Aspirating smoke detector AW-AS100-4

Instruction Manual

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ASENWARE LTD
ADDRESS: 6 PROSPECT WAY, ROYAL OAK INDUSTRIAL ESTATE DAVENTRY, NORTHAMPTONSHIRE, ENGLAND, NN118PL
WEBSITE: www.asenware.com EMAIL: info@asenware.com

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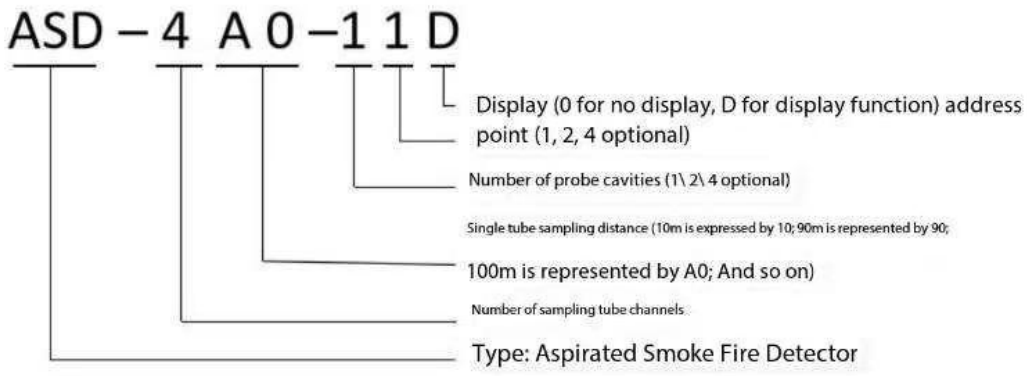
1.Overview of Aspirating smoke detector AW-AS100-4

1.1 Introduction

The aspirating smoke detector AW-AS100-4 is an extremely early smoke detection device that collects air samples through an air sampling tube, analyzes the smoke particle concentration in the air samples, and issues an alarm based on the set value.
The aspirating smoke detector AW-AS100-4 has a wide range of applications and is suitable for the following occasions:
Large spaces: airports, rail transit, stadiums, warehousing and logistics, etc.
Narrow spaces: communication room cabinets, inside power system equipment, Internet data centers, etc.
Clean places: electronics, pharmaceuticals, large hospitals, financial institutions, key laboratories, etc.
Non-clean places: thermal power plants, cable trenches, paper mills, mines and traffic tunnels, etc.
Important places: high-rise buildings, high-end homes, libraries, archives, museums, etc.

1.2 Model Description

Product naming rules



Sr No	Model	Description
1	AW-AS100-4	Four sampling pipes, 1 address point, share one detection room and one suction device; the maximum length of a single pipe is 100 meters, with 26 sampling holes, the total length of the four pipes is 400 meters, and the total number of sampling holes is 104.

1.3 System composition

The aspirating smoke fire detection system is mainly composed of the detector AW-AS100-4, sampling pipeline and background monitoring software

The composition is shown in the figure below:

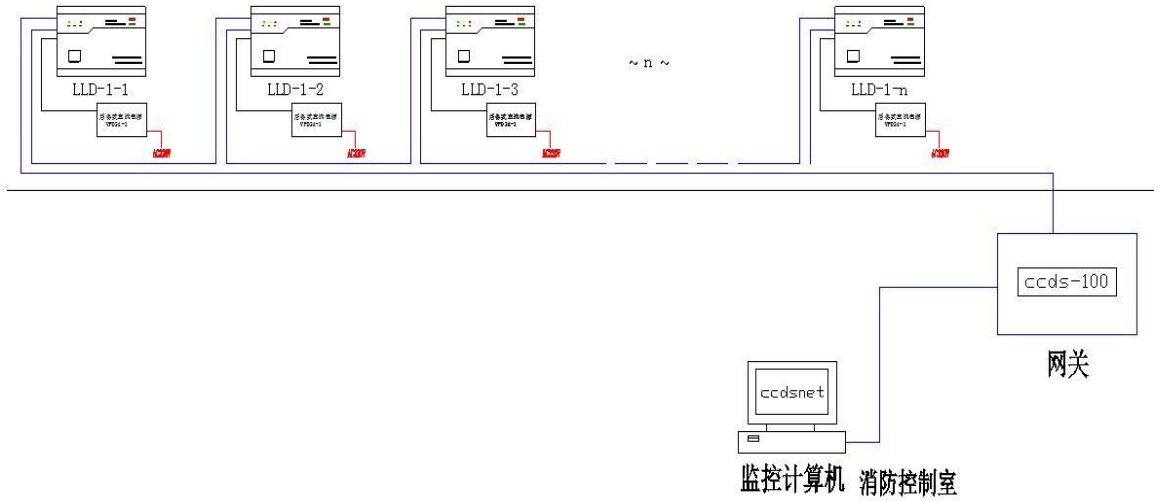


Figure 1 Network diagram of the aspirating smoke detector AW-AS100-4 system

Table 1 Functional Description

Sr No	Composition	Function
1	Aspirating smoke detector AW-AS100-4	Actively sample the air, perform analysis and issue alarms, and enable communication between hosts and between hosts and the background.
2	Monitor Computer	It can realize information collection and aggregation of multiple sampling hosts, realize remote monitoring and control, and provide a user-friendly human-computer interaction page.

1.4 System Features

This system can professionally and reliably solve the problem of early fire hazard detection in multiple scenarios and has the following advantages:

Sensitive: The AW-AS100-4 aspirating smoke detector is extremely sensitive and can detect small smoke particles in the early stages of combustion, thus detecting fire hazards at an early stage.

Accurate, no false alarms: The aspirating smoke detector AW-AS100-2 adopts the laser cavity detection principle to detect smoke.Extremely accurate particle monitoring

Low maintenance cost: Avoid adding consumables such as water or expensive filters. The system has a built-in high-efficiency compression pump that can achieve automatic Cleaning function

Large detection area: The theoretical detection area of a four-tube detector can reach 2000 square meters.

Visualization of smoke content: After the smart terminal is connected to the device, the smoke content waveform of the device can be viewed, allowing people to intuitively feel the current smoke content.Fog conditions make it easy to make timely adjustments.
Easy to operate: It is displayed through the intelligent terminal, and there is no need to operate and set it by pressing buttons, which provides users with great convenience.
Multi-level alarm function: It is divided into five alarm stages, namely, warning, early warning, patrol, fire alarm 1, and fire alarm 2.Parameter values can be set according to customer needs, making it convenient for users to adj parameters
Multiple quick settings: The quick setting option for smoke sensitivity makes it easy for on-site personnel to adjust.
Parameter customization function: can run according to the customer's customized parameters.
Self-learning function: Periodically collect ambient conditions for automatic analysis and automatically adjust appropriate parameters to facilitate customers use
Special alarm input: Through external signals, the micro controller can execute the alarm parameters set by the customer.
Historical alarm query function: can save 30,000 historical alarms.
Event recording function: can save on-site operation records for background query

1.5 Working Principle

The aspirating smoke detector AW-AS100-4 uses laser cavity detection technology, which can detect the tiny smoke particles released in the early stage of material combustion. When the material is burning, the number of smoke particles in the air increases sharply. The aspirating smoke detector ASD-4A0-11D samples the air to the detection core, and uses the "shading rate" principle to pass all smoke particles through the laser cavity to detect light diffraction, accurately reflecting the trend of fire smoke changes. When the light diffraction reaches the set threshold, It will sound an alarm and notify the fire duty personnel in time, winning more time for people to deal with fire hazards.

2. Introduction to Aspirating Smoke Fire Detector AW-AS100-2

2.1 Aspirating Smoke Fire Detector

The aspirating smoke detector AW-AS100-4 can actively sample and analyze the number of smoke particles in air samples, and upload the data to the background system in a timely manner for users to view and take correct measures.

The appearance of the aspirating smoke detector AW-AS100-4 is shown in the figure below:

Figure 3 AW-AS100-4 detector interface identification reference

Table 2 AW-AS100-4 detector interface comparison table

Sr No	Terminals	Function
1	Power	Power input (DC24v±)
2	Power	Power input (DC24v±
3	RS485-1 AB	S485 Communication Interface
4	RS485-1 AB	RS485 communication interface
5	RS485-2 AB	S485 communication reserved interface
6	ALM1	Alarm,per-alarm, patrol signal output interface
7	ALM2	Fire alarm 1, fire alarm 2 signal output interface
8	ALM3	Reserve
9	ALM4	Reserve
10	ALM5	Reserve
11	ALM6	Reserve
12	Fault	Fault signal output interface
12	Reset	Reset input port

