



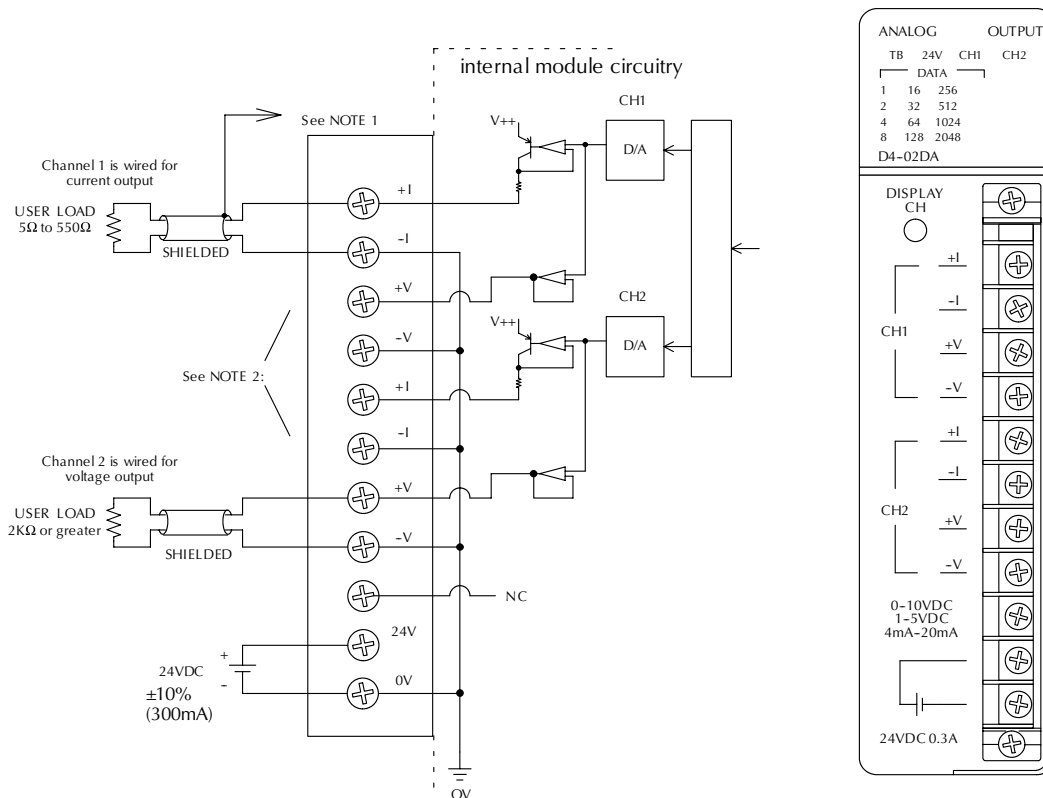
ANALOG OUTPUT MODULES

D4-02DA 2-Channel Analog Output	
Number of Channels	2 (independent)
Output Ranges	0-10V, 1-5V, 4-20 mA
Channels Individually Configurable	Range determined by field wiring connections used
Resolution	12 bit (1 to 4096)
Output Type	Single ended
Output Impedance	0.5 maximum, voltage output
Output Current	5 mA maximum, voltage output
Load Impedance	550ohm maximum, 5.0 minimum, current output 2Kohm minimum, voltage output
Linearity	± 0.1% maximum
Accuracy vs Temperature	± 70 ppm/°C maximum
Maximum Inaccuracy	± 0.2% maximum at 25°C
Conversion Method	Integration
Conversion Time	Start of scan, 30µS + one scan

PLC Update Rate	1 or 2 channels per scan
Digital Output Points Required	32 (Y) Output points (12 binary data bits times 2, eight unused bits.)
Base Power Required 5V	250mA
External Power Supply	24VDC, ± 10%, 300 mA, class2
Operating Temperature	32° to 140°F (0 to 60°C)
Storage Temperature	-4 to 158°F (-20 to 70° C)
Relative Humidity	5 to 95% (non-condensing)
Environmental Air	No corrosive gases permitted
Vibration	MIL STD 810C 514.2
Shock	MIL STD 810C 516.2
Insulation Resistance	10M, 500 VDC
Noise Immunity	NEMA ICS3-304

