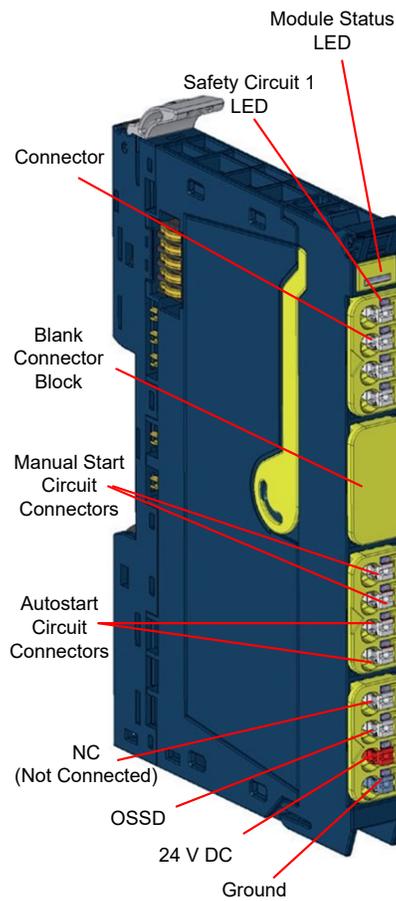


# PACSystems™ RSTi-EP

## SAFE FEED INPUT MODULES

(EP-1901, EP-1902, EP-1922)



## Warnings and Caution Notes as Used in this Publication

### **WARNING**

Warning notices are used in this publication to emphasize that hazardous voltages, currents, temperatures, or other conditions that could cause personal injury exist in this equipment or may be associated with its use.

In situations where inattention could cause either personal injury or damage to equipment, a Warning notice is used.

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### **CAUTION**

Caution notices are used where equipment might be damaged if care is not taken.

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**Note:** Notes merely call attention to information that is especially significant to understanding and operating the equipment.

These instructions do not purport to cover all details or variations in equipment, nor to provide for every possible contingency to be met during installation, operation, and maintenance. The information is supplied for informational purposes only, and Emerson makes no warranty as to the accuracy of the information included herein. Changes, modifications, and/or improvements to equipment and specifications are made periodically and these changes may or may not be reflected herein. It is understood that Emerson may make changes, modifications, or improvements to the equipment referenced herein or to the document itself at any time. This document is intended for trained personnel familiar with the Emerson products referenced herein.

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## Product Description

Emerson provides 3 variants of RSTi-EP safe feed modules EP 1901: one safe input, EP 1902: two safe inputs and EP 1922: two safe inputs, with delayed disconnection, which are intended for connecting safety-related equipment. The RSTi-EP safe feed-input modules are controlled using contact-based safety transducers and/or safety transducers with OSSD (Output Signal Switching Device) inputs. The safety function consists of the safe disconnection of 24 V outputs, the safe state of which is 24 V switched off (current path for outputs and the OSSD output is switched off).

All input sensors are independently supplied via separate voltage paths and report the current machine status to the control unit.

Each RSTi-EP safe feed-input module safely switches off all following modules that are supplied by the output current path (until the next EP-7641 power module) and thus creates a safety segment. To switch the 24 V OSSD voltage back on, either an automatic or a manual start can be selected.

- Automatic start: the safe output current path is switched on immediately after resetting the safety circuit(s).
- Manual start: the output current path is only switched on again if the start button has been held down for a preset length of time.

With the delay module (EP-1922), switching off can be delayed by a defined time so that, for example, a machine can be shut down in a controlled manner. The delay time can be set in four steps between 0 and 60 seconds (corresponds to stop category 1 as per EN 60204).

The wiring connectors on each module are color coded for ease of wiring. Refer to the section, Field Wiring for additional information.

The RSTi-EP station is usually installed on a horizontally positioned DIN rail. Installation on vertically positioned DIN rails is also possible.

Modules should to be allowed to de-energize for a minimum 10 seconds after power down, prior to starting any maintenance activity.

Refer to the RSTi-EP Slice I/O Functional Safety Module User Manual (GFK-2956) for additional information.

Refer to the RSTi-EP Power Supply Reference Guide, a software utility available on PAC Machine Edition V9.00, for detailed power-feed requirements.

