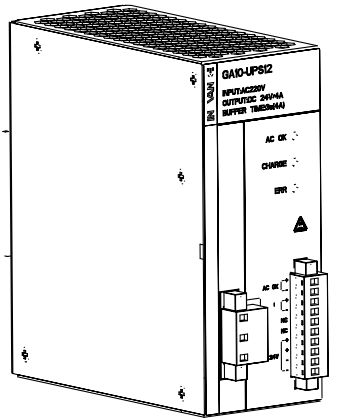
GA10-UPS12 Uninterruptible Power Supply (AC/DC 24 V) User Guide



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Preface

Introduction

The product serves as a DC uninterruptible power supply to provide continuous power supply upon short-term power-off for AC series controllers, AP series controllers, and other equipment that cannot be powered off without advanced plans. When the AC input is powered off, the product can provide short-term uninterrupted power supply through backup energy storage. This can not only protect the controller, but also can provide protection for data backup and shutdown to prevent data loss or uncontrolled actions. The product features compact size, high reliability, low ripple, and low interference.

The product adopts the DIN standard guide rail installation method, and the lifetime of the energy storage medium is more than 10 years. The input and output are designed with overvoltage, overcurrent, and short circuit protection, as well as anti-reverse connection and EMC protection. The product has multiple status signal outputs and adopts dry contacts, which support two wiring applications including sink output and source output. The product also carries indicators to indicate input status, charging and discharging status, and faults. The screw-type power supply and I/O terminals are pluggable, which are convenient for maintenance.

Audience

This guide is aimed at electrical engineers, software engineers, and system engineers.

First-time Use

For the users who use this product for the first time, read the manual carefully. If you have any problem concerning the functions and performance, contact technical support personnel of Inovance to ensure correct use.

Revision History

Date	Version	Revision
May 2021	A01	Updated the product screenprint.
December 2020	A00	First release

Safety Instructions

■ Safety Precautions

1. Before installing, using, and maintaining this product, read the safety information and precautions thoroughly, and comply with them during operations.
2. To ensure the safety of humans and products, follow the signs on the product and all the safety instructions in this user guide.
3. The "CAUTION", "WARNING", and "DANGER" signs are only supplements to the safety instructions.
4. Use this product according to the designated environment requirements. Damage caused by improper usage is not covered by warranty.
5. Inovance shall take no responsibility for any personal injuries or property damages caused by improper usage.

■ Safety Levels and Definitions

DANGER : The "DANGER" sign indicates that failure to comply with the notice will result in severe personal injuries or even death.

WARNING : The "WARNING" sign indicates that failure to comply with the notice may result in severe personal injuries or even death.

CAUTION : The "CAUTION" sign indicates that failure to comply with the notice may result in minor or moderate personal injuries or damage to the equipment.

Please keep this guide well so that it can be read when necessary and forward this guide to the end user.

During Control System Design
WARNING ◆ Install the interlock circuits, and other circuits such as emergency stop, conventional protection, forward and reverse running outside of this product; install devices used to prevent equipment damage (such as up, down, and reciprocating motion limit) outside of this product. ◆ Install the fault protection circuit outside of this product to prevent unsafe accidental mechanical movement. If an error occurs in the input/output control area that this product cannot detect, accidental movement may occur in the area. ◆ Design a user program to ensure the safety of the user and the system when the product fails in display, control, communication, power supply, etc. ◆ During use, keep the charged objects away from the metal shell of the product.

CAUTION

- Do not use this product as a warning device that may cause serious personal injuries, equipment damages, or system shutdown. Use independent hardware and/or mechanical interlocks to design important alarm indications and the control/triggering equipment.

During Installation

WARNING

- Install this product correctly, and use this product indoors. Ensure that the usage environment meets the requirements described in the Basic Parameters section.
- Do not install the product in the environment with strong magnetic field, direct sunlight, high temperature, flammable gas, steam, or dust; otherwise, explosions may be caused.
- Do not use this product in the environment where the temperature may change drastically or the humidity is high; otherwise, condensation inside the device may be caused to damage the device.
- Make sure that all cable connectors are securely connected to the product. If the connection is loose, wrong input or output signals may be generated.

CAUTION

- Install this product within the storage temperature range recommended in this guide; otherwise, the LCD screen may fail.

