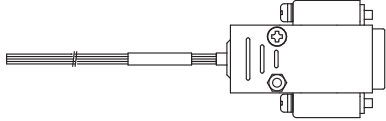
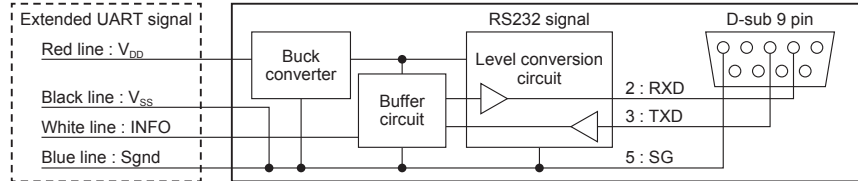


# Extended UART signal - RS232 signal conversion unit

PCA Series  
AME Series  
RB Series

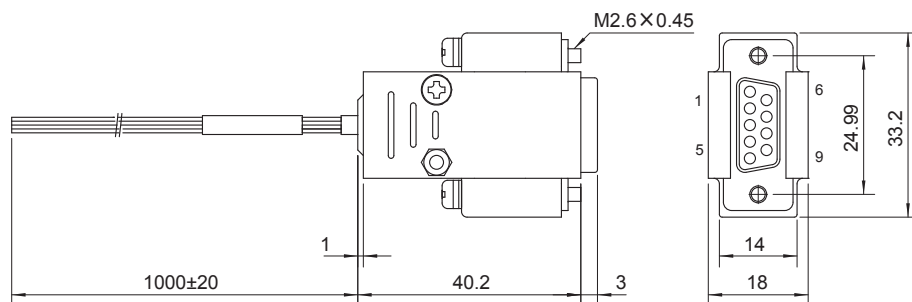
This is a unit to convert Extended UART signal to RS232 signal mutually.

Model name	Compatible model	external form
CR-PC-1	PCA300F PCA600F PCA1000F PCA1500F  RBC200F RBC300F <I3 Option>  AME400F AME600F AME800F AME1200F <AI3 Option>	 <p>D-sub 9 Pin Female Connector</p> <p>&lt;Block Diagram&gt;</p> 

## 1 Specifications

	ITEM	CR-PC-1
ELECTRICAL SPECIFICATIONS	$V_{DD}$ - Vss voltage [V]	DC -0.3 to 14.4
	Sink current (Vcc) [mA]	DC 25
	INFO - Sgnd voltage [V]	DC -0.3 to 5.5
	RXD - SG voltage [V]	DC $\pm 4.2$ typ (RXD Loaded with 3k $\Omega$ to SG)
	RXD output short circuit current [mA]	DC $\pm 60$ max
	TXD - SG voltage [V]	DC -15 to 15 (Input Resistance 3 to 7k $\Omega$ )
	Number of connected	7 max
ENVIRONMENT	Operating temp.,humidity	-20 to 60°C, 20 to 90%RH (Non condensing)
	Storage temp.,humidity	-20 to 85°C, 20 to 90%RH (Non condensing)
	Vibration	10 - 55Hz 19.6m/s <sup>2</sup> (2G) 3minutes period, 60 minutes each along X, Y, and Z axis
	Impact	196.1m/s <sup>2</sup> (20G) 11ms, once each X,Y and Z axis
OTHER	Weight	40g max

## 2 External View



\* Dimensions in mm  
\* Tolerance :  $\pm 1$   
\* Weight : 40g max  
\* AWG : 28

<Extended UART side>

Line color	Signal name	Function
Red	$V_{DD}$	Power input
Black	$V_{SS}$	Ground
White	INFO	Extended UART data
Blue	Sgnd	Signal ground