NOTE 1: Shields should be connected to the 0V of the module or to the 0V of the power supply
NOTE 2: Unused voltage & current outputs should remain open (no connections)

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ANALOG OUTPUT MODULES

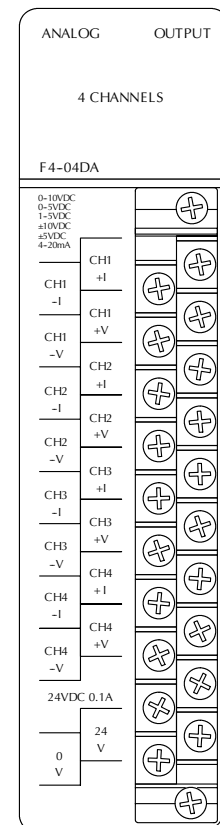
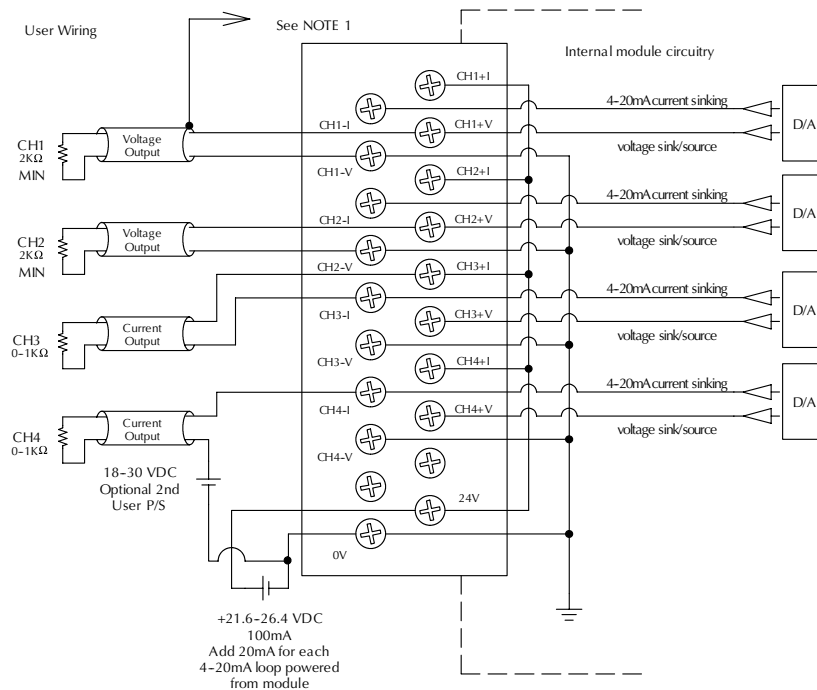
F4-04DA 4-Channel Analog Output

Number of Channels	4
Output Ranges	0-5V, 0-10V, 4-20 mA
Channels Individually Configurable	Yes*
Resolution	12 bit (1 to 4,096)
Conversion Method	Successive approximation
Output Type	Single ended, 1 common
Output Impedance	0.2 typical, voltage output
Load Impedance	2Kohm minimum, voltage output 0ohm minimum, current output
Maximum Load/Power Supply	680/18V, 1Kohm/24V, 1.5K/36V, current output
Voltage Output Current	5mA sink or source
Short-circuit Current	15mA typical, voltage output
Linearity Error	± 0.1 count (± 0.25%) maximum
Gain Calibration Error	± 8 counts max., voltage output -8 to +11 counts max., current output
Offset Calibration Error	± 2 counts max., voltage output -5 to +9 counts max., current output

Conversion Time	5µs max., settling time 0.3 ms max., digital out to analog out
Digital Output Points Required	16 (Y) output points (12 bits binary data and 4 channel select bits)
Base Power Required 5V	120 mA
External Power Supply	+24VDC (± 10%), 100 mA, class 2 (add 20 mA for each current loop used)
Accuracy vs. Temperature	± 50 ppm/°C maximum offset ±25 ppm/°C maximum full scale
Operating Temperature	32° to 140°F (0 to 60°C)
Storage Temperature	-4 to 158°F (-20 to 70° C)
Relative Humidity	5 to 95% (non-condensing)
Environmental Air	No corrosive gases permitted
Vibration	MIL STD 810C 514.2
Shock	MIL STD 810C 516.2
Insulation Resistance	10M, 500VDC
Noise Immunity	NEMA ICS3-304

