

MANUFACTURER DOCUMENT PACKAGE

Manufacturer's Manual

Reference package for procurement and maintenance review

ALLEN-BRADLEY

2080-OF2

TWO-CHANNEL ANALOG OUTPUT PLUG-IN MODULE

Used with the applicable Micro800 plug-in modules configuration.

REFERENCE PACKAGE

OFFICIAL DOCUMENT

Selected official manufacturer pages follow this cover.

Source: Allen-Bradley Micro800 plug-in modules official technical documentation



Micro800 Plug-in Modules

Catalog Numbers 2080-IQ4, 2080-IQ4OB4, 2080-IQ4OV4,
2080-OB4, 2080-OV4, 2080-OW4I, 2080-IF2, 2080-IF2K, 2080-
IF4, 2080-OF2, 2080-TC2, 2080-RTD2, 2080-MEMBAK-RTC,
2080-MEMBAK-RTC2, 2080-TRIMPOT6, 2080-SERIALISOL,
2080-SERIALISOLK, 2080-DNET20, 2080-MOT-HSC



Allen-Bradley

by ROCKWELL AUTOMATION

Important User Information

Read this document and the documents listed in the additional resources section about installation, configuration, and operation of this equipment before you install, configure, operate, or maintain this product. Users are required to familiarize themselves with installation and wiring instructions in addition to requirements of all applicable codes, laws, and standards.

Activities including installation, adjustments, putting into service, use, assembly, disassembly, and maintenance are required to be carried out by suitably trained personnel in accordance with applicable code of practice.

If this equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

In no event will Rockwell Automation, Inc. be responsible or liable for indirect or consequential damages resulting from the use or application of this equipment.

The examples and diagrams in this manual are included solely for illustrative purposes. Because of the many variables and requirements associated with any particular installation, Rockwell Automation, Inc. cannot assume responsibility or liability for actual use based on the examples and diagrams.

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Throughout this manual, when necessary, we use notes to make you aware of safety considerations.



WARNING: Identifies information about practices or circumstances that can cause an explosion in a hazardous environment, which may lead to personal injury or death, property damage, or economic loss.



ATTENTION: Identifies information about practices or circumstances that can lead to personal injury or death, property damage, or economic loss. Attentions help you identify a hazard, avoid a hazard, and recognize the consequence.

IMPORTANT

Identifies information that is critical for successful application and understanding of the product.

These labels may also be on or inside the equipment to provide specific precautions.



SHOCK HAZARD: Labels may be on or inside the equipment, for example, a drive or motor, to alert people that dangerous voltage may be present.



BURN HAZARD: Labels may be on or inside the equipment, for example, a drive or motor, to alert people that surfaces may reach dangerous temperatures.



ARC FLASH HAZARD: Labels may be on or inside the equipment, for example, a motor control center, to alert people to potential Arc Flash. Arc Flash will cause severe injury or death. Wear proper Personal Protective Equipment (PPE). Follow ALL Regulatory requirements for safe work practices and for Personal Protective Equipment (PPE).

The following icon may appear in the text of this document.



Identifies information that is useful and can help to make a process easier to do or easier to understand.

Rockwell Automation recognizes that some of the terms that are currently used in our industry and in this publication are not in alignment with the movement toward inclusive language in technology. We are proactively collaborating with industry peers to find alternatives to such terms and making changes to our products and content. Please excuse the use of such terms in our content while we implement these changes.

About This Publication

Use this manual if you are responsible for designing, installing, programming, or troubleshooting control systems that use Micro800™ controllers.

This manual is a reference guide for Micro800 expansion I/O modules. It describes the procedures that you use to install, wire, and troubleshoot your expansion I/O. This manual:

- Gives you an overview of expansion I/O features and configuration parameter
- Gives you an overview of the Micro800 controller system

You should have a basic understanding of electrical circuitry and familiarity with relay logic. If you do not, obtain the proper training before using this product.

Download Firmware, AOP, EDS, and Other Files

Download firmware, associated files (such as AOP, EDS, and DTM), and access product release notes from the Product Compatibility and Download Center at rok.auto/pcdc.

