Installation Instructions

Allen-Bradley

Micro820 20-Point Programmable Controllers

Catalog Numbers 2080-LC20-20QWB, 2080-LC20-20QBB, 2080-LC20-20AWB, 2080-LC20-20QWBR, 2080-LC20-20QBBR, 2080-LC20-20AWBR

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Important User Information

Solid state equipment has operational characteristics differing from those of electromechanical equipment. Safety Guidelines for the Application, Installation and Maintenance of Solid State Controls (Publication SGI-1.1 available from your local Rockwell Automation sales office or online at http://rockwellautomation.com/literature) describes some important differences between solid state equipment and hard-wired electromechanical devices. Because of this difference, and also because of the wide variety of uses for solid state equipment, all persons responsible for applying this equipment must satisfy themselves that each intended application of this equipment is acceptable.

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.

No patent liability is assumed by Rockwell Automation, Inc. with respect to use of information, circuits, equipment, or software described in this manual.

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 consequences.
	**SHOCK HAZARD:** Labels may be on or inside the equipment (for example, drive or motor) to alert people that dangerous voltage may be present.
	**BURN HAZARD:** Labels may be on or inside the equipment (for example, drive or motor) to alert people that surfaces may reach dangerous temperatures.
IMPORTANT	**IMPORTANT:** Identifies information that is critical for successful application and understanding of the product.

Environment and Enclosure

ATTENTION: This equipment is intended for use in a Pollution Degree 2 industrial environment, in overvoltage Category II applications (as defined in IEC 60664-1), at altitudes up to 2000 m (6562 ft) without derating.

This equipment is considered Group 1, Class A industrial equipment according to IEC/CISPR 11. Without appropriate precautions, there may be difficulties with electromagnetic compatibility in residential and other environments due to conducted and radiated disturbances.

This equipment is supplied as open-type equipment. It must be mounted within an enclosure that is suitably designed for those specific environmental conditions that will be present and appropriately designed to prevent personal injury resulting from accessibility to live parts. The enclosure must have suitable flame-retardant properties to prevent or minimize the spread of flame, complying with a flame spread rating of 5VA or be approved for the application if nonmetallic. The interior of the enclosure must be accessible only by the use of a tool. Subsequent sections of this publication may contain additional information regarding specific enclosure type ratings that are required to comply with certain product safety certifications.

In addition to this publication, see:

- Industrial Automation Wiring and Grounding Guidelines, Rockwell Automation publication 1770-4.1, for additional installation requirements.
- NEMA Standard 250 and IEC 60529, as applicable, for explanations of the degrees of protection provided by different types of enclosure.

Prevent Electrostatic Discharge

ATTENTION: This equipment is sensitive to electrostatic discharge, which can cause internal damage and affect normal operation. Follow these guidelines when you handle this equipment:

- Touch a grounded object to discharge potential static.
- Wear an approved grounding wriststrap.
- Do not touch connectors or pins on component boards.
- Do not touch circuit components inside the equipment.
- Use a static-safe workstation, if available.
- Store the equipment in appropriate static-safe packaging when not in use.

North American Hazardous Location Approval

The following modules are North American Hazardous Location approved: 2080-LC20-20QWB, 2080-LC20-20QBB, 2080-LC20-20AWB, 2080-LC20-20QWBR, 2080-LC20-20QBBR, 2080-LC20-20AWBR

The following information applies when operating this equipment in hazardous locations:	**Informations sur l'utilisation de cet équipement en environnements dangereux:**
Products marked "CL I, DIV 2, GP A, B, C, D" are suitable for use in Class I Division 2 Groups A, B, C, D, Hazardous Locations and nonhazardous locations only. Each product is supplied with markings on the rating nameplate indicating the hazardous location temperature code. When combining products within a system, the most adverse temperature code (lowest "T" number) may be used to help determine the overall temperature code of the system. Combinations of equipment in your system are subject to investigation by the local Authority Having Jurisdiction at the time of installation.	Les produits marqués "CL I, DIV 2, GP A, B, C, D" ne conviennent qu'à une utilisation en environnements de Classe I Division 2 Groupes A, B, C, D dangereux et non dangereux. Chaque produit est livré avec des marquages sur sa plaque d'identification qui indiquent le code de température pour les environnements dangereux. Lorsque plusieurs produits sont combinés dans un système, le code de température le plus défavorable (code de température le plus faible) peut être utilisé pour déterminer le code de température global du système. Les combinaisons d'équipements dans le système sont sujettes à inspection par les autorités locales qualifiées au moment de l'installation.
WARNING: EXPLOSION HAZARD • Do not disconnect equipment unless power has been removed or the area is known to be nonhazardous. • Do not disconnect connections to this equipment unless power has been removed or the area is known to be nonhazardous. Secure any external connections that mate to this equipment by using screws, sliding latches, threaded connectors, or other means provided with this product. • Substitution of any component may impair suitability for Class I, Division 2. • If this product contains batteries, they must only be changed in an area known to be nonhazardous.	**AVERTISSEMENT: RISQUE D'EXPLOSION** • Couper le courant ou s'assurer que l'environnement est classé non dangereux avant de débrancher l'équipement. • Couper le courant ou s'assurer que l'environnement est classé non dangereux avant de débrancher les connecteurs. Fixer tous les connecteurs externes reliés à cet équipement à l'aide de vis, loquets coulissants, connecteurs filetés ou autres moyens fournis avec ce produit. • La substitution de tout composant peut rendre cet équipement inadapté à une utilisation en environnement de Classe I, Division 2. • S'assurer que l'environnement est classé non dangereux avant de changer les piles.

