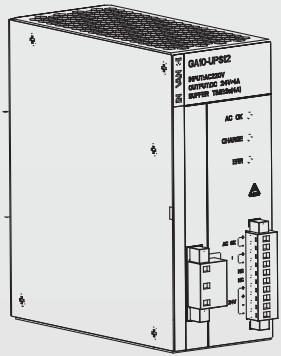
INOVANCE

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19011672A02

GA10-UPS12
Uninterruptible Power Supply
User Guide

Suzhou Inovance Technology Co., Ltd.

Add.: No. 52, Tian E Dang Road, Wuzhong District, 215104,
Suzhou City, Jiangsu Province, P.R. China
Tel: (0512) 6637 6666 Fax: (0512) 6285 6720
www.inovance.com

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 who want to use or understand UPS modules and PLC series products of Inovance.

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
April 2026	A02	Updated the wiring instructions for AC800 series controllers.

August 2022	A01	Updated the title, preface, and safety instructions. Updated the product screenprint.
December 2020	A00	First release

Safety Instructions

■ Safety Precautions

1. Read and comply with the safety instructions during installation, operation, and maintenance of the product.
2. To ensure the safety of humans and the products, follow the marks on the products and all the safety instructions in this document.
3. The "CAUTION", "WARNING", and "DANGER" are only supplements to the safety instructions.
4. Use this product according to the designated environment requirements. Damage caused by improper use is not covered by warranty.
5. Inovance shall take no responsibility for any personal injury or property damage caused by improper use.

■ Safety Levels and Definitions

DANGER The "DANGER" sign indicates that failure to comply with the notice will result in death or serious injury.

WARNING The "WARNING" sign indicates that failure to comply with the notice could result in death or serious injury.

CAUTION The "CAUTION" sign indicates that failure to comply with the notice could result in minor or moderate injury, or equipment damage.

Unpacking
WARNING ◆ Do not install the product in case of any damage, rust, or signs of use on the product or accessories upon unpacking. ◆ Do not install the product in case of water seepage into the product or missing or damaged components upon unpacking. ◆ Do not install the product in the case of any discrepancy between the product you received and the product name on the packing list.

CAUTION

- Check whether the packing is intact and whether there is damage, water seepage, dampness, and deformation before unpacking.
- Unpack the package by following the unpacking sequence. Do not strike the package violently.
- Check for damage, rust, or dents on the surfaces of the product and accessories upon unpacking.
- After unpacking, check the contents against the packing list to ensure that the equipment and accessories are in the correct quantities, and that all documentation is complete.

Storage and transportation

WARNING

- Large or heavy equipment must be handled by qualified professionals using specialized hoisting equipment. Failure to comply could result in personal injury or equipment damage.
- Before hoisting the equipment, ensure that components such as the front cover and terminal blocks are secured firmly with screws. Loosely-connected components may fall off and result in personal injury or equipment damage.
- Never stand or stay under the equipment while it is being hoisted.
- When hoisting the equipment with a steel rope, ensure the equipment is hoisted at a constant speed without suffering from vibration or shock. Do not turn the equipment over or let the equipment stay hanging in the air. Failure to comply could result in personal injury or equipment damage.

CAUTION

- Handle the equipment with care during transportation and mind your step to prevent personal injury or equipment damage.
- When carrying the equipment with bare hands, hold the equipment casing firmly with care to prevent parts from falling. Failure to comply could result in personal injury.
- Store and transport the equipment based on the storage and transportation requirements. Failure to comply could result in equipment damage.
- Do not store or transport the equipment in locations where the equipment may be exposed to splashing water or rain, direct sunlight, strong electric field, strong magnetic field, or strong vibration.
- Store the equipment for up to three months. Take stricter protective measures and carry out the necessary inspections for a longer storage time.
- Pack the equipment securely and properly before transportation. Use a fully enclosed container for long-distance transportation.
- Never transport the equipment with other devices or items that could impact or cause harm to the equipment.

