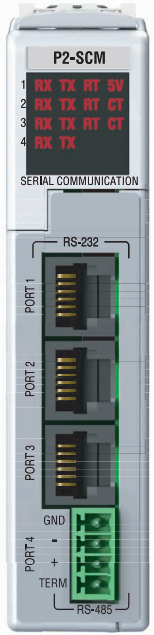
## General Specifications

| | |
|---|---|
| Module Type | Intelligent |
| Modules per Base | 15 maximum* |
| I/O Points Used | None, mapped directly to tags in CPU |
| Field Wiring Connector | 3 - RJ12, 1–4 Position Terminal Block |
| Operating Temperature | 0º to 60ºC (32º to 140ºF) |
| Storage Temperature | -20º to 70ºC (-4º to 158ºF) |
| Humidity | 5 to 95% (non-condensing) |
| Environmental Air | No corrosive gases permitted |
| Vibration | IEC 60068-2-6 (Test Fc) |
| Shock | IEC 60068-2-27 (Test Ea) |
| Field to Logic Side Isolation | None |
| Insulation Resistance | No isolation |
| Module Location | Any slot in any base in a Productivity2000 System |
| Weight | 90g (3.2 oz) |
| Agency Approvals | UL 61010-1 and UL 61010-2-201 File E139594, Canada and USA<br>CE (EN 61131-2 EMC, EN 61010-1 and EN 61010-2-201 Safety)* |

*For complete system limits, please refer to the “Hardware and Communication Limits” table in the Productivity Suite Help file, “Automation Hardware Configuration” topic (P050)
**Meets EMC and Safety requirements. See the D.O.C. for details.




# P2-SCM Serial Communications

**The P2-SCM Serial Communications Module provides three RS-232 ports and one RS-485 port for Modbus master/slave networking or to serial devices using ASCII or custom communication protocols. Port 1 Powers a C-More Micro when using an RJ-12 connector.**

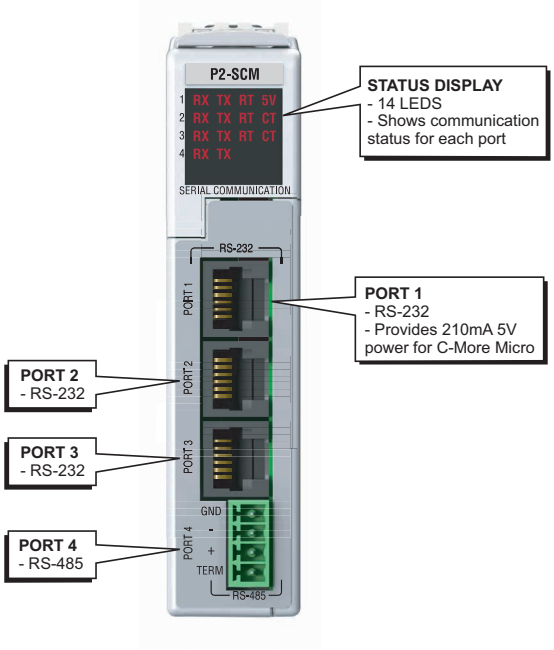


| Document Name | Edition/Revision | Date |
|---|---|---|
| P2-SCM-DS | 2nd Ed. | 9/11/2019 |



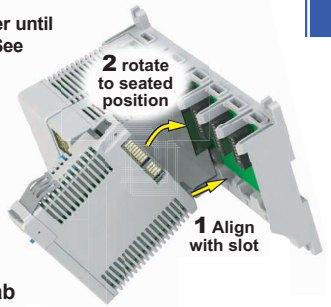
Warranty: Thirty-day money-back guarantee. Two-year limited replacement. (See www.productivity2000.com for details).

# P2-SCM Front Panel



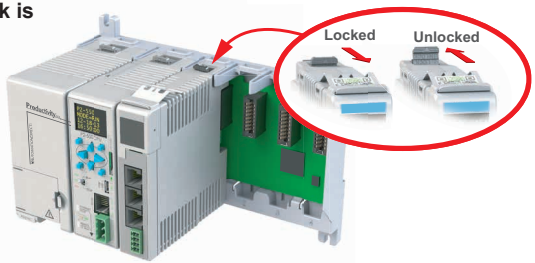

# Module Installation

**WARNING:** Do not apply field power until the following steps are completed. See hot-swapping procedure for exceptions.