One count in the specification table is equal to one least significant bit of the analog data value (1 in 4,096).
NOTE 1: Shields should be grounded at the signal source
NOTE 2: Unused channels should be connected to 0V or have current jumpers installed

Note: The F4-04DA is not recommended for new applications. It is recommended that the F4-04DA-1 or F4-04DA-2 module be used.





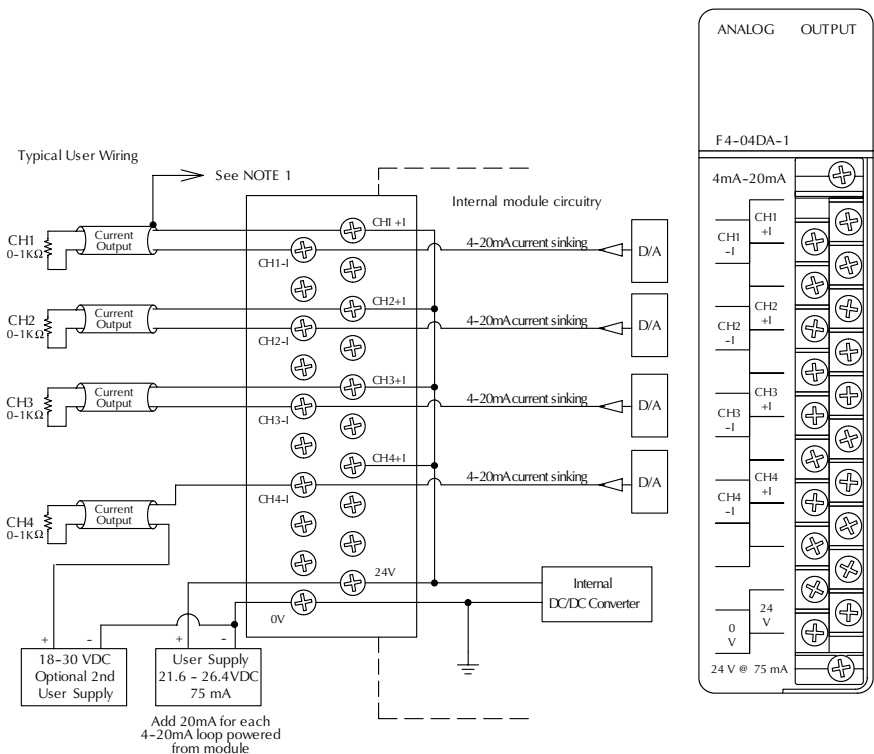
ANALOG OUTPUT MODULES

1-800-633-0405

F4-04DA-1 4-Channel Analog Current Output	
Number of Channels	4, single-ended (one common)
Output Range	4-20 mA current
Resolution	12 bit (1 to 4095)
Output Type	Outputs sink 4-20mA from external supply
External Load Resistance	0 minimum
Maximum Loop Supply	30VDC
Peak Output Voltage	40VDC (clamped, transient suppressor)
Maximum Load/Power Supply	620/18V, 910ohm/24V, 1200/30V
Linearity Error (best fit)	± 1count (±0.025%) maximum
Gain Calibration Error	± 5 counts maximum
Offset Calibration Error	± 3 counts maximum
Maximum Inaccuracy	±0.1% @ 77° F (25° C) ±0.3% @ 32 to 140° F (0 to 60° C)
Conversion Time	100µs max., settling time 2.0 ms max., digital out to analog out