Design

DANGER

- Provide a safety circuit and include an error handling program in the software to ensure that the product remains in a safe state in case of an external power failure or an internal fault.
- If a sustained overcurrent occurs due to overload or load short circuit, the product may smoke or catch fire. An external safety device (such as a fuse or circuit breaker) must be installed.

WARNING

- Any damaged output components such as relays or transistors in this product may result in uncontrolled output that stays in a constant ON or OFF state.
- The product design must comply with the overvoltage category requirements specified in the Environmental Specifications. The system-level power supply must have a lightning protection device, assuring that overvoltage due to lightning shock is not applied to the controller's terminals such as power supply input terminals, signal input terminals, and control output terminals, to prevent damage to the product.
- Ensure that appropriate actions have been taken to prevent product malfunction caused by a communication fault between the product and related devices. Failure to comply could cause personal injury or equipment damage.

CAUTION

- Switches that could cause personal injury or equipment damage must not be configured on the touch screen. Use independent switches for performing critical operations. Failure to comply could result in accidents caused by wrong outputs or faults.

Installation

DANGER

- This equipment must be operated only by trained and qualified electrical personnel. Nonprofessionals must not operate this equipment.

WARNING

- Read through the guide and safety instructions before installation.
- Do not install this equipment in places with strong electric or magnetic field.
- Before installation, check that the mechanical strength of the installation site can bear the weight of the equipment. Failure to comply may result in mechanical hazards.
- Before installation, ensure that the installation site meets the required environmental conditions. Failure to comply could result in equipment damage.
- Do not wear loose clothes or accessories during installation. Failure to comply could result in electric shock.
- When installing the equipment in an enclosed environment (such as a cabinet or case), use cooling devices (such as fans or air conditioners) to cool the space and meet the installation environment requirements. Failure to do so could result in equipment overheating or fire.
- Do not modify this equipment.
- Never loosen the fixing bolts on components and modules, or any bolts marked in red.
- This equipment must be installed inside an indoor cabinet or terminal equipment. The cabinet or terminal equipment itself must be provided with the necessary protective enclosures, such as a fireproof enclosure, an electrical protective enclosure, and a mechanical protective enclosure. The IP rating of these enclosures must comply with the relevant IEC standards, and applicable local laws and regulations.
- Before installing devices with strong electromagnetic interference, such as a transformer, install a shielding device for this equipment to prevent malfunction.
- Install the equipment onto a non-combustible object such as metal. Keep the equipment away from combustible objects. Failure to comply could result in fire.
- For products not supporting hot swapping, disconnect all external power supplies of the system before installing/removing the product. Failure to comply could result in electric shock, product failure, or malfunction.

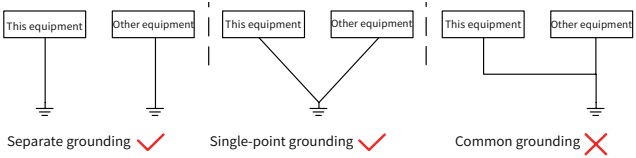
CAUTION

- Cover the top of the equipment with a piece of cloth or paper during installation. This is to prevent unwanted objects such as metal chippings, oil, and water from falling into the product and causing faults. After installation, remove the cloth or paper for effective ventilation and cooling.
- During installation, ensure the equipment is connected to the respective connector securely and hook the equipment firmly. Improper installation may cause the equipment malfunction, failure, or loosening.

Wiring

DANGER

- This equipment must be operated only by trained and qualified electrical personnel. Non-professionals must not operate this equipment.
- Before wiring, disconnect all the power supplies of the equipment. Wait for at least the time designated on the warning label before further operations because residual voltage still exists after power-off. After waiting for the designated time, measure the DC voltage in the main circuit to ensure the DC voltage is within the safe voltage range. Failure to comply could result in electric shock.
- Do not perform wiring, remove the equipment cover, or touch the circuit board with power ON. Failure to comply could result in electric shock.
- Ensure that the equipment is grounded properly. Failure to comply could result in electric shock. Ground the equipment separately or to a single point. Common grounding must not be used.



