# Data Sheet
## Model 5200 Series Controllers
### 10/100Mbps Ethernet Communications

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**Data Sheet: Model 5200 Controller**

## Description

▶ Programmable automation controller with integrated 10/100 M-Bit Ethernet communications.
▶ Two asynchronous communications ports (Two RS-232 or One RS-232 + One RS-485)
▶ Up to 24 Modular I/O bays
▶ On-board Master Encoder / Registration Inputs or Four 24V Sinking Digital Inputs.

## 5200 Specifications

| General | | Value | Description |
|---|---|---|---|
| Supply voltage [1,2] | Option P = 0 | 18-32.0 VDC | For 24.0 VDC nominal systems. |
| | Option P = 1 | 10-32.0 VDC | For 12.0 VDC nominal systems. |
| Supply Current | | CPU / EXP | At Nominal supply voltage (@ 24VDC) |
| Quiescent | | 110 mA / 25 mA | No I/O modules installed, no Communications |
| Fully-Loaded | | 270mA / 25 mA | No I/O modules installed, both RS232 and 100Mbit Link active |
| External +5VDC power | | 5VDC +/-10% 2 ADC | Derived internal to the controller to be used to power analog I/O modules as well as external encoder circuits. |
| Temperature | Operating | 0 to 50°C | Refer to the "Recommended Mounting Orientation" section for proper mounting instructions. |
| | Storage | -25 to 85°C | |

### Controller I/O Capacities (controller capacities are not mutually inclusive)

| | Value | Description |
|---|---|---|
| Number of I/O bays per rack | 6 | |
| Number of I/O bays per system | 24 | 1 CPU Rack + 3 Expansion Racks = 24 I/O bays |
| I/O Capacity per Rack | CPU / Expansion | |
| Digital I/O | 48 / 48 | |
| Analog Inputs | 24 / 24 | |
| Analog Outputs | 48 / 48 | |
| Motion Axis | 6 / 0 | 6 Servo and/or Stepper axis (Only CPU Rack supports motion) |
| High Speed Inputs | 4 / 0 | See specifications and part numbers below for more information. |
| High Speed Inputs | | |
| Encoder Inputs | | |
| Type | 5V Diff. | RS-485 compliant |
| Termination Resistor | 100 Ohm | |
| Max. Frequency | 6 MHz | |
| Registration Inputs / 24V DINs | | |
| Min. $V_{IH}$ | 0.73 * VS | The min threshold voltage at which the input will change from an 'OFF' state to an 'ON' state. |
| Max. $V_{IL}$ | 0.61 * VS | The max threshold voltage at which the input will change from an 'ON' state to an 'OFF' state. |
| Max. $V_{IN}$ | VS | The absolute max input voltage. |
| Max. $I_{IN}$ | 1.2 mADC | The max current flowing into the input with +24VDC applied to the input.. |
| Input resistance | 20k Ω ±10% | Input Resistance to the controller's supply voltage return (VS_RTN). |

## Communications Capacities

| | | Value | Description |
|---|---|---|---|
| Ethernet | | 1 Port | Conforms to IEEE standard 802.3 |
| Speed | | 10/100 Mbps | Auto–Negotiating, Full or Half Duplex. |
| Media Type | | Base-TX | |
| Connector Type | | 8-Pin Telco | See pinout below |
| Isolation | | 1500 VDC | |
| RS-232 | Option C = 1 | 2 Ports | |
| | Option C = 2 | 1 Port | Port #2 will be configured for RS-485. |
| Max. Speed | | 115K baud | 19200 default |
| Connector Type | | 4 / 6 Pin Telco | See pinout below. |
| Isolation | | 500 VDC | The isolation voltage between any port to main CPU. |
| Max. TxD / RxD voltage | | ±10 VDC | |
| Isolated Power | Voltage | 5VDC +-10% | 5V +/-10% to power external communication devices; Port 2 Only |
| RS-485 | Option C = 2 | 1 Port | Port #2 Only; Master Mode Only |
| Max. Speed | | 38,400 baud | 19200 default |
| Connector Type | | 6 Pin Telco | See pinout below. |
| Isolation | | 500 VDC | The isolation voltage between any port to main CPU. |
| +V, –V, DIR voltage range | | 0-5 VDC | DIR Output: 0V = Transmit, 5V = Receive |
| Isolated Power | Voltage | 5VDC +-10% | 5VDC for external communication devices; Port 2 Only |
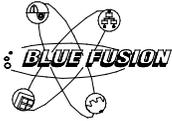
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## Model 5200 Series Controllers
### 10/100Mbps Ethernet Communications