Digital Output Points Required	16 (Y) output points (12 bits binary data, 4 active channel bits)
Base Power Required 5V	70 mA
External Power Supply	21.6-26.4 VDC, 75 mA, class 2 (add 20 mA for each current loop used)
Accuracy vs. Temperature	± 57 ppm/°C full scale calibration range (including maximum offset change, 2 counts)
Operating Temperature	32° to 140°F (0 to 60°C)
Storage Temperature	-4 to 158°F (-20 to 70° C)
Relative Humidity	5 to 95% (non-condensing)
Environmental Air	No corrosive gases permitted
Vibration	MIL STD 810C 514.2
Shock	MIL STD 810C 516.2
Noise Immunity	NEMA ICS3-304

One count in the specification table is equal to one least significant bit of the analog data value (1 in 4,096).
NOTE 1: Shields should be connected to the 0V of the User Power Supply at the module terminal block.
NOTE 2: Unused current outputs should remain open (no connections)



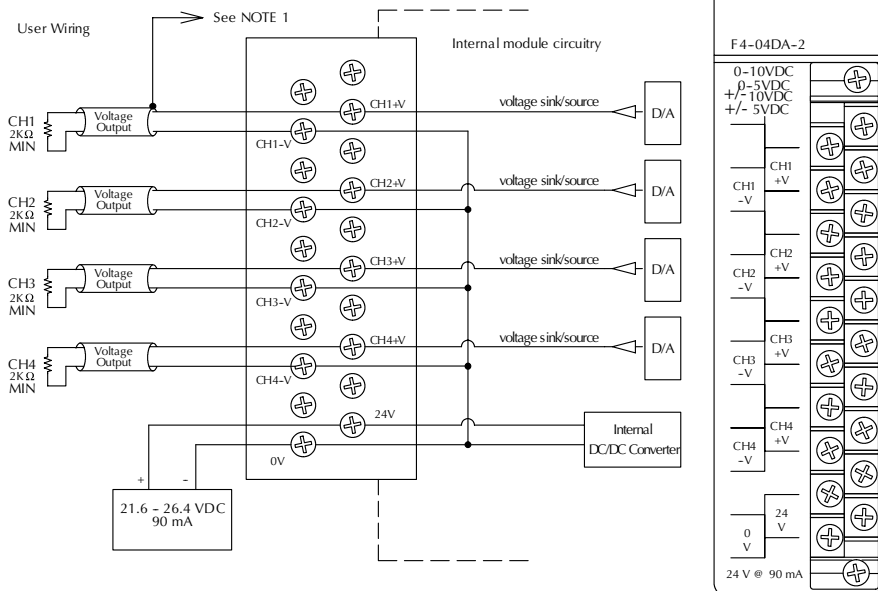
ANALOG OUTPUT MODULES

F4-04DA-2 4-Channel Analog Voltage Output

Number of Channels	4, single ended (one common)
Output Ranges	0-5V, 0-10V, $\pm 5V$, $\pm 10V$
Channels Individually Configurable	Yes
Resolution	12 bit (1 to 4,095)
Load Impedance	2K minimum
Load Capacitance	0.01 μ F maximum
Voltage Output Current	5.0mA sink or source
Short-circuit Current	15 mA typical
Linearity Error (End to End) and Relative Accuracy	± 1 count ($\pm 0.025\%$) maximum
Offset Calibration Error	± 3 counts maximum, unipolar ± 4 counts maximum, bipolar
Full Scale Calibration Error	± 8 counts maximum (offset error included)
Maximum Inaccuracy	$\pm 0.2\%$ @ 77° F (25° C) $\pm 0.4\%$ @ 32 to 140° F (0 to 60° C)

Conversion Time	5 μ s maximum, settling time 2.0 ms maximum, digital out to analog out
Digital Output Points Required	16 (Y) output points (12 bits binary data, 4 active channel bits or 2 active channel bits and 1 sign bit for bipolar)
Base Power Required 5V	90 mA
External Power Supply	21.6-26.4 VDC, 90 mA, class 2 (outputs fully loaded)
Accuracy vs. Temperature	± 57 ppm/ $^{\circ}$ C full scale calibration change (including maximum offset change, 2 counts)
Operating Temperature	32° to 140°F (0 to 60°C)
Storage Temperature	-4 to 158°F (-20 to 70° C)
Relative Humidity	5 to 95% (non-condensing)
Environmental Air	No corrosive gases permitted
Vibration	MIL STD 810C 514.2
Shock	MIL STD 810C 516.2
Noise Immunity	NEMA ICS3-304

