

# AMP-119A II Spark Diverter

## User Manual

Protect Your Production lines from Fire



**Jiangsu Ampeon Electronic Engineering Co., Ltd.**

---

## Preface

Thanks for using AMPEON's high-performances spark diverter AMP series. The AMP series is manufactured with high-quality components and materials and incorporates the latest microprocessor technology available. Jiangsu AMPEON continuously practices the design and innovation of the product and provides excellent products with professional attitude. Furthermore, it responds to the customers with professional service and benefits each other with the customers.

The manual is to be used for the installing, parameter setting, troubleshooting and daily maintenance of spark diverter. In order to assure the proper installing and usage of the product, please read this manual in detail before installing. Please keep this user manual at hand and distribute to all users for reference.

Welcome to visit the website [www.ampeon.cn](http://www.ampeon.cn).



### ATTENTION!

1. First please carry out the delivery inspection and check whether there is damage caused by transportation process.
2. After unpacking, please compare with the packing list and check the type, specification and components of the product. If it does not conform to your order documents or if you have any questions regarding the product, you can contact to the dealer or the service office of our company.
3. Jiangsu Ampeon provides services of the three guarantee period 18 months from the delivery date.
4. Troubles due to lightening strike, water invasion and obvious artificial miss or damage etc. are not in the range of repair guarantee.
5. Metal & spark diverter series products are important products of the fore-spinning procedure in cotton spinning mill. But the users in cotton spinning mill should also take integrated measures in fire protection equipments, selection of material, management regulations etc. to assure the safety production.



### CAUTION!

1. The power supply must first be shut down before the electric wiring.
  2. Wiring, repairing & maintenance of the machine should be carried out by electric professionals.
  3. Do not carry out compression test toward the inner components because the semiconductor units are easy to be broken down by the high voltage and are easy to damage.
  4. The circuit board CMOS integrated circuit is apt to static electricity damage. So you should take the static electricity prevention measure before touching the circuit board with hand.
  5. As the machine is installed to the pipe in high place, installing personnel should take safety measures. Suspending or bracket should be solid to prevent the machine from dropping down.
  6. Select safety area to install the equipment, prevent the high temperature & direct shinning and avoid humidity and splashing of the water drops.
-

---

# Contents

<b>A. Overview.....</b>	<b>2</b>
1. Use.....	2
2. Technical parameter.....	3
<b>B. Principle and structural features.....</b>	<b>3</b>
1. Control box.....	3
1.1 Principle.....	3
1.2 Structural features.....	4
2. Automatic divert sparks unit.....	4
2.1 A010 type automatic divert sparks unit (Figure 3).....	5
2.2 A020 type automatic divert sparks unit (Figure 4).....	6
<b>C. Electrical wiring.....</b>	<b>7</b>
1. The inside of the control box.....	7
2. Explanation of main electrical wiring.....	8
3. Earthing and safety.....	9
<b>D. Installing.....</b>	<b>9</b>
1. The requirements of installing.....	9
2. The installation of control box.....	10
3. The installation of automatic divert sparks unit.....	10
3.1 AMP-119AII equipped with A010 automatic divert sparks unit.....	11
3.2 AMP-119A II equipped with A020 type automatic divert sparks unit.....	12
<b>E. Debugging and usage maintenance.....</b>	<b>13</b>
1. Control panel: RTC-5.....	13
1.1 The instruction of LCD Displayer.....	13
1.2 Operations on fire alarm.....	14
1.3 Inquiry the alarm records.....	14
1.4 Real-time set.....	15
2. The fire alarm simulation test and usage maintenance.....	15
<b>F. Troubleshooting.....</b>	<b>16</b>
<b>G. Wiring Diagram of AMP-119A II Spark Diverter.....</b>	<b>17</b>

## A. Overview

### 1. Use

AMP-119A II spark diverter is mainly used for fireproofing of blowing -carding system in spinning mills. It is installed on the pipe of pneumatic transport systems for materials like fibers or tuft. It effectively detects sparks, mixed or generated in the production process so that ensure the safety of blowing-carding production line in spinning mills or other fiber processing production lines. The professional design make it possible to protect virtually any machine for production lines.

AMP-119A II spark diverter is used widely in the blowing-carding system. This machine is usually installed on the pipe in front of the cards or the no fire area such as the multi-mixer etc. It also is used to protect non-woven card lines and waste recycling lines.

