## Serial Port Connections

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#### Providing Power to an External Device from Port 2

If either port is set up for communications with a serial device that requires 100mA or less at 5VDC, the device can obtain power from Port 2.

### Cable Lengths and Baud Rates

Maximum cable lengths (the total number of feet from the CPU to the last device attached to the cable) are:

Port 1 (RS-232) = 15 meters (50 ft.) Port 2 (RS-485) = 1200 meters (4000 ft.)

Both ports support configurable baud rates, as listed in the CPU descriptions in this manual.

The following pre-assembled cables are available:

| IC200CBL001 | CPU Programming Cable RS232      |
|-------------|----------------------------------|
| IC200CBL002 | Expansion Firmware Upgrade Cable |

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### Port 1: RS-232

## Pin Assignments for Port 1

Port 1 is an RS-232 port with a 9-pin female D-sub connector. It is used as the boot loader port for upgrading the CPU firmware. The pinout of Port 1 allows a simple straight-through cable to connect with a standard AT-style RS-232 port. Cable shielding attaches to the shell.

| Pin   | Signal | Direction | Function  |
|-------|--------|-----------|---|
| 1     | n/c    |           |   |
| 2     | TXD    | Output    | Transmit Data output  |
| 3     | RXD    | Input     | Receive Data input  |
| 4     | n/c    |           |   |
| 5     | GND    |           | 0V/GND signal reference   |
| 6     | n/c    |           |   |
| 7     | CTS    | Input     | Clear to Send input   |
| 8     | RTS    | Output    | Request to Send output  |
| 9     | n/c    |           |   |
| Shell | SHLD   |           | Cable Shield wire connection / 100%<br>(Continuous) shielding cable shield connection |

#### RS232 Point to Point Connection

In pointtopoint configuration, two devices are connected to the same communication line. For RS-232, the maximum length is 15 meters (50ft).



| Serial Port  | Port 1     |
|--------------|------------|
| 9-pin female | 9-pin male |
| (2) RXD      | (2) TXD    |
| (3) TXD      | (3) RXD    |
| (5) GND      | (5) GND    |
| (7) RTS      | (7) CTS    |
| (8) CTS      | (8) RTS    |
|              |            |

CPU

PC 9-Pin

The shield must connect to shell of connectors on both ends of the cable.

## **Connector and Cable Specifications for Port 1**

Vendor Part numbers below are provided for reference only. Any part that meets the same specification can be used.

| Cable:<br>Belden 9610    | Computer cable, overall braid over foil shield<br>5 conductor †<br>30 Volt / 80°C (176°F)<br>24 AWG tinned copper, 7x32 stranding   |                                     |  |                                 |
|--------------------------|---|-------------------------------------|--|---------------------------------|
| 9 Pin Male<br>Connector: | <u>Type:</u><br>Crimp   | <u>Vendor:</u><br>ITT/Cannon<br>AMP | <u>Plug:</u><br>DEA9PK87F0<br>205204-1 | Pin:<br>030-2487-017<br>66506-9 |
|                          | Solder  | ITT/Cannon<br>AMP                   | ZDE9P<br>747904-2                      |                                 |
| Connector<br>Shell:      | Kit *– ITT Cannon DE121073-54 [9-pin size backshell kit]:<br>Metal-Plated Plastic (Plastic with Nickel over Copper) †<br>Cable Grounding Clamp (included)<br>40° cable exit design to maintain low-profile installation |                                     |  |                                 |
|                          | Threaded with #4-40 for secure attachment to CPU001 port †<br>Order Qty 2 for each cable shell ordered  |                                     |  |                                 |

<sup>†</sup> Critical Information – any other part selected should meet or exceed this criteria.

\* Use of this kit maintains the 70mm installed depth.