During Wiring

DANGER

- Before installation, wiring, and other operations, cut off all power supplies. Never wire cables and plug in and out of the connectors in a live state. Otherwise, electric shock or circuit damage may be caused.
- Connect the DC power supply to the dedicated terminals as described in this guide.
- During screw hole processing and wiring, avoid malfunctions, electronic component damages, or fires.
- After the wiring is completed, check carefully to ensure that the working voltage and the position of the wiring terminal are correct. Otherwise, a fire or an accident may be caused.

CAUTION

- To avoid electric shock, cut off the power supply of the product before connecting to the product.

During Operation and Maintenance

CAUTION

- Lithium batteries, LCD screens, and capacitors may contain ingredients that are harmful to health and environment. When disposing of the product, treat it as industrial waste.

☞ Safety recommendations

- Determine the location to install the on-site manual devices or devices with backup functions in the position where the operator directly touches the mechanical parts, such as loading and unloading mechanical tools, or the position where the machine runs automatically. The devices, which can start or interrupt automatic operations of the system, must be independent of the programmable controller.

Disposal

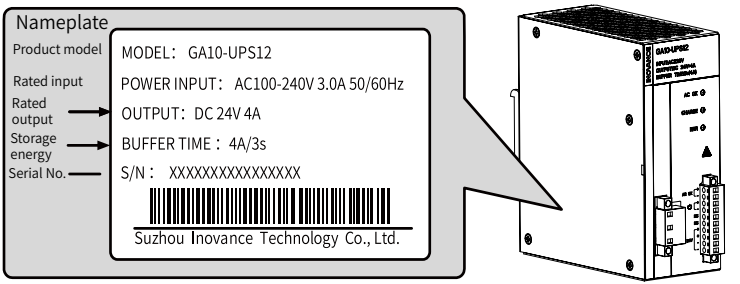
CAUTION

- Treat the scrapped product as industrial waste. Dispose of the battery according to local laws and regulations.

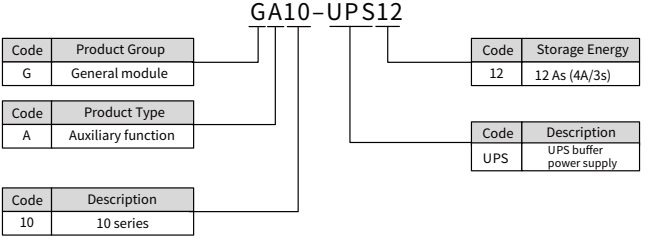
1 Product Information

1.1 Appearance and Model

■ Appearance



■ Model



1.2 Basic Parameters

Item	Description
AC Input	
Input voltage	220 VAC (100 VAC to 240 VAC)
AC frequency	50 Hz to 60 Hz
Maximum input current	3 A/110 VAC; 1.5 A/220 VAC
Input surge current	< 30 A/110 VAC; < 60 A/220 VAC
DC output	

Item		Description
Rated output voltage		24 VDC
Output voltage ripple		< 80 mVp-p
Load regulation rate		< ±2%
Source regulation rate		< ±0.5%
Rated output current		4.0 A
Output short circuit protection		Output is automatically cut off upon short circuit, and output resumes after short circuit is rectified.
Output overvoltage protection		When the output voltage is higher than 30 V, the AC and DC power supplies are disabled and locked. Cut off the power supply and restart the product.
AC/DC efficiency		> 85% (220 VAC with full load) > 83% (110 VAC with full load)
UPS Output		
Energy storage medium		Capacitor
Storage capacity		> 12 As. The holding time upon power-off is longer than 3s for 24 V/4 A output.
Maximum backup output time		10s
Capacitor service life		> 10 years/500000 times
Charge time		< 40s
Rated output current		4.0 A
State Output		
Signal interface		Opto-coupler isolation
Signal specification		5-24 VDC, 30 mA
State output signal	Input detection (AC OK)	When the AC input is powered on, the dry contact is energized. When the AC input is powered off, the dry contact is disconnected.
	Startup signal ⏻	When the AC input is powered on, a 500 ms pulse is energized and input to simulate the power-on signal. When the power supply is turned on and off quickly (the power-off time is less than 10s), the controller cannot detect the power-on state; therefore, the product cannot be turned on. In this case, the simulated power-on signal can be used to turn on the product.
Indicators		
AC OK	Input detection	Green, steady on: The input power supply is normal. Green, steady off: The input power supply fails.

