



FA100

Aspirating smoke
detector

SOFTWARE AND
CONFIGURATION MANUAL



FA | STUDIO

inim®

End-User Licence Agreement (EULA)

This is a legally binding agreement between the authors of this software (Inim Electronics S.r.l.) and You (You means the licensee or anyone engaged by You or otherwise pertaining to You).

By installing, copying or otherwise using this software, You acknowledge that You have read, understand and agree to be bound by the terms of this agreement (EULA). If You do not agree with any of the terms or conditions of this agreement (EULA), You are not authorised to install or use this software for any purpose whatsoever.

All versions of this software are protected throughout the world by copyright and other intellectual property rights. All rights are property of Inim Electronics S.r.l.. You may not duplicate, sell, distribute or use this software save as provided under this End-User Licence Agreement, unless You obtain written consent from Inim Electronics S.r.l..

Any parties interested in using this software for non-personal purposes must contact Inim Electronics S.r.l..

Rights

This license grants the following rights: installation and use. It is allowed to install and use an unlimited number of copies of this product.

Reproduction and distribution

This End-User Licence Agreement hereby grants to You the right to reproduce and distribute an unlimited number of copies of this product; each copy must be in whole and accompanied by a copy of this agreement (EULA).

You may not embed this software in another software application or freeware, shareware or commercial product without first obtaining explicit consent from Inim Electronics S.r.l..

Other rights and restrictions

You are not permitted to reverse engineer, disassemble, decompile or modify this product or any portion thereof.

Separation of components

This software is Licensed as a single product; You are not permitted to separate and use any portion of it on more than one single workstation.

Transfer of the Software

You are permitted to transfer this product and Your rights under this End-User Licence Agreement on a permanent basis to another person or entity.

Licence Term

Our rights under this agreement (EULA) will terminate immediately if You fail to comply with any of the terms and conditions contained within. If this occurs, You must destroy the Software, and all copies of all and any part of it.

By using this software, You agree to be bound by the terms of this End-User Licence Agreement.

Copyright

With the exception of any explicit annotations, all rights and the copyright pertaining to the software in its entirety and its parts (including figures, photographs, animation, video, audio, music, text and code) and accompanying documentation are the exclusive property of Inim Electronics S.r.l..

This software is protected by International Copyright Laws and Agreements and must be considered in the same way as all other material which is subject to copyright laws.

Disclaimer of Warranties

Inim Electronics S.r.l. make no warranties of any kind, either statutory or otherwise in relation to this product. The software and all associated material is released without any undertakings of any kind, express or implied. You use this product at your own risk.

Limits of Liability

In no event shall the authors of this software be liable to You or to those claiming for You for any damage of any kind, whether direct or in direct (including but not limited to, damage or loss of any kind, loss of profits, business interruptions, loss or corruption of data) arising out of or in connection with the use of, or the impossibility to use, this product.

Contact www.inim.it for further details.

Table of contents

Chapter 1 General information	4
1.1 Manufacturer's details	4
1.2 Detection classes	4
1.3 Manuals	4
1.4 About this manual	5
1.5 Copyright	5
1.6 Terminology	5
1.6.1 Graphic conventions	5
Chapter 1 FA/STUDIO software	6
1.7 Software header	6
1.7.1 Configuring the software settings	7
1.8 Installing the software	7
1.9 List of devices	8
1.10 Designer	8
1.11 Flow balancing and flow rate calculation	12
1.11.1 Flow rate calculation parameters	15
1.12 List of materials	15
Chapter 2 FA100 configuration	17
2.1 Main system configuration	18
2.2 Configuration of detectors	19
2.3 Configuration of terminals	19
Chapter 3 Diagnostics	23
3.1 Diagnostics of the motherboard	23
3.2 Diagnostics of the detectors	25
3.3 Remote control	26
3.4 Detector modules history	27
3.5 Events history	27

Chapter 1 General information

1.1 Manufacturer's details

Manufacturer: Inim Electronics S.r.l.
Production plant: Centobuchi, via Dei Lavoratori 10
63076 Monteprandone (AP), Italia
Tel.: +39 0735 705007
Fax: +39 0735 734912
E-mail info@inim.it
Web: www.inim.it

The persons authorized by the manufacturer to repair or replace the parts of this system have authorization to work only on devices marketed under the brand Inim Electronics.

1.2 Detection classes

The EN 54-20 standard provides a classification of aspirating smoke detectors based on detection sensitivity.

The class of the detector must be chosen to suit the project requirements and the characteristics of the environments to be monitored.

Class A Very high sensitivity detection systems that allow the detection of extremely diluted smoke in the air.

To be used in very clean environments where prompt detection is essential, such as, for example, "white rooms".

Class B Detection systems with advanced sensitivity that allow early detection of smoke.

To be used in environments where there are valuable or particularly vulnerable or critical assets such as, for example, electronic devices, server rooms, etc.

Class C Detection systems with normal sensitivity that allow smoke detection in a similar way to traditional point detectors.

To be used in environments that do not present any specific criticalities.

1.3 Manuals

The manuals which are not supplied with the apparatus can be ordered, making reference to their respective codes, or downloaded from www.inim.it.

Instructions manual The guide, supplied with the package content, provides all the instructions necessary for fast installation of the FA100.

Installation and programming manual The installation manual contains the technical specifications of all the system components and the instructions for their installation, including instructions with wiring diagrams for the various modules.

It also contains the instructions for system commissioning

It is the responsibility of the installer to follow all the manufacturer's instructions in order to ensure proper functioning of the system and, at the same time, to comply with all the warnings relating to the active and passive security of the installation.

Software and programming manual The FA/STUDIO software and programming manual contains the description of the software and the instructions for its installation and use.

(this manual)

It also contains the instructions for the configuration and programming of the FA100 system, as well as the descriptions of all the parameters and options.

It is the responsibility of the person who programs the FA100 system to follow the instructions carefully and to ensure they have complete knowledge of the software in order to proceed swiftly and properly with the configuration and programming procedures.

1.4 About this manual

Manual code: DCMSINE0FA100

Revision: 100

1.5 Copyright

The information contained in this document is the sole property of Inim Electronics S.r.l.. Copying, reprinting or modification of this document, in part or as a whole, is not permitted without prior authorization in writing from Inim Electronics S.r.l.. All rights reserved.

1.6 Terminology

Panel, control panel, device

Refer to the main supervisory unit and any constituent parts of the security system device.

Left, Right, Behind, Above, Below

Refer to the directions as perceived by the operator when directly in front of the mounted device.

Qualified personnel

Persons whose training, expertise and knowledge of the products and laws regarding security systems, are able to create, in accordance with the requirements of the purchaser, the most suitable solution for the protected premises.

Select

Click on a specific item on the interface (drop-down menu, options box, graphic object, etc.).

Press

Click-on/push a video button/key on a keypad or screen.

1.6.1 Graphic conventions

Note

The notes contain important information relating to the text.

Attention!



The DANGER warnings indicate that total or partial disregard of the procedure could injure the operator or persons in the vicinity.