<RS232>

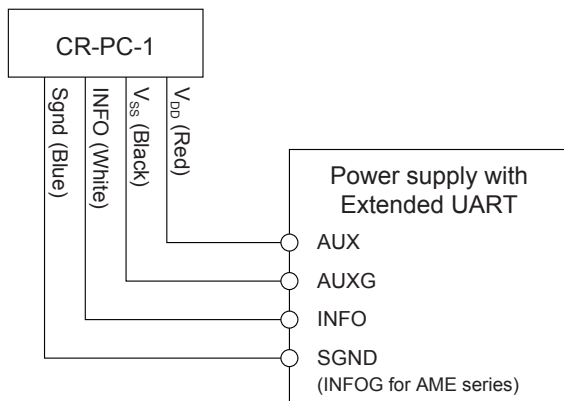
Pin number	Signal name	Function
1	-	N.C.
2	RXD	RS232 received data
3	TXD	RS232 send data
4	-	N.C.
5	SG	Signal ground
6	-	N.C.
7	-	N.C.
8	-	N.C.
9	-	N.C.
Shell	-	N.C.

## 3 Mounting and installation method

### 3.1 Connection method

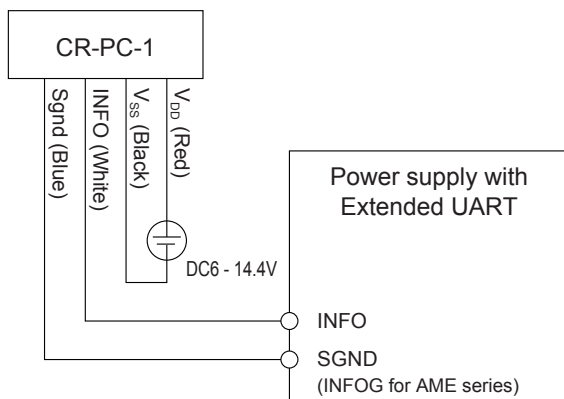
(1) For power supplies with Extended UART which have AUX (12V) power.

- Connect the  $V_{DD}$  line (red) to the AUX (12V) terminal and the  $V_{SS}$  line (black) to the AUXG terminal.
  - Connect the INFO line (white) to the INFO terminal and the Sgnd line (blue) to the SGND terminal (INFOG terminal for AME series).
  - Use a suitable housing and terminal.
- Refer to the instruction manual of the power supply for the pin assignment.



(2) For power supplies with Extended UART which do not have AUX (12V) power.

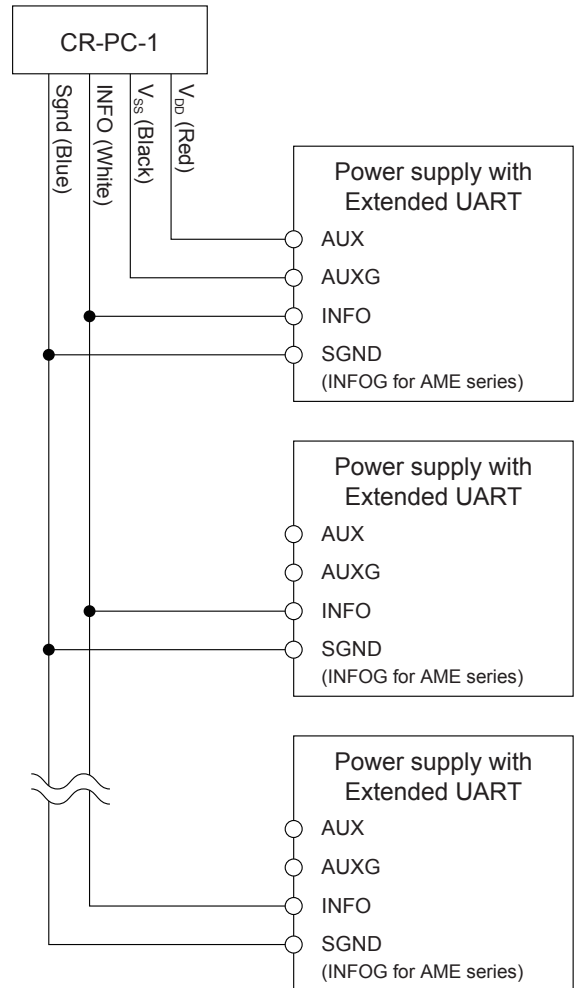
- Apply a voltage of 6 - 14.4 V between the  $V_{DD}$  line (red) (positive side) and the  $V_{SS}$  line (black) (ground side).
  - Connect the INFO line (white) to the INFO terminal and the Sgnd line (blue) to the SGND terminal (INFOG terminal for AME series).
  - Use a suitable housing and terminal.
- Refer to the instruction manual of the power supply for the pin assignment.