**25 South Street**
**Hopkinton, MA 01748**
**Phone: 508.435.9595**
**Fax: 508.435.2373**
**www.ctc-control.com**

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## Connector Identification



| Option H = 1 | Option H = 2 & 3 |
| --- | --- |
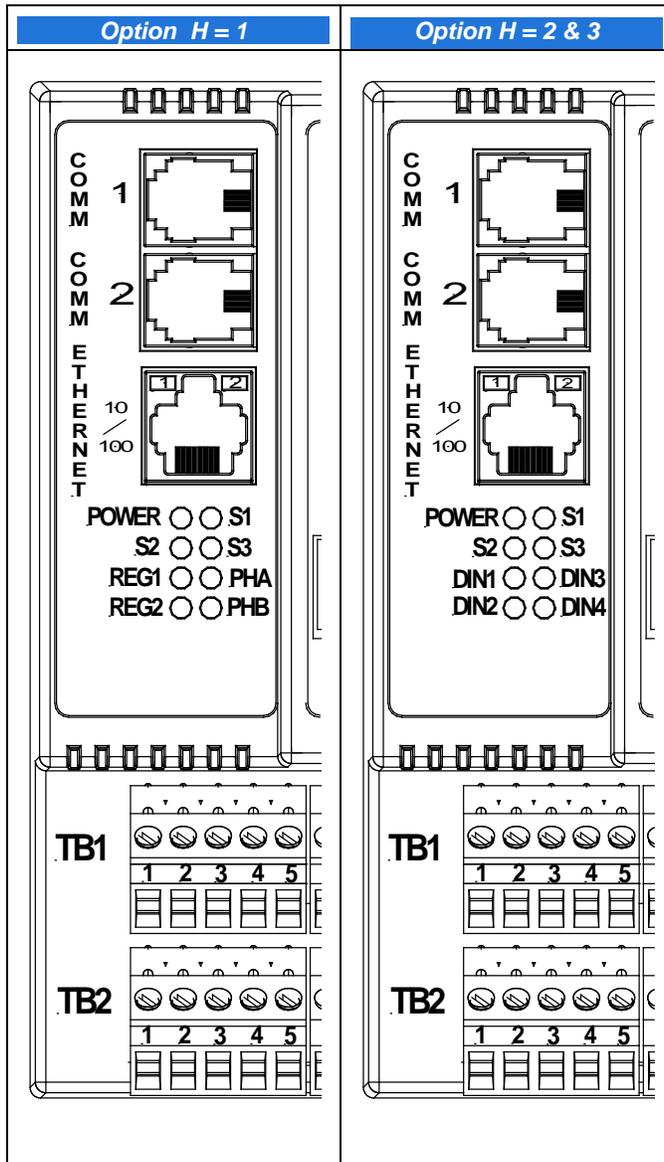
## Connector Pinouts

### Comm1 & Comm2 RS232 / RS485 Pinouts

| Pin # | Option C = 1 | Option C =2 (Port 2 Only) |
| --- | --- | --- |
| 1 | Not Populated | +5 |
| 2 | RS232 TxD | RS485 V+ |
| 3 | Common | Common |
| 4 | Common | Common |
| 5 | RS232 RxD | RS485 V– |
| 6 | Not Populated | DIR |