WARNING:

- If you connect or disconnect the serial cable with power applied to this module or the serial device on the other end of the cable, an electrical arc can occur. This could cause an explosion in hazardous location installations. Be sure that power is removed or the area is nonhazardous before proceeding.
- If you connect or disconnect the communications cable with power applied to this module or any device on the network, an electrical arc can occur. This could cause an explosion in hazardous location installations. Be sure that power is removed or the area is nonhazardous before proceeding.
- When used in a Class I, Division 2, hazardous location, this equipment must be mounted in a suitable enclosure with proper wiring method that complies with the governing electrical codes.
- Exposure to some chemicals may degrade the sealing properties of materials used in the Relays. It is recommended that the User periodically inspect these devices for any degradation of properties and replace the module if degradation is found.
- If you insert or remove the plug-in module while backplane power is on, an electrical arc can occur. This could cause an explosion in hazardous location installations. Be sure that power is removed or the area is nonhazardous before proceeding.
  Refer to the Wiring Diagram for each plug-in module for additional details regarding removal or insertion under power.
- When you connect or disconnect the Removable Terminal Block (RTB) with field side power applied, an electrical arc can occur. This could cause an explosion in hazardous location installations.
  Be sure that power is removed or the area is nonhazardous before proceeding.

ATTENTION:

- The serial cables are not to exceed 3.0 m (9.84 ft).
- Do not wire more than 2 conductors on any single terminal.
- Do not remove the Removable Terminal Block (RTB) until power is removed.

ATTENTION:

- To comply with the CE Low Voltage Directive (LVD), this equipment must be powered from a source compliant with the following: Safety Extra Low Voltage (SELV) or Protected Extra Low Voltage (PELV).
- To comply with UL restrictions, this equipment must be powered from a Class 2 or Limited Voltage Limited Current Source (LVLC).
- For Class I Division 2 applications, use only Class I Division 2 listed or recognized accessories and modules approved for use within the Micro800® platform.

ATTENTION:

- Electrostatic discharge can damage semiconductor devices inside the module. Do not touch the connector pins or other sensitive area pins.
- Be careful when stripping wires. Wire fragments that fall into the controller could cause damage. Once wiring is complete, make sure the controller is free of all metal fragments.
- Do not connect directly to line voltage. Line voltage must be supplied by a suitable, approved isolating transformer or power supply having short circuit capacity not exceeding 100 VA maximum equivalent.

Additional Resources

Resource	Description
Micro820™ 20-point Programmable Controllers User Manual, publication 2080-UM005	A more detailed description of how to install and use your Micro820 programmable controller.
Micro800® Plug-in Modules User Manual, publication 2080-UM004	Installation and wiring descriptions for the different Micro800 plug-in modules.
Micro800 AC Power Supply Installation Instructions, publication 2080-IN001	Information on wiring and installing the optional AC power supply.
Micro820 Remote LCD Installation Instructions, publication 2080-IN010	Information on wiring and installing the Micro800 Remote LCD, 2080-REMLCD.
Industrial Automation Wiring and Grounding Guidelines, publication 1770-4.1	More information on proper wiring and grounding techniques.

If you would like a manual, you can:

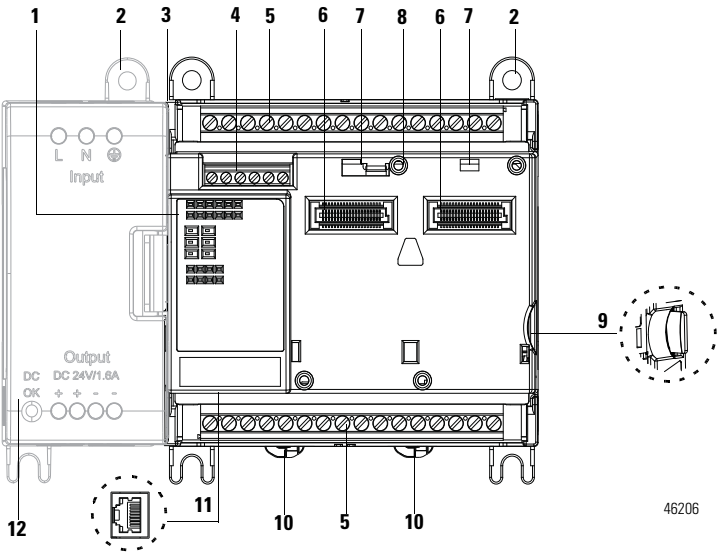
- download a free electronic version from the Internet: http://rockwellautomation.com/literature
- purchase a printed manual by contacting your local Allen-Bradley distributor or Rockwell Automation representative

Overview

The Micro820 20-point controller is an economical brick style controller with embedded inputs and outputs. It can accommodate up to two plug-in modules, any 24V DC output power supply that meets minimum specifications such as the optional Micro800 power supply, 2080-PS120-240VAC.