## Module Features

- SIL 3 compliant (IEC 62061 and EN ISO 13849-1, category 4, PL e)
- OSSD outputs
- Emergency-stop circuits
- Wire breakage and short-circuit detection
- Optional delayed shutdown available
- Spring style technology for ease of wiring
- DIN rail mounted
- Double-click installation for positive indication of correct installation
- EP-1922 provides optional shutdown time delay in four steps from 0 to 60 seconds
- Supports indirect Firmware update through network adapter using web server.

## Ordering Information

Module	Description
EP-1901	1 Safe Feed-Input, 24 VDC
EP-1902	2 Safe Feed-Inputs, 24 VDC
EP-1922	2 Safe Feed-Inputs, 24 VDC, Programmable Delay

## Specifications

Specifications	EP-1901	EP-1902	EP-1922
<b>System Data</b>			
Data	Process and diagnostic data depend on the network adapter used.		
Interface	RSTi-EP system bus		
System bus transfer rate	48 Mbps		
<b>Safety-related data</b>			
Achievable safety level	SIL3 (IEC 61508), SIL CL3 (IEC 62061), PLe and Cat. 4 (DIN EN ISO 13849-1), regarding the entire safety chain		
DC (Diagnostic Coverage)	96.64%		
MTTFd (Mean Time To Failure dangerous)	> 100 years		
PFH (Probability of Failure per Hour)	$6.27 \times 10^{-9}$ 1/h		
SSF (Safe Failure Fraction)	98.58 %		
HFT (Hardware Fault Tolerance)	1		
<b>Inputs</b>			
Safety inputs	1 x 2channel	2 x 2channel	2 x 2channel
Input type	Type 3 as per IEC 61131-2		
Inputs for start function	2 (manual start and autostart)		
Input type	Type 3 as per IEC 61131-2		
<b>Outputs</b>			
Safety output (OSSD)	1		
Output current	8 A (not for capacitive load)		
Overload protection	Excess temperature proof and overload-proof, short circuit proof with external fuse (see below)		
Turn-off time	< 20 ms		
Turn-on time	< 2 s		
Output SS1	--	--	1
Output current	--	--	0,5 A, overload behaviour as per IEC 61131-2
Overload protection	--	--	Over-temperature, Overload and Short Circuit protection with external fuse (see below)
Auxiliary outputs	2 x 2	3 x 2	3 x 2
Output current	max. 10 A (only to support the inputs dedicated inputs)		
<b>Diagnosis</b>			
Module diagnosis	Yes		

Specifications	EP-1901	EP-1902	EP-1922
Individual channel diagnosis	Yes		
<b>Supply</b>			
Supply voltage	20.4V – 28.8V via system bus		
External pre-fusing	mandatory: super fast, max. 8 A		
Reverse battery protection	Yes		
Current consumption ( $I_{IN}$ in the power segment of the fieldbus network adapter), typ.	8 mA		
Current consumption ( $I_{IN}$ in the respective power segment)	45 mA		
<b>General data</b>			
Operating temperature	-20°C to +60°C (-4 °F to +140 °F)		
Storage temperature	-40°C to +85°C (-40 °F to +185 °F)		
Air humidity (operation/transport)	5% to 95%, noncondensing as per IEC 61131-2		
Width	11.5 mm (0.45 in)		
Depth	76 mm (2.99 in)		
Height	120 mm (4.72 in)		
Weight	80 g (2.82 oz)	82 g (2.89 oz)	84 g (2.96 oz)

### Current Demand for Analog Input Modules

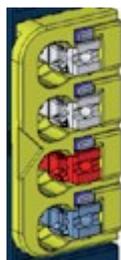
Product	$I_{SYS}$	$I_{IN}$	$I_{OUT}$	$I_S$	$I_L$
EP-1901	8 mA	45 mA	--	--	x
EP-1902	8 mA	45 mA	--	--	x
EP-1922	8 mA	45mA	--	-	x
$I_{SYS}$	Current consumption from the system current path				
$I_{IN}$	Power consumption from input current path				
$I_{OUT}$	Power consumption from output current path				
$I_S$	Current demand of the connected sensors				
$I_L$	Current demand of the connected actuators				
x	Must be included when calculating the power supply				