(3) Connecting a CR-PC-1 to multiple power supplies with Extended UART

- Connect one power supply by the method in (1) or (2).

Then, connect INFO terminals and SGND terminals (INFOG terminals for AME series) in each power supply. Set addresses for each power supply based on the Extended UART Manual.



### 3.2 Warranty Period

- The standard warranty period is 3 years. If the product fails due to manufacturer fault within the warranty period we will replace it.
- Mechanical wear caused by repeated inserting and removing connectors is not covered under this warranty.
- We are not responsible for any damage after modification or disassembly.
- Malfunction or damage caused by natural disasters, earthquakes, floods, fires, or other external factors is not covered under this warranty.

## 4 Others

### <WARNING>

- Do not use near flammable gas.
- Do not store or use near where chemicals are vaporized or emitted (where the unit may come in contact with chemicals).
- Unit is not hot-swappable.
- Do not touch terminals when operating or the product is turned on.
- Do not cover with cloth or paper. Do not put flammable items near the unit. Not end-user repairable, may be dangerous.

### <CAUTION>

- Cosel is not liable for any damages or consequences arising from usage different than the stated intended use.
- Operation in an environment with excessive electromagnetic noise cannot be guaranteed.
- Be careful of static electricity.
- Incorrect wiring can damage the product.  
Care must be taken regarding cable length and layout so that connectors and wires stay connected.
- Fragile, handle with care, avoid dropping.
- Do not use for non-applicable power supplies.
- Do not use or store in an environment where conductive materials may touch the unit or where water or moisture condensation may occur.

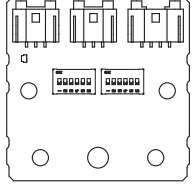
# Extended UART signal - RS485 signal (Modbus-RTU) conversion unit PCA Series AME Series

The CR-PC-2 is a conversion unit which can be connected to our PCA/AME series power supplies (equipped with an extended UART).

Its function is to mutually convert the extended UART signal and the RS485 signal (and Modbus-RTU).

The conversion unit operates as a slave for Modbus communication.

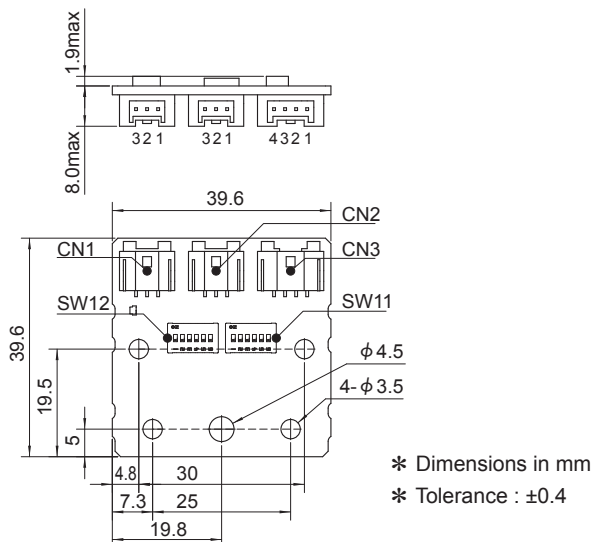
Note that some extended UART commands may not be used.