2.2 Sampling pipeline

The sampling pipeline is used to collect air samples in various areas. The sampling pipeline system consists of a sampling tube, elbow, tee, plug, capillary sampling tube and sampling head. Common pipeline sampling methods are as follows:

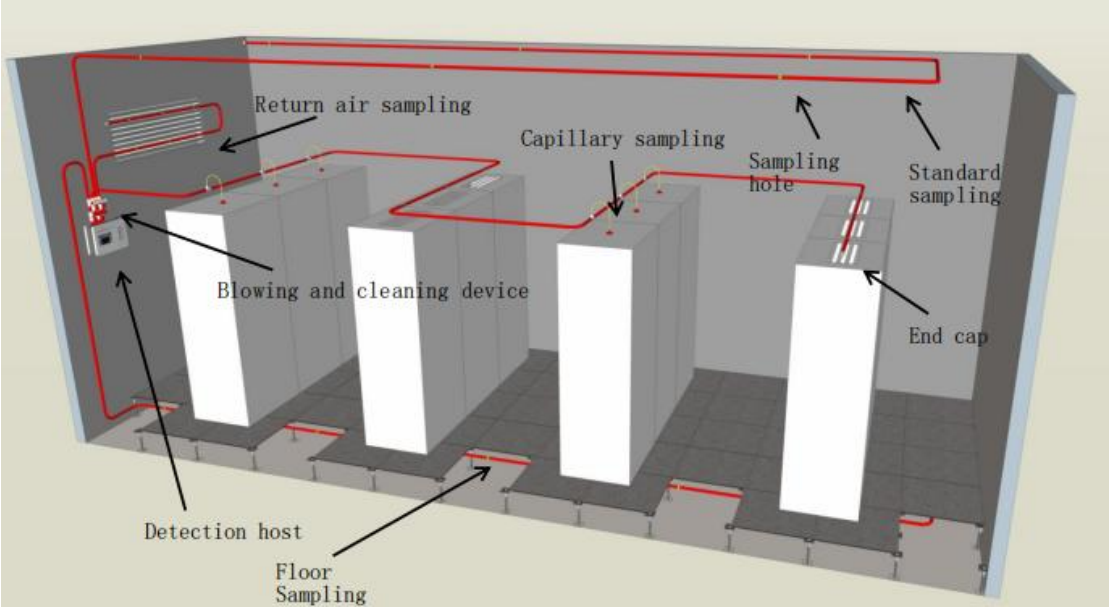


Figure 4 Sampling pipeline composition diagram

3. System installation

3.1 Preparation of installation tools

 Flathead screwdriver M3/M4	 Phillips screwdriver M3/M4	 Protection Gloves	 Diagonal pliers	 Crimping Tool
 Wire strippers	 Insulation tape	 multimeter	Nylon cable ties	 Pipe wrenches

3.2 Packaging Disassembly Before installation

1) Check whether the packaging box is complete, whether the packaging box is damaged or deformed, and whether it will cause damage to the internal items.
2) After unpacking the packaging box, check according to the packing list whether the parts in the packaging box are consistent with the packing list.

3.3 Sampling Pipe Installation

The detailed installation of the sampling pipeline should be arranged according to the actual situation on site and should be completed under the training and guidance of the manufacturer's technical personnel.

3.4 Installation of Aspirating Smoke Detector AW-AS100-4

1) Fix the hanging plate of the AW-AS100-4 aspirating smoke fire detector on the wall, as shown in the figure below:

Figure 6 Detector mounting plate

2) After the mounting plate is fixed with expansion screws, install the detector on the mounting plate as shown in the figure.

Figure 7: Complete installation diagram of the detector

Note: After installation, check the firmness of the installation and make sure the detector does not shake or move left or right.

3.5 Signal Cable Installation

1) Open the front cover of the chassis and remove it as shown in the figure.

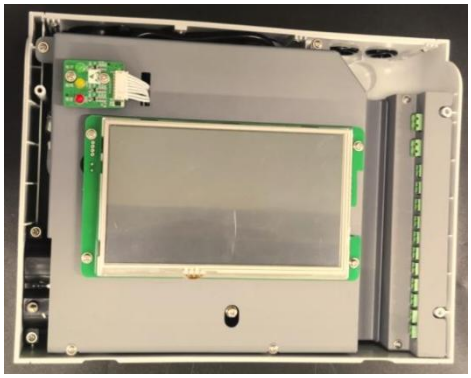


Figure 8 Detector disassembly steps

2) As shown in the figure below, confirm the wiring plan according to the on-site wiring situation, remove the rubber plugs of the detector's wiring holes, and then pass the power line and signal line through the wiring holes, as shown in the figure below.