EN54

Such indications indicate that the information and instructions refer to European standards.

Chapter 1 FA/STUDIO software



The FA/STUDIO software allows the design of an aspirating smoke detection system, the programming of the FA100 devices and the related diagnostic functions.

The software manages a database relating to aspirating smoke detection systems: layout of the pipes (number of branches, length of branches, etc.), position and diameter of the sampling holes, floor plans of rooms, list of materials, programming data of FA100 devices.

In the database, the data of an installation are collected in a logical grouping named a "solution". Within a solution, the different floor plans of the environment to be protected can be arranged on several floors and each of which can house different FA100 devices connected to the relative pipes.

The software consists of three main sections:



- **List of devices**, section visualized when the software is launched, showing the list of detectors used for the system and which allow access to the relative configuration and monitoring sections.



- **Designer**, section for the system project designed via a 3D CAD interface with a section for calculating the flow and sizing the holes.

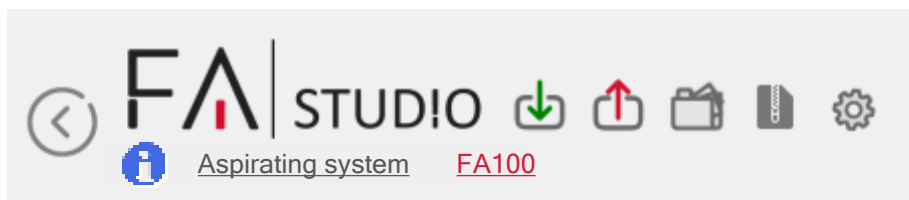


- **List of materials** consisting of the elements present on the system and which allows the production of the documents necessary for installers or the various users.

Contact Inim Electronics S.r.l. to participate in training courses that include the use of the FA/STUDIO software.

On the *Website of Inim Electronics* tutorials are available relating to the use of the software.

1.7 Software header



The top section of the FA/STUDIO software window is common to all sections and to the Start page.

It provides access buttons to the sections, software management functions and open solutions.

Button		Function
	Back	Button to step back to the previously viewed page.
	Read	Once a FA100 device is connected, this option allows the program to load the system programming data to the PC.
	Write	Once a FA100 device is connected, this function allows the program to load the current programming onto the device.

Button	Function
 Solution management	Button to access the function buttons for software solution management: , to generate a new solution , to save the current solution , to open a new solution
 Import / Export	Button to access the functions for importing .ips files (InimPipeStudio files) or exporting the current solution
 Settings	A window will open with the options available for FA/STUDIO software.
 Manual	Button to open the installation and programming manual of the FA100 on the default browser.

A string is displayed below the logo indicating the name of the current solution and, if the programming section is open, the name of the relative FA100 device. The elements of this string are also direct access buttons to the different sections of the solution.

1.7.1

Configuring the software settings



General

This button opens the window with the software settings. This window has two sections, which can be selected using the label at the top.

The "General Settings" section provides the following parameters:

- **Language**, for the selection of the language used by the software
- **Coverage radius**, to set the default measurement (in metres) of the radius of the coverage area of the aspirating pipe holes
- **Simplify capillary calculation**, if a capillary is selected it is considered as if it were a sampling hole.
In this case the length of the capillary pipe does not affect the flow calculation, approximating the estimate of the capillary flow.
Option to be used if the balancing operation is unable to find an optimal solution.
- **Optimization level**, a bar allowing the selection from between 9 optimization levels of the automatic flow balancing calculation.
A low level tends to find a solution more quickly, via a high fan speed.
Higher optimization levels result in slower calculation but tend to find a solution with a lower fan speed, thus optimizing consumption and noise.
All optimization levels perform the same number of attempts so, regardless of the level set, the self-balancing operation may or may not return a valid configuration. If a valid solution cannot be found for a specific system, repeating the calculation with a higher optimization level is of no use.

For the validity of the two options described above, refer to the "*Flow balancing and flow rate calculation*" section.

The "**Template settings**" section allows the setting of .XLS and .DOC file templates that will be used for generating and printing the documents produced by the software.

Updates

Section for searching for software updates and their possible installation on the PC in use.

1.8

Installing the software

The installation of the FA/STUDIO software must be carried out via the setup.exe file which can be downloaded from the reserved area of the www.inim.it website.



The manufacture strongly suggests that you check the website page regularly in order to be informed about the most recent revision of the software and make the appropriate updates.

The revision of the installed software can be consulted in the "**Updates**" section of the settings.

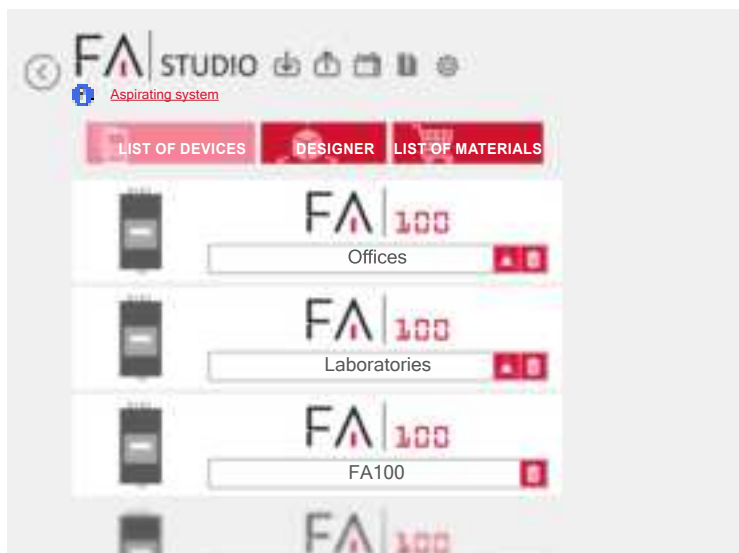


On completion of the installation, the FA/STUDIO icon will appear on your desktop.

1.9 List of devices



The “Device List” section is the home page of the software and the first section displayed after startup.



It shows the list of FA100 devices inserted into the current solution.

For each device the following are provided, inside its own box:

- editable device label
- , button to access the “Designer” section with the device in the centre of the display (if the device has been inserted in the project)
- , button to delete the device from the solution

Clicking on the box itself obtains direct access to the programming section of the selected device.