Model name	Compatible model	External form
CR-PC-2	PCA300F PCA600F PCA1000F PCA1500F  AME400F AME600F AME800F AME1200F <Option I3>	

## 1 Specifications

		ITEM	CR-PC-2
ELECTRICAL SPECIFICATIONS	EXTENDED UART	V <sub>DD</sub> - V <sub>SS</sub> Voltage [V]	DC -0.3 to 12.6
		Sink Current (I <sub>b</sub> ) [mA]	DC 100
		INFO - SGND Voltage [V]	DC -0.3 to 5.5
		Connection wiring length [m]	20m max
		Number of connected	1
	RS485	Transceiver Voltage [V]	1.5 to 5
		Communication method	Half Duplex
		Total connection wiring length [m]	100m max
		Number of connected	32 max
		ENVIRONMENT	
Storage temp., humidity	-20 to 85℃, 20 to 90%RH (Non condensing)		
Vibration	10 – 55Hz 19.6m/s² (2G) 3minutes period, 60 minutes each along X,Y and Z axis		
Impact	196.1m/s² (20G) 11ms, once each X,Y and Z axis		
OTHER		Weight	9.0 g max (Unit only)

## 2 External View



Connector	Housing	Terminal	Mfr.
CN1	SM03B-PASS	PAP-03V-S	SPHD-002T-P0.5
CN2	SM04B-PASS	PAP-04V-S	SPHD-001T-P0.5
CN3	SM04B-PASS	PAP-04V-S	SPHD-001T-P0.5

### <CN1,CN2>

Pin No.	Function
1	A RS485 differential signal (+,Non-inverting)
2	B RS485 differential signal (-,Inverted)
3	G Ground

### <CN3>

Pin No.	Function
1	SGND Signal ground
2	V <sub>SS</sub> Power ground
3	INFO Extended UART signal
4	V <sub>DD</sub> Power input

### <SW11>

Pin No.	Function
1	PCA/AME Command switching
2	RS485 Parity setting 1
3	RS485 Parity setting 2
4	RS485 Baudrate setting 1
5	RS485 Baudrate setting 2
6	N.C.

### <SW12>

Pin No.	Function
1	Slave address setting 32
2	Slave address setting 16
3	Slave address setting 8
4	Slave address setting 4
5	Slave address setting 2
6	Slave address setting 1

## 3 Mounting and installation method

### 3.1 Set up method

#### (1) Setting the Slave address

The conversion unit operates as a slave for Modbus communication. When connecting other slave devices, set the address so that they do not overlap.

When shipped from the factory, the address is set to "64".

The SW12 switches 1 to 6 are user-configurable.

The SW12 switches 1 to 6 also indicate the binary number, starting from the leftmost switch "32" "16" "8" "4" "2" "1", see fig. 3.1 and 3.2 below.

The address value is the sum of the values that are set to "on".

Ex. in fig. 3.1, below, the no. 5 switch is set to "on" so the slave address is "2".

Ex. in fig. 3.2, below, all switches are set to "on" so the slave address is the sum of "32"+"16"+"8"+"4"+"2"+"1"="63".

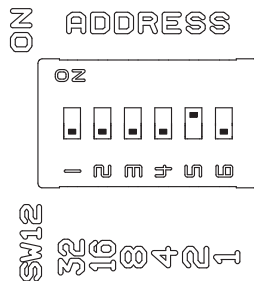


Fig. 3.1 slave address "2" setting

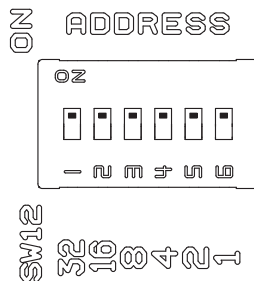


Fig. 3.2 slave address "63" setting

The slave address "0" is reserved for broadcast, so it cannot be used. If all 6 SW12 switches are set to "off" the slave address is "64" rather than "0".

