


**A compact converter that allows communications between RS-232C/USB and RS-422/485 devices. Ideal for industrial applications.**

- Allows communications between RS-232C/USB (Universal Serial Bus) and RS-422/485 devices.
- All signal lines have 1,500-VAC insulation at the RS-232C/USB and RS-422/485 sides using opto-couples, and power supply lines have 1,500-VAC insulation using a transformer.
- Compact 30-mm-wide body supports both screw-mounting and DIN track mounting.
- LED indicator for RD, SD, and power.
- Operation either with or without echoback available.
- Conforms to EMC standards, EN61010-1 (IEC61010-1).
- UL/CSA approved.



## Ordering Information

Appearance	Size (mm)	Power supply voltage	Model
	30 × 80 × 78 (W × H × D)	100 to 240 VAC	K3SC-10 100 to 240 VAC
		24 VAC/VDC	K3SC-10 24 VAC/VDC

### ■ Accessories (Order Separately)

Name	Model
Adapter for RS232C Serial Cable and K3SC	K32-23209

## Specifications

### ■ Ratings

Item	K3SC-10 100 to 240 VAC	K3SC-10 24 VAC/VDC
Power supply voltage	100 to 240 VAC 50/60 Hz	24 VAC 50/60 Hz, 24 VDC
Allowable power supply fluctuation range	85% to 110% of power supply voltage	
Power consumption	5 VA max.	3 VA max./3 W max.
Communications format of master device (e.g., computer)	RS-232C, USB (selectable)	
Communications format of slave device (e.g., component)	RS-422: 4-wire full-duplex mode, RS-485: 2-wire half-duplex mode (selectable)	
Communications method	Start-stop synchronization	
Ambient operating temperature	RS-232C	-10 to 55°C (with no icing)
	USB	0 to 55°C (with no icing)
Ambient operating humidity	25% to 85% (with no condensation)	
Ambient storage temperature	-20 to 65°C	

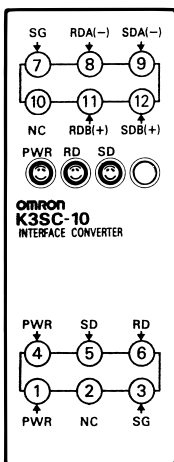
## ■ Characteristics

Item		Specification		
Master device	RS-232C interface	Maximum transmission distance	15 m	
		Maximum number of connectable Units	1 Unit	
	USB interface (See note 1.)	Maximum transmission distance	5 m; hub delay time + cable delay time ≤ 70 ns	
		Maximum number of connectable Units	1 Unit	
		USB standard	V1.1	
Slave device	RS-422/485 interface	Maximum transmission distance	500 m	
		Maximum number of connectable Units	31 Units (for multi-drop connection)	
Baud rate		1,200/2,400/4,800/9,600/19,200/38,400 (bps) Default setting: 9,600		
Data length		7/8 bits Default setting: 7		
Stop bit length		1/2 bits Default setting: 2		
Communications parity		None/even/odd Default setting: Even		
Echoback selection		Echoback: With/without Default setting: Without		
Selection switch response delay		Approx. 30 ms		
Insulation resistance		20 MΩ min. measured at 500 VDC between the following: External terminals ↔ casing RS-232C terminals and USB port ↔ RS-422/485 terminals ↔ power supply terminals		
	Isolation method	Communications	Phototransistor coupler	
		Power supply	Isolating transformer	
Dielectric strength		1,500 VAC for 1 minute measured between the following: External terminals ↔ casing RS-232C terminals and USB port ↔ RS-422/485 terminals ↔ power supply terminals		
Noise immunity		AC power supply terminals, normal/common mode: ±1,500 V AC/DC power supply terminals, normal mode: ±480 V; common mode: ±1,500 V Square wave with 1-ns rising edge ±1 μs, ±100 ns		
Vibration resistance	Malfunction	10 to 55 Hz, 0.5-mm single amplitude for 10 minutes each in X, Y, and Z directions		
	Destruction	10 to 55 Hz, 0.5-mm single amplitude for 2 hours each in X, Y, and Z directions		
Shock resistance	Malfunction	98 m/s <sup>2</sup> 3 times each in X, Y, and Z directions		
	Destruction	294 m/s <sup>2</sup> 3 times each in X, Y, and Z directions		
Weight		Approx. 150 g		
Enclosure rating (See note 2.)	Front panel operation parts	Conforms to IEC standards, equivalent to IP20 (when terminal cover mounted)		
	Terminals	Equivalent to VDE 0106/100 (when terminal cover mounted)		
EMC		Radiated Emission:	EN61326 class A	
		Conducted Emission:	EN61326 class A	
		Immunity ESD:	EN61000-4-2: 4-kV contact discharge (level 2) 8-kV air discharge (level 3)	
		Immunity-RF-interference:	EN61000-4-3: 10 V/m (amplitude modulated, 80 MHz to 1 GHz) (level 3) 10 V/m (pulse modulated, 900 MHz)	
		Immunity Conducted Disturbance:	EN61000-4-6: 10 V (0.15 to 80 MHz) (level 3)	
		Immunity Burst:	EN61000-4-3: 2-kV power-line (level 3) 2-kV I/O signal-line (level 4)	
Approved standards		UL508, CSA22.2 No. 14-95; conforms to EN50081-2, EN50082-2, EN61010-1 (IEC61010-1); conforms to VDE0106/part 100 (Finger Protection) when the terminal cover is mounted.		
Memory protection		No protective functions (Communications data is not protected for power interruptions during communications.)		