Summary of Changes

This publication contains the following new or updated information. This list includes substantive updates only and is not intended to reflect all changes.

Topic	Page
Added 2080-IF2K and 2080-SERIALISOLK catalogs	throughout
Added reference to FactoryTalk Design Workbench software	throughout
Updated Wiring Applications for 2080-MOT-HSC	21
Added Configure the Plug-in Module	28
Updated Use High Speed Counter Instructions	28
Updated Use Feedback Axis	29
Updated Use High Speed Counter UDFB	30
Updated Use the 2080-MOT-HSC Module	39

Additional Resources

These documents contain additional information concerning related products from Rockwell Automation. You can view or download publications at rok.auto/literature.

Additional Resources

Resource	Description
Micro800 Programmable Controller Family Selection Guide, publication 2080-SG001	Provides information to help you select the Micro800 controller, plug-ins, expansion I/O, and accessories, based on your requirements.
Micro800 Programmable Controllers Technical Data, publication 2080-TD001	Provides detailed specifications for Micro800 controllers, expansion I/O modules, plug-in modules, and accessories.
Micro830, Micro850, and Micro870 Programmable Controllers User Manual, publication 2080-UM002	Describes how to install, configure, use, and troubleshoot your Micro830®, Micro850®, and Micro870® controllers.
Micro800 16-point and 32-point 12/24V Sink/Source Input Modules Installation Instructions, publication 2085-IN001	Provides information on mounting and wiring the expansion I/O modules (2085-IQ16, 2085-IQ32T).
Micro800 Bus Terminator Module Installation Instructions, publication 2085-IN002	Provides information on mounting and wiring the expansion I/O bus terminator (2085-ECR).
Micro800 16-point Sink and 16-point Source 12/24V DC Output Modules Installation Instructions, publication 2085-IN003	Provides information on mounting and wiring the expansion I/O modules (2085-0V16, 2085-0B16).
Micro800 8-point and 16-point AC/DC Relay Output Modules Installation Instructions, publication 2085-IN004	Provides information on mounting and wiring the expansion I/O modules (2085-0W8, 2085-0W16).
Micro800 8-point Input and 8-point Output AC Modules Installation Instructions, publication 2085-IN005	Provides information on mounting and wiring the expansion I/O modules (2085-IA8, 2085-IM8, 2085-OA8).
Micro800 4-channel and 8-channel Analog Voltage/Current Input and Output Modules Installation Instructions, publication 2085-IN006	Provides information on mounting and wiring the expansion I/O modules (2085-IF4, 2085-IF8, 2085-OF4).
Micro800 4-channel Thermocouple/RTD Input Module Installation Instructions, publication 2085-IN007	Provides information on mounting and wiring the expansion I/O module (2085-IRT4).
Micro870 Programmable Controllers 24V DC Expansion Power Supply Installation Instructions, publication 2085-IN008	Provides information on mounting and wiring the 24V DC expansion power supply (2085-EP24VDC).

The number of supported Micro800 plug-ins on the controllers are summarized in [Table 2](#).

Table 2 - Plug-in Slots on Micro800 Controllers

Controller	Number of Plug-in Slots
Micro810®	0
Micro820®	2
Micro830	2 (10/16 points) 3 (24 points) 5 (48 points)
Micro850	3 (24 points) 5 (48 points)
Micro870	3



ATTENTION: Removal and Insertion Under Power (RIUP) is not supported on all Micro800 plug-in modules, except on the 2080-MEMBAK-RTC and 2080-MEMBAK-RTC2 modules.



ATTENTION: Micro800 plug-in modules can be installed on any plug-in slot on the controller, except for the 2080-MEMBAK-RTC and 2080-MEMBAK-RTC2 modules, which can only be installed on the leftmost plug-in slot.

Digital Plug-ins

12/24V Digital Plug-ins – 2080-IQ4, 2080-IQ4OB4, 2080-IQ4OV4, 2080-OB4, 2080-OV4

These digital plug-in modules provide transistor outputs for switching various 12/24V DC voltages to field loads and for detecting 12/24V signals from field devices.