Note

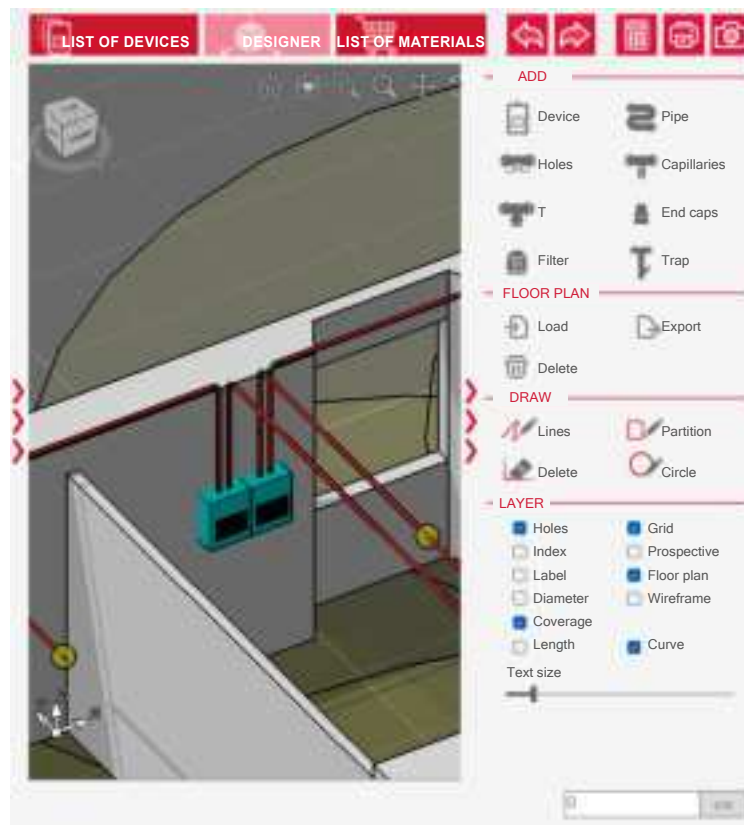
At the end of the list, mouse hover to show the icon for adding a device to the solution.

Deleting a device associated with a “Designer” project, does not delete the project but only disconnects it from the real device being programmed.

1.10 Designer



The “Designer” section allows the 3D modelling of the system, the flow calculation and the hole sizing.



At the centre of the section is a CAD environment for the drawing of the structure of the aspirating system with all its components.

On the sides of the section are two panels with the tools for the system project design. The left panel contains the building plans and the right panel the modeling tools.

These panels can be expanded or collapsed by means of the appropriate arrows.

The designer, using the various tools available on the side panels, can draw the system, also by importing a project from a drawing file external to the software (CAD floor plans in DWG, DXF or PDF format), and by inserting the various components it must comprise.

At any time it is possible to check the validity or the correspondence to the chosen detection classes (refer to "*Detection Classes*"), by means of the flow rate calculation tool supplied.

There is also a section-specific menu bar with the following buttons:

-  , buttons to cancel or repeat the last operation in the memory, limited to each floor
- , button to start the tool for the flow rate calculation
- , button that automatically generates a system report and the calculation of the flow rates in DOC format
- , button that generates a JPG file, captures screenshots of the designer's current video screen

The captured screenshots are saved in a folder, accessible via the  button and are automatically inserted into the report document.

System layout limitations

During the drawing phase the software will, by default, have already set the parameters required or restricted by legislation.

In this way certain operations, such as failure to respect the minimum distances between objects are prohibited by the software, preventing the user from drawing or inserting elements in prohibited points.

For other types of operations that may fail to comply with the regulations, the FA/STUDIO has a flow rate calculation engine that warns of non-conformities or design defects.

System layout limitations	operation denied by the designer	flow rate calculation notice
overall length ≤ 160 m		✓
distance of a sample hole from the FA100 device ≤ 100 m		✓
distance of a hole from the next element ≤ 25 cm	✓	
distance between holes ≤ 10 cm	✓	
exhaust pipe length ≤ 10 m	✓	
distance of a sampling capillary kit from the next element ≤ 25 cm	✓	
distance of a T-fitting from the next element ≤ 25 cm	✓	
only one dust filter for each detector module	✓	
distance of a dust filter from the FA100 device ≤ 2 m	✓	
only one condensate trap per detector module	✓	
distance of a condensate trap from the FA100 device ≤ 2 m	✓	
no holes between the FA100 device and the dust filter	✓	
no holes between the FA100 device and the condensate trap	✓	
number of holes based on detection class		✓

Navigation

In the upper part of the drawing section are the navigation tools common to the main CAD modeling software:

- , allows top view of the drawing in its entirety
- , allows enlargement of a point in the drawing
- , zoom of the selected area
- , allows moving closer to or further away from the work plane ("Shift" + right mouse button)
- , to move on the work plane ("Ctrl" + right mouse button or directional arrows)
- , to rotate the view ("Alt" + right mouse button)
- , as per the  button without rotating the view

Once a navigation tool has been selected, to cancel or return to "normal" mode simply press the right mouse button or the "Esc" key on the keyboard.

Through the cube on the top left it is possible to rotate the view by clicking on an edge and dragging. By clicking on each face of this it is possible to have its default view.

Drawing operations are carried out on the work plane that coincides with the current view.

For each project there is the possibility of structuring the system on multiple floors, and for each of them it is possible to apply a different floor plan.

To add a floor it is necessary to open the left side panel and move the mouse over the roof of the "house". After doing so the **"Add"** button will appear.

It will be possible to change the label of the floors or their position (by means of the directional arrows)

To delete a floor, simply click on the relevant  button. This will also remove all the aspirating devices inserted on the floor in question as well as the associated floor plan.

Via the right side panel, under **"Floor plan"**, can be found three buttons that allow operations to import, export or delete a floor plan from the work plane.

Clicking on **"Load"** opens a window that allows the selection of a file in one of the 3 accepted formats (DWG, DXF, PDF). If a file in CAD format (dwg, dxf) is added, it will be necessary to specify the unit of measurement with which the Autocad file was created (metres, centimetres, millimetres). For pdf files it will be necessary to specify the floor plan scale.

The base work plane is the plane of the cube defined as "Top". The two-dimensional drawings will therefore be positioned on this plane.



Project floor plans



Plans





By means of the **“Export”** button it is possible to export in a CAD format the entire project (floor plan with the piping drawing). Only visible elements will be exported, as selected in the **“Layer”** panel.



Using the **“Delete”** button will only delete the floor plan and not the system that has been modelled. If it is necessary to hide the floor plan temporarily, it is sufficient to deactivate the **“Floor plan”** option found in the **“Layer”** section.

Viewing and layer

Through the right side panel **“Layer”** it is possible to set the display mode of the drawing area and the contained elements.

The following options allow both the display of the relevant element and the creation of a customized layer when exporting the project into a CAD format:

- **Holes**, option that highlights sampling holes
- **Index, Label, Diameter**, options that display via caption the numerical index on the piping, the description and the diameter of the hole
- **Coverage**, option that highlights the hole coverage area on the base plane
- **Length**, option that displays via caption the length of the branch of piping between two adjacent elements
- **Floor plan**, option that displays the drawing imported into the project

The following options affect display mode only:

- **Grid**, option that displays a grid on the base plane
- **Prospective**, option that simulates a perspective depth in the case of a three-dimensional view
- **Wireframe**, option that replaces 3D elements with linear graphic elements
- **Curve**, option which, during the piping drawing phase, automatically inserts 3D curves, with any appropriate corrections
The modification of this option applies to curves drawn from that point onwards and not to those already positioned
- **Text size**, bar for selecting the size of the writing displayed

FA100 Insertion



To add a FA100 device it is necessary to:

1. Open the right side panel.
2. Select the **“Device”** element on the **“Add”** panel.
3. See box bottom right.
Via the numeric keyboard, specify in cm the desired installation height of the device (default **“0”**).
4. Click on the point where the device is to be inserted or press the **“Enter”** button.
To cancel, press the **“Esc”** button or right mouse click on the text.

