FIRE AND SECURITY

AutroSense 75

Aspirating Detector

Installation & Commissioning Handbook

CE

Protecting environment, life and property...

AUTRONICA

P-ASENSE75/IE 980302

Table of Contents

1. Introduction

1.1 About this manual

This manual describes the installation of a smoke detector system based on Autronica's *AutroSense 75* aspirating detector. The manual also contains guidelines for the installation of exhaust pipes, procedures for commissioning the system, and a brief description of service and maintenance functions.

1.2 The product

The *AutroSense 75* aspirating detector comes in 3 different versions:

- BW-75/ADR for an addressable analogue system
- BW-75/ADS for an addressable analogue system with heightened sensitivity
- BW-75/KON for a conventional system

1.3 Application

AutroSense 75 is designed for use in all situations, including corrosive and dusty environments. The detector can be adapted to suit the prevailing conditions and provide the required detection level by using detector chambers with different levels of sensitivity.

The detector can be connected to either one or two exhaust pipes.

Where the AutroSense 75 is connected to an *analogue addressable fire alarm system*, each individual pipe will be allocated its own address. In the event of an alarm being reported, the area monitored by the respective pipe will be identified on the fire alarm control panel.

In a *conventional system* both chambers will be normally connected to the same detector loop, i.e. both pipes will monitor the same detection zone. It is possible to connect two different detector loops to the detector chambers to obtain information about which pipe is in alarm.

1.4 The reader

This manual is designed for use by authorised service technicians and others responsible for the installation.

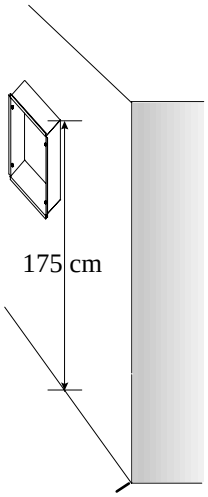
1.5 Other reference documents

Further information concerning the AutroSense 75 aspirating detector is found in the following:

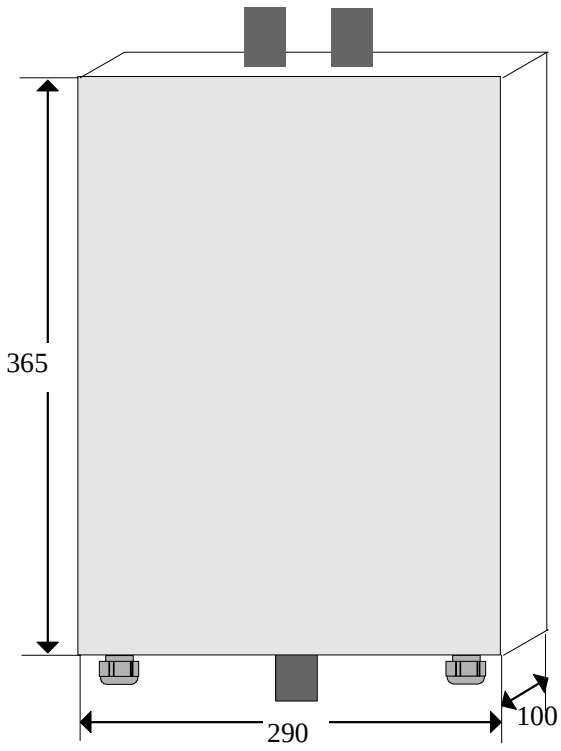
Manual	**Article no.**
Operating Manual	P-ASENSE75/FE
Data Sheet for the AutroSense 75 aspirating detector	P-AS75/CE

2. Installation

2.1 Recommended height for mounting



2.2 Dimensions



2.3 Positioning of the detector

If the pipes are to be installed in rooms with different pressures, the detector should be located in the room with the lowest pressure.