When changing the setting, disconnect the conversion unit power (so the  $V_{DD}-V_{SS}$  line is open or at 0V) and restart it.

After restarting, the changed address setting will take effect.

#### (2) RS485 Communication data format setting

The factory default RS485 communication data format is configured as shown below.

##### Data format

Communication speed	19200bps
Data length	8 bit
Stop bit	1 bit
Parity	Even parity
Transfer direction	LSB first

The communication speed, parity, and stop bit can be configured by setting the "SW11" 2-5 switches (see fig. 3.3), as shown below.

SW11		Parity, Stop bit
2	3	
OFF	OFF	Even parity Stop bit : 1 bit (default)
ON	OFF	Odd parity Stop bit : 1bit
OFF	ON	
ON	ON	Non parity Stop bit : 2bit

SW11		Communication speed
4	5	
OFF	OFF	19200bps (default)
ON	OFF	9600bps
OFF	ON	4800bps
ON	ON	2400bps

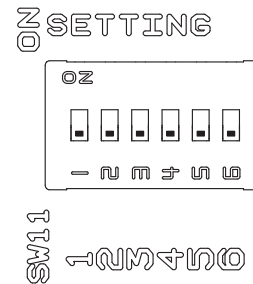


Fig. 3.3 dip switch

When changing the setting, disconnect the conversion unit power (so the  $V_{DD}-V_{SS}$  line is open or at 0V) and restart it. After restarting, the changed setting will take effect.

### (3) Extended UART conversion power supply settings

Set this conversion unit according to the PCA or AME to be connected.

The factory default setting is for our PCA series.

To use with our AME series, change the “SW11” no. 1 switch to the “ON” position, as shown below in fig. 3.4.

ie. no. 1 switch = “ON”, AME series

no. 1 switch = “OFF”, PCA series

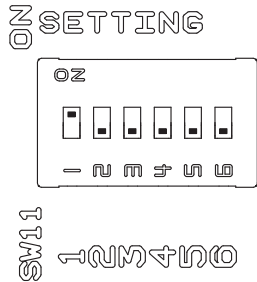


Fig. 3.4 Settings when using AME

When changing the setting, disconnect the conversion unit power (so the  $V_{DD}$ - $V_{SS}$  line is open or at 0V) and restart it. After restarting, the changed setting will take effect.

### (4) Power supply settings

The extended UART communication address for this conversion unit is fixed at “7”.

See the communication manual of the power supply for the setting method.

## 3.2 Connection method

### (1) RS485 Connection

Connect the master A terminal (+, non-inverting) to the CN1 or CN2 conversion unit A terminal. Connect the master B terminal (-, inverting) to the CN1 or CN2 conversion unit B terminal.

Connect the master GND terminal to the CN1 or CN2 conversion unit G terminal. All as shown in fig. 3.5 and 3.6 below.

We recommend using shielded twisted pair cables (AWG22).

Connect the shielded cable to the master GND terminal.

If the master device can share both 2-wire and 4-wire connections, refer to the master device manual for the connection method. The bias voltage of the A and B terminals should be implemented on the master as necessary.

Note that the polarity of the master A and B terminals may be inverted depending on the manufacturer. (Ensure that the non-inverting terminals and the inverted terminals are connected to each other.)

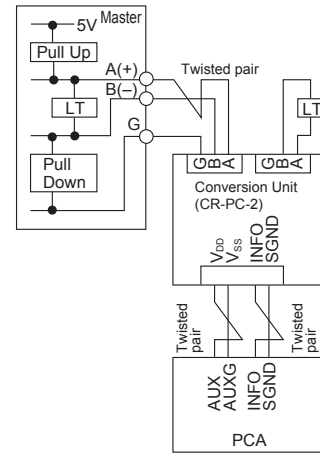


Fig.3.5 Connected to one unit ex.