AC/DC Relay Output Module – 2080-OW4I

The 2080-OW4I is a 4-channel relay output and provides dry contact relay closure outputs for switching various AC and DC voltages to field loads.

Analog Plug-ins

The following analog plug-ins are supported by most Micro800 controllers.

Non-isolated Unipolar Analog Input and Output – 2080-IF2, 2080-IF2K, 2080-IF4, 2080-OF2

These plug-in modules add extra embedded non-isolated unipolar (0...10V, 0...20 mA) analog I/O and offer 12-bit resolution.

Specialty Plug-ins

Non-isolated Thermocouple and RTD – 2080-TC2 and 2080-RTD2

These non-isolated plug-in modules help to make temperature control possible when used with PID (Proportional Integral Derivative).

See [Non-isolated Thermocouple and RTD Plug-in Modules – 2080-TC2 and 2080-RTD2 on page 23](#) for more information.

Memory Backup and High Accuracy RTC – 2080-MEMBAK-RTC and 2080-MEMBAK-RTC2

These plug-in modules allow you to make a backup copy of the project in your controller, and adds precision real-time clock function without needing to calibrate or update periodically.

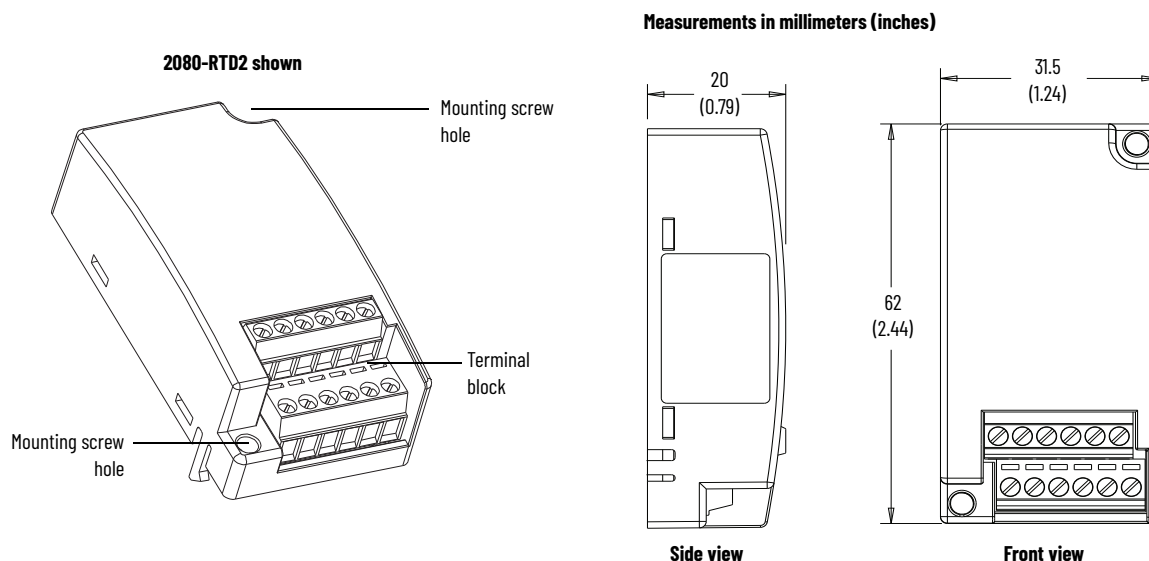
They can also be used to clone/update Micro800 application code. The 2080-MEMBAK-RTC2 has larger memory to support clone/update for Micro870 application code. However, these

Install and Wire Your Module

This chapter provides hardware features, installation, and wiring connection diagrams for all Micro800 plug-in modules.

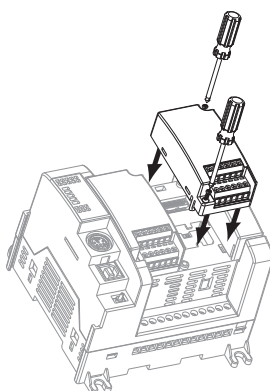
Hardware Features

The plug-in modules, except for the 2080-MEMBAK-RTC and 2080-MEMBAK-RTC2, can be plugged into any plug-in slots on the Micro800 controllers.