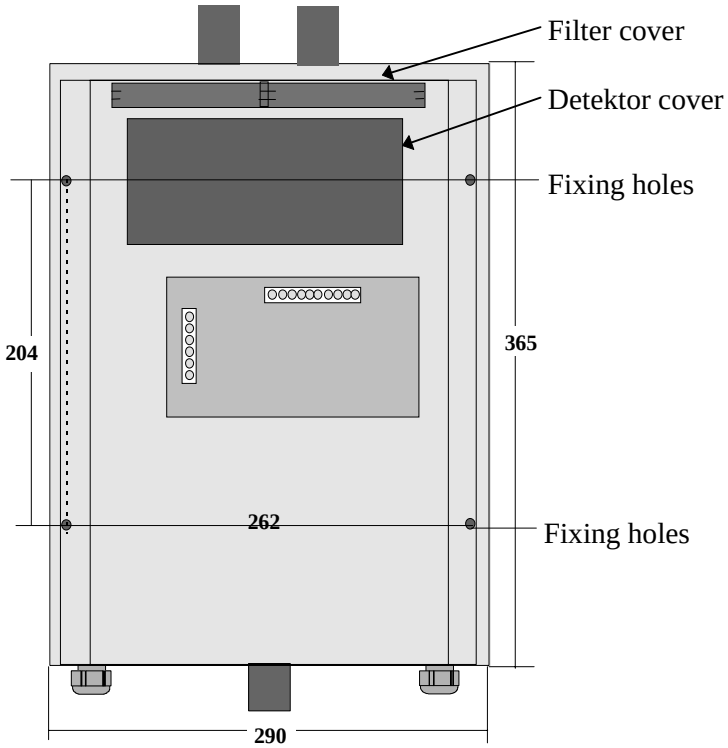
In a building where the ventilation system causes a substantial negative pressure, the detector should be located in the room in which the pipe system is installed.

In instances where the detector *has to be* located in the room with the highest pressure, a return pipe must be attached to the lower pipe outlet and fed into the room with the lowest pressure. This means that the return air will be led into the room with the lowest pressure.

2.4 Mounting the detector

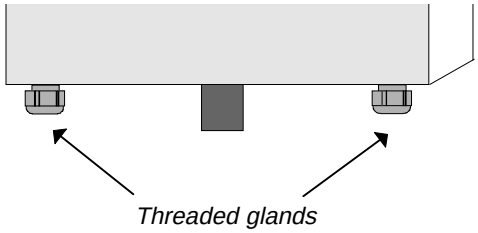
The unit is fitted with 4 fixing holes:

- Mark off and drill holes for 6 mm (max.) screws (and plugs if necessary).
- Remove the cover (the illustration shows the detector without its cover).
- Tighten all 4 screws .

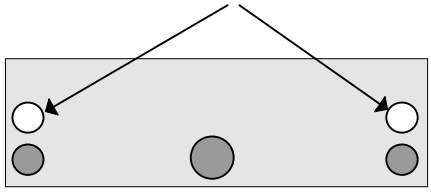


2.5 Cable entry

The power supply and loop cables are fed in through the underside of the unit via threaded glands (2 such glands are provided).



The unit is also supplied with 2 lead-in holes fitted with plugs. These can be removed as required.



2.6 Cable connections

2.6.1 Introduction

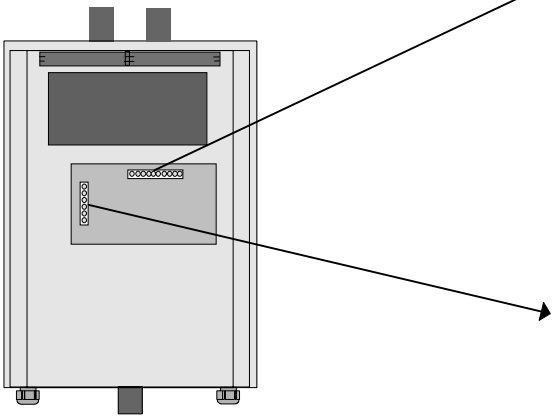
This chapter covers all necessary external cable connections.

IMPORTANT:
The following procedure refers to primary installation:
1. Carry out all necessary loop connections.
2. *Do not* connect up the power before commissioning, *see Chap. 4.5.*

2.6.2 Overview

Terminal strip 2 *- (internal connections)*

Error output				Fan		**(detectors)** Loop			
NO	CM	NC	2K	-	+	-	+	-	+
⊘	⊘	⊘	⊘	⊘	⊘	⊘	⊘	⊘	⊘



Terminal strip 1

Loop	1	⊘
	2	⊘
	3 -	⊘
	4 -	⊘
24V DC		⊘
		⊘
		⊘
	-	⊘

2.6.3 Terminal strips 1 and 2

IMPORTANT! ***Terminal strip 1*** *is for all external connections, i.e. detector loops and power.*

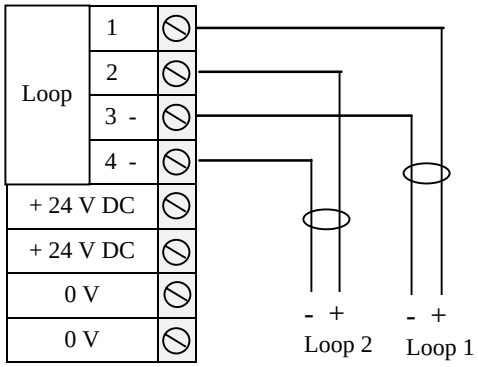
Terminal strip 2 is for internal connections only. These connections have already been implemented, except that with the external connection of 1 detector loop (conventional version), *endload 1* should be removed (terminal strip 2).