Clicking with the right mouse button on the device figure opens a contextual menu where it is possible to:

- associate the device with a real device that requires configuring
- rotate the device on the horizontal plane (if no pipes are connected)
- reorder the numerical index of the holes
- move the aspirating device along with the entire connected system
- delete the device and the entire connected system (if a device associated with a module configured in the solution is deleted, it will be disassociated automatically)
- display the information panel

Modelling the piping



Through the right side panel under **“Add”** option, it is possible to select the **“Pipe”** button. At the same time, yellow arrows appear on the work plane at the points where pipes can be added.

If a new FA100 has been added there will be two main couplings **“D1”** and **“D2”**, relating to the two FAD100 internal detector modules and the exhaust pipe.

By clicking on a vertical arrow it is possible to move up or down in order to insert piping, whereas the horizontal arrow moves in all 4 directions on the plane. By right clicking on the mouse the piping interrupts.

Via the numeric keyboard, it is possible to enter the length of the pipe expressed in cm (see the box at the bottom right).

To shorten the inserted pipe, click in the direction opposite to the pipe or enter a negative value via the numeric keyboard.

To lengthen a pipe beyond the size of the screen, it is possible also to select the pipe and move around using the directional arrows on the screen and on the keypad.

Through the contextual menu (via the right mouse button), it is possible to delete a branch or consult the data.

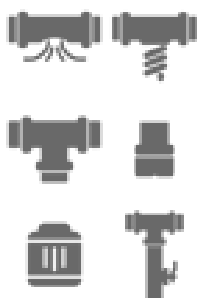
In the drawing phase of the piping, the software allows 90 degree direction changes. The result, however, changes depending on the **"Curve"** option:

- option active: the software automatically inserts a "curve" element and consequently corrects the position of the piping, depending on the size of the curve.
- option not active: no graphic element is inserted into the piping which follows the direction and the position of the piping as it is drawn

Note

It is recommended to exit the Add pipe mode before selecting any other designer function (pan, rotate, zoom, etc.), in order to avoid drawing pipes unintentionally.

Holes, capillaries, T-fittings, end caps, filters, condensate traps



To add an element to the system it is necessary to select the relevant button from the **"Add"** tool panel on the right.

Pointing the cursor on one of the pipes (not exhaust pipes) shows a line indicating the distance from the start to end of the pipe. Left mouse click to insert the element, right click to exit **"Add"** mode.

Using the numeric keyboard, it is possible to enter a value expressed in centimetres (see box at the bottom right) which will indicate the distance from the previous point (if a value > 0 is entered) or from the next point (if a negative value is entered).

Using the contextual menu (right mouse click) it is possible to:

- rename the hole
- set the length of the capillary
- set the hole size
- move the element
- delete the element
- consult the data

Moving a T-fitting to another point in the system also moves any connected branch in the same original direction.

By eliminating a T-fitting any connected branch will also be eliminated.

By inserting a T-fitting in the last 25 cm of a pipe, it will automatically be inserted at the end of the pipe as a sort of end cap from which a further 2 branches can be added.

Note

If the distance constraints are not respected, the element will not be added to the system.

1.11

Flow balancing and flow rate calculation

Once the aspirating system has been designed, the pipes distributed and the holes positioned, it is necessary to calculate the programming data to be loaded on the FA100 device (sensitivity, nominal flow, fan speed and class) and ensure that the constraints foreseen for the detection class requested by the designer based on the project needs and regulations are respected.

This is possible by means of correct balancing of the flows of the sampling holes, respecting the transport times and the minimum and maximum flow values expected for the selected class.

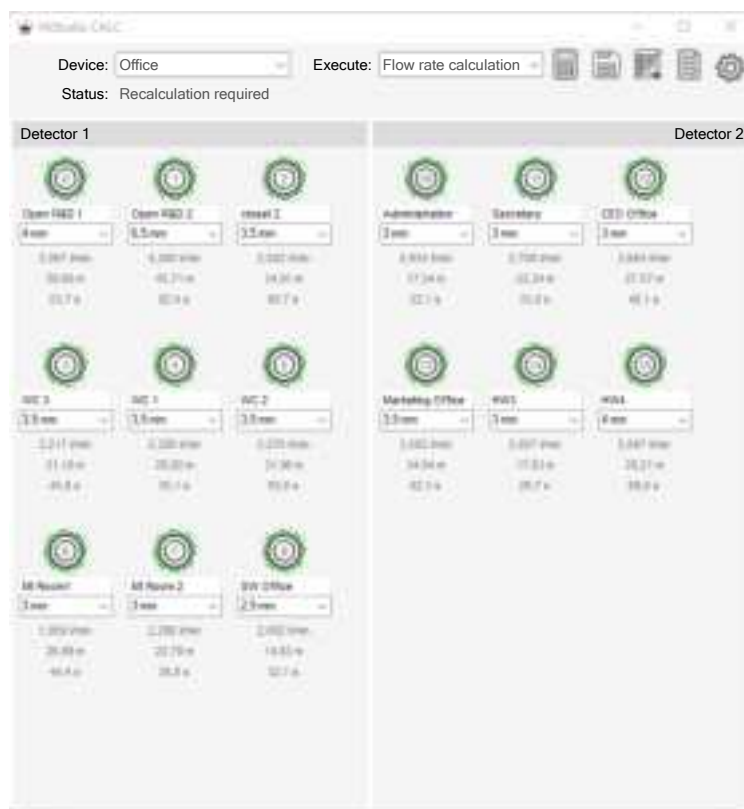
The flow balancing calibration (expressed as a percentage of the minimum air flow of a hole on the maximum flow) is an indicator of the quality of the aspirating system and is obtained from the calculation of the flow rates of all the sampling holes.

By respecting a minimum balancing value, each hole, even the one with the lowest flow rate, will supply a sufficient quantity of air to guarantee the detection of smoke for the established class and all the others, with a greater flow rate, will have better sensitivity.

The FA/STUDIO has a section for the calculation of the flow rate and balancing. In this section there is a calculation engine that provides the requested data, allowing the verification of the project and the visualization of any critical points.



The bar in the “Designer” section provides the “**Calculation of flow rates**” button which opens a window with the tools necessary for the required calculation and visualization of the holes with the relative data.



The window shows all the holes in the system, divided into two sections, one for each of the two FAD100 detector modules relative to the device selected in the “**Device**” box on the top left.