The Micro820 controller can also support a remote LCD (2080-REMLCD) through an RS232 port. This remote LCD can be mounted on the same DIN rail as the controller.

Controller Overview



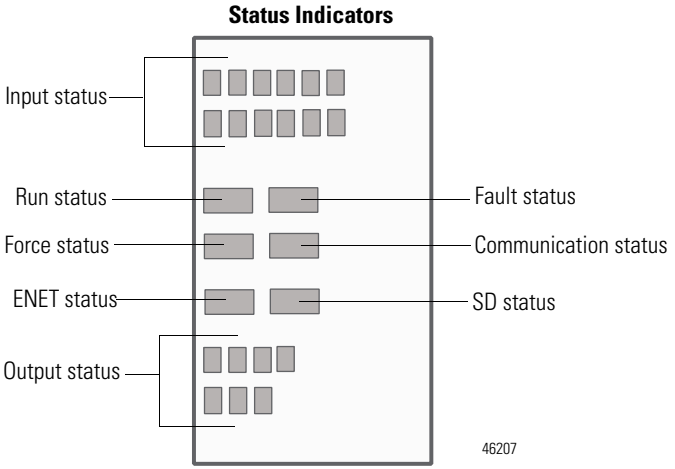
Controller Description

	Description		Description
1	Status indicators	7	Plug-in latch
2	Optional power supply panel mounting latch hole	8	Plug-in screw hole
3	Optional power supply slot	9	microSD™ (Micro Secure Digital) card slot
4	RS232/RS485 non-isolated combo serial port	10	DIN rail mounting latch
5	Removable/fixed[1] terminal block	11	RJ-45 Ethernet connector port
6	40-pin high speed plug-in connector	12	Optional power supply

(1) Removable terminal blocks are available on modules with catalog numbers that end in R. Catalog numbers that do not end in R have fixed terminal blocks.

Status Indicators

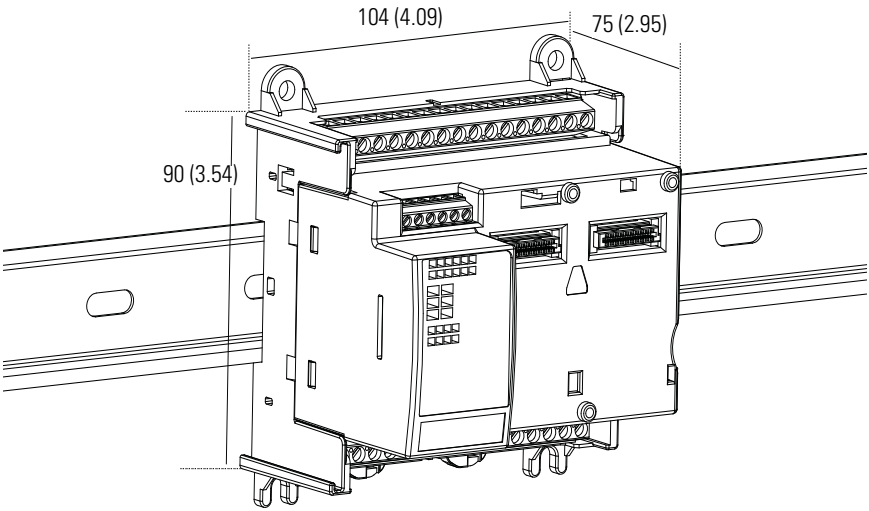
Controller status LED indicators are located at the leftmost side of the controller, next to the two plug-in slots.



Mount the Module

Most applications require installation in an industrial enclosure to reduce the effects of electrical interference and environmental exposure. Locate your controller as far as possible from power lines, load lines, and other sources of electrical noise such as hard-contact switches, relays, and AC motor drives. For more information on proper grounding guidelines, see the Industrial Automation Wiring and Grounding Guidelines, publication 1770-4.1.

Mounting Dimensions and DIN Rail Mounting



Mounting dimensions do not include mounting feet or DIN rail latches.
Measurements are in millimeters (inches).

Module Spacing

Maintain spacing from objects such as enclosure walls, wireways and adjacent equipment. Allow 50.8 mm (2.0 in.) of space on all sides for adequate ventilation. If optional accessories/modules are attached such as the optional power supply, 2080-PS120-240VAC, make sure that there is 50.8 mm (2 in.) of space on all sides after attaching the optional parts.

DIN Rail Mounting

The module can be mounted using the following DIN rails: 35 x 7.5 mm and 35 x 15 mm (EN 50 022 - 35 x 7.5 and EN 50 022 - 35 x 15).