For further details about internal connections to terminal strip 2, see *Appendix*.

2.6.4 External connection of 2 detector loops - conventional version

If the unit is connected to a conventional alarm system, the following applies when 2 detector loops (one for each detector) are connected:

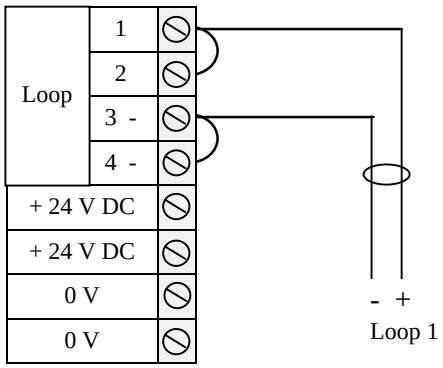
Terminal strip 1



2.6.5 External connection of 1 detector loop - conventional version

If the unit is connected to a conventional fire alarm system, the following applies when 1 detector loop (connected to both detectors and exhaust pipe) is connected:

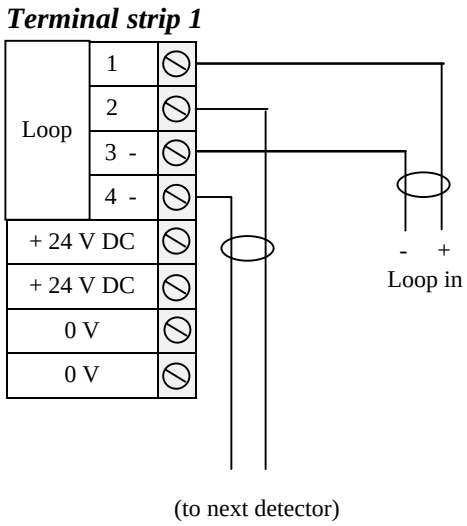
Terminal strip 1



Endload 1 on *terminal strip 2* must be removed. See detailed information about internal connections to terminal strip 2 in *Appendix*.

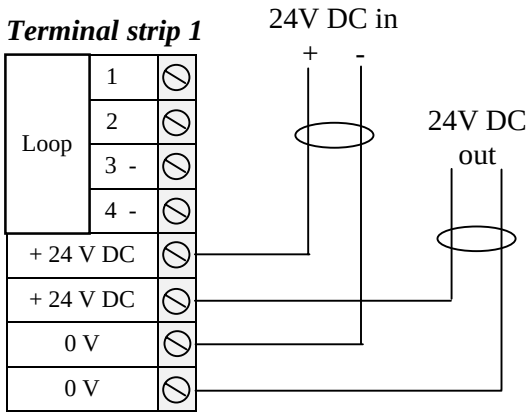
2.6.6 External connection of detector loop - analogue addressable system

If the unit is connected to an analogue addressable fire alarm system the following will apply:



2.6.7 Power supply

IMPORTANT:
With a primary installation, power must not be connected before commissioning – see Chap. 4.5.



3. Installing the pipe system

3.1 General guidelines

Special guidelines apply to agricultural applications.The following general guidelines apply to the installation of the exhaust pipes:

1. The optimum internal diameter of a pipe is 22 mm (the correct size is 25 mm piping). Other sized piping will work, but will usually provide a slower response.

2. When more than one pipe is used, you should try to achieve a reasonable balance (e.g. ±10% of the length) in the pipes in order to obtain an even suction pressure.

3. If only one pipe is used, any other pipes must be plugged again.

4. The maximum total pipe length permitted is 200 metres. *Note*: this corresponds to 2 lengths at 100 m, or 4 lengths at 50 m.

5. If more than two pipes are used, then the pipes must be divided as close to the detector as possible.

6. The pipes must have an end plug with a 2-6 mm diameter hole drilled (usually 4 mm diameter).

7. The air intake/suction holes should normally be 2.5 mm in diameter, and each length should not have more than 20 holes.

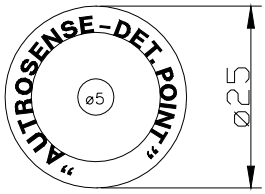
8. The holes should be drilled at specific places in the pipes. De-burr each sampling hole to ensure that the pipe is free from any obstruction that may affect the airflow.