## LEDs

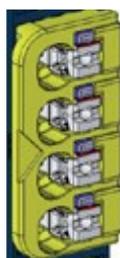
LED	EP-1901	EP-1902	EP-1922
<b>Module Status</b>	<b>Green:</b> Communication over the system bus		
1.1	<b>Yellow:</b> Safety circuit 1 OK	<b>Yellow:</b> Safety circuit 1 OK	<b>Yellow:</b> Safety circuit 1 OK
1.2	--	--	
1.3	--	--	
1.4	--	--	
2.1	--	<b>Yellow:</b> Safety circuit 2 OK	<b>Yellow:</b> Safety circuit 2 OK
2.2	--	--	--
2.3	--	--	--
2.4	--	--	--
3.1	--	--	--
3.2	--	--	--
3.3	--	--	--
3.4	--	--	--
4.1	--	--	<b>Yellow:</b> SS1 output active
4.2	<b>Yellow:</b> 24 V DC_OSSD active	<b>Yellow:</b> 24 V DC_OSSD active	<b>Yellow:</b> 24 V DC_OSSD active
4.3	<b>Green:</b> Feed-in voltage in valid range	<b>Green:</b> Feed-in voltage in valid range	<b>Green:</b> Feed-in voltage in valid range
4.4	--	--	--

## Field Wiring

The connection frame can take up to four connectors, and four wires can be connected to each connector. Those four connectors will be comprised of a Power Connector, one or more Safety, Start, and Autostart Connector(s), and Blank Connectors as needed to fill in the connection frame. The Spring style technology allows either finely stranded or solid wire conductors with crimped wire-end ferrules or ultrasonically welded wires, each with a maximum cross-section of 1.5 mm<sup>2</sup> (16 gauge), to be inserted easily through the opening in the clamping terminal without having to use tools. To insert fine stranded wires without wire-end ferrules, the pusher must be pressed in with a screwdriver and released to latch the wire.



**Power Connector**



**Safety, Start, and Autostart Connector**



**Blank Connector**

## Connector Specification:

- Conductor cross-section 0.14 to 1.5 mm<sup>2</sup> (26 – 16 guage)
- Maximum ampacity: 10 A
- 4-pole

The pushers are color-coded for the following connections:

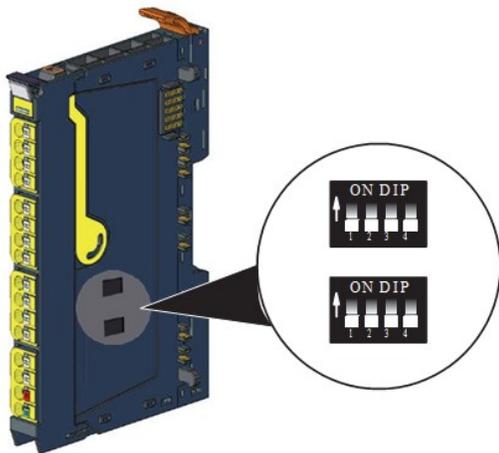
- White Signal
- Blue GND
- Red 24 V DC

The modules do not have a fused sensor/activator power supply. All cables to the connected sensors/actuators must be fused corresponding to their conductor cross-sections (as per Standard DIN EN 60204-1, section 12).

Refer to the RSTi-EP Slice I/O Functional Safety Module User Manual (GFK-2956) for additional information.

For technical assistance, go to <https://www.emerson.com/Industrial-Automation-Controls/support>.

## Dip Switches



**DIP Switch on EP1922 Module**

To ensure the safety functions regard the following instructions for adjustment:

- DIP switches of equal numbers must have identical positions in both rows.
- If an external device generating pulses is connected to a safety input of the EP-1922, this input must be operated in mode *no test pulses* (DIP switch setting ON).
- When operating in mode *no test pulses*
  - the test pulses of the external device must be shorter than 2 ms, otherwise the safe output will be deactivated
  - a safe laying of cables can be necessary depending on the required safety level