The appropriate parameters are shown for each hole:

- the hole icon, with the numerical index and a colour that changes depending on the outcome of the flow rate calculation (green for regular, yellow, orange or red if there are any critical issues)
- the name/label, editable
- the diameter, in millimeters, is editable, as returned by the automatic calculation of the flow rates, or entered by the designer
- the flow, flow rate of inspired air, expressed in litres per minute
- the distance from the FA100, in metres, i.e. the path of inspired air from the hole to the detector
- transport time, in seconds, the time it takes for the air to complete the path to the detector

If you use the hole display not as an icon but as a table, the following values are also shown:

- the percentage of the hole flow on the total flow
- the flow deviation, i.e. the percentage of the hole flow on the flow average
- the sensitivity, in mdB/m, i.e. the sensitivity of the detector relative to the single sampling point

To carry out the required calculations and to set or view other parameters it is possible to use the buttons at the top:



-  , button to start the calculation selected in the **"Run"** box
The operations that can be performed are:
 - **Calculation of the flow rate**, using the data entered by the designer for each hole and for the aspirating device, it is possible to calculate the flow rate and check the system
 - **Optimize flow**, this operation looks for a configuration of the holes in such a way as to obtain the maximum balancing with the lowest possible aspiration speed, based on the entered sensitivity class.
 - **Optimize time**, this operation looks for a configuration of the holes that provides the shortest possible transport time with the lowest aspirating speed, based on the entered sensitivity class.

The optimization operations perform exactly the same algorithm, therefore, if one of the two has not given a valid solution, the other will be unable to find a valid solution.

The optimization calculation procedures can be further improved via the "Optimization level" option available in the "*Configuring the software settings*" section.

The result of the operations is also viewable, in a summary manner and with icons, via the **"Status"** string:

- "Calculation performed", the software correctly performed the requested operation and returned correct data on the flow rate, sensitivity and transport times.
 - "Operation failed", based on the layout of the system, the position of the holes and their size, it is not possible to estimate an acceptable flow rate.
In most cases it is necessary to reduce the size of the system or the number of holes.
In most cases it is necessary to reduce the size of the system or the number of holes, alternatively the operation can be repeated by enabling the "Simplify capillary calculation" option available in the "*Configuring the software settings*" section.
 - "Recalculation required", the data displayed has not been updated.
This occurs when either a calculation operation has never been performed, or a parameter that affects the calculation has been modified.
-  , button to save the current configuration
The calculated data (fan speed, pipe diameter, nominal flow and sensitivity of each detector module) are applied to the configuration pages of the *device* and the *detector modules*.
 -  , button to change the display mode in the window (icons/table)
 -  , button to open a section with the results of the performed calculation
 -  , button to open *configuration section* with the parameters for calculating the flow rates (aspirating speed, pipe diameter, pressure, altitude and temperature)

Statistics

The **"Statistics"** section that is opened by the  button shows the results of the last operation performed (flow rate calculation or automatic balancing).

This returns the following parameters, split between the two detector modules plugged into the FA100:

- total length of the pipes connected to the detector, in metres
- longest transport time between all pipe holes, expressed in seconds
- the total flow rate, in l/min or m/s
- the average flow rate of the holes
- the balancing
- the number of holes compliant with sensitivity requirements compared to the total number
-  ,  ,  , warning icons with the relevant notification:

- "Number of holes too high", it is advisable to change class or reduce the number of holes
- "Exhaust pipe too long", it is necessary to change the layout of the system
- "Flow too high", it is advisable to reduce the number or size of the holes
- "Transit time too high", it is advisable to increase the fan speed or the diameter of the holes
- "Balancing value too low", it is advisable to reduce the fan speed or change the diameter of the holes
- "Distance value too high", the layout of the system must be changed
- "Total length value too high", the layout of the system must be changed
- "Total flow rate too low", need to increase the size of the holes

1.11.1

Flow rate calculation parameters



The flow rate calculation section contains the "Calculation parameters" section for configuring some parameters of the FA100 module selected under "**Device**" option and its FAD100 detectors modules.

The available parameters are those used to calculate the current flow rates or to correct any critical issues detected.

In the case of automatic balancing, in this section the software shows the optimal values calculated for programming the device. These values are automatically entered in the configuration of the corresponding parameters (see configuration of *main* and its *detector*

modules), after a click of the  button on the calculator window.

The parameters for the FA100 device available here are:

- **Aspirator speed**, to be entered in the box, in revolutions per minute (RPM)
- **Ø internal Pipe**, pipe diameter, in millimetres

The parameters for the detectors entered in the FA100 device are:

- **Sensitivity**, ($\times 10^{-5}$ dB/m)
- **Class**, detection class (A, B, and C)

To these are added the following parameters used to calculate the flow rates:

Pressure, Altitude, Temperature, atmospheric pressure, altitude and temperature of the installation site

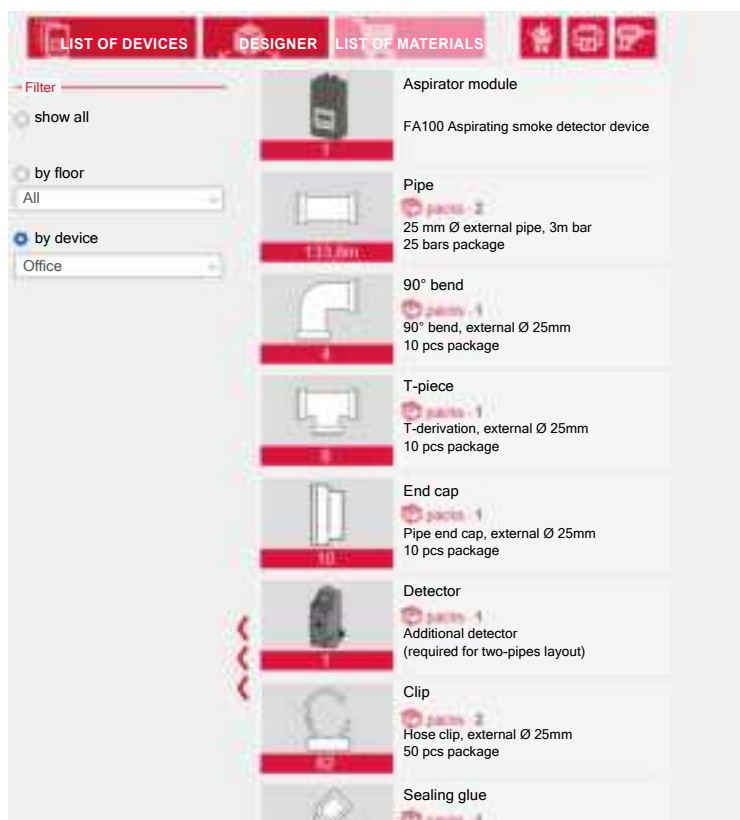
1.12

List of materials



The section for the "List of materials" provides the complete list of materials necessary for the installation of the system as designed inside the FA/STUDIO solution.

In this section the list can be filtered, changed by adding or not further materials and displayed on the screen or through the preparation of documents useful for the purchase order.



In the centre of the section is the list of materials, depending on the display filter as set in “**Filter**” panel on the left.

This panel can be expanded or collapsed by means of the appropriate arrows.

For each type of material listed, the following is shown:

- icon with the number of pieces (or total length of the piping)
- description of the material
- measurements of the single piece
- number of pieces per package
- number of packages required

The software also automatically adds materials that are not explicitly inserted by the designer (clips, fittings, glues, etc.). The number of these pieces is estimated based on what is necessary for the installation of the designed system.

