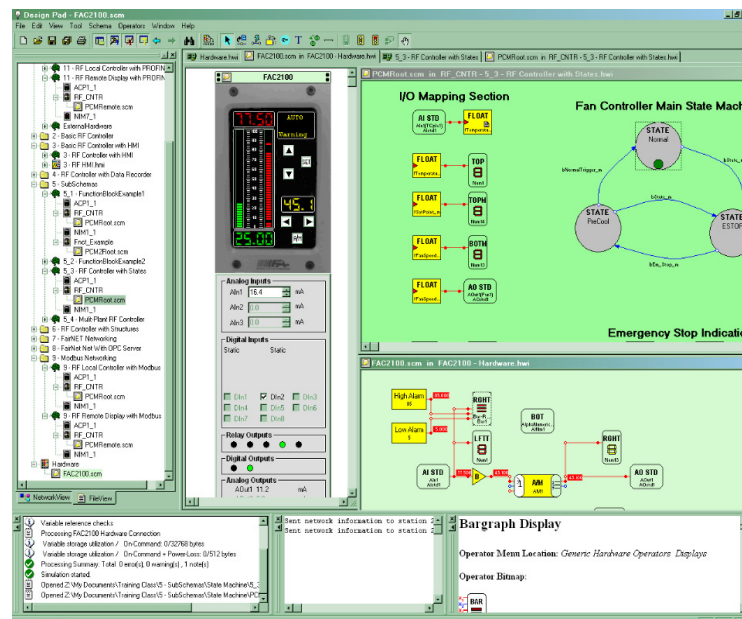
The *FAC-2000* controller is also equipped with two communication channels to support RS-232 and RS-485 networking. Protocols supported include MODBUS RTU, MODBUS ASCII, custom ASCII text messages, custom Binary messages, and the FairNET protocol. Controllers can share

information at speeds up to 1 MBPS. They can also communicate with third-party HMI packages (running on standard PCs).

The digital technology used to build the *FAC-2100*, in combination with Fairmount Automation's *Design Pad G3™* software package, makes the *FAC-2100* extremely easy to program and very versatile. Programming the device entails "drawing" a desired control scheme using a vast array of operator functions. These operator functions are wired together to indicate the signal flows from device inputs to device outputs. *Design Pad G3* supports over 100 operators, including

- Controller Blocks (e.g., PID controller, lead-lag controller)
- Signal Conditioning Functions (e.g., characterizer, rate limiter, track & hold)
- Signal Comparator Blocks (e.g., high/low alarm, equality, less or equal)
- Mathematical Operators (e.g., addition, multiplication, natural logarithm)
- Logic Functions (e.g., NAND gate, XOR gate, RS flip flop)
- General Purpose Operators (e.g., timer, ramp profile, multiplexer, A/B switch)
- Hardware Operators (e.g., analog input, bargraph display, A/M button)
- Networking Operators (e.g., broadcast, receiver, parameter synchronization)

Design Pad G3 is not only a design tool. It can also serve as a powerful simulation tool. After a design is completed, *Design Pad G3* offers the ability to simulate the control scheme and model a process, graph any signal in the circuit, and interact with computer-generated *FAC-2100* front panels and rear-panels. *Design Pad G3* also offers controller network simulations (i.e., concurrent simulation of multiple networked control stations).



Digital Process Controllers for Extreme Environments



ENVIRONMENTAL CHARACTERISTICS

Operating Ambient Temperature Range.....	-20 °C to 65 °C
Storage/Transport Ambient Temperature Range.....	-40 °C to 85 °C
High Impact Shock.....	MIL-STD-901D, Grade A
Mechanical Vibration.....	MIL-STD-167B
Electro-Magnetic Interference.....	MIL-STD-461E
Facial Protection.....	NEMA 4
Housing Protection.....	NEMA 4