**Note:** Use a ball point pen or something similar to set the DIP switches and avoid spiky or sharp-edged tools.

## Setting options for the DIP Switch

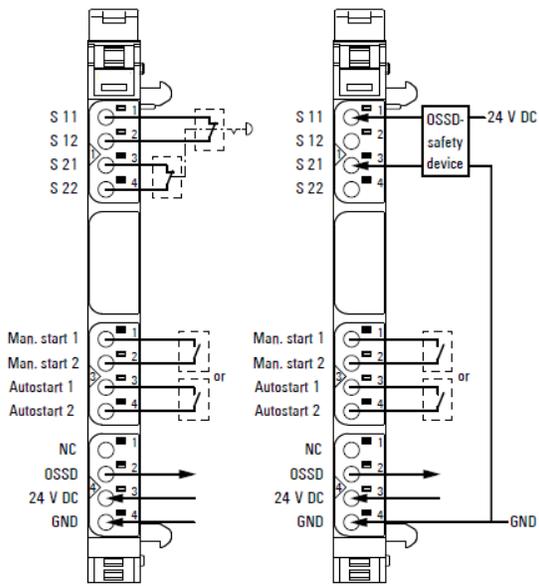
 = ON

 = OFF

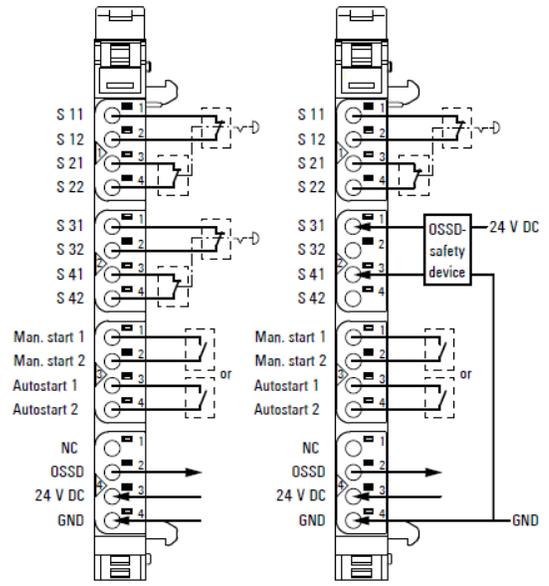
X = Setting not relevant

Input		Delay		Function
1	2	3	4	
	x	x	x	Safety input 0 evaluating own test pulses
	x	x	x	Safety input 0 no test pulses
x		x	x	Safety input 1 evaluating own test pulses
x		x	x	Safety input 1 no test pulses
x	x			24 V Safe: no delay
x	x			24 V Safe: delay 1 second
x	x			24 V Safe: delay 30 seconds
x	x			24 V Safe: delay 60 seconds