## Port 2: RS-485

## Pin Assignments for Port 2

Port 2 is an RS-485 port with a 15-pin female D-sub connector. This can be attached directly to an RS-485 to RS-232 adapter.

| Pin     | Signal | Direction | Function  |
|---------|--------|-----------|---|
| 1       | SHLD   |           | Cable Shield Drain wire connection  |
| 2, 3, 4 | n/c    |           |   |
| 5       | P5V    | Output    | +5.1VDC to power external devices (100mA max.)                                      |
| 6       | RTSA   | Output    | Request to Send (A) output  |
| 7       | GND    |           | 0V/GND reference signal   |
| 8       | CTSB'  | Input     | Clear to Send (B) input   |
| 9       | RT     |           | Resistor Termination (120 ohm) for RDA'   |
| 10      | RDA'   | Input     | Receive Data (A) input  |
| 11      | RDB'   | Input     | Receive Data (B) input  |
| 12      | SDA    | Output    | Transmit Data (A) output  |
| 13      | SDB    | Output    | Transmit Data (B) output  |
| 14      | RTSB   | Output    | Request to Send (B) output  |
| 15      | CTSA'  | Input     | Clear to Send (A) input   |
| Shell   | SHLD   |           | Cable Shield wire connection / 100% (Continuous ) shielding cable shield connection |

## **Connector and Cable Specifications for Port 2**

Vendor Part numbers below are provided for reference only. Any part that meets the same specification can be used.

| Cable:<br>Belden 8105  | Low Capacitance Computer cable, overall braid over foil shield<br>5 Twisted-pairs †<br>Shield Drain Wire †<br>30 Volt / 80°C (176°F)<br>24 AWG tinned copper, 7x32 stranding<br>Velocity of Propagation = 78%<br>Nominal Impedance = 100Ω † |            |              |               |
|--|---|------------|--------------|---------------|
| 15 Pin Male  | <u>Type:</u>  | Vendor:    | <u>Plug:</u> | <u>Pin:</u>   |
| Connector:   | Crimp   | ITT/Cannon | DAA15PK87F0  | 030-2487-017  |
|  |   | AMP        | 205206-1     | 66506-9       |
|  | Solder  | ITT/Cannon | ZDA15P       |               |
|  |   | AMP        | 747908-2     |               |
| Connector  | Kit* – ITT Cannon DA121073-50 [15-pin size backshell kit]:  |            |              |               |
| Shell:<br>Metal-Plated Plastic (Plastic with Nickel over Copper)<br>Cable Grounding Clamp (included)<br>40° cable exit design to maintain low-profile installation |   |            |              | ver Copper) † |
|  | Plus – ITT Cannon 250-8501-009 [Extended Jackscrew]:<br>Threaded with (metric) M3x0.5 for secure attachment †<br>Order Qty 2 for each cable shell ordered   |            |              |               |

† Critical Information – any other part selected should meet or exceed this criteria.

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RS485 Point to Point Connection with Handshaking

In point topoint configuration, two devices are connected to the same communication line. For RS485, the maximum cable length is 1200 meters (4000 feet). Modems can be used for longer distances.



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#### RS-485 Multidrop Serial Connections

In the multidrop configuration, the host device is configured as the master and one or more PLCs are configured as slaves. The maximum distance between the master and any slave may not exceed 4000 feet (1200 meters). This figure assumes good quality cables and a moderately noisy environment. A maximum of 8 slaves can be connected using RS485 in a *daisy chain* or multidrop configuration. The RS485 line must include handshaking and use wire type as specified earlier.



When wiring RS-485 multidrop cables, reflections on the transmission line can be reduced by daisy-chaining the cable as shown below. Make connections inside the connector to be attached to the PLC. Avoid using terminal strips to other types of connectors along the length of the transmission line.



Termination resistance for the Receive Data (RD) signal must be connected only on units at the ends of lines. This termination is made at the CPU by connecting a jumper between pin 9 and pin 10 inside the D-shell connector.

Ground Potential: Multiple units not connected to the same power source must have common ground potential or ground isolation for proper operation of the system.