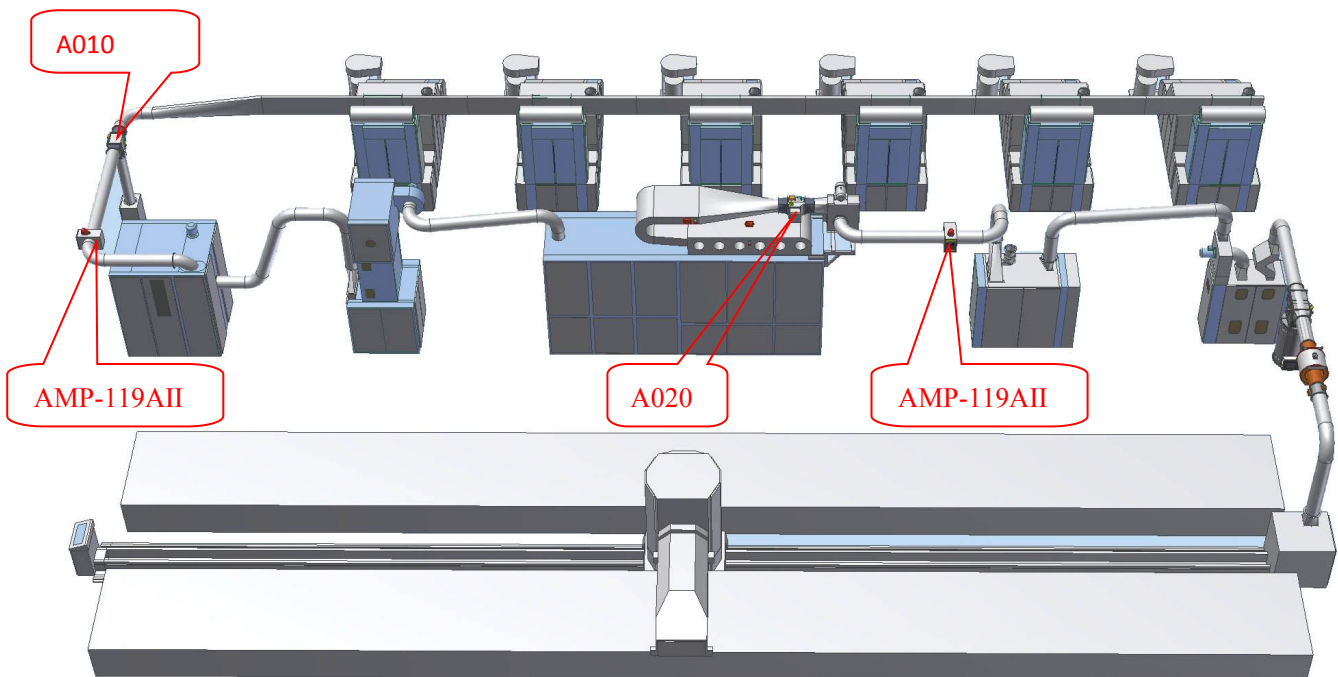


Figure 1: The installation on blowing -carding system

## 2. Technical parameter

Spark Sensitivity	as small as $\Phi 1\text{mm}$ moving sparks visual angle is no less than $90^\circ$ Speed up to 50m/s
Response time	$\leq 300\text{ms}$
Operating voltage	AC220V $\pm 10\%$
Power	Static condition $< 30\text{VA}$ Time of alerting $< 100\text{VA}$
Compressed air pressure range	600-800kPa
Contact load of relay	5A , $\sim 250\text{V}$
Sound level of alarm	$> 90\text{db}$
Requirement of environment	Temperature- $10^\circ\text{C} \sim 40^\circ\text{C}$ , relative humidity (20-75) %RH

### B. Principle and structural features

#### 1. Control box

The control box of AMP-119A II spark diverter (Figure 5) with double infrared spark detectors is directly installed on the conveying pipes by flanges.

##### 1.1 Principle

When the beater of a bale plucker strikes metal material or the spindle end of the beater is tangled with fiber, sparks may be caused. The sparks can mix in the fiber and move in the conveying pipe under the action of the wind. When the cotton fiber mixed with sparks moves through the high sensitive infrared detecting area, the controlling program will immediately activate the fire alarm with sound and light. Furthermore, while shutting down the related machines, all the ember contaminated material are diverted into collecting box to assure that the sparks will not enter the downstream machinery .

## 1.2 Structural features

AMP-119AⅡ spark diverter composed of two main parts: control box and automatic divert sparks unit. The standard automatic sparks unit is A010 type, but you can also choose the A020 type.