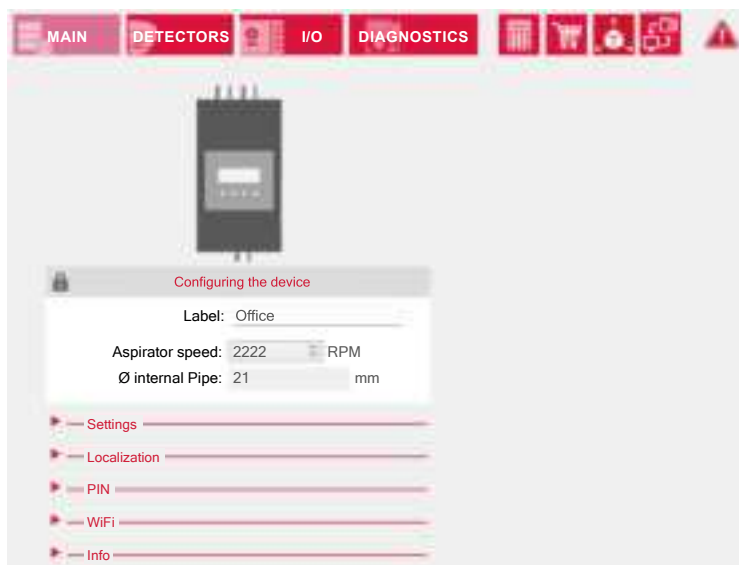
There is also a section-specific menu bar with the following buttons:

- , button to add to the list of materials for the selected FA100 device other pieces not foreseen by the project and the software
- , button that automatically generates a document (XLS or PDF) or a printout of the current filtered list
- , button that opens a section with a summary of the number of holes and their various sizes, inherent to the list with the current filters

Chapter 2 FA100 configuration



Selection, by clicking once on one of the FA100 devices listed in the “List of devices” section, gives direct access to the configuration tools of the selected device.



At the top will be visualized the access keys to further configuration sections:



- **Main**, first section reachable after selecting the device with the main configuration parameters



- **Detectors**, programming section of the two FAD100 detector modules installed inside



- **I/O**, programming section of the connection terminals for inputs and outputs available on the *mother board* of the FA100 device



- **Diagnostic**, section for the FA100 device diagnostic functions via a direct and real-time connection

Menu bar

The first three sections listed above also share the availability of the following keys:

- , button to start the flow rate calculation
- , button to access the “Materials list” section
- , button to access the “Designer” section with the device at the centre of the display (if the device has been connected to the machinery being configured)
- , button to open a window for entering the data necessary for connection with the FA100 device (COM port and IP address)



The presence of the warning icon alerts the programmer to the presence of critical issues or noteworthy reports.

2.1 Main system configuration



Configuring the device

This section is divided into further sub-sections.

Attention!

The parameters available in this section can only be modified after clicking on the  icon and after visualizing the warning message:

Changing the fan speed will invalidate the flow calculations.

The value of these parameters should derive from a calculation performed using the software (refer to the specific *section*) or the *pre-calculated* tables supplied. Furthermore, it also depends on the design of the pipes and the location of the holes. Consequently, modifying these parameters might compromise the correct functioning of the device.

- **Label**, editable name/label of the device
- **Aspirator speed**, to be entered in the box, in revolutions per minute (RPM)
- **Ø internal Pipe**, pipe diameter, in millimetres

Settings

The parameters and options available here are:

- **Power fault delay**, this is the time interval expressed in seconds, that once exceeded due to the persistence of a power problem, will allow signalling of the relative fault signal.
- **Automatic alarm restore**, if activated, this option allows reset of the status of warning/alarm (LED signals, LCD display, relays/outputs status) when the measured smoke level drops below the thresholds.
- **Key press tone**, if activated, the pressing of the keys on the front of the FA100 will generate a “beep” sound.
- **Ancillary power supply**, if activated, the power of the FA100 from the “AUX” terminals will be monitored.
- **Event tone**, if activated, the FA100 will reproduce a sound when an event occurs.
- **Loop interface enabled**, if activated, prepares the FA100 for connection to a Inim Electronics fire control panel loop.
- **Aspirator enabled in maintenance**, if activated, the aspirator will switch off when the FA100 device is placed in maintenance mode.



Localization

The presence of the “info” icon allows the opening of a window with the diagram of related connections.

Section to set the language, date and time of the FA100.



One mouse-click on the  button directly sets the data indicated on the device.

PIN

Section for the modification of the installer PIN.

The default Installer PIN is “111111”.

WiFi

Section for setting the parameters of the Wi-Fi communication board.

If the FA100-WIFI board is installed, it must be enabled by activating the “**Wi-Fi enabled**” option.

It is also possible to specify the operating mode of the Wi-Fi board:

- **Station**, module installed within an existing network, reachable via its own IP address
- **Access point**, the module creates its own network to which it will be necessary to connect in order to monitor the FA100

Info

Information regarding the firmware version, hardware, programming data version and serial number of the FA100 device.

2.2 Configuration of detectors



The software section for the configuration of FAD100 smoke detector modules that the FA100 is equipped with, is divided into two sections, both the same, but each one dedicated to a specific detector module.

The two detector modules can be distinguished as follows:

- **1**, left detector module
- **2**, right detector module

If a detector module is enabled, by activating the “**Enabled**” option, the following parameters can be set:

- editable name/label of the detector
- **Class**, detector module classification (A, B or C according to EN 54-20)
- **Sensibility**, smoke detector alarm threshold (x 10⁻⁵ dB/m)
- **Nominal flow rate**, value of the nominal intake air flow in liters/minute

Attention!

The value of these parameters should derive from a calculation performed using the software (refer to the specific *section*) or the *pre-calculated* tables supplied. Furthermore, it also depends on the design of the pipes and the location of the holes. Consequently, modifying these parameters might compromise the correct functioning of the device.