TIP For environments with greater vibration and shock concerns, use the panel mounting method, instead of DIN rail mounting.

Before mounting the module on a DIN rail, use a flat-blade screwdriver in the DIN rail latch and pry it downwards until it is in the unlatched position.

1. Hook the top of the DIN rail mounting area of the controller onto the DIN rail, and then press the bottom until the controller snaps onto the DIN rail.

2. Push the DIN rail latch back into the latched position.

To remove your controller from the DIN rail, pry the DIN rail latch downwards until it is in the unlatched position.

Panel Mounting

The preferred mounting method is to use four M4 (#8) screws per module. Hole spacing tolerance: ±0.4 mm (0.016 in.).

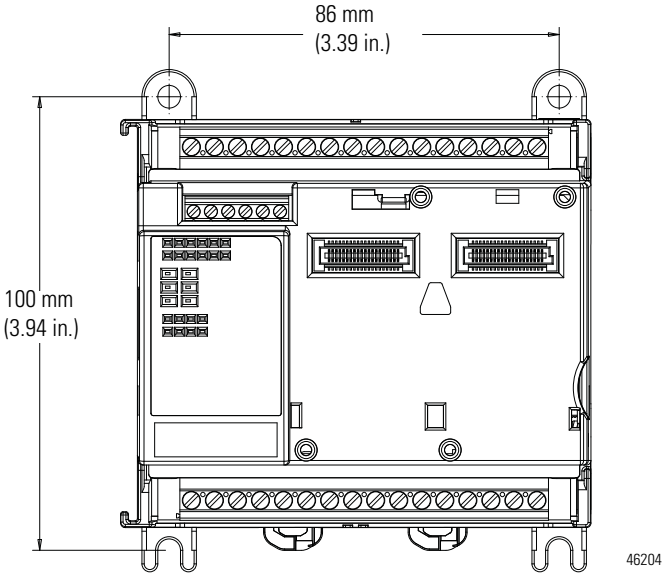
Follow these steps to install your controller using mounting screws.

1. Place the controller against the panel where you are mounting it. Make sure the controller is spaced properly.

2. Mark drilling holes through the mounting screw holes and mounting feet then remove the controller.

3. Drill the holes at the markings, then replace the controller and mount it. Leave the protective debris strip in place until you have finished wiring any other devices.

Panel Mounting Dimensions



Install the microSD Card

The Micro820 controller has a card slot for a microSD card. The microSD card is primarily used for project backup and restore. It is also used for data-logging and recipe and to change controller mode under specific conditions.

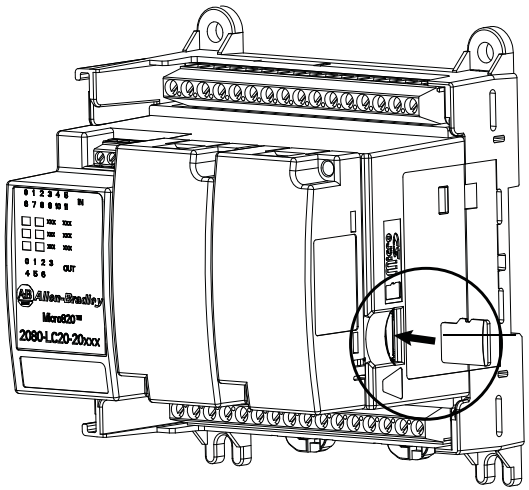
WARNING: When you insert or remove the microSD card while power is on, an electrical arc can occur. This could cause an explosion in hazardous location installations.
Be sure that power is removed or the area is nonhazardous before proceeding.

IMPORTANT

Micro820 controllers support industrial grade microSD cards through an embedded microSD card slot. It supports Class 6 and 10 SDSC and SDHC microSD cards, with FAT32/16 formats, 32 GB maximum size. Industrial grade cards such as Swissbit S-200u/S300u are recommended. The microSD card file system supports only one file partition.

Micro820 controllers do **not** support Class 4 microSD cards.

1. Insert the microSD card into the card slot.
   You can install the microSD card in one orientation only. The beveled corner should be at the bottom. If you feel resistance when inserting the microSD card, pull it out and change the orientation.



Insert the microSD card into the slot.

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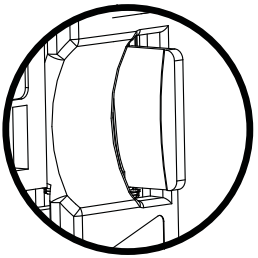
2. Gently press the card until it clicks into place.



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3. To remove the microSD card from the slot, gently press the card until it clicks back and releases itself from the slot.

Use Surge Suppressors

Because of the potentially high current surges that occur when switching inductive load devices, such as motor starters and solenoids, we recommend the use of some type of surge suppression to protect and extend the operating life of the controllers output contacts. Switching inductive loads without surge suppression can *significantly* reduce the life expectancy of relay contacts. By adding a suppression device directly across the coil of an inductive device, you prolong the life of the output or relay contacts. You also reduce the effects of voltage transients and electrical noise from radiating into adjacent systems.