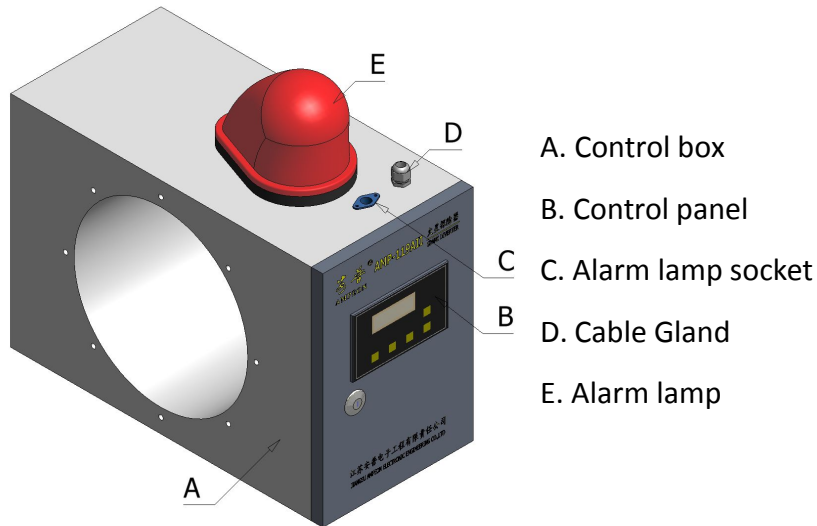


Figure 2a: The parts of control box

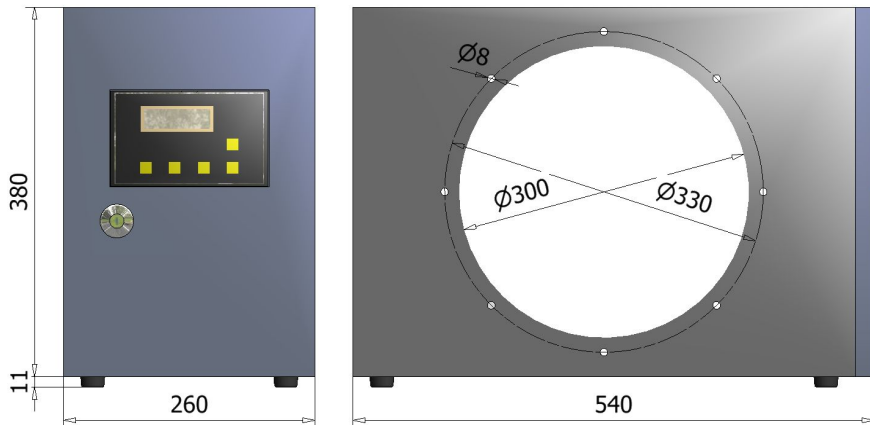


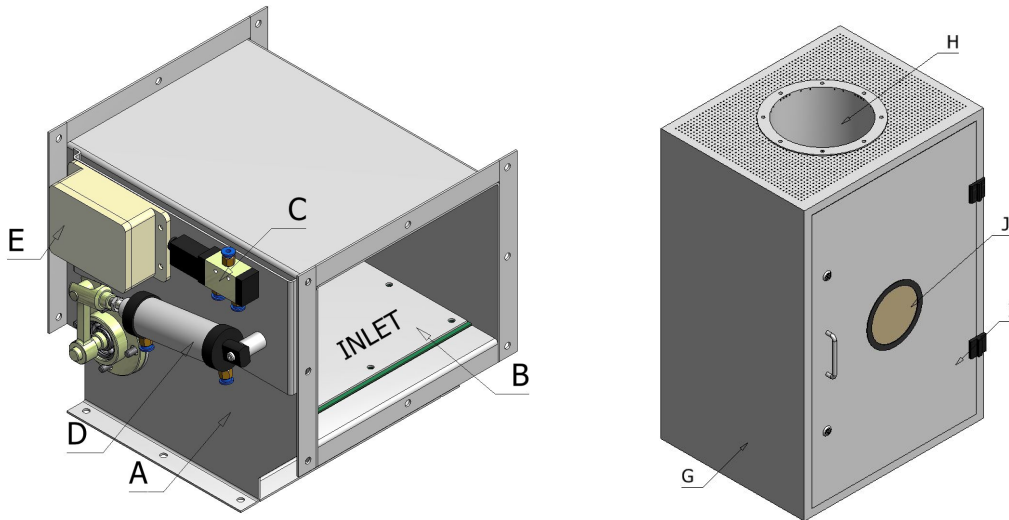
Figure 2b: The dimension of control box

## 2. Automatic divert sparks unit

The automatic divert sparks unit of AMP119AⅡ Spark Diverter has two options, one is A010 type (standard) and the other is A020 type (optional).

**2.1 A010 type automatic divert sparks unit (Figure 3)**

It consists of pneumatic three-way diverting valve and collecting box. The valve can divert all ember contaminated material into the collecting box. The diverter is easy to install and maintenance.



- |   |                       |
|---|-----------------------|
| A. A010 pneumatic three-way diverting valve | B. Movable Flap       |
| C. Electromagnetic valve                    | D. Air cylinder       |
| E. Junction box                             |                       |
| G. A010 collecting box                      | H. Inlet              |
|   | I. Door               |
|   | J. Observation window |

Figure 3a: The parts of A010 automatic divert sparks unit

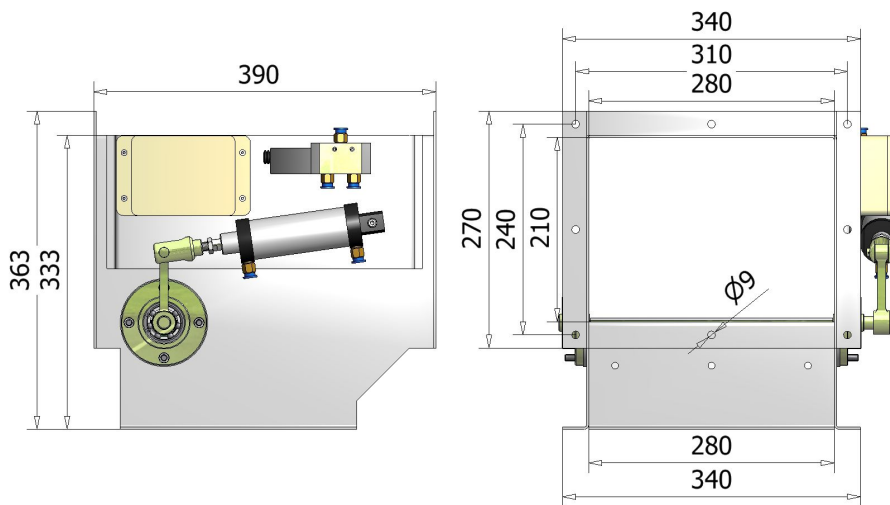


Figure 3b1: The dimension of A010 pneumatic three-way diverting valve

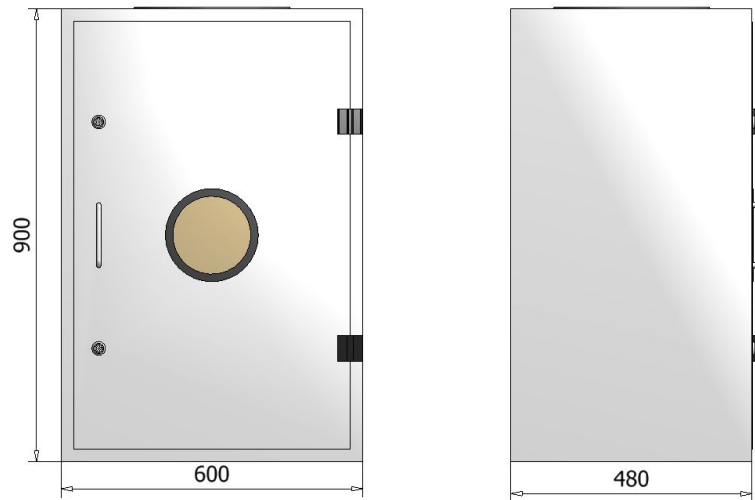


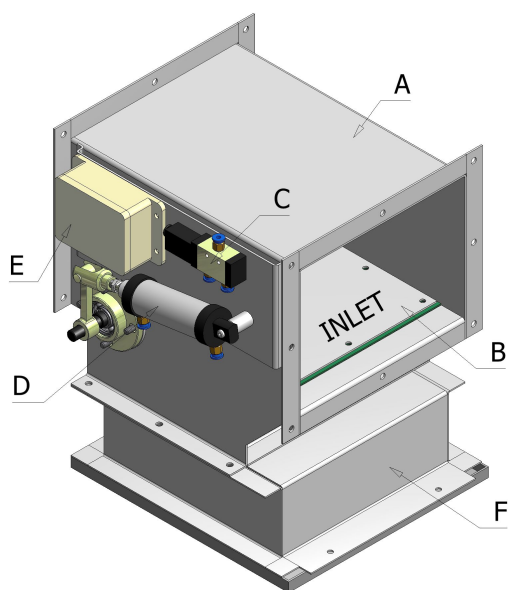
Figure 3 b2: The dimension of A010 collecting box