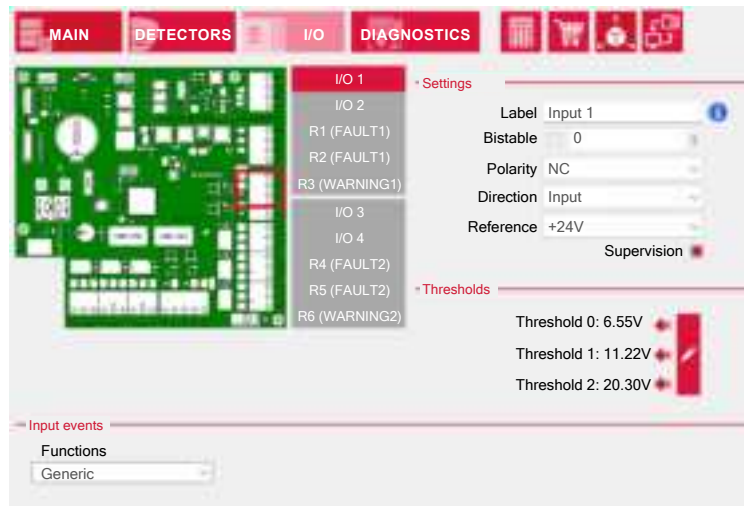
• Thresholds

- **Warning**, activation threshold of the smoke detection “warning”.
Expressed as a percentage and can be set between 20% and 100% (the latter value represents the alarm threshold).
- **Customized**, the customized activation threshold.
Expressed as a percentage and can be set between 20% and 150% and therefore can take on extremely low values (“early” warning) or higher than the alarm threshold.
The box next to it allows you to give a name to this threshold (used for example in the Events log).
- **Flow fault**, minimum (low flow) and maximum (high flow) measured flow failure thresholds, expressed as a percentage.
For example, a minimum threshold of -15% means that the device will report a low flow fault when the measured air flow is reduced by 15% of the nominal flow rate.
- **Temperature event**, activation threshold of the “Temperature above threshold” event (used in I/O programming).
Expressed in °C and can be set between -20 and +60 °C.
- **Fast logging**, in the detector history, this represents the level of smoke detected beyond which the data saving frequency going from 1 per minute (standard saving speed) to 1 every 3 seconds (higher speed which allows for a greater level of detail in the event of a fire).

2.3 Configuration of terminals



The programming section of the connection terminals contains a list of the selectable terminals and a representation of the *mother board* of the FA100 device on which the selected terminal is highlighted.



Depending on the selection, the following sections appear with the parameters and options relating to the configuration terminal:

- **Settings**

- **Label**, editable name/label of the terminal
- **Bistable/Monostable**, applies only to the output terminals and indicates the activation mode:
If "Bistable", the output activates in the presence of the programmed event and deactivates when it resets.
If "Monostable", the output activates in the presence of an event for a programmable time interval and then deactivates regardless of the event.
In the case of a monostable output, the activation time must be entered in seconds.
- **Polarity**, selectable between normally open and normally closed.
- **Direction**, selection of the type, between input and output
- **Reference**, option to indicate whether the input is connected towards +24V or towards ground (GND)
- **Supervision**, an option which, if enabled, allows monitoring on the terminal connections and the reporting of any faults (short circuit or open circuit).



The presence of the "info" icon allows the opening of a window with the diagram of related connections.

Note

Supervision requires the use of balancing resistors.

- **Thresholds**, section that allows the modification of the activation thresholds foreseen for the input, i.e. the transition values between the reset, activation and fault statuses.

These values can be programmed by opening the appropriate window via the  button.

Note

When modifying the parameters it is necessary to write the programming on the device before activating the real-time reading of the terminal, otherwise the values read may not be the true values.

In this window it is possible to modify and display the threshold values on a graph, select the relative unit of measurement (Volt or Ohm) and access other parameters indicated above.

The level of each input is continuously measured by the device and compared to programmed thresholds to establish the input status (stand-by, activation, fault).

The status of the input depends on the settings (supervision, polarity and reference) in accordance with the following table:

Supervision	ON	ON	ON	ON	OFF	OFF	OFF	OFF
Polarity	N.O.	N.C.	N.C.	N.O.	N.O.	N.C.	N.C.	N.O.
Reference	GND	+24V	GND	+24V	GND	+24V	GND	+24V
Threshold 2	Open circuit	Shorted circuit	Open circuit	Shorted circuit	Stand-by		Activation	
Threshold 1	Stand-by	Stand-by	Activation	Activation				
Threshold 0	Activation	Activation	Stand-by	Stand-by	Activation		Stand-by	
Minimum value	Shorted circuit	Open circuit	Shorted circuit	Open circuit				

The  button allows direct connection with the FA100, making it possible to read the current value of the terminal on the graph in real time.

- **Input events**, this section presents the “**Functionality**” box for the selection of the functions to be associated with each input.
 - **Generic**, a generic input can only be used to condition the activation of a programmable output (refer to “*Output events*”).
 - **Rearm**, function of the input that resets the FA100 device.
 - **Mute buzzer**, function of the input that bypasses the audible signals of the device.
 - **Maintenance**, function of the input that places the device in maintenance mode.
 - **Detector bypassed**, function of the input that bypasses a FAD100 detector module. When a detector module is bypassed, all output activations and alarm and fault signals are deactivated.
 - **Relay supervision**, input function for monitoring the status of a relay output of the device. By clicking on the  icon it will be possible to view the wiring diagram.
 - **Conventional zone supervision**, function of the input for monitoring a zone of a conventional fire control panel. By clicking on the  icon it will be possible to view the wiring diagram.
- **Output events**, this section presents a box for the selection of the events connected to the activation of the output.
 - **None**, the output will always be deactivated unless it is activated by the inputs (with “Generic” function) selected with “OR” logic.
 - **Always active**, the output will always be activated unless it is deactivated by the inputs (with “Generic” function) selected with “AND” logic.
 - **Alarm**, the output will activate when the selected detector modules go into alarm status.
 - **Warning**, the output will activate when the selected detector modules exceed the warning threshold.
 - **Fault**, the output will activate in the presence of the selected faults, general or via detector module.
 - **Customized**, the output will activate when the selected detector modules exceed the customized threshold.
 - **Temperature above threshold**, the output will activate when the selected detector modules detect a temperature higher than the set threshold.

- **Loop remote output**, the output will be driven by the fire control panel connected through the loop.
- **Date change**, the output will activate when a date/time change is performed on the device, manual or automatic intervention, as in the case of summer/winter time changeover.
- **PIN OK**, the output will activate when a user or installer accesses the device using a valid PIN.
- **Invalid PIN**, the output will activate when the device detects an attempt at access using an invalid PIN.

The activation of the outputs for "Alarm", "Warning", "Fault", "Custom", "Temperature above threshold", "Loop remote output", "Date change", "PIN OK", "PIN wrong", can be conditioned by the inputs (with "Generic" function) with "AND/OR" logic.

It is not recommended to use the "Date change", "PIN OK" and "Invalid PIN" events with a bistable output otherwise this can only be deactivated when the device is reset.