One count in the specification table is equal to one least significant bit of the analog data value (1 in 4096).
NOTE 1: Shields should be connected to the 0V of the module or the 0V of the P/S
NOTE 2: Unused voltage outputs should remain open (no connections)





ANALOG OUTPUT MODULES

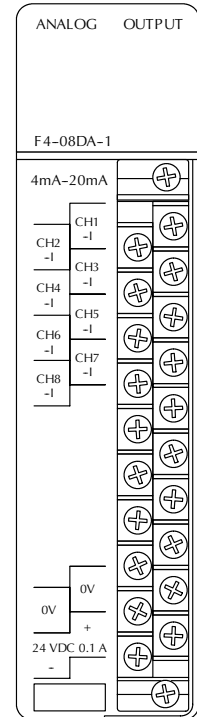
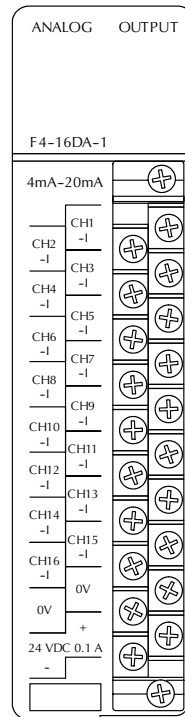
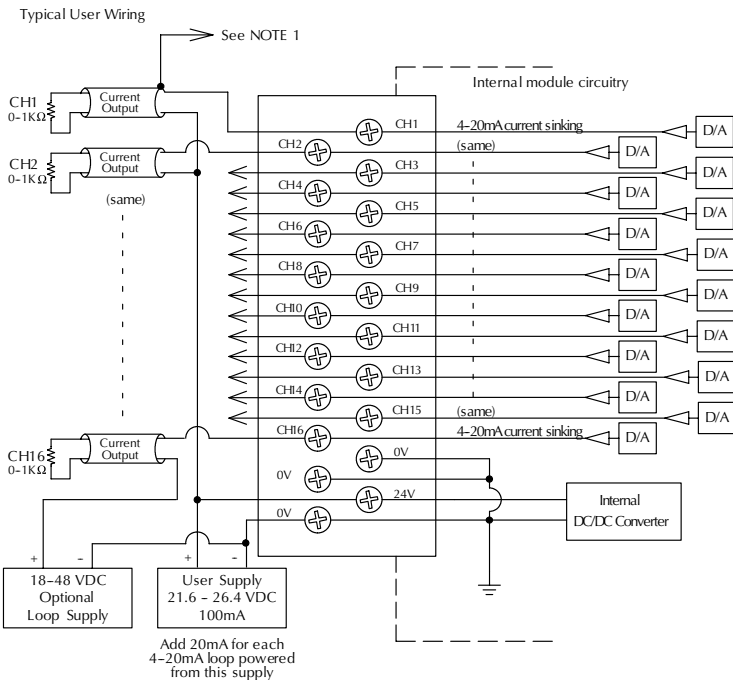
F4-08DA-1 8-Channel Analog Current Output F4-16DA-1 16-Channel Analog Current Output

Number of Channels F4-08DA-1 F4-16DA-1	8, single ended (one common) 16, single ended (one common)
Output Ranges	4-20mA current
Resolution	12 bit (1 to 4095)
Output Type	Outputs sink 4-20 mA from external supply
Peak Output Voltage	40VDC (no transient voltage suppression)
External Load Resistance	0-480 @ 18V, 220-740 @ 24V, 1550-1760 @48 V
Maximum Loop Supply	48VDC (with load resistance in proper range)
Crosstalk	-70dB, ± 1 count maximum
Linearity Error (End-to-End) & Relative accuracy	± 1 count maximum
Full Scale Calibration Error (offset error incl.)	±8 counts max. (20.0 mA at 25° C)
Offset Calibration Error	± 3 counts max. (4.0 mA at 25° C)
Maximum Inaccuracy	±0.2% @ 77° F (25° C) ±0.4% @ 32 to 140° F (0 to 60° C)