## 2.2 A020 type automatic divert sparks unit (Figure 4)

It uses the collecting bag instead of A010 type collecting box, connecting the three-way diverting valve. Once the fire alarm is activated, it will shut off the transport pipe immediately, and then the collecting bag will be popped out. The eliminated ember contaminated material is diverted in the collecting bag.

### ATTENTION!

The A020 type has not the collecting box, so it requires no ground space in workshop. It's generally placed on the top of multi-bin mixer or some other place that the ground space is limited.



A. A020 pneumatic three-way diverting valve

B. Movable flap

C. Electromagnetic valve

D. Air cylinder

E. Junction box

F. Collecting bag

Figure 4a: parts of A020 automatic divert sparks unit



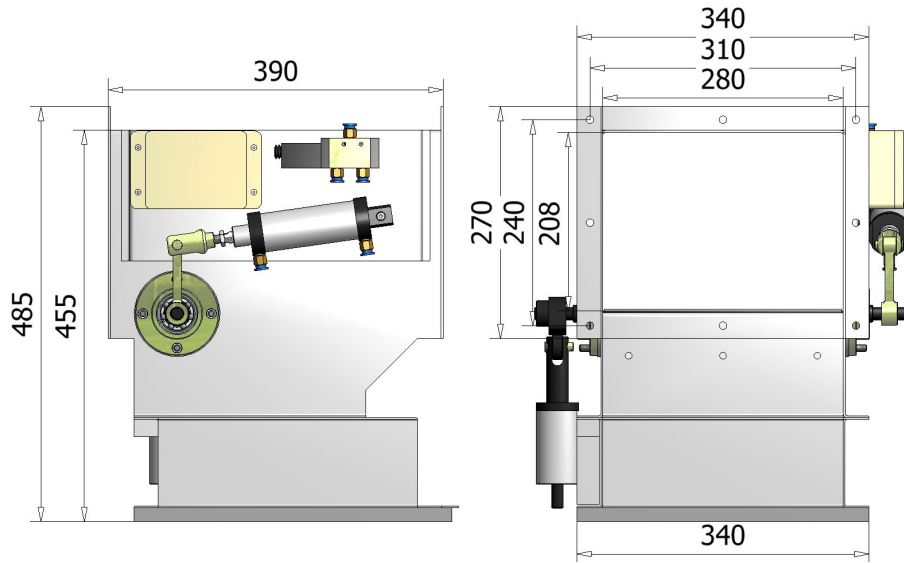
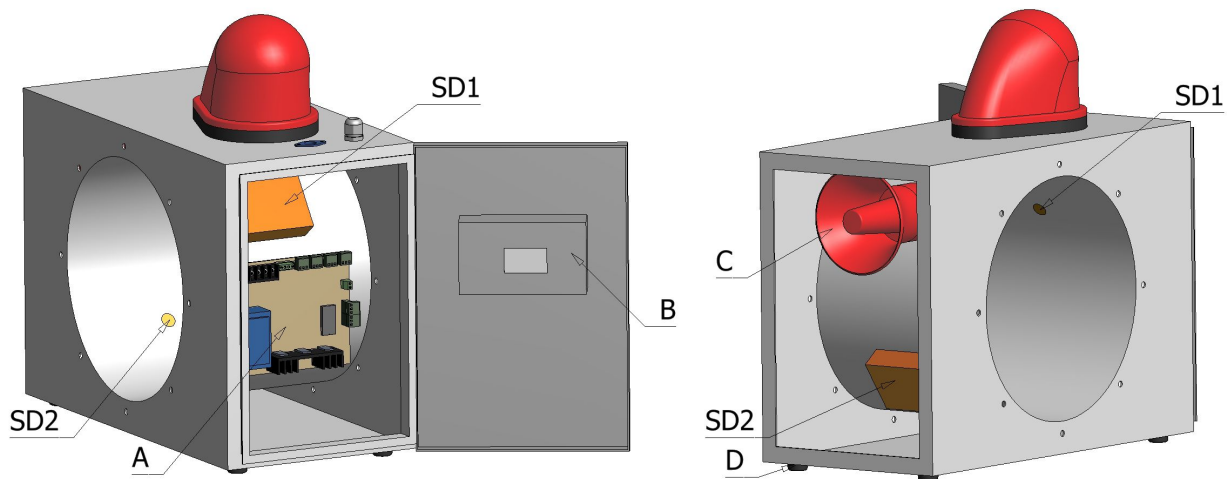