- Note:**
1. A USB driver and communications software for the USB driver are required to use USB. This functionality is available with Windows 98/2000 only.
  2. The enclosure ratings do not apply when USB is used.

# Nomenclature

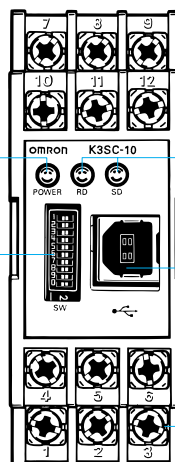
Terminal Cover



**Note:** Cover the terminals to prevent electric shock.

**Caution:** Be sure to use the K3SC-10 with the terminal cover mounted when using in machinery that must conform to EN/IEC standards.

K3SC without Terminal Cover



**Power Indicator**  
Lights (green) when power is supplied.

**Communications Setting Switch**  
Used to set the communications conditions for connected devices.

Communications Setting Switch

Switch	Setting
1	Baud rate
2	
3	
4	Data length
5	
6	Parity
7	
8	Master device
9	Slave device
10	Echoback

**Communications Status Indicators**  
Light (yellow) during communications.  
RD: Lights when receiving RS-422/485 communications.  
SD: Lights when sending RS-422/485 communications.

**USB Port**  
Port for USB connections. Use this port if the master device is a USB device.

**M3.5 Terminal Screw**

## Operation

### ■ Communications Settings Switch

Use this switch to set the communications conditions for the K3SC to those used by connected devices.

Setting ON↔OFF	Baud rate						Data length		Stop bits		Parity			Master device		Slave device		Echoback		
	1,200 bps	2,400 bps	4,800 bps	9,600 bps	19,200 bps	38,400 bps	7	8	2	1	Even	Odd	None	RS-232C	USB	RS-485	RS-422	OFF (with-out)	ON (with)	
1 <input type="checkbox"/>	ON	OFF	ON	OFF	ON	OFF														
2 <input type="checkbox"/>	OFF	ON	ON	OFF	OFF	ON														
3 <input type="checkbox"/>	OFF	OFF	OFF	OFF	ON	ON														
4 <input type="checkbox"/>							OFF	ON												
5 <input type="checkbox"/>									OFF	ON										
6 <input type="checkbox"/>											OFF	ON	OFF							
7 <input type="checkbox"/>											OFF	OFF	ON							
8 <input type="checkbox"/>														OFF	ON					
9 <input type="checkbox"/>																OFF	ON			
0 <input type="checkbox"/>																		OFF	ON	