3) Remove the wiring terminals on the detector board and connect the cables, as shown in the figure below:

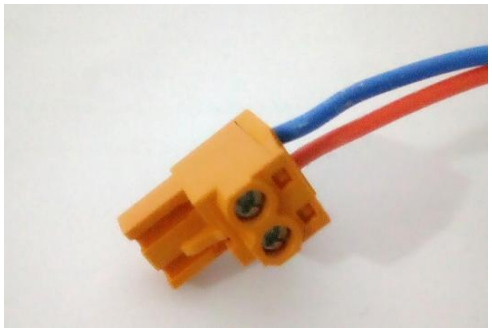


Figure 10 Cable and terminal wiring diagram

Note: Pay attention to the positive and negative polarity of the connecting cable.

4) Refer to Table 2 Detector Wiring Comparison Table to connect the signal cables.

Note: The power terminal is not plugged in yet.

3.6 Power-on debugging

1) Power-on steps

Step 1: Use a multi-meter to measure the voltage on the power supply terminals to see if it is around 24Vdc (0.4~26.4Vdc).When the value exceeds this range, you need to confirm whether there is a problem with the power supply.

Step 2: Use a multi-meter to check if the voltage direction is correct.

Step 3: According to Figure 11, insert the power input terminal into the detector power. And install the front panel of the detector in order.

Note: When the power input is normal, the power indicator on the cover is green;

Step 4: After plugging in the power terminal, the power indicator lights up green, the detector starts normally, and the fan rotates normally.

Step 5: The device starts normally.

3.7 Check after installation

Sr No.	Description
1	Confirm that the detection device is installed and the power and signal wiring are secure
2	Arrange the cables and tie them to the bracket nearby.
3	Determine whether the communication between the detector and the background host is normal and whether the data transmission is accurate
4	Check if the parameter settings are correct
5	Check whether there is any foreign matter such as residue in the chassis.
6	Check chassis and bracket for paint peeling,and repaint the peeling areas in time.

4. Technical parameter table

Category	Parameter	Description
Environment Conditions	Operating tempt	-10℃～+55℃
	transport tempt	-40℃～+70℃
	Storage tempt	-40℃～+70℃
	Humidity	5%～95%，无 Condensation
	Storage humidity	5%～95%
	Altitude	0 m～4000m (High temperature derating is applied at 2000m～4000m. The operating temperature decreases by 1℃ for every 200m increase)
Power Parameters	Input Voltage	Rated operating voltage is 24Vdc (operating voltage: 20.4~26.4Vdc)
	Maximum power	30W
Host Parameters	Protection area	The protection area of a single hole is 20 m2, and 100 holes of the whole machine can reach 2000 m2
	Senitivity	0.005至20%(obs/m)
	Filter	2-stage filtration
	Analysis Chamber	Laser cavity 1
	No. of Channels	Four channels
	Address points	1 address point
	Sampletube length	total length of 4 pipes can reach 400m. When 4 pipes used at same time, max single pipe is 100m
	Sampletube size	Outer diameter 25mm, inner diameter 21mm
	Sampling Holes	26 single tubes, 104 quad tubes
	Sampling aperture	2.0mm×25, 8.0mm×1 (end cap)/each tube
	Airflow monitor	3 Level
	Record	30000 records
	Alarm level	5 levels
	Inspiratory volume	Stepless speed regulation
	Display	7-inch touch screen
	Drycontactinput	1 pair
	Relay output	3 pairs
	Relay load	DC30V 2Amax/AC125V 0.5Amax
	Communication	RS485
Other Parameters	Safety Design	IEC60950-1
	MTBF	100,000 hours
	Size	L300 mm×W230 mm×H98 mm <
	Weight	3kg
	Installation	Wall Mounting
	Cooling method	Natural cooling

5. Instructions for use

5.1 Alarm handling

When an alarm occurs, you can press the "Mute" button on the fire alarm controller to stop the alarm. Then, check the location of the alarm according to the alarm information of the detector to confirm whether a fire has occurred; if a fire has occurred, take appropriate measures according to the fire situation.