Figure 4b: The dimension of A020 automatic divert sparks unit

### C. Electrical wiring

#### 1. The inside of the control box



A. Main control board

B. Control panel

C. Loudspeaker

D. Alarm lamp

SD1. Spark detector1

SD2. Spark detector2

Figure 5: The parts in the control box

## 2. Explanation of main electrical wiring

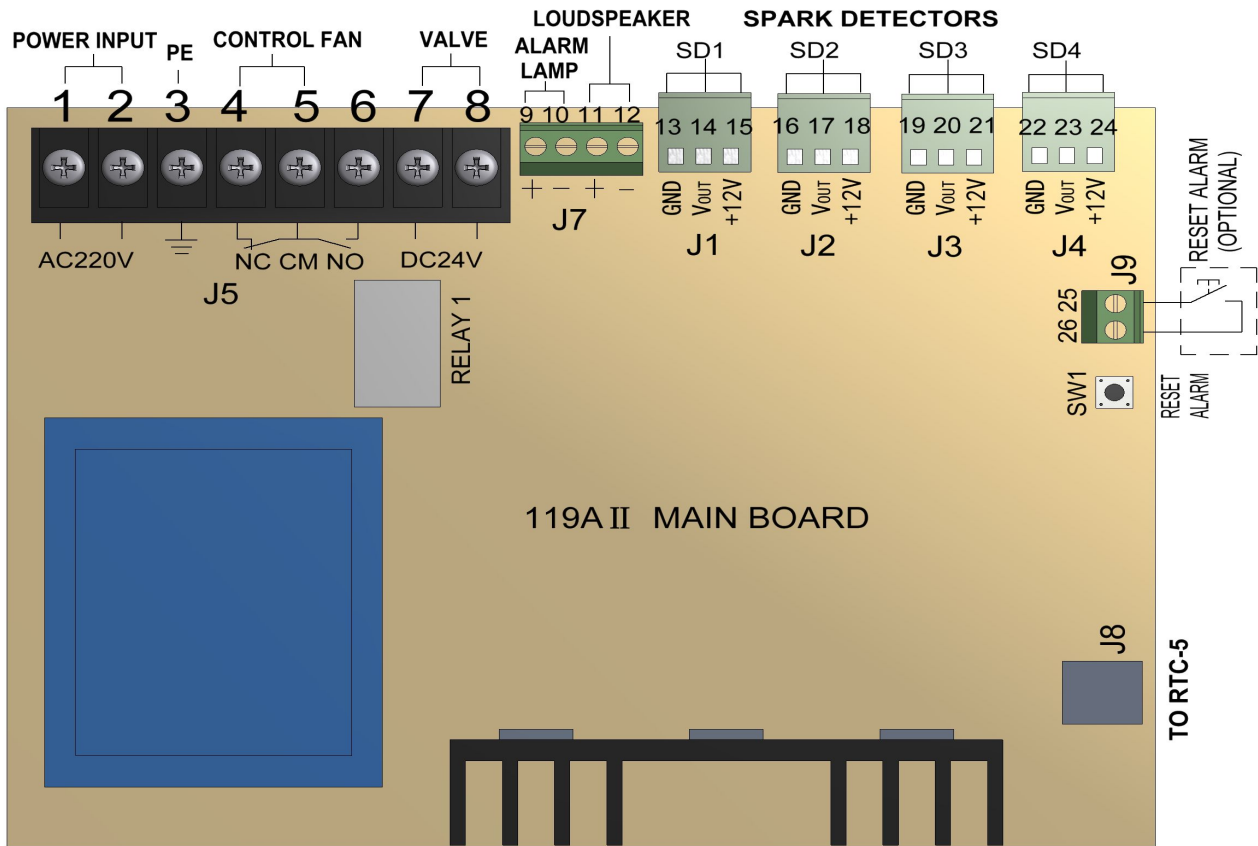


Figure 6: Electrical wiring diagram

- a. Terminal 1 and terminal 2 are the power input AC220V, terminal 3 is earthing.

**⚠ ATTENTION!**

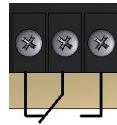
We shall avoid the share of power supply with other equipments that may produce interference radiation. We shall pay special attention to avoiding the phenomenon that on the time of spark alarm stopping, the power supply of instrument itself can not be shut down for output of relay signal.

- b. Terminal 4 'NC' and terminal 5 'CM' provide a couple of voltage-free normally closed relay contacts, that can be used to control the fan and other production machinery. (Terminal 5 'CM' and terminal 6 'NO' provide a couple of normally opened relay contacts.)

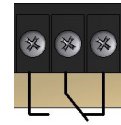
**Relay 1:** This relay is activated when the fire alarm is activated.

Contact Load:  $U \sim 250V$   
 $I \ 5A$

Normal operation or  
 power disconnected



Spark detected



c. The terminal 7 and 8 are used to drive electromagnetic valve of the automatic divert sparks unit.

d. The terminal  $SD_1$ 、 $SD_2$ 、 $SD_3$ 、 $SD_4$  are used to connected four spark detectors. The detectors  $SD_1, SD_2$  are ready in the control box, but  $SD_3, SD_4$  detectors are used for extension (optional for the customer).

### 3. Earthing and safety

a. You should earth properly according to the safety standard of local government. This equipment needs to be separately earthed. It is suggested that the earthing wire be as short as possible and it is prohibited to earth it together with other equipments.

b. While overhauling, please first shut down the power supply and interrupt the compressed air supply. The temperature of the radiator is very high. So don't touch it to avoid burn.

c. After the fire alarm is activated, you should shut down the general power supply of the procedure and then put out the fire.

d. The function test or maintenance work that needs climbing should be carried out by more than two people.

## D. Installing

### 1. The requirements of installing

a. You should read this "User manual" carefully before installation. The distance

between the control box of spark detector and the automatic divert sparks unit can be calculated as '  $L(m) \geq 0.25 \times \text{transport velocity (m/s)}$  ', and it's less than 4m ~ 8m as usual. The customer should also pay special attention to the influence effected by the transport velocity to the diverter. The prefect distance should be determined after experiments.

- b. There is a pipe with the inspection window that installed beside the control box , for the use of periodic inspection to the spark detecting function and cleaning the dust on the spark detectors.