### Ethernet 10/100 Base-T Pinouts

| Pin # | Signal |
| --- | --- |
| 1 | TX0+ |
| 2 | Tx0- |
| 3 | RX1+ |
| 4 | NC[6] |
| 5 | NC[6] |
| 6 | RX1– |
| 7 | NC[6] |
| 8 | NC[6] |

### Power and Input Terminations[5]

| | Option H = 1 | Option H = 2&3 |
| --- | --- | --- |
| TB1-1 | +VS Input | +VS Input |
| TB1-2 [4] | REG1/DIN3 | REG1/DIN3 |
| TB1-3 [4] | +PHA/+CNT1/+DIN1 | PHA/CNT1/DIN1 |
| TB1-4 [4] | +PHB/+CNT2/+DIN2 | PHB/CNT2/DIN2 |
| TB1-5 | +5 VDC Output | +5 VDC Output |
| TB2-1 | VS Return | VS Return |
| TB2-2 [4] | REG2/DIN4 | REG2/DIN4 |
| TB2-3 [4] | –PHA/–CNT1/–DIN1 | VS Return |
| TB2-4 [4] | –PHB/–CNT2/–DIN2 | VS Return |
| TB2-5 | VS Return | VS Return |

### LED Identification

| | |
| --- | --- |
| **Ethernet #1 10mB Status** | Off = No connection<br>Green vs. Yellow = Half vs. Full Duplex<br>Flashing = Activity |
| **Ethernet #2 100mB Status** | Off = No connection<br>Green vs. Yellow = Half vs. Full Duplex<br>Flashing = Activity |
| **POWER** | Off = Power Failure<br>On = Normal Operation |
| **S1/2/3** | All Off = Normal Operation<br>S1 Flashing = Software Fault<br>S2 Solid =Hardware Fault<br>S3 Flashing = DHCP Negotiating |
| **REG1/2 & PHA/B CNT1/2 & DIR1&2 DIN1/2/3/4** | Off = Open Circuit<br>On = Closed Circuit |

**NOTES**

1. When analog I/O modules are installed in a controller, it is recommended that the controller be powered via a dedicated linear power supply.
2. Power to each controller should by individually fused with a 32VDC (maximum) rated 5.0 amp, fast-acting fuse.
3. For proper operation, use approved CTC supplied Expansion Cables ONLY.
4. No Connection on Expansion Racks
5. All high speed inputs can operate as Encoders with Registration inputs, as Counters with Direction inputs, or as standard digital inputs.
6. Series RC (75.0 Ohm resistor / 0.001uF capacitor) to chassis for optional ground terminations.

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Minimum Firmware Revision: 5.01

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## Mechanical Specifications

### Dimensions

9.43"
8.93"
8.45"
1.50"
1.38"
3.00"
5.77"
9.68"
1.64"
2.57"
1.77"
1.88"

SHOWN WITH FLUSH MOUNTING BRACKET (080-510030)

SHOWN WITH RIGHT-ANGLE
MOUNTING BRACKET (080-510040)
.OVERALL HEIGHT = 6.0"