Insert Module into Controller

Follow the instructions to insert and secure the plug-in module to the controller.



1. Position the plug-in module with the terminal block facing the front of the controller as shown.
2. Snap the module into the module bay.
3. Using a screwdriver, tighten the 10...12 mm (0.39...0.47 in.) M3 self-tapping screw to torque specifications. See the Micro800 Programmable Controllers Technical Data, publication [2080-TD001](#) for more information.

IMPORTANT

Analog I/O performance depends on the application. For better noise immunity, cable length should ideally be less than 3 m (10 ft) because the plug-ins are non-isolated. For longer cable length requirements, use the 2085 expansion I/O modules instead.

Wiring

The following plug-in modules have 12-pin female terminal blocks:

- 2080-IQ4
- 2080-IQ40B4, 2080-IQ40V4
- 2080-OB4, 2080-OV4, 2080-OW4I
- 2080-IF2, 2080-IF2K, 2080-IF4
- 2080-TC2, 2080-RTD2

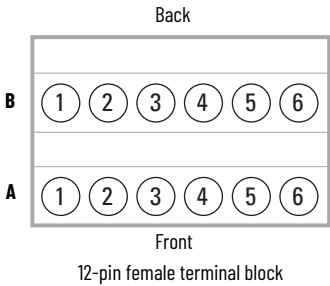


Table 4 - Pin Designations for 12-pin Female Terminal Block Modules

Pin	2080-IQ4	2080-IQ40B4, 2080-IQ40V4	2080-OB4, 2080-OV4	2080-OW4I	2080-IF2, 2080-IF2K	2080-IF4	2080-TC2	2080-RTD2
A1	I-02	I-02	Not used	COM3	COM	COM	CH0+	CH0+
A2	I-03	I-03	Not used	O-3	Not used	VI-2	CH0-	CH0-
A3	COM	COM	-24V DC	Not used	Not used	CI-2	CJC+	CH0L (Sense)
A4	COM	-24V DC	-24V DC	Not used	COM	COM	Not used	Not used
A5	Not used	O-02	O-02	Not used	Not used	VI-3	Not used	Not used
A6	Not used	O-03	O-03	Not used	Not used	CI-3	Not used	Not used
B1	I-00	I-00	Not used	COM0	VI-0	VI-0	CH1+	CH1+
B2	I-01	I-01	Not used	O-0	CI-0	CI-0	CH1-	CH1-
B3	COM	COM	+24V DC	COM1	COM	COM	CJC-	CH1L (Sense)
B4	COM	+24V DC	+24V DC	O-1	VI-1	VI-1	Not used	Not used
B5	Not used	O-00	O-00	COM2	CI-1	CI-1	Not used	Not used
B6	Not used	O-01	O-01	O-2	COM	COM	TH	Not used