9. These rules apply to average pipe lengths. If the pipe runs start to become excessively long (i.e. more than 60 metres), the sampling holes should be slightly smaller in diameter (down to 2 mm), and the end-plug holes slightly larger (6 mm).

10. With long pipe runs, the number of intakes with a diameter of 2 mm may be increased to 25.

11. To cover an area as effectively as possible the sampling holes should be laid out in a grid pattern.

12. To help identification and location, each individual hole should be marked with a white, circular label with a hole at the centre (these can be supplied). The pipe and position of each detection hole should be marked with a warning label as in the example below.



13. The pipe and position of holes should be well-marked. Below is shown a warning label for suitably marking the pipe system.

3.2 Guidelines for agricultural installations

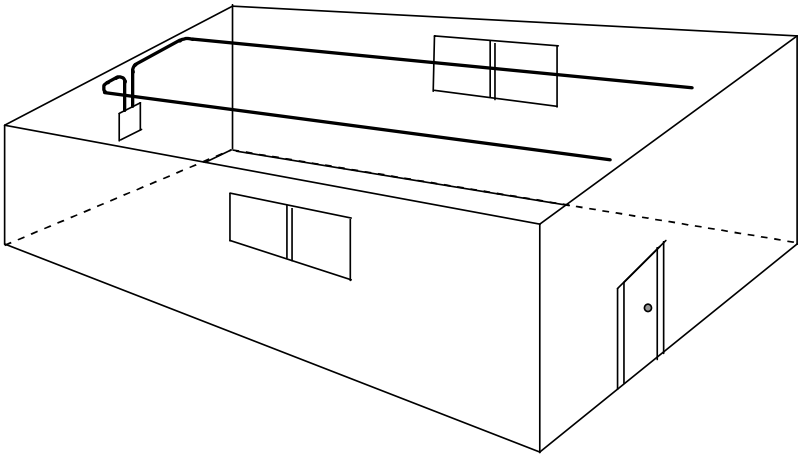
For guidelines for agricultural installations, reference is made to the insurance companies' regulations for fire alarm systems.

AutroSense 75 includes *among* the following:

- maximum single pipe length is 46 m
- maximum number of pipe lengths is 2 x 46 m
- minimum number of holes per room is 2
- minimum distance from hole to wall is 0.5 m
- maximum distance between holes is 5 m
- pipe loops up to 30 m long should have sealed ends – sampling holes should not be less than 3 mm in diameter
- pipe loops longer than 30 m should have open ends
- maximum distance from the pipes to roof is 10 m
- under a saddle roof, the the pipes should be installed a minimum 0.5 m and maximum 1 m from the ridge

3.3 Installing the pipe system in the roof/ceiling

To cover a fire zone in a room, the exhaust/suction pipes should be located either directly under the ceiling panels or with a maximum distance of 100 mm to the panels, and laid out in one, two, three or four runs to cover the whole zone area.



For ceiling/roof installations, the sampling holes should be 25 mm, but not more than 100 mm, below the ceiling/roof, and should point downwards into the room. This design ensures that the holes are below the thin layer of warm air that usually forms under ceilings in heated rooms or under real fire conditions, and which causes smoke to layer.

From a point of view of installation and maintenance, the most effective way of fixing pipes in a ceiling/roof is with standard pipe fixing clips designed to fit the external diameter (OD) of the pipes.

3.4 Pipe joints

All joints should be glued.

3.5 Cleaning out the pipe system following installation

Following installation the pipe system should be thoroughly cleaned out by, for example, by drawing a rag through the pipes attached to a length of wire.

The system can also be cleaned out by removing the end plug and using an air pressure hose in the opposite direction to the normal air flow i motsatt retning av normal luftstrøm.

3.6 Concealed pipes

Concealed pipes should be secured to ceiling girders or support girders with standard pipe clamps or self-locking clips of nylon.

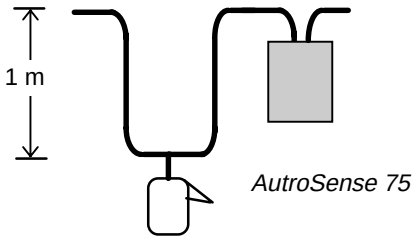
3.7 Connecting to the AutroSense 75 detector unit

The 2 inlets on the top of the detector unit are designed for receiving 25 mm diameter pipes. These should be glued fast in the inlets.

3.8 Installing a “moisture trap”

In environments with extremely high humidity it may be necessary to use a *moisture trap* to prevent condensation entering the detector.