**Note:** All pins are factory-set to OFF.

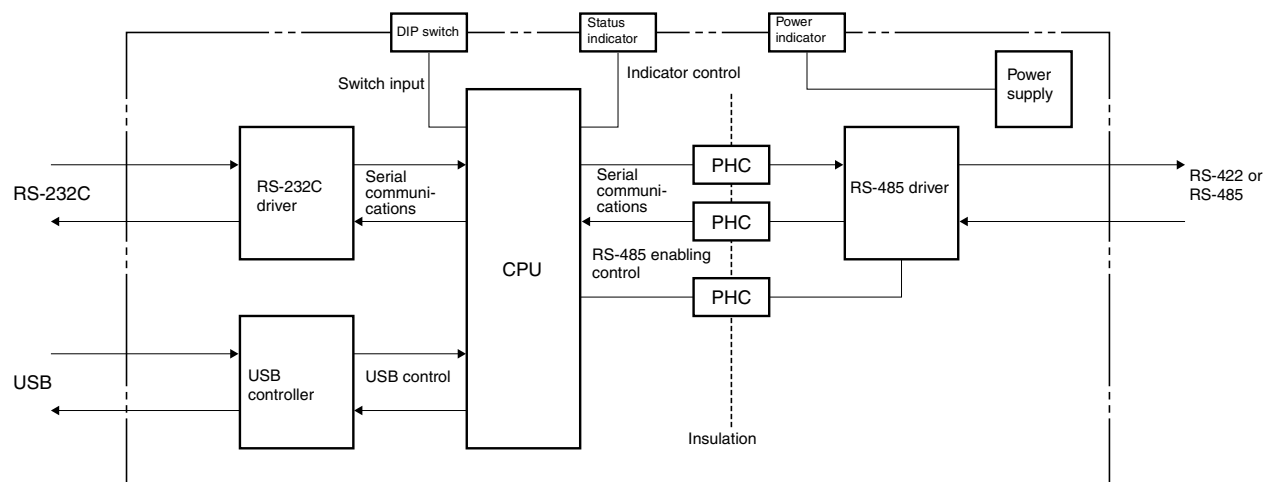
### ■ Terminal Specifications

Be sure to check the input and output specifications for the signal pins of connected devices before connecting the terminals.

Function	Terminal number	Name	Signal direction	Explanation
For connecting the operating power supply	1 and 4	PWR	---	The input power supply specifications vary with the model. A 100 to 240-VAC model and a 24-VAC/VDC (no-polarity) model are available.
Connection terminals for RS-232C communications with master device (DIP switch pin 8: OFF)	3	SG	---	Connect to signal ground.
	5	SD	Input	Receives data from SD of the master device.
	6	RD	Output	Sends data to RD of the master device.
Used for RS-485 communications with slave device (DIP switch pin 9: OFF)	8	RDA(-)	Input/output	SD and RD for RS-485 (cold side) Terminals 8 and 9 are connected internally when pin 9 of the DIP switch is set to OFF.
	9	SDA(-)		
	11	RDB(+)	Input/output	SD and RD for RS-485 (hot side) Terminals 11 and 12 are connected internally when pin 9 of the DIP switch is set to OFF.
	12	SDB(+)		
Used for RS-422 communications with slave device (DIP switch pin 9: ON)	7	SG	---	Connect to signal ground.
	8	RDA(-)	Input	Receives RS-422 data and outputs it to the master side.
	9	SDA(-)	Output	Converts data received via RS-232C from the master device to RS-422 data and outputs the data.
	11	RDB(+)	Input	Receives RS-422 data and outputs it to the master side.
	12	SDB(+)	Output	Converts data received via RS-232C from the master device to RS-422 data and outputs the data.

**Note:** Terminals 2 and 10 are not used.

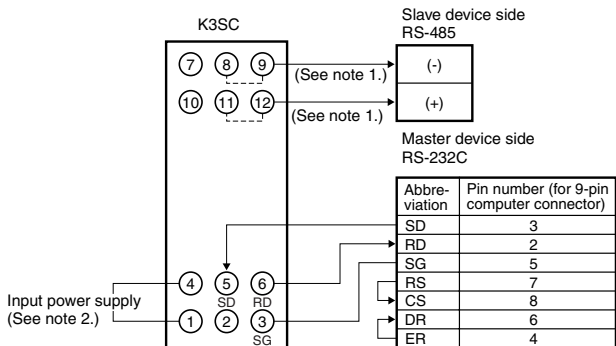
### ■ Internal Configuration (Block Diagram)



# Installation

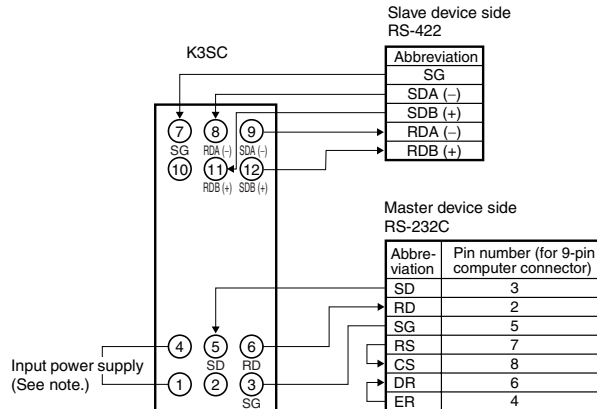
## External Connections

### RS-485 Connection



- Note:**
1. If RS-485 is selected as the communications method (i.e., pin 9 of the DIP switch is set to OFF), terminals 8 and 9, and terminals 11 and 12 are connected internally.
  2. Either a 100 to 240-VAC or 24-VAC/VDC (no polarity) input power supply is used.