Refer to the Micro820 Programmable Controllers User Manual, publication 2080-UM005, for suitable surge suppression methods and recommended surge suppressors.

Minimizing Electrical Noise on Analog Channels

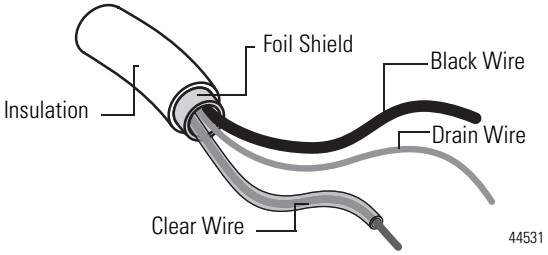
Inputs on analog channels employ digital high-frequency filters that significantly reduce the effects of electrical noise on input signals. However, because of the variety of applications and environments where analog controllers are installed and operated, it is impossible to ensure that all environmental noise will be removed by filters.

Several specific steps can be taken to help reduce the effects of environmental noise on analog signals:

- Install the Micro800 system in a properly rated (NEMA/IP) enclosure. Make sure that the Micro800 system is properly grounded.
- Use Belden cable #8761 for wiring the analog channels, making sure that the drain wire and foil shield are properly earth grounded, (see Grounding Your Analog Cable on page 13 for more information).
- Route the Belden cable separately from any AC wiring. Additional noise immunity can be obtained by routing the cables in grounded conduit.

Grounding Your Analog Cable

Use shielded communication cable (Belden #8761). The Belden cable has two signal wires (black and clear), one drain wire, and a foil shield. The drain wire and foil shield must be grounded at one end of the cable.



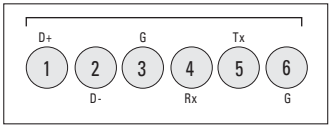
IMPORTANT Do not ground the drain wire and foil shield at both ends of the cable.

Wiring Your Plug-In Modules

Wiring diagrams for your Micro800 plug-in modules are available in the Rockwell Automation Literature Library, http://rockwellautomation.com/literature.

Wire the Controller

Serial Port Terminal Block



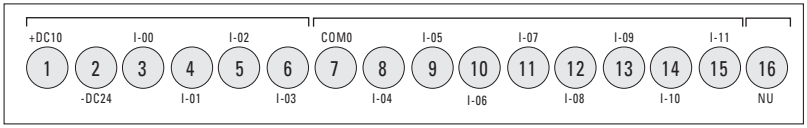
(View into terminal block)

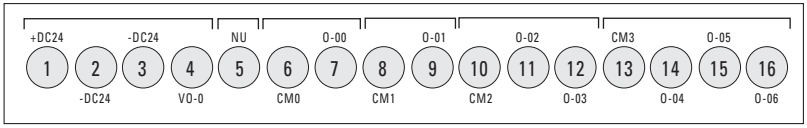
Pin 1	RS485	Data +
Pin 2	RS485	Data -
Pin3	RS485	Ground(1)
Pin 4	RS232	Receive
Pin 5	RS232	Transmit
Pin 6	RS232	Ground(1)

(1) Non-isolated.

2080-LC20-20AWB / 2080-LC20-20AWBR / 2080-LC20-20QWB / 2080-LC20-20QWBR

Input Terminal Block





Output Terminal Block

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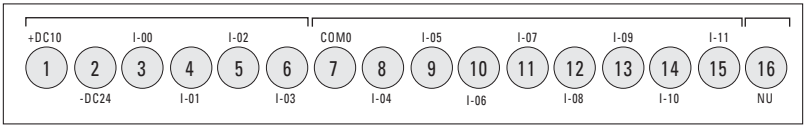
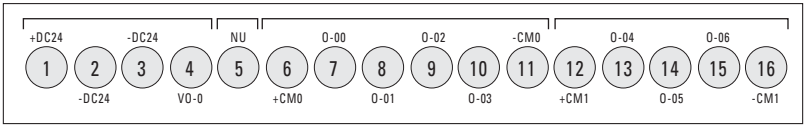
ATTENTION: For 2080-LC20-20AWB/R, inputs 0…3 are limited to 24V DC. All other inputs (4...11) are limited to 120V AC.