**Step One:** Align module catch with base slot and rotate module into connector.

**Step Two:** Pull top locking tab toward module face. Click indicates lock is engaged.




**WARNING:** Explosion hazard – Do not connect or disconnect connectors or operate switches while circuit is live unless the area is known to be non-hazardous. Do not hot-swap modules unless the area is known to be non-hazardous.

# P2-SCM Configuration Options

| Configuration Item | Port 1 (RS-232) | Ports 2 & 3 (RS-232) | Port 4 (RS-485) |
|---|---|---|---|
| Protocol Selections | Disabled, Modbus RTU, ASCII/Custom | Disabled, Modbus RTU, ASCII/Custom | Disabled, Modbus RTU, ASCII/Custom |
| Data Rate | 1200, 2400, 4800, 9600, 19200, 33600, 38400 | 1200, 2400, 4800, 9600, 19200, 33600, 38400 | 1200, 2400, 4800, 9600, 19200, 33600, 38400 |
| Parity | None, Odd or Even | None, Odd or Even | None, Odd or Even |
| Data Bits[4] | 7 or 8 bits | 7 or 8 bits | 7 or 8 bits |
| RTS Off Delay Time[1] | None, or 0–5,000 ms | None, or 0–5,000 ms | N/A |
| RTS On Delay Time[1] | None, or 0–5,000 ms | None, or 0–5,000 ms | N/A |
| Modbus Character Timeout[2] | None, or 0–10,000 ms | None, or 0–10,000 ms | None, or 0-10,000 ms |
| Communication Timeout (Timeout between query and response) | 500-10,500 ms | 500–10,500 ms | 500–10,500 ms |
| Response/Request Delay Time | N/A | N/A | None, or 1–5,000 ms |
| Comm Heartbeat Value[2] | 2–1,000 sec | 2–1,000 sec | 2–1,000 sec |
| Node Address (Station) | 1 to 247 | 1 to 247 | 1 to 247 |
| CTS | N/A | Ignore, Wait, System Input[3] | N/A |
| Enable/Disable CTS Wait Timeout | 1–9999 tenths of seconds | 1–9999 tenths of seconds | N/A |
| RTS | On, Off, Assert During Transmit, System Output | On, Off, Assert During Transmit, System Output | N/A |
| RS-485 2-Wire Mode | N/A | N/A | Disable, Enable |
| Modbus Port Security | Read/Write, Read Only | Read/Write, Read Only | Read/Write, Read Only |

1. For “None” selection with Modbus RTU protocol, Modbus.org minimums are used. This minimum is 3.5 character times up to 19, 200 baud rate and 1.75ms over 19,200 baud rate
2. Only applies to Modbus messages
3. CTS signal is only provided on Ports 2 & 3
4. 7-bit data are only supported with Odd or Even parity

# Port Specifications

## RS-232 Ports 1, 2 & 3

| Electrical Specifications | Min | Typ | Max | Units |
|---|---|---|---|---|
| Output ON, Space Condition (3kΩ, 1000pF Load) | 5.0 | 5.2 | N/A | Volts |
| Output OFF, Mark Condition (3kΩ, 1000pF Load) | N/A | -5.2 | -5.0 | Volts |
| Output Short-Circuit Current | | 15 | N/A | mA |
| Short-Circuit Duration | | N/A | No Limit | Seconds |
| Output Resistance | 300 | | N/A | Ohm |
| Input ON Threshold | N/A | 1.6 | 2.4 | Volt |
| Input OFF Threshold | 0.6 | 1.2 | N/A | Volt |
| Input Resistance | 3k | 5k | 7k | Ohm |

## Line Specifications for RS-232 Ports

| RS-232 Line Specifications | Options | Units |
|---|---|---|
| Data Rate Setting | 1200, 2400, 4800, 9600, 19200, 33600, 38400 | Baud |
| Data Rate Error | ±2 | % |
| Data Bits Setting[1] | 7 or 8 | Bits |
| Stop Bits Setting | 1 | Bits |
| Parity Setting | None[1], Odd or Even | Parity |
| Data Transmission | Half duplex or full duplex | N/A |
| Network | Point-to-Point | |