### Recommended Mounting Orientations

VERTICAL

VERTICAL

080-510030
FLUSH MOUNTING BRACKET

080-510030
RIGHT-ANGLE
MOUNTING BRACKET
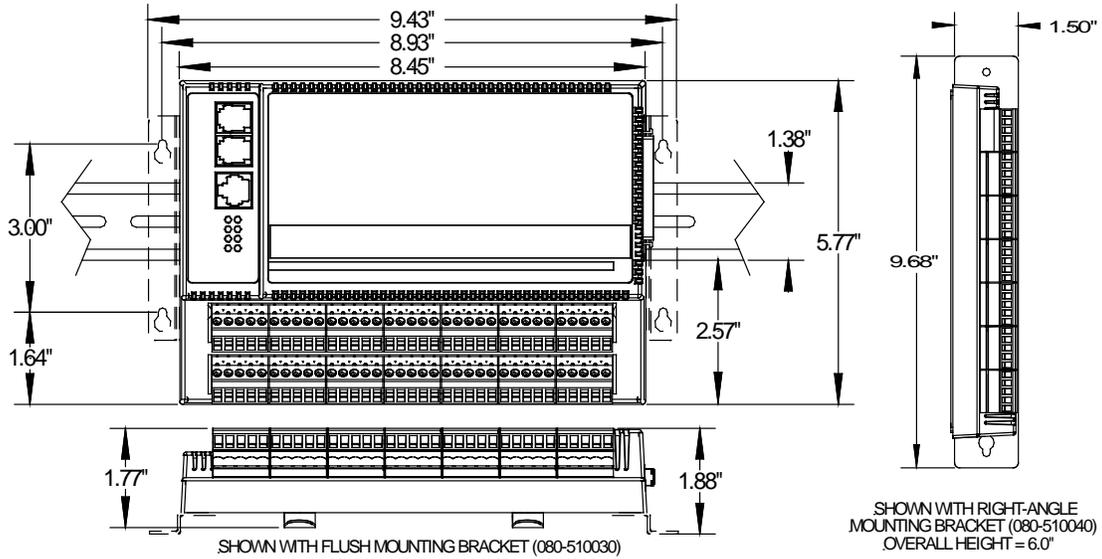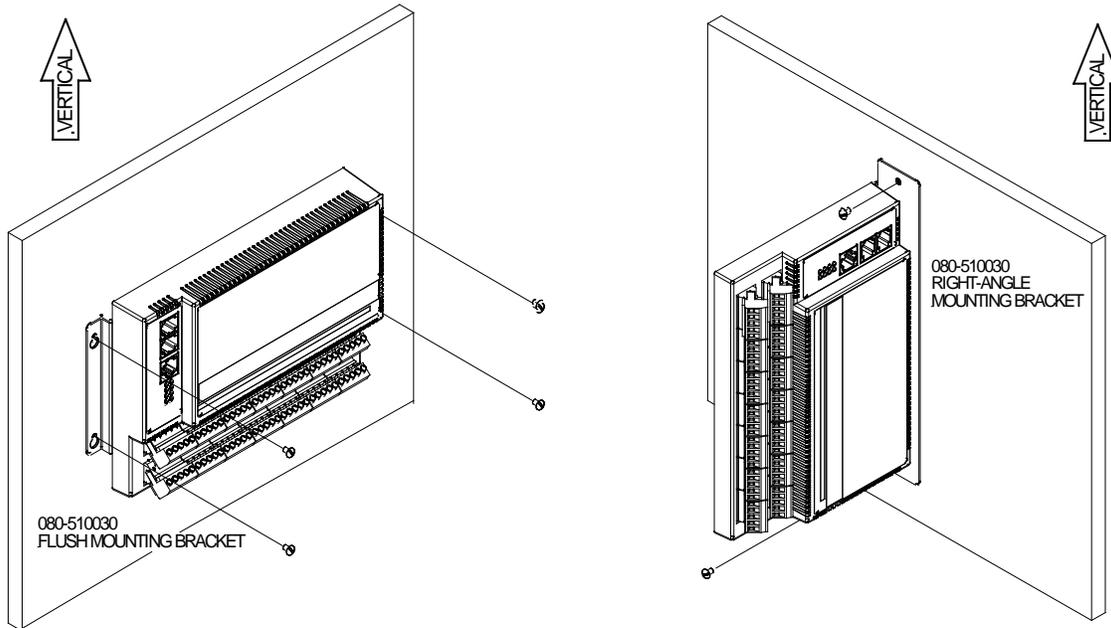
NOTES:
1. De-rate operating temperatures to 0 to 45°C if mounted in any other orientation than described above
2. All mounting instruction and physical dimensions pertain to Expansion Racks as well.