**CAUTION!**

**Avoid the daylight falling or reflecting on the detecting area, otherwise, it may trigger false alarms.**

## 2. The installation of control box

Control box can be hung to the two sides of the metal pipe when it's directly connected to this pipe, or it can be directly hung by the installing screws on the two sides of the control box. If the length of the straight pipe is limited, the control box can also be horizontally installed to the vertical pipe.

**ATTENTION!**

**The control panel of control box should be installed facing the direction that is easy to operate or control. Besides, the foreside and the backside should not be too close to the wall for the convenience of maintenance. The inspection window should also face the direction for easy inspection.**

## 3. The installation of automatic divert sparks unit

Usually, the automatic divert sparks unit is installed after the fan to ensure all the ember contaminated material drop into the collect box correctly that is the position of positive pressure.

### 3.1 AMP-119AII equipped with A010 automatic divert sparks unit

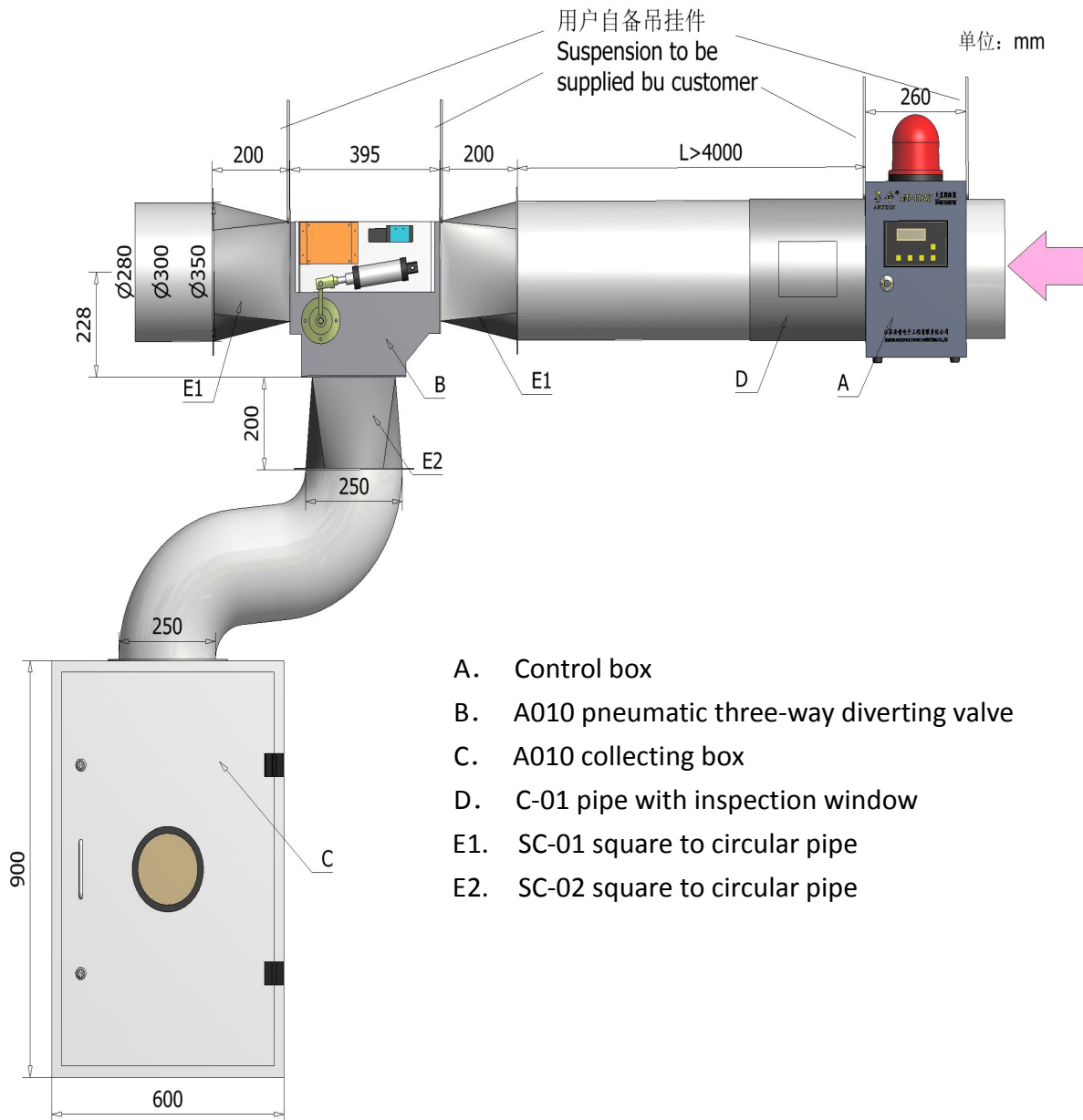
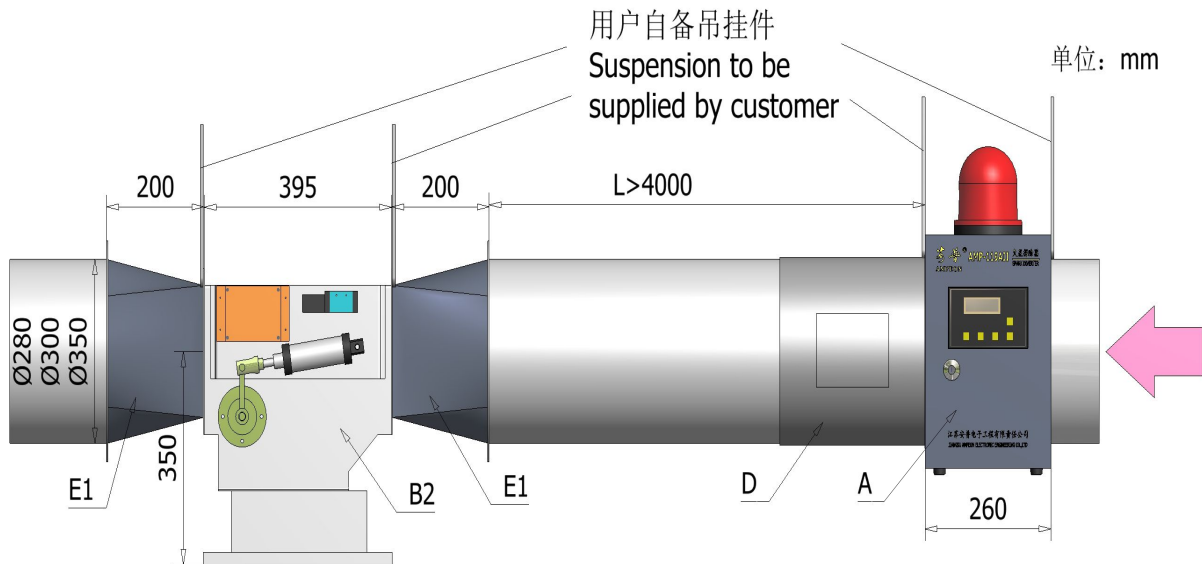