- Insulate the cable terminals properly to ensure the insulation distance between cables will not be shortened after cables are connected to the terminal block. Failure to comply could result in electric shock or equipment damage.
- Install the terminal cover attached to the equipment before power-on or operation after wiring is completed. Failure to comply could result in electric shock.

WARNING

- Never connect the power cable to output terminals of the equipment. Failure to comply could cause equipment damage or even fire.
- Cables used for wiring must comply with the requirements for the cross-sectional area and shielding. The shielding layer of the shielded cable must be reliably grounded at one end.
- Tighten the terminal screws with the torque specified in the user guide. Insufficient or excessive torque may cause overheating and damage of the joint, which could result in fire.
- After wiring is done, ensure that all cables are connected properly and no screws, washers or exposed cables are left inside the equipment. Failure to comply could result in electric shock or equipment damage.

CAUTION

- Follow the proper electrostatic discharge (ESD) procedure, and wear an anti-static wrist strap to perform wiring. Failure to comply could damage the equipment or its internal circuits.
- Use shielded twisted pairs for the control circuit. Connect the shield to the grounding terminal of the equipment for grounding purpose. Failure to comply will result in equipment malfunction.

Power-on

DANGER

- This equipment must be operated only by trained and qualified electrical personnel. Non-professionals must not operate this equipment.
- Before power-on, ensure that the equipment is installed and wired properly.
- Ensure that the power supply meets equipment requirements before power-on to prevent equipment damage or fire accident.
- Do not open the cabinet door or protective cover of the product, touch any wiring terminal of the product, or remove any components or parts while the product is powered on. Failure to comply could result in personal injury or even death.

WARNING

- Perform a trial run after wiring to ensure the equipment operates safely. Failure to comply could result in personal injury or equipment damage.

Operation

DANGER

- The equipment must be operated only by professionals. Failure to comply can result in injury or death.
- Do not touch any connecting terminals or disassemble any unit or component of the equipment during operation. Failure to comply could result in electric shock.

WARNING

- Do not touch the enclosure, fan, or resistor with bare hands. Failure to comply could result in burns.
- Prevent metal or other objects from falling into the equipment during operation. Failure to comply could result in fire or equipment damage.
- During operation, do not bring live parts into contact with the metal enclosure of the product. Failure to comply could result in fire or product damage.

CAUTION

- Operate the equipment within the specified environmental conditions. Failure to comply could result in equipment failure or damage.
- Touch the HMI panel with hands only. Failure to comply could cause panel damage, which is out of the warranty range.

Safety recommendations

- In positions where the operator directly touches the mechanical components, for example, where a mechanical device is loaded/unloaded, or where a machine runs automatically, manually-operated devices or other alternative means must be carefully designed so that they are independent of the product to start or stop the automatic operation of the system.
- If you need to modify the program while the system is running, use the lock function or other protective measures. Ensure that only authorized personnel can make the necessary modifications.

Battery usage

WARNING

- Do not use batteries that do not meet the product requirements. Failure to comply could result in death, personal injury, explosion, or fire.
- Do not throw batteries into a fire or heat oven. Do not crush or cut the battery. Failure to comply could result in death, personal injury, explosion, or fire.
- Do not expose the battery to extremely high temperatures. Failure to comply could result in death, personal injury, explosion, or fire.
- Do not swallow batteries. Failure to comply could result in chemical burns.
- Seek for medical treatment immediately if a button battery is swallowed by accident, because this may cause severe internal burns within two hours and even death.

CAUTION

- Keep batteries out of reach of children.
- If the battery compartment is not securely closed, stop using the product immediately and keep it out of reach of children.