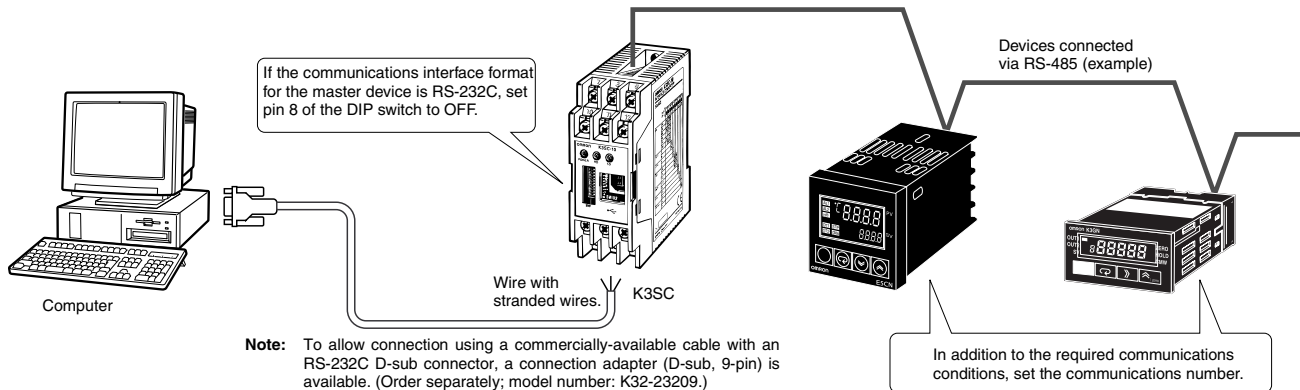
### RS-422 Connection



- Note:** Either a 100 to 240-VAC or 24-VAC/VDC (no polarity) input power supply is used.

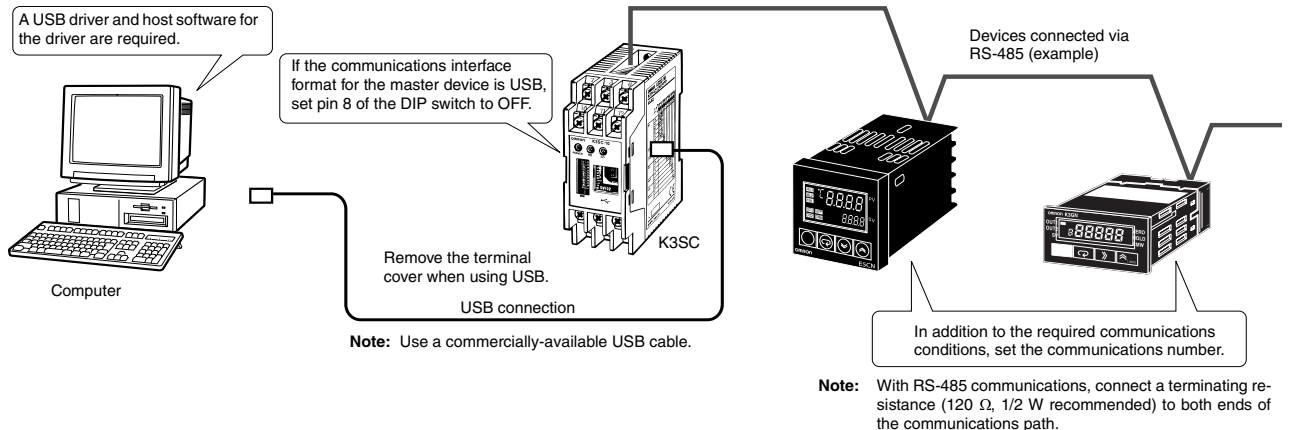
### Connection to an RS-232C Master Device

First set the same communications conditions (baud rate, stop bits, data length, and parity) for the master device, the Interface Converter, and slave devices.