Air moisture has a tendency to condense at bends in the pipes. This will collect at the bottom of the “U” and run into the condensation trap.



Condensation trap

When the condensation trap (enlarged in the diagram) fills up, water will automatically run out when the water level rises above the highest point on the drainage pipe. As long as the trap contains water the system will remain airtight, and it will be impossible for air to enter the pipe via the trap.

The condensation trap(s) should be located immediately in front of the inlet to the detector (this applies to both pipes). Several condensation traps can be used if the humidity is extremely high. A trap should be mounted at the lowest point in the pipes to avoid the system being blocked by condensation.

4. Commissioning the system

4.1 Responsibility for commissioning the system

Commissioning and voltage setting should only be carried out by authorised technical personnel.

4.2 Pre-commissioning check-list

The following check-list should be implemented prior to commissioning the system:

1. Check that all equipment, electrical wiring and pipe loops are as per specification and that the installation is in accordance with the drawings.

2. Check that all the cables have being connected to the correct terminals and with correct polarity.

3. Check that the cables are free from external voltage.

4. If the AutroSense 75 detector unit is connected to a analogue addressable fire alarm system:
   - check that the interface board and detector is coded to the correct address

5. Check that the sampling holes are drilled at specified locations in the exhaust pipes. De-burr each sampling hole to ensure that the pipe is free from any obstruction that may affect the airflow.

6. Check that all markings, instructions and layout diagrams are in accordance with the specifications.

7. Check that the pipes are properly fixed, that all joints are sealed, and that the system is cleaned out.

8. Check that the ends of the pipes are open, that there are no strong air currents around the pipes, and that ends of concealed pipes (e.g. pipes installed above the ceiling) are led down into the room and have the same pressure as the detector.

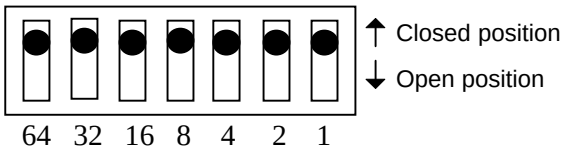
9. Check that the return pipe ends in either the same room as the detector, or the same room in which the pipe system is installed, or in a low pressure zone relative to the exhaust pipe.

4.3 Setting addresses - analogue addressable system

- Unscrew the detector cover.

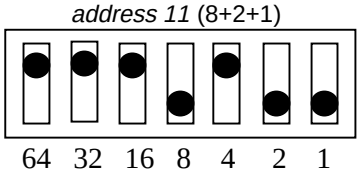
The detectors are equipped with 7 address switches marked with the following digital values: 1, 2, 4, 8, 16, 32 and 64. The correct address is found by summing the values of the switches that stand in the OPEN position. This is when the switches are pushed/flicked towards the market value, i.e. downwards in the diagram.

The diagram below shows the switches in the CLOSED position.



The *examples* below show the switch setting for respectively address 11 and address 68.

Switch setting for *address 11* (8+2+1)



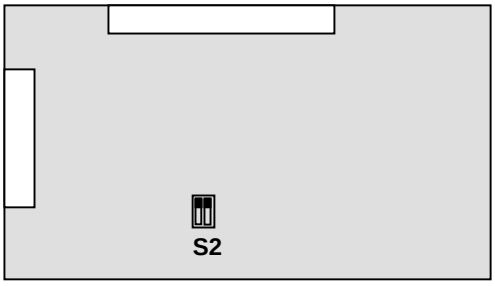
Switch setting for *address 68* (64+4)

Important:
Note that also the BNB-35 addressing unit for fault monitoring must be given the correct address.

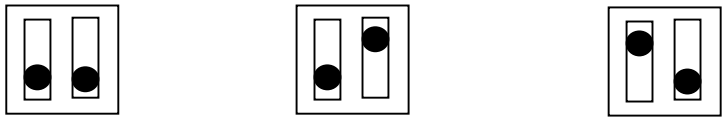
- Replace the detector cover, and tighten the screws.