Maintenance

DANGER

- Maintenance must be performed only by trained and qualified electrical personnel.
- Do not maintain the equipment with power ON. Failure to comply could result in electric shock.
- Before maintenance, disconnect all the power supplies of the equipment and wait for at least the time specified on the warning label.
- Disconnect all external power supplies of the system before cleaning the equipment or re-tightening screws on the terminal block or screws of the connectors. Failure to comply could result in electric shock.
- Disconnect all external power supplies of the system before removing or installing the product, or connecting or disconnecting cables. Failure to comply could result in electric shock or malfunction.

WARNING

- Perform routine and periodic inspection and maintenance on the equipment according to maintenance requirements and keep a maintenance record.

Repair

DANGER

- Repair must be performed only by trained and qualified electrical personnel.
- Do not repair the equipment with power ON. Failure to comply could result in electric shock.
- Before inspection or repair, disconnect all the power supplies of the equipment and wait for at least the time specified on the warning label.

WARNING

- Submit a request for repair based on the warranty agreement.
- When the fuse is blown or the circuit breaker or earth leakage circuit breaker (ELCB) trips, wait for at least the time designated on the equipment warning label before power-on or further operations. Failure to comply could result in equipment damage, personal injury, or death.
- Troubleshooting and repair of a faulty or damaged equipment must be performed by professionals based on the repair instructions, with the repair records kept properly.
- Replace quick-wear parts of the equipment according to the replacement instructions.
- Do not use damaged equipment. Failure to comply could result in death, personal injury, or severe equipment damage.
- Recheck the wiring and reset the parameters after equipment replacement.

Disposal
WARNING ◆ Dispose of the retired equipment in accordance with applicable national regulations and standards. Failure to comply could result in property damage, personal injury, or death. ◆ Recycle retired equipment in accordance with industry waste disposal standards to avoid environmental pollution. ◆ Treat the retired equipment as industrial waste. Dispose of used batteries according to local laws and regulations.

Safety Label

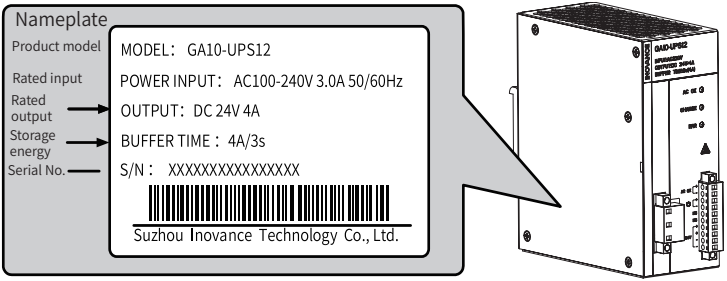
To ensure safe operation, comply with safety labels on the equipment and do not damage or remove the labels. The following table describes the meanings of the safety labels.

Safety label	Description
	◆ Before using the equipment, read the guide and safety precautions carefully. Failure to comply could result in personal injury, death, or equipment damage. ◆ Do not touch the terminals or remove the cover with power-on or within 10 min after power-off. Failure to comply could result in electric shock. ◆ The surface of the running equipment may become very hot. Do not touch these hot areas. Failure to comply may cause burns.

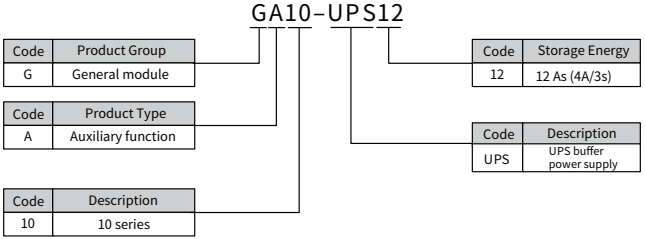
1 Product Information

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 VDC to 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.
	Power-on 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℃ /70% RH)
Standard compliance		CE
EMC		
Conducted emission		EN 55022 Class A
Immunity		EN 61000-6-2,3,4
Environment		
Working temperature		-10℃ to +55℃
Storage temperature		-40℃ to +70℃
Overtemperature protection		Protection upon 90℃ and automatic restoration upon 75℃
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