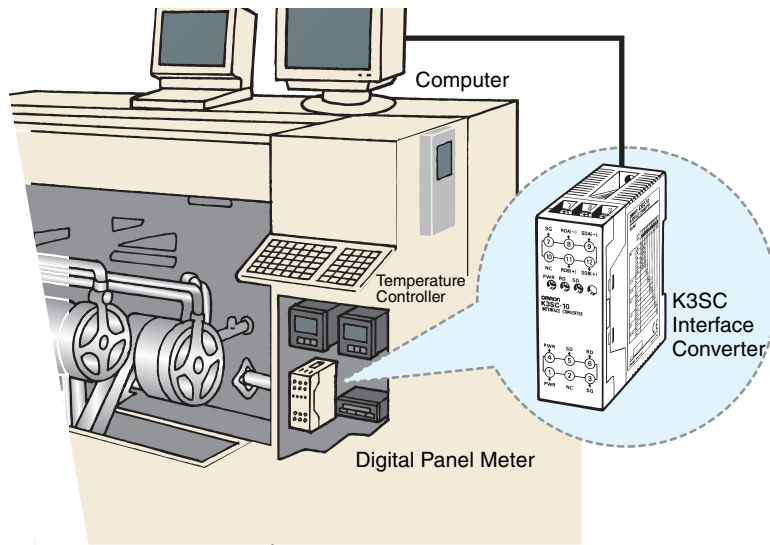
### Connection to a USB Master Device

First set the same communications conditions (baud rate, stop bits, data length, and parity) for the Interface Converter and slave devices.