If it is a false alarm, take the following measures:
Check whether there is too much dust at the location of the false alarm, and confirm whether the false alarm is caused by human or other factors.

5.2 Fault and abnormality handling

When a fault occurs, you can press the "Mute" button on the fire alarm controller to stop the alarm. Then, check the location of the fault according to the fault information of the detector, and take appropriate measures according to the situation:

(1) If it is a detector fault, refer to Chapter 8 Fault Analysis and Troubleshooting for preliminary solutions.

(2) When the cause of the fault is unknown or cannot be restored, please notify the installation unit or manufacturer as soon as possible for repair.

(3) When the system has abnormal sounds, light indications, odors, etc., turn off the power immediately and notify the installation unit or manufacturer as soon as possible.

6. Maintenance

The only thing that needs routine replacement in the system is the dust filter, which has a service life of 2 years and may be shortened in dusty environments. When the filter efficiency is less than 70%, the system will generate a filter replacement fault to remind the user that the filter needs to be replaced.
In order to ensure that the aspirating smoke detection system can operate normally in the best functional state, regular maintenance is required to maximize the system performance.

The maintenance time and content are shown in Table 4.

Table 4

time / content	moon	season	Half a year	One year	2 years
Check airflow	√	√	√	√	√
End hole smoke test		√	√	√	√
Check the sampling line			√	√	√
Cleaning the sampling line					√

The maintenance of the aspirating smoke detection system is divided into monthly maintenance, quarterly maintenance, half-year maintenance, annual maintenance and two-year maintenance. It is recommended that the monthly maintenance be performed by the user, while the other quarterly, half-year, annual and two-year maintenance should be performed by trained professionals or companies.

Check airflow status Check the airflow value of each pipeline on the LCD screen. If there is a significant difference in the airflow value, check whether the sampling tube is broken or the sampling hole is blocked.

End hole smoke test

(1) Introduce a small amount of smoke at the end of the tube.
(2) Check whether the reaction time (within 120 seconds) is within the specification requirements.
(3) If there is a significant difference in the reaction time, check the sampling pipeline to see if there is a significant change.

Check the sampling line

(1) Check the air sampling line, air sampling point and/or capillary hose for any obstructions.
(2) Visually check whether the sampling tube is broken and the sampling hole is blocked.
(3) If there is a capillary sampling hose, check whether its connection is loose.

Cleaning the sampling pipeline

(1) Clean each air sampling hole to remove accumulated dust.
(2) Use an appropriate tool (such as a toothpick or needle) to insert into the sampling hole and remove accumulated dust.
(3) If there is a sampling hose, remove the hose from the sampling tube and cover the sampling hole with self-adhesive tape. It may be necessary to blow compressed air through the sampling hose to remove accumulated dust.
(4) When using air duct sampling, if conditions permit, the sampling tube in the air duct should be removed for cleaning.
(5) High-pressure air can be used to clean difficult-to-access pipes and sampling holes. First, remove the sampling pipe from the detector host, direct the high-pressure and fast air flow output by the air compressor to the sampling pipe inlet, and release the compressed air for two minutes to clear the accumulated dust in the sampling pipe and the sampling hole. In addition, for the convenience of future maintenance, a three-way valve can be added to the pipeline inlet of the detector

host.The valve is normally switched to the position connecting the sampling pipeline and the detection host. During maintenance, it is switched to the position connecting the sampling pipeline and the maintenance.The inlet is located so that high pressure air can be connected directly to the maintenance inlet.

7. Explanation

7.1 Transportation and storage

(1) Generally, the goods are packed in cartons, which are separated by partitions. They can be transported by common means of transportation and should be protected from moisture and rain.The packaging box cannot be inverted.
(2) It should be stored in a ventilated and dry warehouse, free from corrosive gases such as acid and alkali, and should be protected from strong vibration, shock and strong Electromagnetic field effects.

7.2 Environmental impact

The environmental protection and safety of this equipment meet national standards and have no adverse impact on the environment. Recycling and scrapping shall be carried out in accordance with relevant regulations.

7.3 Notes:

(1) The installation of detectors should be carried out in accordance with relevant national standards and specifications
(2) In case of failure, contact the maintenance unit in time to solve the problem. Self-disassembly is strictly prohibited
(3) After the detector is officially put into use, the filter should be regularly maintained and cleaned
(4) When the detector is being maintained, the logic control function of the maintenance area should be cut off to avoid unnecessary alarm linkage