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## Expansion Rack Connections

MIN: 1.25"
MAX: 2.50"

5200 CPU
RACK

5200 EXPANSION
RACK
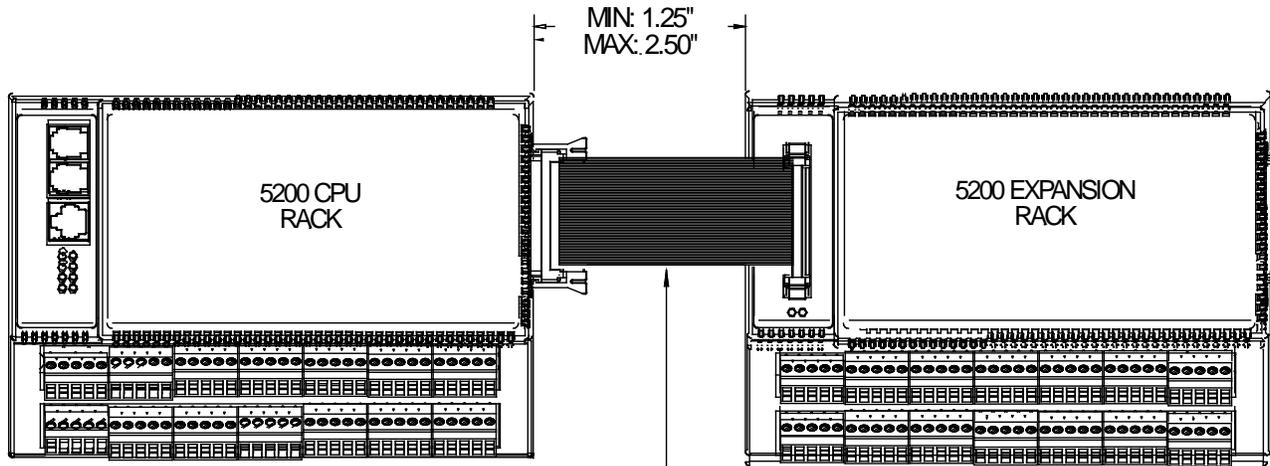
CABLE PN#: 000-520010

WARNING: ONLY USE CTC APPROVED EXPANSION CABLES.
WARRANTY IS VOIDED IF AN UNAPPROVED, DAMAGED, OR MODIFIED
EXPANSION CABLE IS USED.

## Part Numbers:  XXnnnn – P H C M cc

| XXnnnn | P | | H | | C | | M | cc |
|---|---|---|---|---|---|---|---|---|
| **Rack Type** | **Power** | | **High Speed Inputs** [1,2] | | **Communications** | | **Memory** | **Custom Code** |
| **CPU Rack** | | | | | | | | |
| BC5220 | 0 | 18-32V | 0 | None | 1 | Two RS-232 | 0 | 1.5MB NVRAM 1 MB Flash | 00 |
| | 1 | 10-32V | 1 | Two D.E. Inputs (5V) [1,2,3] Two S.E. Inputs (24V) [1,2,4] | 2 | One RS-232 One RS-485 | 1 | 3.5MB NVRAM 5 MB Flash | |
| | | | 2 | Two S.E. Inputs (5V) [1,2,3] Two S.E. Inputs (24V) [1,2,4] | | | 2 | 3.5MB NVRAM 9 MB Flash | |
| | | | 3 | Two S.E. Inputs (24V) [1,2,3] Two S.E. Inputs (24V) [1,2,4] | | | 3 | 5.5MB NVRAM 17 MB Flash | |
| **Expansion Rack** | | | | | | | | |
| BX5210 | 0 | 18-32V | 0 | None | 0 | None | 0 | None | 00 |
| | 1 | 10-32V | | | | | | | |