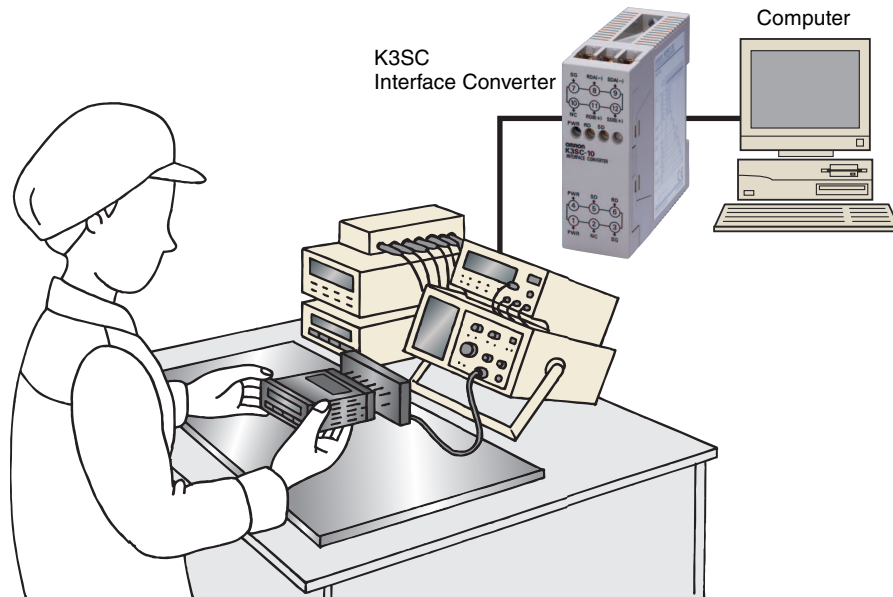


# Applications

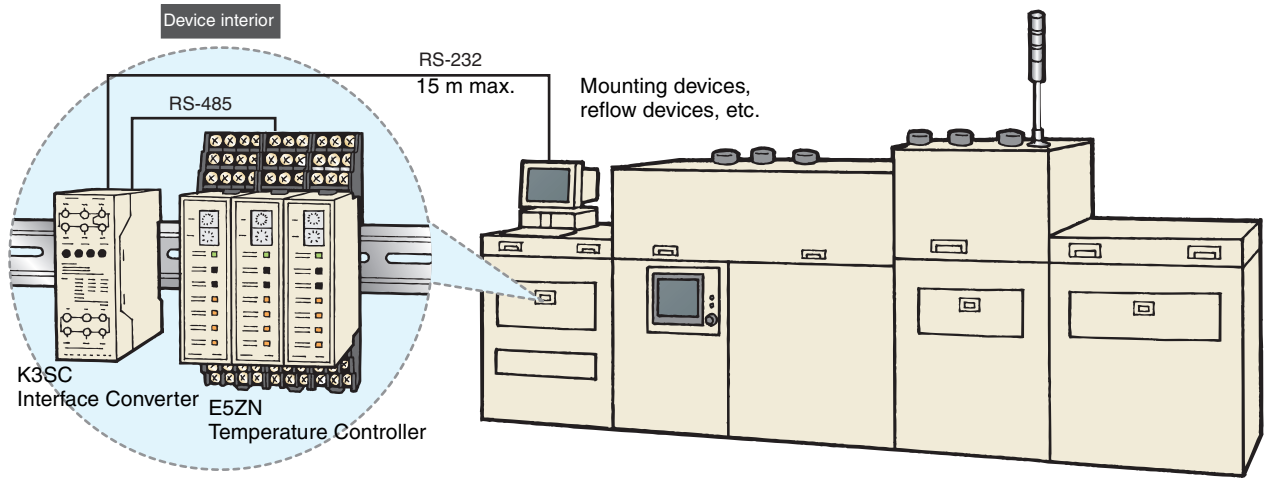
## Monitoring and Maintenance of Installations and Equipment



## Inspections and Debugging for Communications Equipment

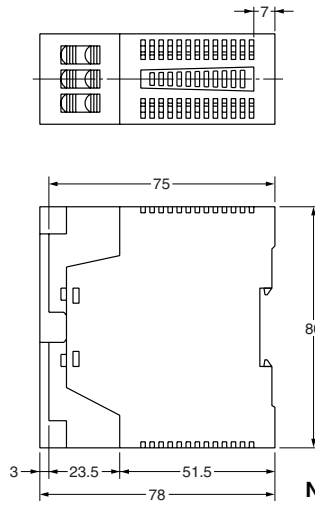
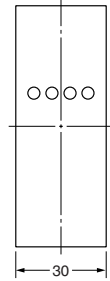
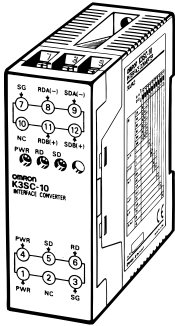


### Installation Temperature Control with a Computer

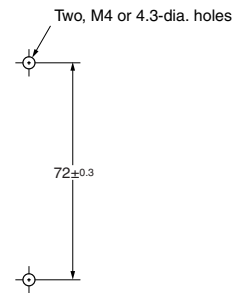


## Dimensions

### K3SC-10



#### Mounting Hole Dimensions (For Direct Mounting)



**Note:** DIN track mounting is also possible.

## Precautions

### ⚠ Caution

Do not touch any of the terminals while power is being supplied. Doing so may result in electric shock.

### ⚠ Caution

Do not allow bits of metal or wire cuttings to enter the interior of the product as this may result in malfunction, fire, or electric shock.

### ⚠ Caution

Do not attempt to disassemble, repair, or modify the product. Any attempt to do so may result in malfunction, fire, or electric shock.

### ⚠ Caution

Tighten the terminal screws to the specified torque. Loose screws may result in burning or malfunction. The recommended tightening torque is 0.78 N·m.

### General Precautions

Do not mount the product in the following places:

- Locations subject to shock or vibration
- Outdoor locations or locations subject to direct sunlight, wind, or rain.

- Locations subject to temperatures or humidity outside the specified ranges
- Locations subject to condensation or icing
- Locations subject to large amounts of dust
- Locations subject to flammable gases or objects
- Locations subject to corrosive gases (in particular sulfide or ammonia gases)

Be sure to check power supply specifications, terminal numbers, and polarities before performing wiring.

Turn OFF the power supply before performing installation or wiring.

Turn OFF the power supply before removing the terminal cover.

Do not connect anything to unused terminals.

### Correct Use

Perform wiring with crimp terminals that are suitable for M3.5 screws.

Install the product as far away as possible from devices that generate strong high-frequency noise (e.g., high-frequency welders) or surges.

Do not pull on the USB cable. Doing so may cause the cable to come loose.

**ALL DIMENSIONS SHOWN ARE IN MILLIMETERS.**

To convert millimeters into inches, multiply by 0.03937. To convert grams into ounces, multiply by 0.03527.

Cat. No. N104-E1-01A **In the interest of product improvement, specifications are subject to change without notice.**

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