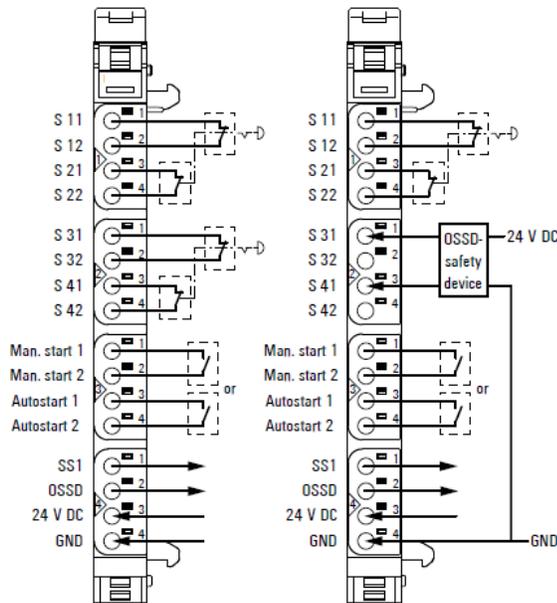
# Connection Diagrams



**EP-1901**

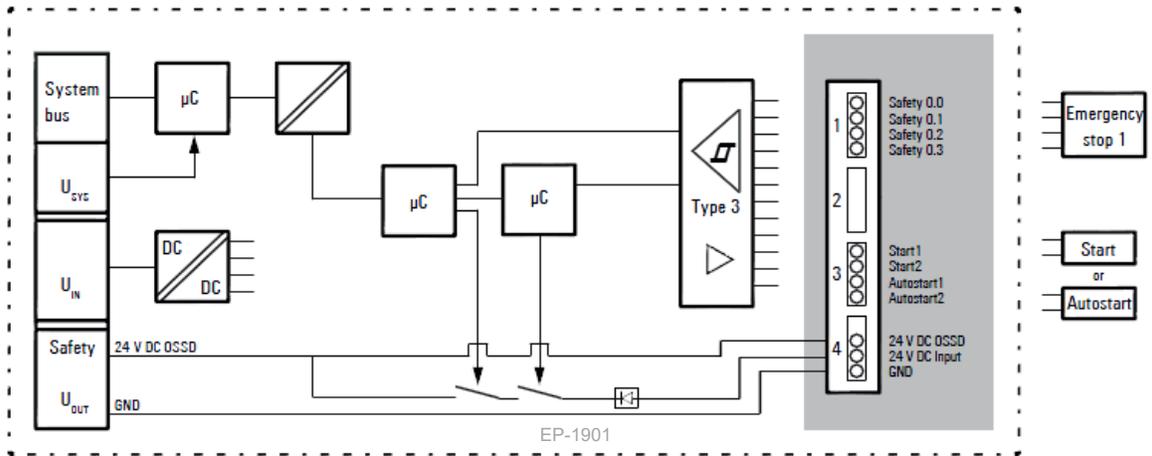


**EP-1902**

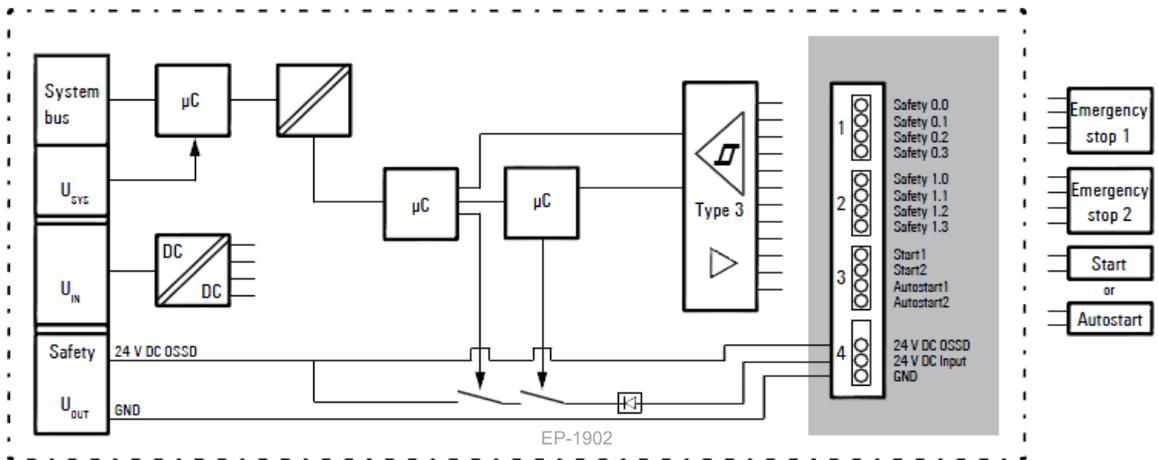


**EP-1922**

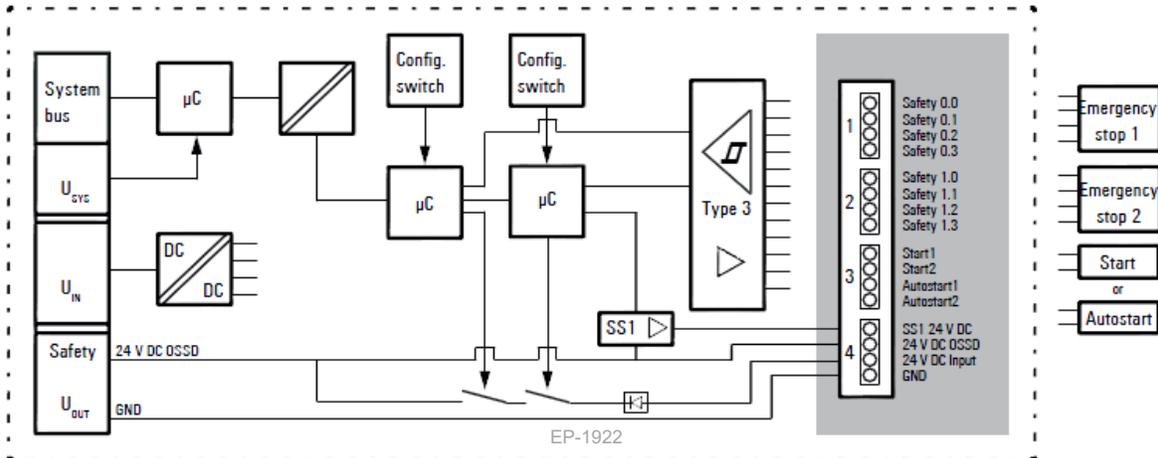
# Connection Block Diagrams



**EP-1901**



**EP-1902**



EP-1922

## Installation in Hazardous Areas

### ⚠ WARNING

- EQUIPMENT LABELED WITH REFERENCE TO CLASS I, GROUPS A, B, C & D, DIV. 2 HAZARDOUS AREAS IS SUITABLE FOR USE IN CLASS I, DIVISION 2, GROUPS A, B, C, D OR NON-HAZARDOUS AREAS ONLY
- EXPLOSION HAZARD - SUBSTITUTION OF COMPONENTS MAY IMPAIR SUITABILITY FOR CLASS I, DIVISION 2;
- EXPLOSION HAZARD - WHEN IN HAZARDOUS AREAS, TURN OFF POWER BEFORE REPLACING OR WIRING MODULES; AND
- EXPLOSION HAZARD - DO NOT CONNECT OR DISCONNECT EQUIPMENT UNLESS POWER HAS BEEN SWITCHED OFF OR THE AREA IS KNOWN TO BE NONHAZARDOUS.

## ATEX Marking

Ⓔ II 3 G Ex nA IIC T4 Gc

Ta: -20°C to +60°C (-4° F to +140 °F)

## Release History

Catalog Number	Firmware Version	Date	Comments
EP-1901-CB EP-1902-C EP-1922-CB	01.13	Jan 2024	Updated product markings to include UKCA, CCC & Morocco.
EP-1901-BB EP-1902-BB EP-1922-BB	01.13	Sep-2019	Following Emerson's acquisition of this product, changes have been made to apply appropriate branding and registration of the product with required certification agencies. No changes to material, process, form, fit or functionality.
EP-1901	01.13	Dec-2015	Documentation update only

EP-1902 EP-1922			
EP-1901 EP-1902 EP-1922	01.13	Nov-2015	Initial Release

## Important Production Information for this Release

### Updates

None - Documentation update only