1. 7-bit data are only supported with odd or even parity

## RS-485 Port 4

| Electrical Specifications | Min | Typ | Max | Units |
|---|---|---|---|---|
| Driver Differential Output (54Ω Load) | 1.5 | N/A | N/A | Volts |
| Driver Common-Mode Output | N/A | | 3 | Volts |
| Driver Short-Circuit Output Current | | | 250 | mA |
| Short-Circuit Duration (Thermal Shutdown) | | | No Limit | Seconds |
| Receiver Differential Input Threshold | 200 | | N/A | mV |
| Receiver Common-Mode Input | -7 | | 12 | Volt |
| Input Resistance | 12k | | N/A | Ohm |
| Termination Resistance (TB Jumper wire 'T' to '+') | N/A | 120 | | Ohm |
| Data Rate | 1200 | N/A | 38400 | Baud |
| Data Rate Error | N/A | | ±2 | % |
| Cable Length (38400 baud maximum) | | | 1200 | Meter |

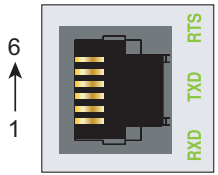
## Line Specifications for RS-485 Port

| RS-485 Line Specifications | Options | Units |
|---|---|---|
| Data Rate Setting | 1200, 2400, 4800, 9600, 19200, 33600, 38400 | Baud |
| Data Bits Setting[1] | 7 or 8 | Bits |
| Stop Bits Setting | 1 | Bits |
| Parity Setting | None[1], Odd or Even | Parity |
| Data Transmission | Half duplex | N/A |

1. 7-bit data are only supported with odd or even parity

## Port 1

| Port Type | RS-232 |
|---|---|
| Description | Non-isolated RS-232 DTE port connects the CPU as a Modbus/ASCII master or slave to a peripheral device. Includes ESD and built-in surge protection. |
| Data Rates | Selectable, 1200, 2400, 4800, 9600, 19200, 33600, and 38400 |
| +5V Cable Power Source | 210mA maximum at 5V, ±5%. Reverse polarity and overload protected |
| TXD | RS-232 Transmit output |
| RX | RS-232 Receive input |
| RTS | Handshaking output for modem control |
| GND | Logic ground |
| Maximum Output Load (TXD/RTS) | 3kΩ, 1,000pF |
| Minimum Output Voltage Swing | ±5V |
| Output Short Circuit Protection | ±15mA |
| Port Status LED | Red LED is illuminated when active for TXD, RXD and RTS |
| Cable Options | EA-MG-PGM-CBL<br>D2-DSCBL<br>USB-RS232 with D2-DSCBL<br>FA-CABKIT<br>FA-ISOCON for converting RS-232 to isolated RS-485 |

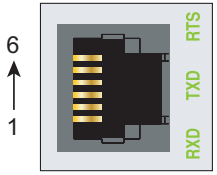



6-pin RJ12 Female Modular Connector

| Pin # | Signal | |
|---|---|---|
| 6 | GND | Logic Ground |
| 5 | RTS | Rs-232 Output |
| 4 | TXD | RS-232 Output |
| 3 | RXD | RS-232 Input |
| 2 | +5V | 210mA Maximum |
| 1 | GND | Logic Ground |

## Port 2 and 3 (RS-232 Configuration)

| Port Type | RS-232 |
|---|---|
| Description | Non-isolated RS-232 DTE port connects the CPU as a Modbus/ASCII master or slave to a peripheral device. Includes ESD and built-in surge protection. |
| Data Rates | Selectable, 1200, 2400, 4800, 9600, 19200, 33600, and 38400 |
| TXD | RS-232 Transmit output |
| RX | RS-232 Receive input |
| RTS | Handshaking output for modem control |
| GND | Logic ground |
| Maximum Output Load (TXD/RTS) | 3kΩ, 1,000pF |
| Minimum Output Voltage Swing | ±5V |
| Output Short Circuit Protection | ±15mA |
| Port Status LED | Red LED is illuminated when active for TXD, RXD and RTS |
| Cable Options | D2-DSCBL<br>USB-RS232 with D2-DSCBL<br>FA-CABKIT<br>FA-ISOCON for converting RS-232 to isolated RS-485 |

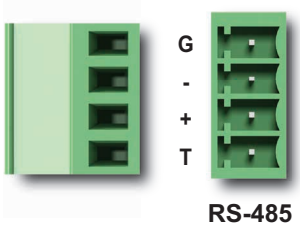



6-pin RJ12 Female Modular Connector

| Pin # | Signal | |
|---|---|---|
| 6 | GND | Logic Ground |
| 5 | RTS | RS-232 Output |
| 4 | TXD | RS-232 Output |
| 3 | RXD | RS-232 Input |
| 2 | CTS | RS-232 Input |
| 1 | GND | Logic Ground |