Figure 1 - Example Wiring for 2080-IQ40B4

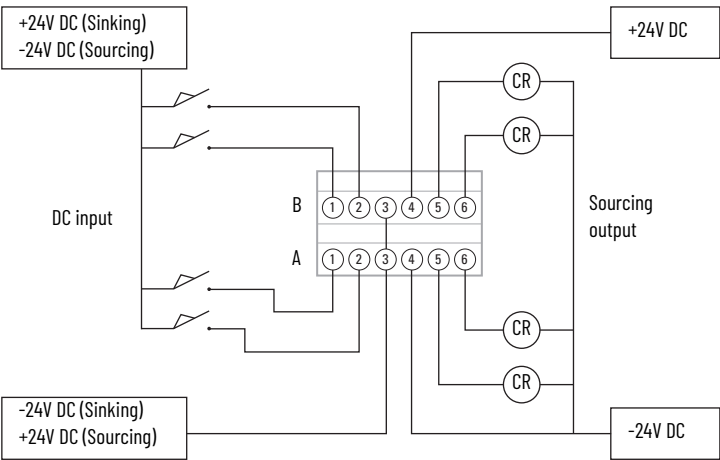


Figure 2 - Example Wiring for 2080-IQ40V4

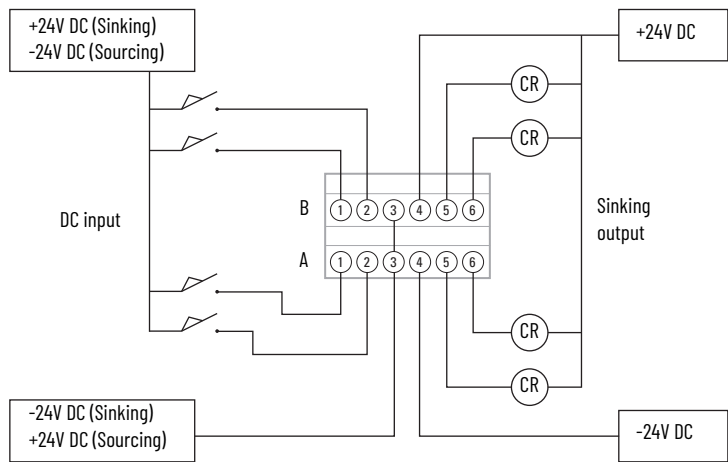
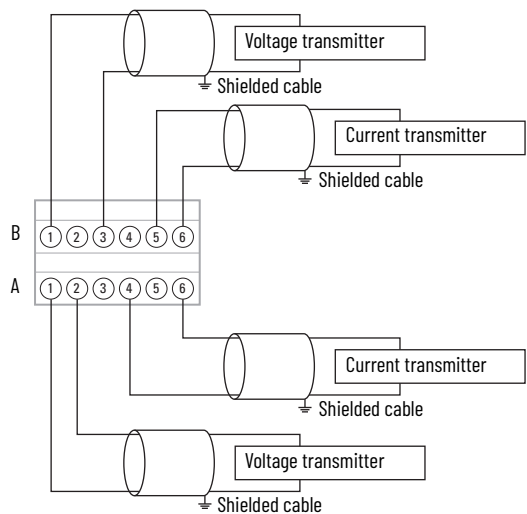


Figure 3 - Example Wiring for 2080-IF4



The following plug-in modules have 8-pin female terminal blocks:

- 2080-OF2
- 2080-SERIALISOL, 2080-SERIALISOLK
- 2080-MOT-HSC

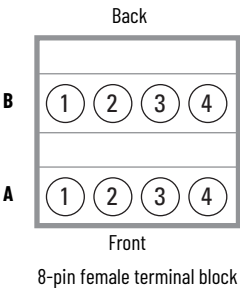


Table 5 - Pin Designations for 8-pin Female Terminal Block Modules

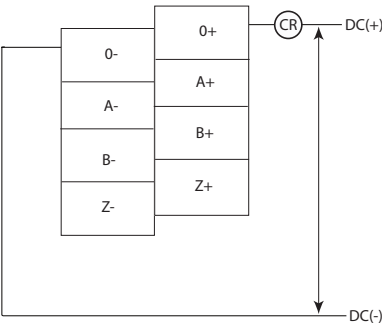
Pin	2080-OF2	2080-SERIALISOL, 2080-SERIALISOLK	2080-MOT-HSC ^{(1) (2)}
A1	COM	RS-485 B+	0-
A2	COM	GND	A-
A3	COM	RS-232 RTS	B-
A4	COM	RS-232 CTS	Z-
B1	VO-0	RS-232 DCD	0+

Table 5 - Pin Designations for 8-pin Female Terminal Block Modules (Continued)

Pin	2080-OF2	2080-SERIALISOL, 2080-SERIALISOLK	2080-MOT-HSC ^{(1) (2)}
B2	CO-0	RS-232 RXD	A+
B3	VO-1	RS-232 TXD	B+
B4	CO-1	RS-485 A-	Z+

(1) **IMPORTANT:** Individually shielded, twisted-pair cable (or the type that is recommended by the encoder or sensor manufacturer) should be used for the 2080-MOT-HSC plug-in.
(2) Sinking output/sourcing output wiring for the 2080-MOT-HSC plug-in is shown as follows.