4.4 Setting switches for monitoring the air flow

- Depending on whether both pipes are connected, or whether only the left or right pipe is connected, set the switch **S2** to configure air-flow monitoring in:-



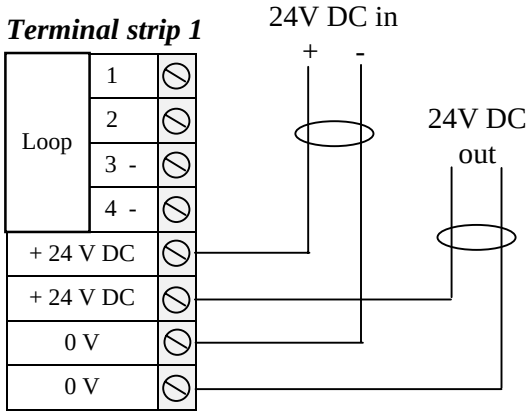
both pipes *left pipe* *right pipe*



4.5 Power supply

When all pre-commissioning checks have been completed and the addresses (analogue addressable system only) and switches for air-flow monitoring have been set, then the unit can be connected to the power.

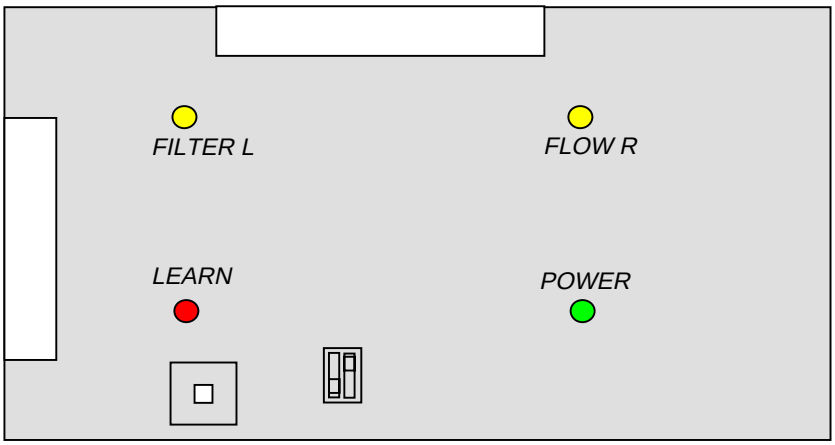
- Connect up the 24V DC supply (taken from the external 24V DC outlet on the control panel).



The detector indicators will show the following configuration when the front cover is removed:

- The green indicator (lower right) marked *POWER* will come on.

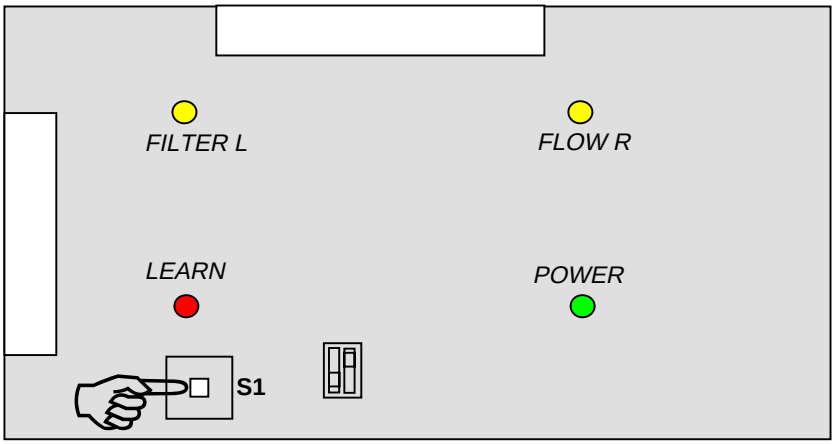
You can now configure the detector, i.e. the detector has to «learn» the exact airflow in the pipe system.



4.6 Configuration of air-flow monitoring

The air-flow monitoring configuration is an automatic function. This will ensure that the upper and lower air flow limits are correct.

1. Activate the configuration by pressing and holding down for 2 seconds the “LEARN” button marked **S1** (see diagram below).



2. Observe the following “LEARN” mode:
   - The yellow indicators will flash depending on the switch setting
     - left pipe: only the *FILTER L* indicator will flash
     - right pipe: only the *FLOW R* indicator will flash
     - both pipes: both *FILTER L* and *FLOW R* will flash

   - The red *LEARN* indicator will come on
   - The green *POWER* indicator will come on

3. Wait approx. 5 minutes (the “learning” period)
4. Observe at “learning mode time-out” (after approx. 5 minutes) that the yellow *FILTER L* and/or *FLOW R* indicator(s) will go out, while the red *LEARN* indicator will start to flash.

5. If the detector accepts the measurements during the period, the red *LEARN* indicator will flash a few times, and then go out. The configuration of airflow monitoring is done for the actual pipe(s). Only the green indicator should be lit.

If the detector does *not* accept the measurements as valid values, the indicators will show the following:-

- The red *LEARN* indicator will continue flashing.
- The yellow *FILTER L* indicator will start to flash.