2080-LC20-20QBB / 2080-LC20-20QBBR

Input Terminal Block





Output Terminal Block

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Specifications

General Specifications

<table>
<tr><th>Attribute</th><th>2080-LC20-20AWB(R)</th><th>2080-LC20-20QBB(R)</th><th>2080-LC20-20QWB(R)</th></tr>
<tr><td>Number of I/O</td><td colspan="3">12 inputs, 8 outputs</td></tr>
<tr><td>Dimensions
HxWxD</td><td colspan="3">90 x 104 x 75 mm
(3.54 x 4.09 x 2.95 in.)</td></tr>
<tr><td>Shipping weight, approx.</td><td colspan="3">0.38 kg (0.83 lb)</td></tr>
<tr><td>Wire size</td><td colspan="3">
For fixed terminal blocks:
<table>
<tr><th></th><th>Min</th><th>Max</th><th></th></tr>
<tr><td>Solid</td><td>0.14 mm^2
(26 AWG)</td><td>2.5 mm^2
(14 AWG)</td><td rowspan="2">rated @ 90 °C
(194 °F) insulation max</td></tr>
<tr><td>Stranded</td><td>0.14 mm^2
(26 AWG)</td><td>1.5 mm^2
(16 AWG)</td></tr>
</table>
For removable terminal blocks:
<table>
<tr><th></th><th>Min</th><th>Max</th><th></th></tr>
<tr><td>Solid and
Stranded</td><td>0.2 mm^2
(24 AWG)</td><td>2.5 mm^2
(14 AWG)</td><td>rated @ 90 °C
(194 °F) insulation max</td></tr>
</table>
For RS232/RS485 serial port:
<table>
<tr><th></th><th>Min</th><th>Max</th><th></th></tr>
<tr><td>Solid</td><td>0.14 mm^2
(26 AWG)</td><td>1.5 mm^2
(16 AWG)</td><td rowspan="2">rated @ 90 °C
(194 °F) insulation max</td></tr>
<tr><td>Stranded</td><td>0.14 mm^2
(26 AWG)</td><td>1.0 mm^2
(18 AWG)</td></tr>
</table>
</td></tr>
<tr><td>Wiring category(1)</td><td colspan="3">2 – on signal ports
2 – on power ports
2 – on communication ports</td></tr>
<tr><td>Wire type</td><td colspan="3">Use copper conductors or shielded cables</td></tr>
<tr><td>Terminal screw torque</td><td colspan="3">For removable and fixed terminal blocks:
0.5…0.6 Nm (4.4…5.3 lb-in.) using a 0.6 x 3.5 mm flat-blade screwdriver.
Note: Use a handheld screwdriver to hold down the screws at the side.

For RS232/RS485 serial port:
0.22…0.25 Nm (1.95…2.21 lb-in.) using 0.4 x 2.5 x 80 mm 2-component grip with non-slip grip screwdriver.</td></tr>
<tr><td>Input circuit type</td><td colspan="3">24V DC sink/source (standard) – for 2080-LC20-20QWB(R), 2080-LC20-20QBB(R)
120V AC – for 2080-LC20-20AWB(R) for Inputs 4…11 only</td></tr>
</table>

General Specifications

Attribute	2080-LC20-20AWB(R)	2080-LC20-20QBB(R)	2080-LC20-20QWB(R)
Output circuit type	Relay	24V DC source (standard and high-speed)	Relay
Power input	24V DC		
Power consumption	5.62 W (without plug-ins, max)…8.5 W (with plug-ins, max)		
Power dissipation	6 W		
Power supply voltage range	20.4…26.4 V DC, Class 2, or Limited Voltage Limited Current Source (LVLC)		
Auxiliary power supply output for thermistor	10V		
I/O rating	Input: 120V AC 16 mA Output: 2A, 240VAC 2A, 24V DC	Input: 24V DC, 8.8 mA Output: 24V DC, 1 A per point (Surrounding air temperature 30°C) 24 V DC, 0.3 A per point (Surrounding air temperature 65 °C)	Input: 24V DC, 8.8 mA Output: 2 A, 240 V AC, 2A, 24V DC
Isolation voltage	250V (continuous), Reinforced Insulation Type, Output to Aux and Network, Inputs to Outputs. 150V (continuous), Reinforced Insulation Type, Input to Aux and Network. Type tested for 60 s @ 3250 V DC Output to Aux and Network, Inputs to Outputs. Type tested for 60 s @ 1950 V DC Input to Aux and Network.	50V (continuous), Reinforced Insulation Type, I/O to Aux and Network, Inputs to Outputs. Type tested for 60 s @ 720 V DC, I/O to Aux and Network, Inputs to Outputs.	250V (continuous), Reinforced Insulation Type, Output to Aux and Network, Inputs to Outputs. 50V (continuous), Reinforced Insulation Type, Input to Aux and Network. Type tested for 60 s @ 720 V DC, Inputs to Aux and Network, 3250 V DC Outputs to Aux and Network, Inputs to Outputs.
Pilot duty rating	C300, R150	–	C300, R150
Insulation stripping length	• 7 mm for the removable and fixed terminal blocks • 5 mm for the RS232/RS485 serial port		
Enclosure type rating	Meets IP20		
North American temp code	T4		

(1) Use this Conductor Category information for planning conductor routing. Refer to Industrial Automation Wiring and Grounding Guidelines, publication 1770-4.1.