### Functional Compatibility

Not Applicable

### Problems Resolved by this Release

None

### New Features and Enhancements

None

### Known Restrictions and Open Issues

None

### Operational Notes

None

### Product Documentation

RSTi-EP Slice I/O Module User Manual (GFK-2958)

RSTi-EP Slice I/O Functional Safety Module User Manual (GFK-2956)

# General Contact Information

Home link: <http://www.emerson.com/industrial-automation-controls>

Knowledge Base: <https://www.emerson.com/iac-support>

## Technical Support

### Americas

Phone: 1-888-565-4155  
1-434-214-8532 (If toll free option is unavailable)

Customer Care (Quotes/Orders>Returns): [customercare.mas@emerson.com](mailto:customercare.mas@emerson.com)  
Technical Support: [support.mas@emerson.com](mailto:support.mas@emerson.com)

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+39-0362-228-5555 (from Italy - if toll-free 800 option is unavailable or dialing from a mobile telephone)

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Technical Support: [support.mas.emea@emerson.com](mailto:support.mas.emea@emerson.com)

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Customer Care (Quotes/Orders>Returns): [customercare.cn.mas@emerson.com](mailto:customercare.cn.mas@emerson.com)  
Technical Support: [support.mas.apac@emerson.com](mailto:support.mas.apac@emerson.com)

Any escalation request should be sent to [mas.sfdcescalation@emerson.com](mailto:mas.sfdcescalation@emerson.com)

**Note:** If the product is purchased through an Authorized Channel Partner, please contact the seller directly for any support.

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