Conversion Time	400µs maximum, for full scale change 2.25 to 4.5 ms for digital out to analog out
Digital Output Points Required	F4-16DA-1 16 (Y) output points (12 bits binary data, 3 bits channel select , 1bit output enable) F4-08DA-1 32 (Y) output points 2 sets each (12 bits binary data, 3 bits channel select , 1bit output enable)
Base Power Required 5V	90 mA
External Power Supply	21.6-26.4 VDC, 100 mA, class 2 (add 20 mA for each current loop used)
Accuracy vs. Temperature	± 57 ppm/°C full scale calibration range (including maximum offset change, 2 counts)
Operating Temperature	32° to 140°F (0 to 60°C)
Storage Temperature	-4 to 158°F (-20 to 70° C)
Relative Humidity	5 to 95% (non-condensing)
Environmental Air	No corrosive gases permitted
Vibration	MIL STD 810C 514.2
Shock	MIL STD 810C 516.2
Noise Immunity	NEMA ICS3-304

One count in the specification table is equal to one least significant bit of the analog data value (1 in 4,096).
NOTE 1: Shields should be connected to the 0V of the User Power Supply at the module terminal block.
NOTE 2: Unused current outputs should remain open (no connections)

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ANALOG OUTPUT MODULES

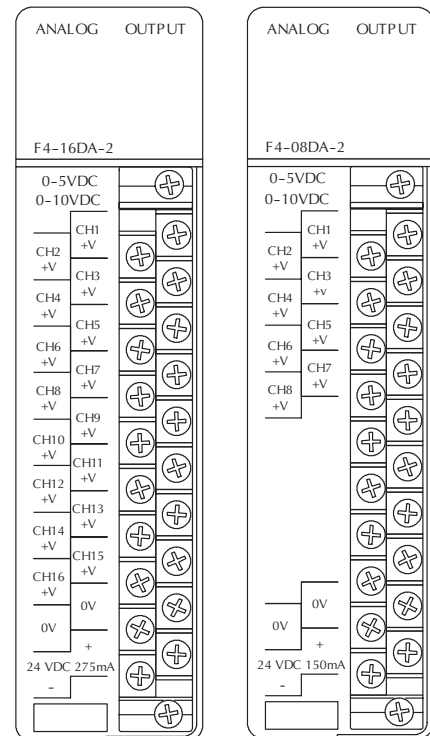
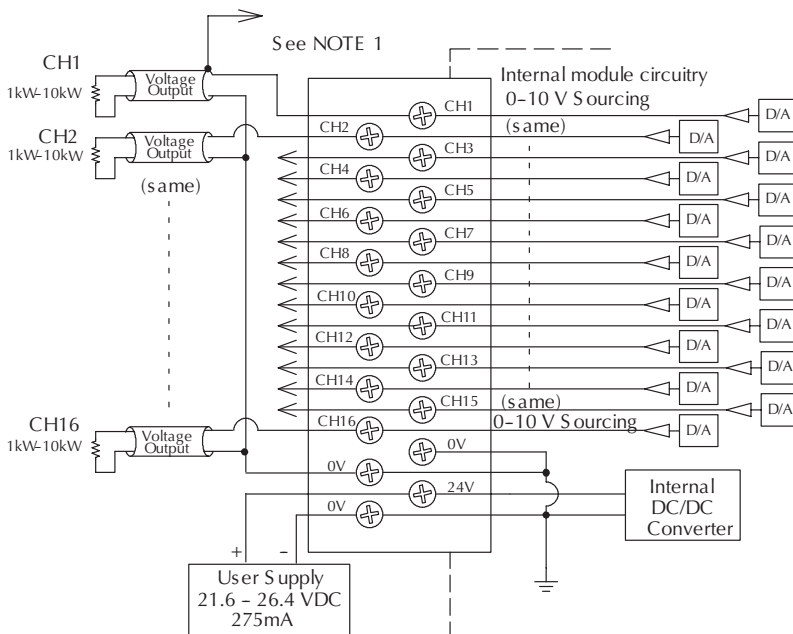
F4-08DA-2 8-Channel Analog Voltage Output F4-16DA-2 16-Channel Analog Voltage Output