Figure 7: AMP-119A II equipped with A010 automatic divert sparks unit

The pneumatic three-way diverting valve of A010 is directly installed on the pipe, pay attention to the direction of inlet and outlet during the installation to avoid wrong installation. Bottom of the pneumatic three-way diverting valve is connected to the collecting box on the ground with pipe. The pneumatic three-way diverting valve of A010 can take horizontal installation as well as vertical installation.

### 3.2 AMP-119A II equipped with A020 type automatic divert sparks unit

A020 type automatic divert sparks unit is connected to the transport pipe with equipped square to circular pipe, pay attention to the direction of inlet and outlet during the installation .



- A. control box
- B2. A020 automatic divert sparks unit
- D. C-01 pipe with inspection window
- E1.SC-01 square to circular pipe

Figure 8: AMP-119A II equipped with A020 automatic divert sparks unit

#### ATTENTION!

1. The distance between the control box and the A020 automatic divert sparks unit can be calculated as ' $L(m) \geq 0.25 \times \text{transport velocity (m/s)}$ ', and it's over 4m~8m as usual.
2. The user should also pay special attention to the influence effected by transport velocity to the diverter.

## E. Debugging and usage maintenance

### 1. Control panel: RTC-5



Figure 9: Control panel and main page

#### 1.1 The instruction of LCD Displayer


NO.	Display	Explanation
1	2011/ 07/ 02	Jul.2,2011
2	13:51:09	Shows the real-time
3	♪00	The record of alarming is zero
4	AMPEON	Company's Logo


#### ATTENTION!

The above are messages of the main working page. The red LED will be on after the main board is power on, and the green LED would flashes if there was new alarm message, and it will return to the original after looking over the records.


## 1.2 Operations on fire alarm

① This instrument activate fire alarm with sound and light, the display of the real time in the main page of LCD will be stopped, at the same time.

The instrument will be enabled after pressing the key  to reset the alarm in the state of fire alarm, meanwhile, the real time works normally, and there will be one more alarming message.

② Delete the alarm records: Press the key  to delete the latest alarm record in the state of LCD main page.

## 1.3 Inquiry the alarm records

① Press the key  to enter into the page of the latest alarm record , that will show the time 'year, month, day, hour and minute' of the latest alarm record(see Figure 10):

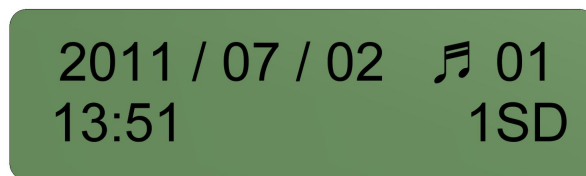




Figure 10: Alarm records inquiring page

Instructions: There was one alarm record saved on July 2, 2011 13:51, Detector 1 caused the fire alarm.





② Then press the key  continually to turn to the page of the formal alarm records till showing 'NO RECORD' , which means there was no record any more, and the system would return to the main page.

③ Press the key  to exit, or it would return to the main page 10s later if there was no operation order.



## 1.4 Real-time set

① The time has been set before the machine leave the factory.

② If you want to adjust the time, press the key  to enter into the page of time setting(see Figure 11), press the key  again to switch year, month, day, hour and minute one by one, and the chosen item would flash, then change the data with pressing the key . After setting the time, press the key  to return to the main page and the system will store the data automatically.

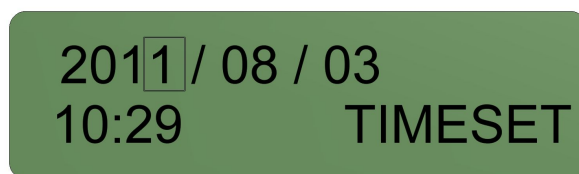


Figure 11: Time setting page

## 2. The fire alarm simulation test and usage maintenance

a. There is an active window on the pipe beside the spark diverter. Shine the spark detector through the small window and it will be OK if the controller can carry out normal action. (The tungsten filament of the torch is a hot body and includes infrared ray) During action, it activate the fire alarm with sound and light, so it is necessary to turn off the alarm manually.

b. During the normal use, if fire alarm activated, the fan and other machines can not be restarted until the cause is found out. Occasionally although the small sparks can die out by itself, we should also stop for not less than half an hour, and we can not restart the machines until the source of interference is inspected and the safety can be assured.

c. The spark alarm function should be checked regularly with simulation test to assure that they are in the good working status. It is suggested that the test be carried out at least once every two weeks.