Item		Description
CHARGE	Charging/ discharging indication	Green, flashing once every 2s: Charging Green, steady on: Charging is completed. Green, flashing once every 0.5s: The input power supply fails. The UPS provides the power supply (3s/4 A).
ERR	UPS fault	Red, steady on: The UPS is faulty due to output short circuit, overload, or input overvoltage.
Safety		
Insulation voltage withstanding	Input-output	3000 VAC (excluding the discharge tube and Y capacitor, 20 mA, 1 min)
	Input-enclosure	2000 VAC (excluding the discharge tube and Y capacitor, 20 mA, 1min)
	Output-enclosure	500 VAC (20 mA, 1 min)
Insulation impedance (input-output, input/output-enclosure)		> 100 MΩ (500 VDC/25°C /70% RH)
Standard compliance		CE
EMC		
Conducted emission		EN 55022 Class A
Immunity		EN 61000-6-2,3,4
Environment		
Working temperature		-10°C to +55°C
Storage temperature		-40°C to +70°C
Overtemperature protection		Protection upon 90°C and automatic restoration upon 75°C
Working humidity		5% to 95%
Pollution degree		2
Mechanical Parameters		
Mounting mode		DIN guide rail mounting
D x W x H		121 x 55 x 136 (excluding the rail)
Weight		< 1000 g

2 Mounting

2.1 Mounting Dimensions

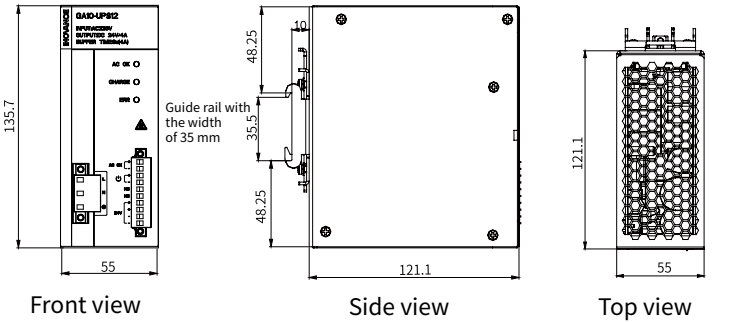
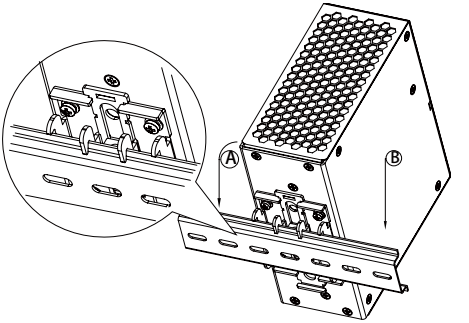


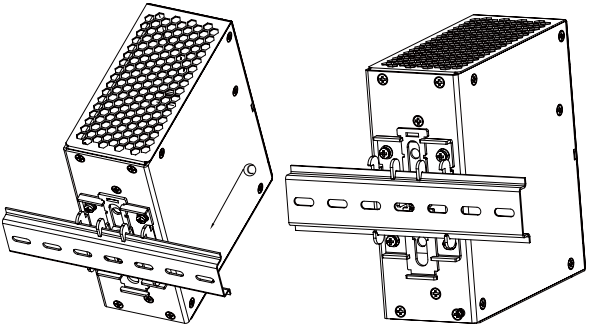
Figure 2-1 Mounting dimensions (mm)

2.2 Mounting Mode

1) Hang the upper fixing jaws of the product to the upper part of the DIN guide rail by following direction A. Then, hard press the product by following direction B until the middle and side fixing jaws are aligned.

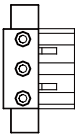
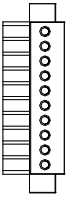


2) Hard press the product by following direction C until the product is completely embedded on the guide rail.

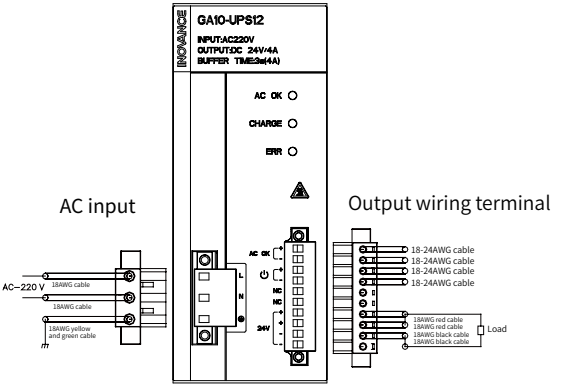


3 Electrical Design Reference

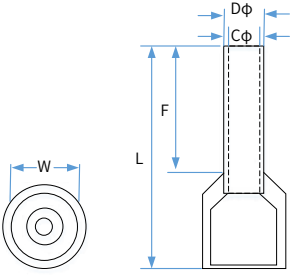
■ Terminal description

Diagram	Signal Type	Cable	E Series Tube-Type Wiring Terminal Specification
	AC input terminal	18AWG	E1008
	DC output terminal (24 V output)	18AWG	E1008
	DC output terminal (signal output)	18AWG to 24AWG	E1008/E7508/E0508