## Port 4 (RS-485 Configuration)

| Port Type | RS-485 |
|---|---|
| Description | Non-isolated RS-485 port connects the CPU as a Modbus/ASCII master or slave to a peripheral device. Includes ESD/EFT protection and automatic echo cancellation when transmitter is active. |
| Data Rates | Selectable, 1200, 2400, 9600, 19200, 33600, 38400 |
| TXD+/RXD+ | RS-485 transceiver high |
| TXD-/RXD- | RS-485 transceiver low |
| GND | Logic Ground |
| Input Impedance | 19kΩ |
| Maximum Load | 50 transceivers, 19kΩ each, 60Ω termination |
| Output Short Circuit Protection | ±250mA, thermal shut-down protection |
| Electrostatic Discharge Protection | ±8kV per IEC1000-4-2 |
| Electrical Fast Transient Protection | ±2kV per IEC1000-4-4 |
| Minimum Differential Output Voltage | 1.5 V with 60Ω load |
| Fail Safe Inputs | Logic high input state if inputs are unconnected |
| Maximum Common Mode Voltage | -7.5 V to 12.5 V |
| Port Status LED | RED LED Illuminated when active for TXD and RXD |
| Cable Options | Recommend L19827-XXX from AutomationDirect.com |




RS-485

| Pin # | Signal |
|---|---|
| G | GND |
| – | TXD-/RXD- |
| + | TXD+/RXD+ |
| T | TERMINATION |

## Diagnostic LEDs

| LED | Port 1 | Port 2 | Port 3 | Port 4 |
|---|---|---|---|---|
| RXD | X | X | X | X |
| TXD | X | X | X | X |
| RTS | X | X | X | |
| CTS | | X | X | |
| 5V | X | | | |

1 - All RS232 & RS485 LED's reflect the actual electrical level of the signal, there is no direct firmware control of LED's
2 - RS232 LED's RXD, TXD, RTS & CTS are turned ON when their voltage on the RS232 wire is postive (MARK)
a - This occurs when the UART I/O signal is low (GND)
b - They are turned OFF when the voltage on the RS232 wire is negative (SPACE)
3 - RS485 LED's RXD & TXD are turned ON when the UART I/O signal is low (GND)
4 - 5V LED is ON when 5V power is good, 5V LED is OFF when 5V is shorted to ground

**WARNING:** To minimize the risk of potential safety problems, you should follow all applicable local and national codes that regulate the installation and operation of your equipment. These codes vary from area to area and it is your responsibility to determine which codes should be followed, and to verify that the equipment, installation, and operation are in compliance with the latest revision of these codes. ***Equipment damage or serious injury to personnel can result from the failure to follow all applicable codes and standards. We do not guarantee the products described in this publication are suitable for your particular application, nor do we assume any responsibility for your product design, installation, or operation.*** If you have any questions concerning the installation or operation of this equipment, or if you need additional information, please call Technical Support at 770-844-4200.

This publication is based on information that was available at the time it was printed. At AutomationDirect.com® we constantly strive to improve our products and services, so we reserve the right to make changes to the products and/or publications at any time without notice and without any obligation. This publication may also discuss features that may not be available in certain revisions of the product.

## Removable Terminal Block Specs (Port 4)

| | |
|---|---|
| Number of Positions | 4 Screw Terminals, 3.5 mm Pitch |
| Wire Range | 16–28 AWG<br>Solid/Stranded Conductor<br>"Use Copper Conductors, 75°C or Equivalent" |
| Screw Driver Size | TW-SD-VSL-1 (Recommended) |
| Screw Torque | 0.4 N·m |

## Cable Options

| | |
|---|---|
| Recommended | L19827-100, Belden #9841 or Equivalent |

**Caution:** *If possible, remove field power prior to proceeding. If not, then* ***EXTREME*** *care* ***MUST*** *be taken to prevent damage to the module, or even personal injury due to a short circuit from the live terminal block.*

### Important Hot-Swap Information

**The Productivity2000 System supports hot-swap!** Individual modules can be taken offline, removed, and replaced while the rest of the system continues controlling your process. Before attempting to use the hot-swap feature, be sure to read the hot-swap topic in the programming software's help file or our online documentation at AutomationDirect.com for details on how to plan your installation for use of this powerful feature.