Number of Channels F4-08DA-2 F4-16DA-2	8, single ended (one common) 16, single ended (one common)
Output Range	0-5VDC, 0-10VDC
Resolution	12 bit (1 to 4095)
Output Type	Voltage Sourcing 10mA max.
External Load Resistance	1K max./10K min. (example: 10volts@ 1K = 10mA load)
Crosstalk	-70dB, ± 1 count maximum
Linearity Error (End-to-End) and Relative Accuracy	± 1 count maximum (10VDC at 25°C)
Full Scale Calibration Error (Offset Error Included)	± 6 counts max. (10VDC at 25°C)
Offset Calibration Error	± 3 counts max. (0VDC at 25°C)
Maximum Inaccuracy	$\pm 0.2\%$ @ 77°F (25°C) $\pm 0.4\%$ @ 32 to 140°F (0 to 60°C)

Conversion Time	400 μ s maximum, for full scale change 4.5 to 9 ms for digital out to analog out
Digital Output Points Required	F4-08DA-2 16 (Y) output points 12 bits binary data, 3 bits channel select, 1 bit output enable) F4-16DA-2 32 (Y) output points (two sets each of 12 bits binary data, 3 bits channel select, 1 bit output enable)
Power Budget Require	80mA @ 5VDC (base power)
External Power Supply	21.6-26.4VDC, 150mA, class 2
Accuracy vs. Temperature	± 57 ppm/°C full scale calibration range (including maximum offset change, 2 counts)
Operating Temperature	32° to 140°F (0 to 60°C)
Storage Temperature	-4 to 158°F (-20 to 70°C)
Relative Humidity	5 to 95% (non-condensing)
Environmental Air	No corrosive gases permitted
Vibration	MIL STD 810C 514.2
Shock	MIL STD 810C 516.2
Noise Immunity	NEMA ICS3-304

One count in the specification table is equal to one least significant bit of the analog data value (1 in 4,095).
NOTE 1: Shields should be connected to the 0V of the User Power Supply at the module terminal block.

Typical User Wiring





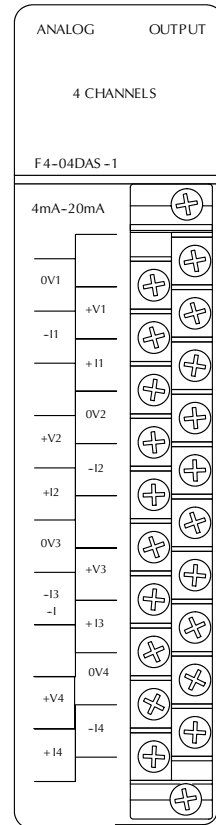
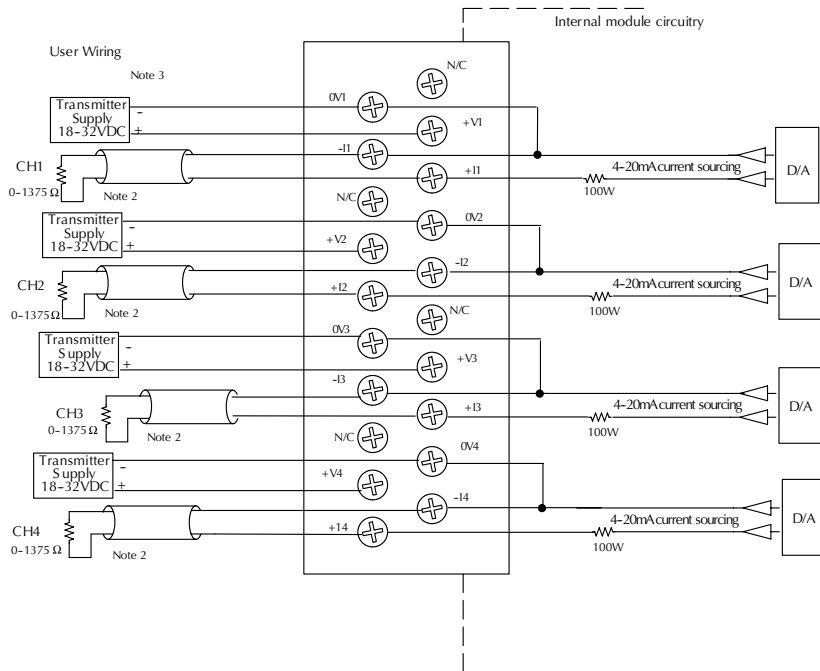
ANALOG OUTPUT MODULES