■ Wiring diagram

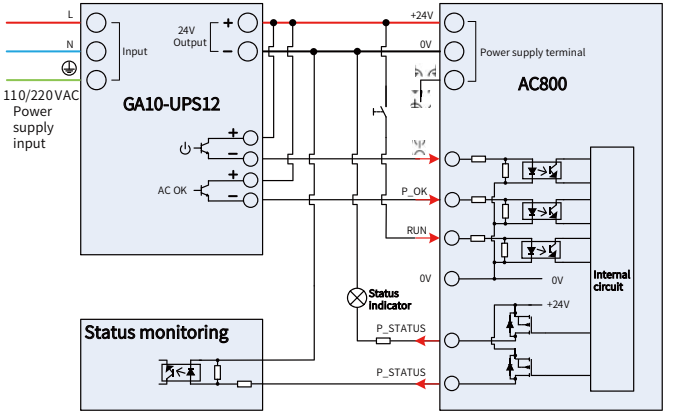


■ Tube-type wiring terminal specification



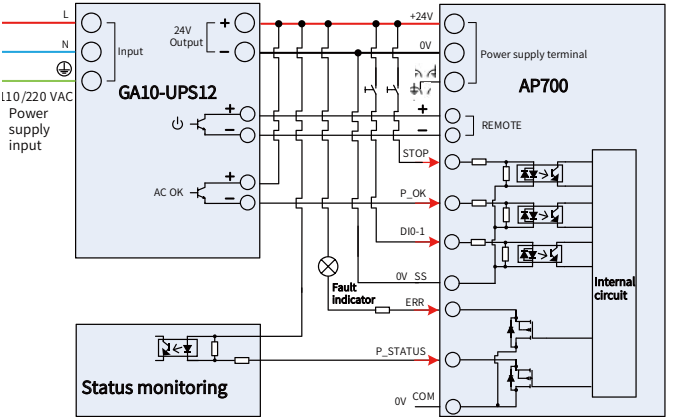
Model	Dimension						Cross Sectional Area (mm^2)
	F	L	W	Dϕ	Cϕ	AWG	
E0506	6.0	12.0	2.6	1.3	1.0	#22	0.5
E0508	8.0	14.0					
E0510	10.0	16.0					
E7506	6.0	12.4	2.8	1.5	1.2	#20	0.75
E7508	8.0	14.6					
E7510	10.0	16.4					
E7512	12.0	18.4					
E1006	6.0	12.4	3.0	1.7	1.4	#18	1.0
E1008	8.0	14.6					
E1010	10.0	16.4					
E1012	12.0	18.4					

■ Connecting to the AC800 series controller



The startup signal and power-off detection signal AC OK terminals must be connected according to the preceding figure. For other state signal terminals, connect them as required.

■ Connecting to the AP700 series controller



The startup signal ⏻ and power-off detection signal AC_OK terminals must be connected according to the preceding figure. For other state signal terminals, connect them as required.

INOVANCE Warranty Agreement

Inovance provides an 18-month free warranty (subject to information indicated by the barcode on the product or the contract terms) to the equipment itself from the date of manufacturing for the failure or damage under normal use conditions.

Within the warranty period, maintenance will be charged for the damage caused by the following reasons:

1) Improper use or uninstallation/repair/modification without prior permission
2) Fire, flood, abnormal voltage, natural disasters, and secondary disasters
3) Hardware damage caused by dropping or transportation after procurement
4) Operations not following the user instructions
5) Damage out of the equipment (for example, external device factors)

If there is any problem during the service, contact Inovance' s agent or Inovance directly.

The maintenance fee is charged according to the latest Maintenance Price List of Inovance.

If there is any problem during the service, contact us or our agent directly.

You are assumed to agree on terms and conditions of this warranty agreement by purchase of the product. Inovance reserves the rights for explanation of this agreement.