**NOTES**

(1) *S.E.* Refers to single ended inputs, *D.E.* refers to differential ended inputs.
(2) All high speed inputs can operate as Encoders with Registration inputs, as Counters with Direction inputs, or as standard digital inputs.
(3) Voltage ratings and input type refers to *Encoder #1 and #2 / Counter Trigger #1 and #2 / Digital Inputs #3 and #4 only*.
(4) Voltage ratings and input type refers to *Registration #1 and #2 / Counter Direction #1 and #2 / Digital Inputs #1 and #2 only*.
(5) Model 52xx controllers ship with a default IP address of 192.168.1.52

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## Applications / Users Guides

| Doc. ID | Title |
|---|---|
| 951-520001 | Model 5200 Remote Administration Guide |
| 951-520002 | Model 5200 Communications Guide |
| 951-520003 | Model 5200 Script Language Guide |
| 951-520004 | Model 5200 'C' Users Programming Guide |
| 951-520005 | Model 5200 Bootloader Installation Guide |
| 951-520006 | Quick Reference Register Guide |
| 951-520007 | Model 5200 Analog Modules Application Guide |
| MAN-1000A | Quickstep User's Guide |
| MAN-1010A | Quickstep Programming Guide |
| MAN-1050 | CTC Load Utility User's Guide |

## I/O Modules

| Part Number | Description |
|---|---|
| M1-11A | Digital Input Module *(Eight VDC Sourcing Inputs)* |
| M1-11B | Digital Input Module *(Eight VDC Sinking Inputs)* |
| M1-11C | Digital Input Module *(Eight +5 VDC Sourcing Inputs)* |
| M1-11D | Digital Input Module *(Eight +5 VDC Sinking Inputs)* |
| M1-20A | Digital Output Module *(Eight VDC Sourcing Outputs)* |
| M1-20B | Digital Output Module *(Eight +5 VDC Sourcing Outputs)* |
| M1-22A | Digital Output Module *(Eight VDC Sinking Outputs)* |
| M1-30A | Analog I/O Combo Module *(Two ±10 VDC Analog Inputs; Two ±10 VDC Analog Outputs)* |
| M1-30B | Analog I/O Combo Module *(Two ±20 mVDC Analog Inputs; Two ±10 VDC Analog Outputs)* |
| M1-30C | Analog I/O Combo Module *(Two 4-20 mADC Analog Inputs; Two ±10 VDC Analog Outputs)* |
| M1-30D | Analog I/O Combo Module *(Two ±100 mVDC / Thermocouple; Two ±10 VDC Analog Outputs)* |
| M1-31A | Analog Input Module *(Four ±10 VDC Analog Inputs)* |
| M1-31B | Analog Input Module *(Four ±20 mVDC Analog Inputs)* |
| M1-31C | Analog Input Module *(Four 4-20 mADC Analog Inputs)* |
| M1-31D | Analog Input Module *(Four ±100 mVDC / Thermocouple Analog Inputs)* |
| M1-32A | Analog Output Module *(Six ±10 VDC Analog Outputs, Fully Isolated)* |
| M1-32B | Analog Output Module *(Eight ±10 VDC Analog Outputs)* |
| M1-40A | Dual Axis Servo Module *(Two ±10 VDC Analog Servo Outputs; Two VDC Sourcing Registration Inputs; Two +5 VDC Diff-Ended Encoder Inputs)* |
| M1-50A | Dual Axis Stepper Module *(Four +5 VDC Diff-Ended Step/Direction Outputs; Eight VDC Sourcing Inputs)* |

## Miscellaneous Hardware

| Part Number | Description |
|---|---|
| 080-510030 | Flush Mounting Brackets |
| 080-510040 | Right-Angle Mounting Brackets |
| 000-520010 | 4" Expansion Cable (Note: Each expansion racks come with one expansion cable) |

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