Analog Input Specifications for I-00…I-03

Attribute	Value
Number of inputs	4
Type	Voltage (single-ended)
Data range	0...4095
Input voltage range	0…10V DC
Maximum input	26.4V DC
Input impedance	14.14 kΩ
Resolution	12-bit, 2.5 mV/count
Smoothing	None
Input time constant, typical	0.44 ms
Isolation	None
Accuracy (25…55 °C)	5% of full-scale (2% with calibration)

AC Input Specifications for I-04…I-11 for 2080-LC20-20AWB(R)

Attribute	Value
Number of inputs	8
On-state voltage	120V AC, nom 79V AC, min 125V AC, max
On-state current	5 mA, min 16 mA, max
Input frequency	50/60 Hz, nom 47 Hz, min 63 Hz, max
Off-state voltage, max	20V AC
Off-state current, max	2.5 mA
Inrush current, max	250 mA @ 125V AC
Inrush decay time constant, max	22 ms

DC Input Specifications

Attribute	Non-isolated, shared with analog inputs (Inputs 00…03)	Isolated inputs (Inputs 04…11) – for 2080-LC20-20QWB(R), 2080-LC20-20QBB(R) only
Voltage category	24V DC Sink	24V DC Sink/Source
On-state voltage, nom	12/24V DC	24V DC
On-state voltage range	9.8…26.4V DC	24V DC, nom 10…26.4V DC @ 65 °C (149 °F) 10…30V DC @ 30 °C (86 °F)
Off-state voltage, max	5V DC	
Off-state current. max	0.5 mA	1.5 mA
On-state current, min	0.75 mA @ 10.8V DC 1.0 mA @ 15V DC	1.8 mA @ 10.8V DC 2.7 mA @ 15V DC
On-state current, nom	2.1 mA @ 24V DC	8.5 mA @24V DC
On-state current, max	2.6 mA @ 26.4V	12.0 mA @ 30V DC
Nominal impedance	14.1 kΩ (non-isolated)	3.74 kΩ (isolated)
IEC input compatibility	Type 1	Type 3

Relay Output Specifications for O-00...06 for 2080-LC20-20QWB(R), 2080-LC20-20AWB(R)

Attribute	Value
Voltage, min	5 V, AC 5 V, DC
Voltage, max	250 V, AC
Maximum switching time	10 ms, turn on 10 ms, turn off
Life	10,000,000 cycles (mechanical) 100,000 cycles (Electrical with UL test load)

Relay Contact Ratings

Maximum Volts	Amperes		Amperes Continuous	Volt-Amperes	
	Make	Break		Make	Break
120 V AC	15 A	1.5 A	2 A	1800	180
240 V AC	7.5 A	0.75 A			
24 V DC	1.0 A		1 A	28	
125 V DC	0.22 A				

Analog Output Specifications

Attribute	Value
Output count range	0...4008
Output type	Voltage
Output Voltage Range	0…10V
Voltage Output Maximum Load (Resistive)	>1000 Ohms
Accuracy	2% of full scale for voltage
Resolution	12-bit, 2.5 mV/count
Output update rate (with no output capacitance), max	20 ms
Channel-to-bus isolation	No isolation
Channel-to-channel isolation	No isolation

DC Output Specifications for 2080-LC20-20QBB(R)

Attribute	Standard Outputs (Outputs O-00…O-05)	High Speed Output [1] (Output O-06)
User supply voltage	10V DC, min 26.4V DC, max	10V DC, min 26.4V DC, max
Load current, min	10 mA	
On state voltage drop, max	1V @ load current 2.5V @ surge current	1.5V @ load current
Current ratings per point	0.3 A @ 65 °C, max 1.0 A @ 30 °C, max 1.0 mA, min 1.0 mA, max leakage	100 mA (high speed operation) 1.0 A @ 30 °C 0.3 A @ 65 °C (standard operation)
Surge current per point peak current max surge duration max rate of repetition @ 30 °C max rate of repetition @ 65 °C	 4.0 A 10 ms once each second once every two seconds	

DC Output Specifications for 2080-LC20-20QBB(R)

Attribute	Standard Outputs (Outputs O-00…O-05)	High Speed Output [1] (Output O-06)
Controller current, max total	3 A	–
Turn-on time, max	0.1 ms	0.2 µs
Turn-off time, max	1.0 ms	2.5 µs
Response time, max	10 ms	
Frequency rate	NA	2%

[1] High speed output operation is greater than 5 Khz.

PWM Output Duty Cycle Error

Turn On/Off time for the Micro820 controllers for the PWM output port is 0.2 µs and 2.5 µs max, respectively. Duty cycle error is:

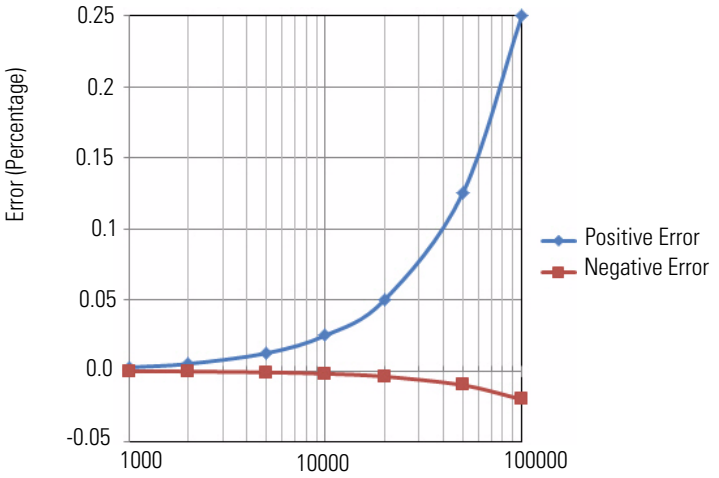
Positive error = 2.5 µs * F

Negative error = -0.2 µs * F

The plot below shows duty cycle error vs. frequency.