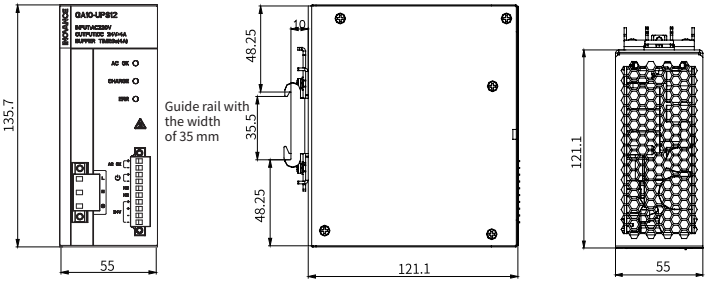
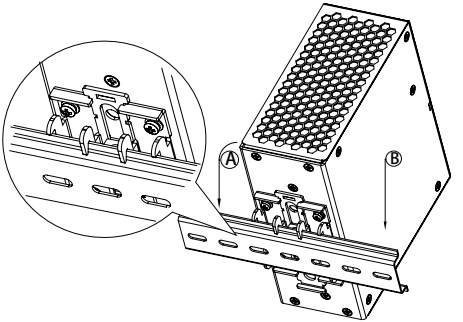


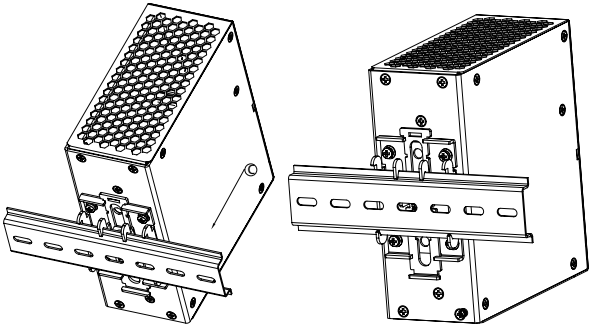
Figure 2-1 Mounting dimensions (mm)

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.

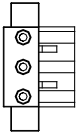
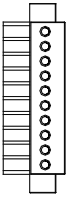


2) Hard press the product by following direction C until the product is completely embedded on the guide rail.