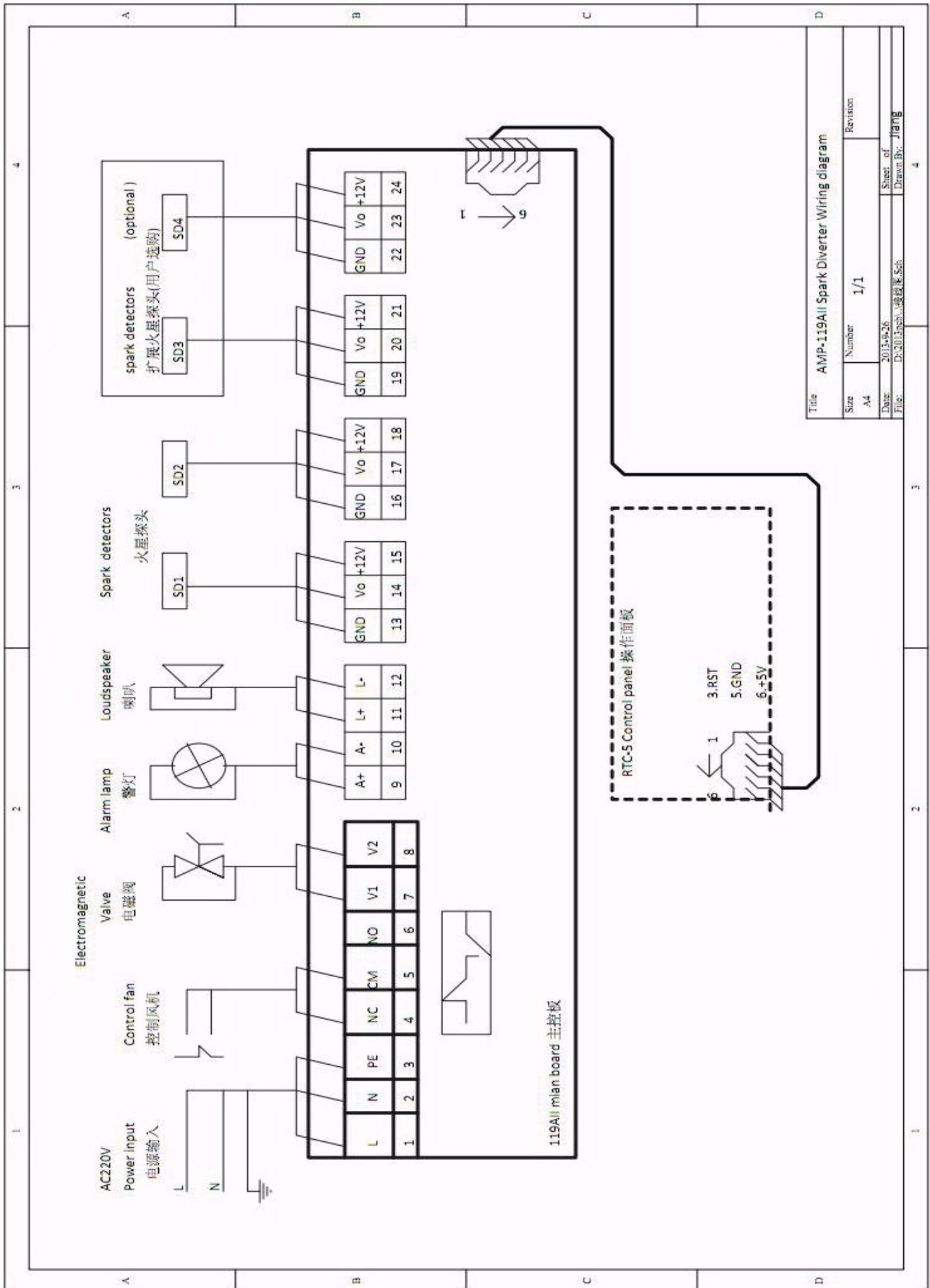
d. The lens of the spark detectors must be checked regularly for damage and cleaned. If the glass lens is damaged, the detector must be replaced.

## F. Troubleshooting

In the below table, common faults and elimination methods during debugging or normal operation are listed. If faults still fails to be eliminated after referring to the below table, please contact after-sale service department of Jiangsu Ampeon or visit our website to acquire relevant technical support and services.

Incident	Cause	Location to Check	Troubleshooting
*Spark monitor red led is not on  *LCD has no displays	*Power circuit. *Plug behind the display panel loses. *Damage of the main board	*The AC220V of power supply is normal or not. *The plug connected to the display panel was going flexible or not *Check the main board	*Ensure reliable AC220V power supply *Reinsert the plug *Replace the main board
The fire alarm sounded frequently without any fire. False Alarm?	* The sunlight reflected to the detecting area *one of the detectors is damaged	*Check the detecting area *spark detectors	*Avoid the sunlight reflected to the detecting area *Replace the damaged spark detector
There is output voltage but the diverting valve didn't act	Check pneumatic parts and the flap of the automatic divert sparks unit is OK	*Check the pressure of pressurized air for normal. *The electromagnetic valve and the cylinder acts for normally *Check the movable flap of the actuator for stuck	*Return the pressure of pressurized air to normal *Change the pneumatic parts *Clean and adjust the pneumatic three-way diverting valve
The clock is incorrect	*The battery is short of electric energy.	Check the control panel	Replace the battery on the circuit board. It doesn't affect the main function of spark detecting
LCD has displays, but the clock doesn't work	*The crystal oscillation structure on display control panel is damaged.	Check the control panel	Replace the control panel
LCD background light is not bright	*There is a life span of background light *There is problem with power supply circuit	Check the control panel	The background light has its life, and that LCD background light off doesn't affect the function

### G. Wiring Diagram of AMP-119A II Spark Diverter



---

**Jiangsu Ampeon Electronic Engineering Co.,Ltd.**

*Phone : 86-519-82612300 , 82616999      Fax : 86-519-82616555*

*[www.ampeon.cn](http://www.ampeon.cn)*