Sinking Output Wiring



Sourcing Output Wiring

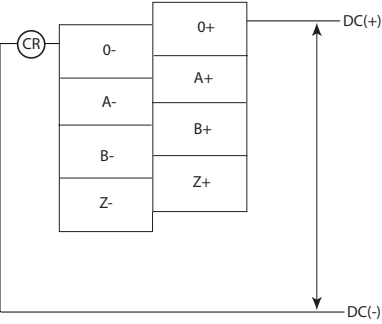
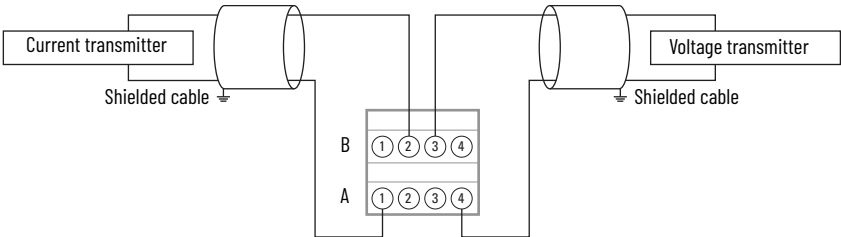


Figure 4 - Example Wiring for 2080-OF2



Serial Port to Modem Cable Pinout

When connecting Micro800 to a modem using an RS-232 cable, the maximum that the cable length may be extended is 15.24 m (50 ft).

DTE Device
(Micro800 RS-232
Isolated Serial Port Plug-
in Module)

8-pin

B3	TXD
B2	RXD
A2	GND
A1	B(+)
B4	A(-)
B1	DCD
A4	CTS
A3	RTS

DCE Device
(Modem, and so
on)

25-pin 9-pin

TXD	2	3
RXD	3	2
GND	7	5
DCD	8	1
DTR	20	4
DSR	6	6
CTS	5	8
RTS	4	7



ATTENTION: Do not connect to pins A1 and B4 for RS-232 connections. This connection causes damage to the RS-232/485 communication port.

Analog Plug-in Modules

Analog Plug-in Modules

I/O Type	Catalog Number	Description	Page
Input	2080-IF2, 2080-IF2K	2-channel non-isolated unipolar voltage/current analog input module	40
	2080-IF4	4-channel non-isolated unipolar voltage/current analog input module	
Output	2080-OF2	2-channel non-isolated unipolar voltage/current analog output module	40

Environmental specifications and certifications for Micro800 plug-in modules are provided on page [46](#).