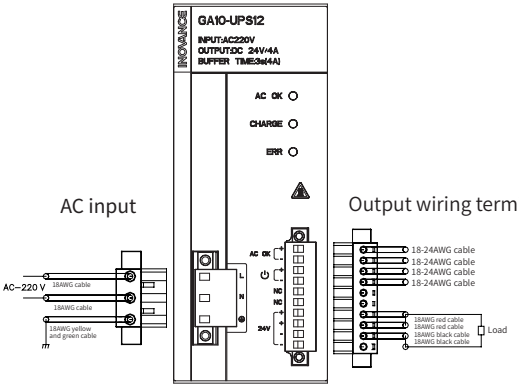


3 Electrical Design Reference

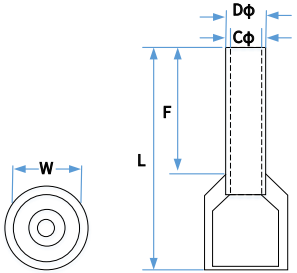
■ Terminal description

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



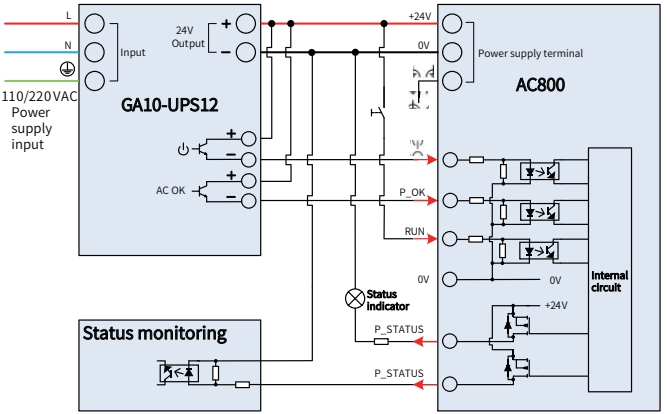
Model	Dimension						Cross Sectional Area (mm²)
	F	L	W	Dϕ	Cϕ	AWG	
E0506	6.0	12.0	2.6	1.3	1.0	#22	0.5
E0508	8.0	14.0					
E0510	10.0	16.0					
E7506	6.0	12.4	2.8	1.5	1.2	#20	0.75
E7508	8.0	14.6					
E7510	10.0	16.4					
E7512	12.0	18.4					

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

Wiring instructions for power-off data retention

If the AC800 controller needs to support the power-off data retention function, the matching GA10-UPS12 UPS power supply must be purchased and installed. The wiring of the control signals between the UPS and the AC800 controller is shown in the figure below.



- Power-off detection signal (P_OK): When the P_OK terminal of the AC800 controller detects an external power loss, this signal changes from ON to OFF, and the AC800 controller saves data and shuts down automatically.
- The power-on signal ⏻ : When the corresponding terminal ⏻ of the AC800 controller detects an external 24 V power supply, this signal changes from OFF to ON, and the controller powers on.

CAUTION

- To ensure reliable data retention during a power failure, the following two points must be strictly observed:

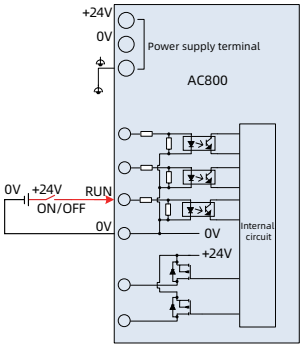
  ■ The GA10-UPS12 UPS must be dedicated only to the AC800 controller. Do not connect any other loads.

  ■ The power-off detection signal (P_OK), power-on signal (⏻), and 0 V of the AC800 controller must be wired correctly.

- The interval between the power cycles of the AC800 controller must be greater than 10 seconds. An interval shorter than 10 seconds may prevent the system from starting automatically. In this case, press the power-on button manually.

Wiring instructions for remote control RUN/STOP

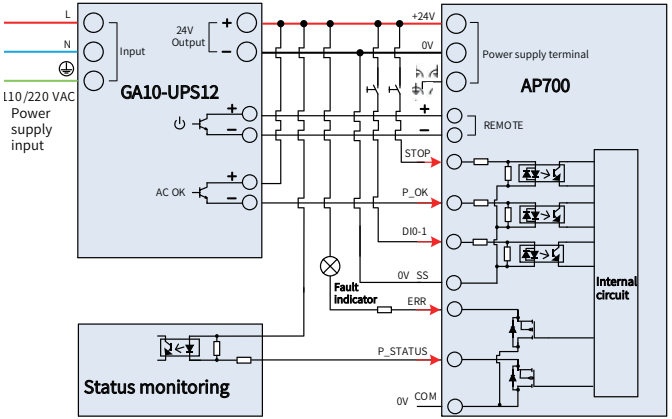
If the RUN/STOP status of the AC800 controller needs to be controlled by an external signal, the matching GA10-UPS12 UPS power supply must be purchased and installed. The wiring of the control signals between the UPS and the AC800 controller is shown in the figure below.



The remote control logic is shown in the table below:

Switch/Relay status	AC800 controller status
ON	STOP
OFF	RUN

■ Connecting to the AP700 series controller



The power-on signal ⏻ and the power-off detection signal (AC_OK) must be wired as shown in the figure. For other status signals, wire them according to your specific requirements (See the diagram).

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.