To get the duty cycle error at a certain frequency, for example, the user sets frequency to 20 KHz, and sets duty cycle to 30% in Connected Components Workbench, then actual duty cycle is

$30\%\ ^{+5\%}_{-0.4\%}$.



Auxiliary Power Supply for Thermistor Applications

Attribute	Value
Output voltage	9.5V, min 10.04V, typical 10.5V, max
Output current	10 mA, typical 50 mA, max

Embedded RTC

Attribute	Value
Resolution	1 sec
Accuracy	± 52 sec/month @ 25 °C ± 160 sec/month @ 0...55 °C
Power off	Supercap – 4 days @ 25 °C Supercap life – 5 years @ 40 °C, 14.5 years @ 25 °C

Environmental Specifications

Attribute	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% non-condensing
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, non-operating	IEC 60068-2-27 (Test Ea, Unpackaged Shock): DIN mount: 25 g PANEL mount: 45 g
Emissions	CISPR 11 Group 1, Class A
ESD immunity	IEC 61000-4-2: 6 kV contact discharges 8 kV air discharges

Environmental Specifications

Attribute	Value
Radiated RF immunity	IEC 61000-4-3: 10V/m with 1 kHz sine-wave 80% AM from 80…2000 MHz 10V/m with 200 Hz 50% Pulse 100% AM @ 900 MHz 10V/m with 200 Hz 50% Pulse 100% AM @ 1890 MHz 10V/m with 1 kHz sine-wave 80% AM from 2000…2700 MHz
EFT/B immunity	IEC 61000-4-4: ±2 kV @ 5 kHz on power ports ±2 kV @ 5 kHz on signal ports ±1 kV @ 5 kHz on communication ports
Surge transient immunity	IEC 61000-4-5: ±1 kV line-line(DM) and ±2 kV line-earth(CM) on power ports ±1 kV line-line(DM) and ±2 kV line-earth(CM) on signal ports ±1 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

Certifications

Certification (when product is marked)(1)	Value
c-UL-us	UL Listed Industrial Control Equipment, certified for US and Canada. See UL File E322657. UL Listed for Class I, Division 2 Group A,B,C,D Hazardous Locations, certified for U.S. and Canada. See UL File E334470.
CE	European Union 2004/108/EC EMC Directive, compliant with: EN 61326-1; Meas./Control/Lab., Industrial Requirements EN 61000-6-2; Industrial Immunity EN 61000-6-4; Industrial Emissions EN 61131-2; Programmable Controllers (Clause 8, Zone A & B) European Union 2006/95/EC LVD, compliant with: EN 61131-2; Programmable Controllers (Clause 11)
C-Tick	Australian Radiocommunications Act, compliant with: AS/NZS CISPR 11; Industrial Emissions
EtherNet/IP	ODVA conformance tested to EtherNet/IP specifications
KC	Korean Registration of Broadcasting and Communications Equipment, compliant with: Article 58-2 of Radio Waves Act, Clause 3

(1) See the Product Certification link at http://www.rockwellautomation.com/products/certification for Declaration of Conformity, Certificates, and other certification details.

Notes:

Rockwell Automation Support

Rockwell Automation provides technical information on the Web to assist you in using its products. At http://support.rockwellautomation.com, you can find technical manuals, a knowledge base of FAQs, technical and application notes, sample code and links to software service packs, and a MySupport feature that you can customize to make the best use of these tools.

For an additional level of technical phone support for installation, configuration and troubleshooting, we offer TechConnect support programs. For more information, contact your local distributor or Rockwell Automation representative, or visit http://support.rockwellautomation.com.

Installation Assistance

If you experience a problem within the first 24 hours of installation, please review the information that's contained in this manual. You can also contact a special Customer Support number for initial help in getting your product up and running.

United States	1.440.646.3434 Monday – Friday, 8 a.m. – 5 p.m. EST
Outside United States	Please contact your local Rockwell Automation representative for any technical support issues.

New Product Satisfaction Return

Rockwell Automation tests all of its products to ensure that they are fully operational when shipped from the manufacturing facility. However, if your product is not functioning and needs to be returned, follow these procedures.

United States	Contact your distributor. You must provide a Customer Support case number (call the phone number above to obtain one) to your distributor in order to complete the return process.
Outside United States	Please contact your local Rockwell Automation representative for the return procedure.

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