Specifications – Analog Input Plug-in Modules

Attribute	2080-IF2, 2080-IF2K	2080-IF4												
Number of inputs	2 unipolar non-isolated	4 unipolar non-isolated												
Voltage range	0...10V DC													
Current range	0...20 mA													
Input impedance Voltage mode Current mode	>100 kΩ 250 Ω													
Resolution, max	12 bits unipolar, with software selected option for 50 Hz, 60 Hz, 250 Hz, 500 Hz													
Data range	0...65535													
Overall accuracy ⁽¹⁾ Voltage terminal Current terminal	±1% full scale @ 25 °C (77 °F) ±1% full scale @ 25 °C (77 °F)													
Non-linearity (in percent full scale)	±0.1%													
Repeatability ⁽²⁾	±0.1%													
Module error over full temperature range Voltage Current	-20...+65 °C (-4...+149 °F) ±1.5% ±2.0%													
Input channel configuration	Through configuration software or the user program													
Field input calibration	Not required													
Update time	180 ms per enabled channel													
Input group to bus isolation	None													
Channel to channel isolation	None													
Power consumption	<60 mA @ 3.3V													
Operating altitude	2000 m													
Cable length, max	10 m													
Mounting torque	0.2 N•m (1.48 lb•in)													
Terminal screw torque	0.22...0.25 N•m (1.95...2.21 lb•in) using a 2.5 mm (0.10 in.) screwdriver													
Wire size	<table><tr><th>Wire Type</th><th>Min</th><th>Max</th><th>Description</th></tr><tr><td>Solid</td><td>0.14 mm² (26 AWG)</td><td>1.5 mm² (16 AWG)</td><td rowspan="2">Rated @ 90 °C (194 °F) or greater, 1.2 mm (3/64 in.) insulation max</td></tr><tr><td>Stranded</td><td>0.14 mm² (26 AWG)</td><td>1.0 mm² (17 AWG)</td></tr></table>			Wire Type	Min	Max	Description	Solid	0.14 mm ² (26 AWG)	1.5 mm ² (16 AWG)	Rated @ 90 °C (194 °F) or greater, 1.2 mm (3/64 in.) insulation max	Stranded	0.14 mm ² (26 AWG)	1.0 mm ² (17 AWG)
	Wire Type	Min	Max	Description										
	Solid	0.14 mm ² (26 AWG)	1.5 mm ² (16 AWG)	Rated @ 90 °C (194 °F) or greater, 1.2 mm (3/64 in.) insulation max										
Stranded	0.14 mm ² (26 AWG)	1.0 mm ² (17 AWG)												
Enclosure type rating	None (open-style)													
North American temp code	T4													

(1) Includes offset, gain, non-linearity, and repeatability error terms.
(2) Repeatability is the ability of the input module to register the same reading in successive measurements for the same input signal.

Specifications – Analog Output Plug-in Module

Attribute	2080-OF2
Number of outputs	2 unipolar non-isolated
Voltage range	0...10V DC
Current range	0...20 mA
Resolution, max	12 bits unipolar

Specifications – Analog Output Plug-in Module (Continued)

Attribute	2080-OF2			
Output count range	0...65535			
D/A Conversion Rate (all channels), max	2.5 ms			
Step Response to 63% ⁽¹⁾	5 ms			
Current load in voltage output, max	10 mA			
Voltage resistive load, min	1 kΩ			
Current resistive load	500 Ω			
Inductive load (current outputs), max	0.01 mH			
Capacitive load (voltage outputs), max	0.1 μF			
Overall accuracy ⁽²⁾ Voltage terminal Current terminal	±1% full scale @ 25 °C (77 °F) ±1% full scale @ 25 °C (77 °F)			
Non-linearity (in percent full scale)	±0.1%			
Repeatability ⁽³⁾	±0.1%			
Output error over full temperature range Voltage Current	-20...+65 °C (-4...+149 °F) ±1.5% ±2.0%			
Open and short-circuit protection	Yes			
Output overvoltage protection	Yes			
Input group to bus isolation	None			
Channel to channel isolation	None			
Power consumption	<60 mA @ 24V			
Operating altitude	2000 m			
Cable length, max	10 m			
Mounting torque	0.2 N•m (1.48 lb•in)			
Terminal screw torque	0.22...0.25 N•m (1.95...2.21 lb•in) using a 2.5 mm (0.10 in.) screwdriver			
Wire size				
	Wire Type	Min	Max	Description
	Solid	0.14 mm ² (26 AWG)	1.5 mm ² (16 AWG)	Rated @ 90 °C (194 °F) or greater, 1.2 mm (3/64 in.) insulation max
	Stranded	0.14 mm ² (26 AWG)	1.0 mm ² (17 AWG)	
Enclosure type rating	None (open-style)			
North American temp code	T4			

(1) Step response is the period of time between when the D/A converter was instructed to go from minimum to full range until the device is at 63% of full range.

(2) Includes offset, gain, non-linearity, and repeatability error terms.

(3) Repeatability is the ability of the input module to register the same reading in successive measurements for the same input signal.