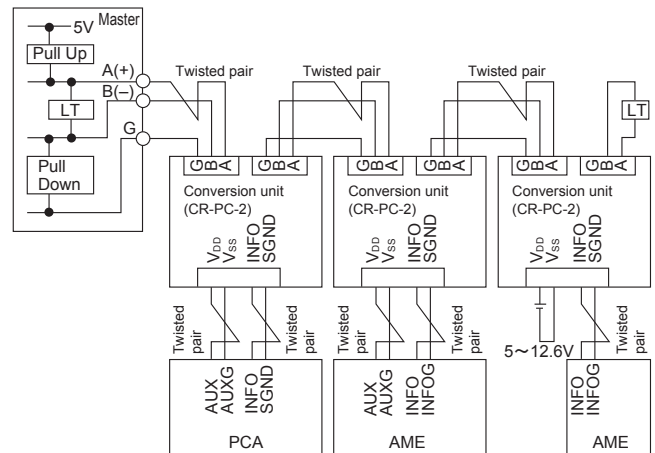


Fig.3.6 Connected to multiple units ex.

### (2) Connecting a terminating resistor

This conversion unit does not have a built-in terminating resistor (LT : Line Termination). Connect a terminating resistor to both ends of the RS485 bus line. When only this conversion unit is connected to the RS485 bus line, connect a 120Ω (1/2W) terminating resistor to CN1 or CN2 (see Fig. 3.5).

For the master device terminating resistor, refer to the master device manual. When using multiple units of this conversion unit on the RS485 bus line, connect a 120Ω (1/2W) terminating resistor to the conversion unit farthest from the master side. (see Fig. 3.6).

### (3) Extended UART connection (using the supplied harness)

PCA series - use the harness in the “PCA” tube.

- Connect the 4-pin connector to CN3 of the conversion unit.
- Connect the 10-pin connector to CN3 of the PCA.
- Connect the 12-pin connector to CN1 or CN2 of the PCA.

AME series - use the harness in the “AME” tube.

- Connect the 4-pin connector to CN3 of the conversion unit.
- Connect the 10-pin connector to CN1 of the AME.

(4) Extended UART connection (If not using the supplied harness or if using other function pins of the power supply)

<When using the AUX function to power the conversion unit>

PCA series - connect the AUX, INFO, AUXG, and SGND terminals of the PCA to the  $V_{DD}$ , INFO,  $V_{SS}$ , and SGND terminals (CN3) of the conversion unit, respectively.

AME series - connect the AUX, INFO, AUXG, and INFOG terminals of the AME to the  $V_{DD}$ , INFO,  $V_{SS}$ , and SGND terminals (CN3) of the conversion unit, respectively.

Connect using twisted pair cables (AWG28). The AUX terminal voltage of the communication power supply must be in the range of 5 to 12.6V.

Refer to the catalog illustration of each power supply for the housing and terminal to be used.

<When not using the AUX function to power the conversion unit>

PCA series - connect the INFO, and SGND terminals of the PCA to the INFO, and SGND terminals (CN3) of the conversion unit, respectively.

AME series - connect the INFO, and INFOG terminals of the AME to the INFO, and SGND terminals (CN3) of the conversion unit, respectively.

The voltage between the conversion unit CN3,  $V_{DD}$  and  $V_{SS}$  terminals must be in the range of 5 to 12.6V (see Fig. 3.6).

(5) Extended UART Connection Caution

If the power supply restarts, turn off the power of the conversion unit (set the voltage between  $V_{DD}$  and  $V_{SS}$  to 0V or open) and restart it before communicating.

Do not connect more than one of these conversion units per power supply with extended UART. Doing so may cause the communication unit to malfunction (See fig. 3.7).

When a conversion unit is connected to a power supply with an extended UART, do not connect an additional device that would be the master of the extended UART communication to the INFO terminal of the power supply. Doing so may cause the communication unit to malfunction (see fig. 3.8).