There are several reasons why the detector will not accept the measurements. For example, the switches may be set incorrectly. If only one pipe is connected to the aspirating detector, check that the switch setting is correct (left or right pipe, see *Chap. 4.4)*. The could even be a fault in the detector.

- Rectify the problem and repeat the configuration procedure.

4.7 Final installation tasks

- Replace the top cover.
  IMPORTANT: Ensure that the top cover is replaced correctly to avoid “false” air entering the detector.
- Tighten up the 6 screws.

5. Final testing

5.1 Alarm test / testing of smoke transport time and symmetry

- Introduce a puff of smoke (or use an environmentally friendly test gas) into each pipe.
- Note the time it takes to give alarm (= smoke transport time).

The time lapse should not exceed 120* seconds. If the exceeds 120* seconds for one of the pipes, a larger hole can be made in the end plug to this pipe.

* For agricultural applications the maximum transport time is 60 seconds.

5.2 Testing of air-flow monitoring

5.2.1 Introduction

This test will activate an error warning. If the test fails, check that the error monitoring function is correctly calibrated and that the pipe system has been installed correctly.

5.2.2 Simulated break in a pipe

- A break in the pipe system is simulated by disconnecting the pipe from the detector.

  An error warning will be given.

5.2.3 Simulated blockage in a pipe

- A break in the pipe system is simulated by disconnecting the pipe from the detector.

  An error warning will be given.

5.3 Fire simulation test

To ensure that the aspirating detector functions properly, and to check the integrity of the pipe system, a fire simulation test should be implemented. This test should be as realistic as possible, and the fire should involve the same type of material that can be expected to be found in the monitored fire zones.

NB!
When a fire simulation test is implemented, the location of the fire should be drawn in on a copy of the system design drawings.
The time it takes to give alarm should also be noted here.

The drawing should be filed for reference purposes when servicing the system.

6. Service and maintenance

6.1 Annual service

The service check-list below provides check-points for an annual inspection and service of the system.

NB!
In seriously polluted environments it may be necessary to inspect and service the system more frequently.

Before carrying out a service you should inform the person in charge and, if necessary, disconnect the control outputs.

6.2 Service check-list

	Task	Remarks	Tick here
1	Change the filter in the detector.	See next chapter.	
2	Check that the pipes are intact and free from any obvious defects such as a break.		
3	Check that the sampling holes are clear. Clean out if necessary.		
4	Implement an alarm test, and check that the time it takes for the alarm to activate is more or less the same as when the system was commissioned.		
5	Introduce smoke/environment-friendly test gas in the end of the pipe and check that the smoke transport time approximates the transport time during the commissioning of the system.	A slower transport time could indicate a blockage or dust, etc. in the pipes. If the transport time is excessive, it may be necessary to clean out the pipe system.	
6	If necessary, clean out the pipe system.	The system can be cleaned by drawing a soft rag through the pipes with the help of a wire, or by removing the end plug and using an air-pressure hose in the opposite direction to the normal air flow.	
7	Ensure that the pipe system is intact after cleaning.		
8	If a fire simulation test was implemented when the system was commissioned, carry out a random test at one of the same test sites.		
9	Compare the response time with that noted during commissioning.		
10	When the service is complete, set the system to normal running and inform the person in charge.		

6.3 Changing the filter

Change the filter as follows:

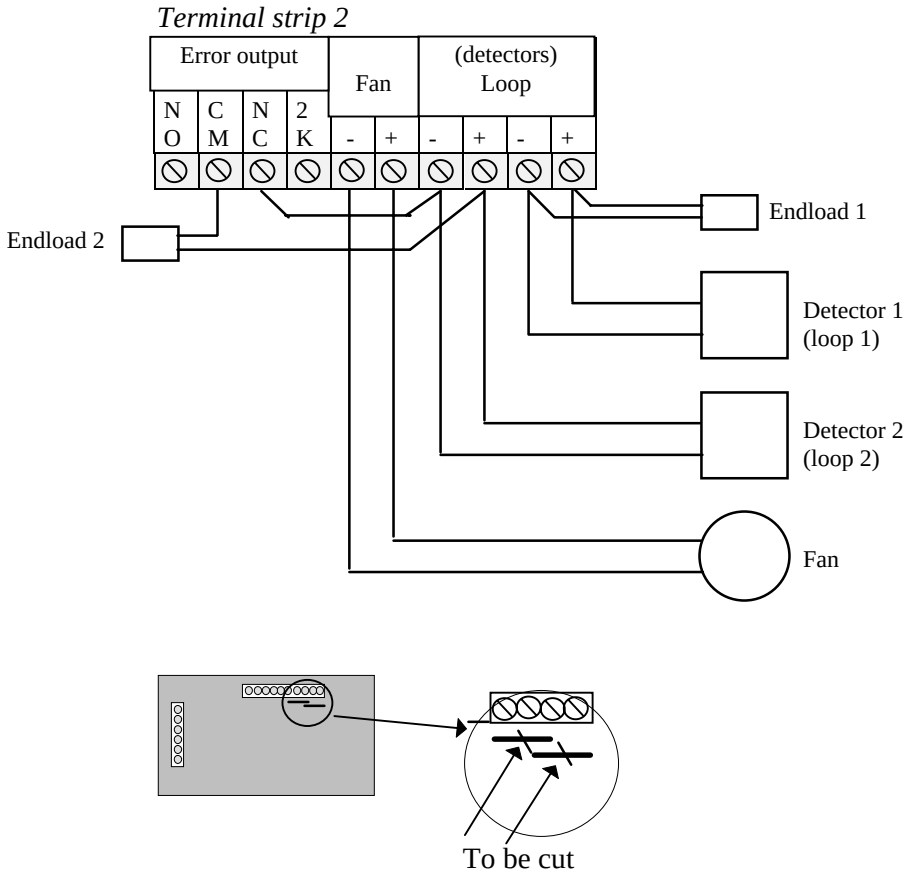
- Loosen the screws and remove the cover.
- Remove the filter cover by loosening the 2 screws.
- Remove the filter by carefully pulling on the corner.
- Install the new filter.
  IMPORTANT: Ensure that the filter is installed properly. The reflector should bend *downwards* and stand innermost against the back plate. *The arrow should point downwards*.
- Replace the top cover.
  IMPORTANT: Ensure that the cover is properly replaced to avoid "false" air entering the detector.
- Tighten the 6 screws.

7. Appendix

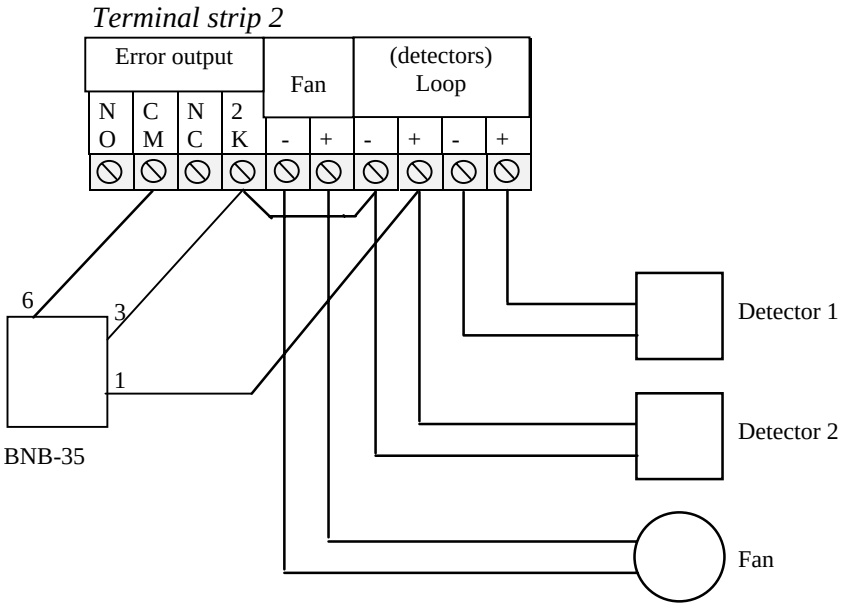
7.1 Terminal strip 2

Terminal strip 2 is for connecting internal cables only, and the unit is supplied from Autronica ready-wired. However, when 1 detector loop is connected externally (conventional version), the *endload 1* should be removed (terminal strip 2).

7.1.1 Internal connection for 2 loops - conventional version



7.1.2 Internal connection of detector loop - analogue addressable system



8. Reader's Comments

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Stringent control throughout Autronica Fire and Security assures the excellence of our products and services. Our quality system conforms to the Quality System Standard NS-EN ISO 9001, and is valid for the following product and service ranges: marketing, sales, design, development, manufacturing, installation and servicing of:

- fire alarm and security systems
- maritime instrumentation systems for monitoring and control
- petrochemical, oil and gas instrumentation systems for monitoring and control

In the interest of product improvement, Autronica Autronica Fire and Security reserves the right to alter specifications according to current rules and regulations.

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