ANALOG INPUTS

Quantity / Resolution.....	3 Channels / 16 Bits
Sampling Rate.....	50 Hz Maximum
Current Input Ranges Supported.....	0-20mA, 4-20mA
Current Input Accuracy.....	+/-40uA at 25 °C, +/-100uA Over Temperature
Standard Voltage Input Ranges Supported.....	0-20V, 0-10V, 0-5V, 1-5V, 0-2.5V
Standard Voltage Input Range Accuracy.....	+/-36mV at 25 °C, +/-86mV Over Temperature
Low Voltage Input Ranges Supported.....	0-1V, 0-500mV, 0-250mV, 0-100mV
Low Voltage Input Range Accuracy.....	+/-2mV at 25 °C, +/-5mV Over Temperature
Resistance Input Range Supported.....	0-2400Ω
Resistance Input Range Accuracy.....	+/-2.4Ω or +/-0.4% of Reading (whichever is smaller) Over Temperature
RTD Supported.....	3 Wire, 100Ω Platinum (European or American curve), 120Ω Nickel, or Custom
RTD Accuracy.....	+/- 1 °C Over Temperature

ANALOG OUTPUTS

Quantity / Resolution.....	2 Channels / 14 Bits
Current Output Ranges Supported.....	0-20mA, 4-20mA
Current Output Range Accuracy.....	+/-40uA at 25 °C, +/-100uA Over Temperature
Voltage Output Ranges Supported.....	0-10V, 0-5V
Voltage Output Range Accuracy.....	+/-20mV at 25 °C, +/-100mV Over Temperature

UNIVERSAL DIGITAL INPUTS

Quantity / Type.....	2 Channels / Opto-isolated
Input Signal Support.....	5VDC, 28VDC (at approximately 7mA)
Single-Input Operating Modes.....	on/off (i.e. switch), pulse counter, frequency counter
Dual-Input Operating Modes.....	event timer, quadrature decoder
Maximum Frequency.....	500 kHz

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Digital Process Controllers for Extreme Environments



DIGITAL INPUTS

Quantity / Type	8 Channels / Opto-isolated
Maximum Allowable Continuous Input Voltage	200 VDC or 140 VAC RMS
Maximum Allowable Voltage Spike	1000V peak 1.2 μ S x 50 μ S pulse per MIL-STD-1399 Section 300
Logic High Voltage Range	5-200 VDC or 24-130 VAC RMS 55-500 Hz
Minimum Input Duration for Logic High Detection	4 ms
Logic Low Voltage Range	0-1 VDC or 0-0.5 VAC RMS 55-500 Hz
Minimum Input Duration For Logic Low Detection	56 ms
Minimum Input Current Required (AC and DC inputs)	5mA RMS

LOW POWER DIGITAL OUTPUTS

Quantity / Type	2 Channels / Opto-isolated Transistor
Output Signal Support	up to 28VDC (40mA maximum)
Operating Modes	on/off, variable frequency square-wave, pulse width modulation (PWM)
Maximum Frequency	50 kHz

HIGH POWER DIGITAL OUTPUTS

Quantity / Type	5 Relays Maximum / Up to 4 Mechanical Form C and up to 3 Opto-isolated Solid State Form A
Mechanical Relay Rated Signal Range	4 A (resistive) @24 VDC or 120 VAC, 2 A(resistive) @240 VAC
Solid State Relay Rated Signal range	3 A @60 VDC or 140 VAC

RS-485 NETWORK

Network capacity	Can Drive 32 standard RS-485 unit loads or 256 FAC-2100s
Network capacity	256 FAC-2100s can be driven by a standard RS-485 transceiver
Protocols Supported	MODBUS RTU/ASCII (Master or Slave), Custom Binary/ASCII Messaging, FairNET (Master and Slave)
Max baud rate	1 Mbit / Seconds
Electrostatic Discharge Protection	+/- 15 KV Human Body model
Signal Electrical Isolation from Control Circuitry	1500 VDC
Cable fault protection	No spurious signals on receiver inputs if network cable is open or shorted.
Biasing	On-board 470 ohm high and low, Switchable In/Out
Termination	On-board 110 ohm, Switchable In/Out

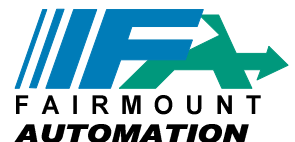
USER INTERFACE

Numeric Displays	Two 4-digit and one 3-digit, 7-segment digital readouts (0.4" x 0.3")
Analog Bargraphs	Two columns of 40 LEDs (4.0" x 0.2")
Alpha-Numeric Displays	Three rows with 8 characters each (7x5 pixel resolution)
Keypad	Six positive tactile-feel keys

PHYSICAL CHARACTERISTICS

Weight	9 pounds
Front panel dimensions	5.5" x 8.0"
Depth (w/o cylindrical connector shells)	7.75"

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