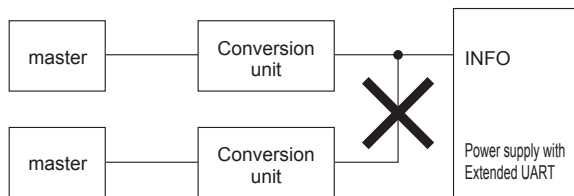


Fig. 3.7 Connection restriction ex. 1

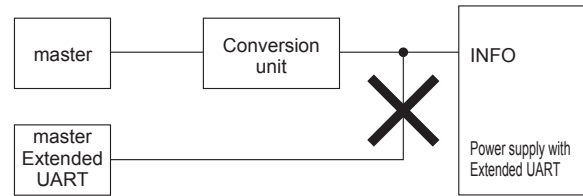


Fig. 3.8 Connection restriction ex. 2

### 3.3 Mounting Example

The following is an example of how to mount the conversion unit on the PCA or the AME series. There are mounting holes for M4 screws on the side of the PCA and AME series chassis. Prepare a through-type spacer ( $L \geq 3\text{mm}$ ) to which an M4 screw can be attached. Mount the conversion unit to the power supply with M4 screws through the spacer (see Fig. 3.9).

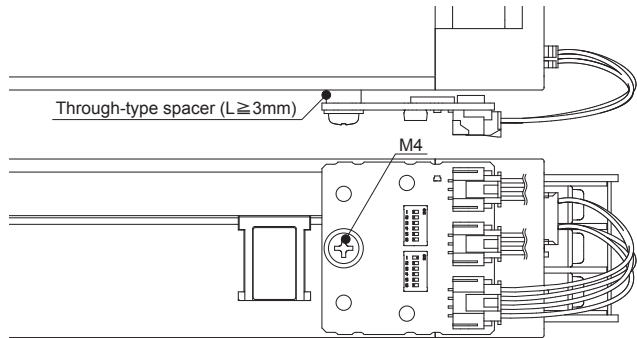


Fig. 3.9 Mounting conversion unit on the AME series power supply ex.

### 3.4 Warranty Period

- The standard warranty period is 3 years. If the product fails due to manufacturer fault within the warranty period we will replace it.
- Mechanical wear caused by repeated inserting and removing connectors or turning switches ON and OFF is not covered under this warranty.
- We are not responsible for any damage after modification or disassembly.
- Malfunction or damage caused by natural disasters, earthquakes, floods, fires, or other external factors is not covered under this warranty.

## 4 Communication Specifications

### 4.1 Transmission specifications

No.	ITEM	SPECIFICATIONS	
1	Communication method	Half Duplex	
2	Synchronization method	Start-stop synchronous	
3	Connection configuration	1 : N (master : Slave)	
4	Communication speed	2400, 4800, 9600, 19200bps (default) ±2% error tolerance	
5	Flow control	None	
6	Data format	Data length	8 bit
7		Stop bit	1 bit (default), 2 bit
8		Parity	Even (default), Odd, None
9		Transfer direction	LSB first

### 4.2 Communication protocol

For the communication protocol specifications, see the CR-PC-2 communication manual.

## 5 Others

#### <WARNING>

- Do not use near flammable gas.
- Do not store or use near where chemicals are vaporized or emitted (where the unit may come in contact with chemicals).
- Unit is not hot-swappable.
- Do not touch terminals when operating or the product is turned on.
- Do not cover with cloth or paper. Do not put flammable items near the unit. Not end-user repairable, may be dangerous.

#### <CAUTION>

- Cosel is not liable for any damages or consequences arising from usage different than the stated intended use.
- Operation in an environment with excessive electromagnetic noise cannot be guaranteed.
- Be careful of static electricity.
- Incorrect wiring can damage the product.  
Care must be taken regarding cable length and layout so that connectors and wires stay connected.
- Fragile, handle with care, avoid dropping.
- Do not use for non-applicable power supplies.
- Do not use or store in an environment where conductive materials may touch the unit or where water or moisture condensation may occur.