1-800-633-0405

F4-04DAS-1 4-Ch. 4-20mA Isolated Analog Out	
Number of Channels	4, isolated current sourcing
Output Range	4-20mA current
Resolution	16 bit (1 to 65536)
Output Type	Outputs source 4-20 mA from external supply
Isolation Voltage	±750V continuous, channel to channel, channel to logic
Loop Supply	12-32VDC
Output Loop Compliance	Vin - 2.5V
Load Impedance	0-1375 (@ 32V)
Maximum Load/Power Supply	375/12V, 975/24V, 1375/32V
PLC Update Rate	1 channel per scan min., 4 per scan max.
Digital Output Points Required	32 (Y) output points 16 binary data, 2 channel identification, 1bit output enable)
Power Budget Requirement	60mA @ 5VDC (supplied by base)
External Power Supply	50mA per channel

Linearity Error (End-to-End)	± 10 count maximum (0.015% of full scale)
Conversion Settling Time	3ms to 0.1% of full scale
Gain Calibration Error	± 32 counts (± 0.05%)
Offset Calibration Error	± 13 counts (± 0.02%)
Output Drift	50ppm/°C
Maximum Inaccuracy	±0.07% @ 77° F (25° C) ±0.18% @ 32 to 140° F (0 to 60° C)
Operating Temperature	0 to 60°C (32° to 140°F)
Storage Temperature	-20 to 70° C (-4 to 158°F)
Relative Humidity	5 to 95% (non-condensing)
Environmental Air	No corrosive gases permitted
Vibration	MIL STD 810C 514.2
Shock	MIL STD 810C 516.2
Noise Immunity	NEMA ICS3-304

One count in the specification table is equal to one least significant bit of the analog data value (1 in 65536).
 NOTE 1: Shields should be connected to the 0V.
 NOTE 2: Load must be within compliance voltage.
 NOTE 3: For non-isolated outputs, connect all 0V's together (0V1...0V4) and connect all +V's together (+V1...+V4).



ANALOG OUTPUT MODULES

F4-04DAS-2 4-Channel 0-5V/10V Isolated Analog Output

Number of Channels	4, isolated
Output Range	0-5VDC, 0-10VDC
Resolution	16 bit (1 to 65536)
Isolation Voltage	±750V continuous, channel to channel, channel to logic
Load Impedance	2k min
PLC Update Rate	1 channel per scan min., 4 per scan max.
Digital Output Points Required	16 data bits, 2 channel ID, 1 output enable 32 (Y) output points
Power Budget Requirement	60mA @ 5VDC (supplied by base)
External Power Supply	60mA per channel, 21.6VDC-26.4VDC

Linearity Error (End-to-End)	± 10 count maximum (0.015% of full scale)
Conversion Settling Time	3ms to 0.1% of full scale
Gain Calibration Error	± 32 counts (± 0.05%)
Offset Calibration Error	± 13 counts (± 0.02%)
Maximum Inaccuracy	±0.07% @ 77° F (25° C) ±0.18% @ 32 to 140° F (0 to 60° C)
Operating Temperature	0 to 60°C (32° to 140°F)
Storage Temperature	-20 to 70° C (-4 to 158°F)
Relative Humidity	5 to 95% (non-condensing)
Environmental Air	No corrosive gases permitted
Vibration	MIL STD 810C 514.2
Shock	MIL STD 810C 516.2
Noise Immunity	NEMA ICS3-304

One count in the specification table is equal to one least significant bit of the analog data value (1 in 65536).
NOTE 1: Shields should be connected to the 0V.
NOTE 2: Load must be within compliance voltage.