Specialty Plug-in Modules

Specialty Plug-in Modules

I/O Type	Catalog Number	Description	Page
RTD input	2080-RTD2	2-channel non-isolated RTD module	42
Thermocouple input	2080-TC2	2-channel non-isolated thermocouple module	
Memory backup and high accuracy RTC	2080-MEMBAK-RTC	Memory backup and high accuracy RTC, 1 MB	42
	2080-MEMBAK-RTC2	Memory backup and high accuracy RTC, 4 MB	
Trimpot input	2080-TRIMPOT6	6-channel trimpot analog input module	43
High-speed counter	2080-MOT-HSC	High-speed counter module	43

Environmental specifications and certifications for Micro800 plug-in modules are provided on page [46](#).

Specifications – RS-232/RS-485 Isolated Serial Port Plug-in Module

Attribute	2080-SERIALISOL, 2080-SERIALISOLK			
Mounting torque	0.2 N•m (1.48 lb•in)			
Terminal screw torque	0.22...0.25 N•m (1.95...2.21 lb•in) using a 2.5 mm (0.10 in.) screwdriver			
Wire size				
	Wire Type	Min	Max	Description
	Solid	0.14 mm ² (26 AWG)	1.5 mm ² (16 AWG)	Rated @ 90 °C (194 °F) or greater, 1.2 mm (3/64 in.) insulation max
	Stranded	0.14 mm ² (26 AWG)	1.0 mm ² (17 AWG)	
Isolation voltage	500V AC			
Enclosure type rating	None (open-type)			
North American temp code	T4			

Environmental Specifications

Environmental Specifications – Micro800 Plug-in Modules

Attributes	Value
Temperature, operating	IEC 60068-2-1 (Test Ad, Operating Cold), IEC 60068-2-2 (Test Bd, Operating Dry Heat), IEC 60068-2-14 (Test Nb, Operating Thermal Shock): -20...+65 °C (-4...+149 °F)
Temperature, surrounding air, max	65 °C (149 °F)
Temperature, nonoperating	IEC 60068-2-1 (Test Ab, Unpackaged Nonoperating Cold), IEC 60068-2-2 (Test Bb, Unpackaged Nonoperating Dry Heat), IEC 60068-2-14 (Test Na, Unpackaged Nonoperating Thermal Shock): -40...+85 °C (-40...+185 °F)
Relative humidity	IEC 60068-2-30 (Test Db, Unpackaged Damp Heat): 5...95% noncondensing
Vibration	IEC 60068-2-6 (Test Fc, Operating): 2 g @ 10...500 Hz
Shock, operating	IEC 60068-2-27 (Test Ea, Unpackaged Shock): 25 g
Shock, nonoperating	IEC 60068-2-27 (Test Ea, Unpackaged Shock): 25 g – DIN rail mount 35 g – Panel mount
Emissions	IEC 61000-6-4
ESD immunity	IEC 61000-4-2: 6 kV contact discharges 8 kV air discharges
Radiated RF immunity	IEC 61000-4-3: 10 V/M with 1 kHz sine-wave 80%AM from 80...6000 MHz
EFT/B immunity	IEC 61000-4-4: ±2 kV @ 5 kHz on signal ports ±2 kV @ 5 kHz on shielded ports – 2080-RTD2, 2080-TC2 only For 2080-DNET20, 2080-SERIALISOL only: ±4 kV @ 5 kHz on power ports – 2080-DNET20 only ±2 kV @ 5 kHz on communication ports
Surge transient immunity	IEC 61000-4-5: For 2080-IQ4, 2080-OB4, 2080-OV4, 2080-IQ4OB4, 2080-IQ4OV4, 2080-OW4I only: ±1 kV line-line(DM) and ±2 kV line-earth(CM) on signal ports For 2080-IF2, 2080-IF2K, 2080-IF4, 2080-OF2, 2080-RTD2, 2080-TC2, 2080-MOT-HSC only: ±2 kV line-earth(CM) on shielded ports For 2080-DNET20, 2080-SERIALISOL only: ±1 kV line-line(DM) and ±2 kV line-earth(CM) on power ports – 2080-DNET20 only ±2 kV line-earth(CM) on communication ports
Conducted RF immunity	IEC 61000-4-6: 10V rms with 1 kHz sine-wave 80%AM from 150 kHz...80 MHz