Chapter 3 Diagnostics



The diagnostic section of the FA100 device comprises various sections reachable via the buttons available on the top left:

- , button to access the diagnostics of the FA100 motherboard
- , button to access display of the graph of the data measured in real time by the FAD100 detector modules as function of the time
- , button to access the remote reproduction of the frontal part of the connected FA100 device, with its buttons and display
- , button to access the "Detector history", graph of data stored by the detector modules in a non-volatile memory as function of the time
- , button to access the Events log (data logger)

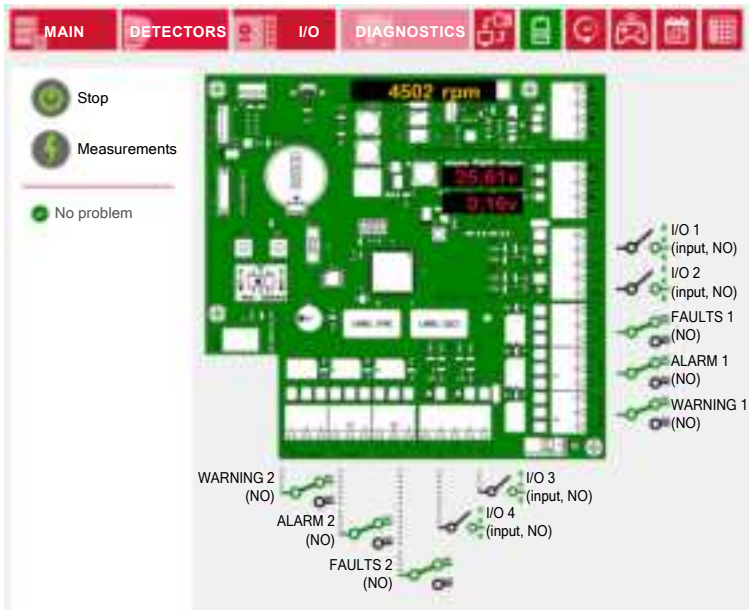
Note

Before starting a real-time session, it is necessary to write the current programming or read it from the connected device, otherwise the data received may not be reliable.

3.1 Diagnostics of the motherboard



The FA100 motherboard diagnostics section shows a reproduction of the board with details of the terminals.



The  button on the left starts a direct connection with the FA100 which provides the opportunity to view the status of the terminals in real time and the presence of faults, possibly signalled with an icon alongside (, , ).

Faults

Possible faults signalled:

- “Corrupt programming”, the programming data is incorrect, missing or not present, so the device may operate as expected. It is necessary to reprogram the device.
- “Firmware update failed”, the update procedure was interrupted or failed. It is necessary to retry the update procedure.
- “Supervision fault”, the voltage on a terminal exceeds the programmed supervision thresholds, therefore the terminal is short-circuited or open. The device is operating correctly but the programming linked to the terminal is temporarily deactivated
- “Service mode”, the device is in maintenance mode therefore it is operating correctly but cannot generate any type of signalling, neither for specific faults nor alarms. By default, when in Service mode, the fault relays are activated and the aspirating system is operative, however these behaviours can be modified by means of the appropriate programming options.
- “Aspirator fault” indicates failure of the fan. The device is operating correctly but the aspirator fan is not spinning at the programmed speed. Checking the fan connector is recommended.
In these cases, a “Low flow fault” is also displayed but such a fault also occurs in the event of an obstruction in the system.
- “Loop fault”, it occurs when the loop is no longer reachable or has been enabled and not yet connected. In this case, it is necessary to check the connection with the control panel and verify that it is operating correctly.
- “Loop Isolator Open”, it occurs when the device detects a shorted or open circuit on the connection with the loop.
- “Primary power fault”, it occurs when the Mains power is below the minimum threshold value. The device will continue to operate correctly however the fault will be signalled. Check the connection and functionality of the primary power supply.
- “Ancillary power fault”, it occurs if the secondary power supply has been enabled but is lower than the minimum threshold value. The device will continue to operate correctly however the fault will be signalled. Check the programming or the connection and functionality of the secondary power supply.

Terminals

There is a label for each terminal with the description, type of terminal (input, output or relay) and polarity (N.C. / N.O.).

An icon is also associated whose colour represents the status of activation (**stand-by**, **active**, **fault**).

Status of **input** terminals:

polarity	stand-by	active	open circuit	short circuit
N.O.				
N.C.				

Status of **output** terminals:

polarity	stand-by	active	fault
N.O.			
N.C.			

Status of **relay output** terminals:

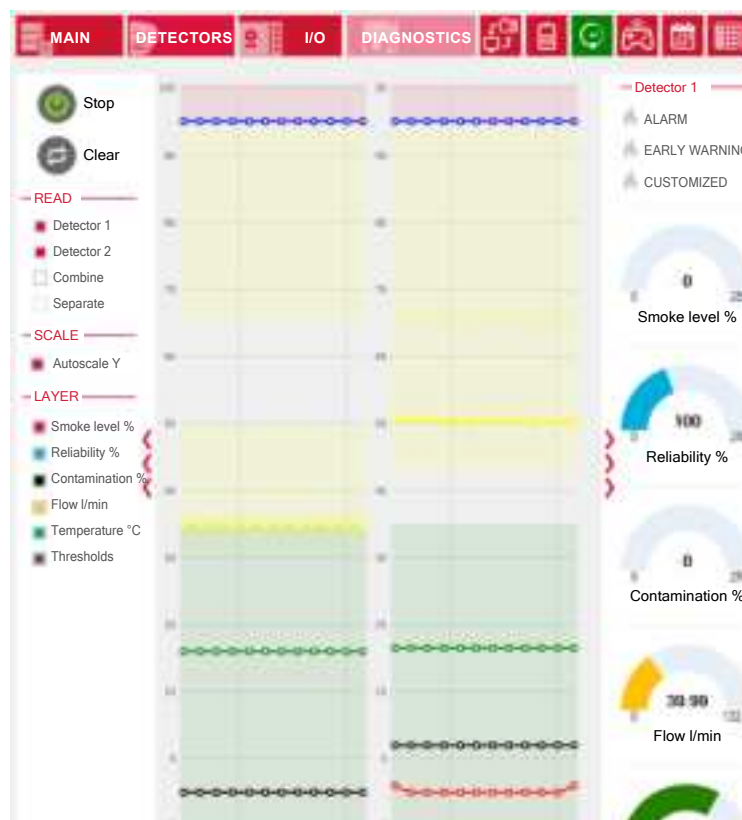
polarity	stand-by	active	fault
N.O.			
N.C.			

The  button on the left starts the reading of the fan speed (RPM), the voltage supplied by the primary and ancillary power sources.

3.2 Diagnostics of the detectors



The diagnostic section of the two FAD100 detector modules eventually installed in the FA100 device present in the central part a graph of the data measured in real time by the detector modules as function of time.



The  button on the left starts the reading of the data detected in real time:

- percentage of smoke detected with respect to the alarm threshold
- reliability, an indication that expresses the prevalence of particulates with a diameter of less than 1 μm in the aspirated particulate matter (particulates originating from combustion) compared to other contaminants (e.g. dust).
- contamination level of the detector module.
- airflow rate, aspirated, in l/min
- temperature, in °C

16:14:27		
	DETECTOR 1 Smoke level (%)	0
	DETECTOR 1 Reliability (%)	100
	DETECTOR 1 Contamination (%)	0
	DETECTOR 1 _ Flow(l/min)	39.74
	DETECTOR 1 Temperature (°C)	21

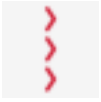
These values are reported on the graph via points, grouped into trend lines differentiated by colour.

By positioning the cursor on one of these points, the software shows in a label all the values read at that moment by the detector.

By activating the “**Thresholds**” option, the graph will also show the thresholds of the values read, as well as *programmed*, with the background colour:

- smoke level, contamination:
 - **grey**, stand-by status
 - **yellow**, early warning status
 - **red**, alarm status
- airflow

- **yellow**, regular flow
- **grey**, anomalous flow
- temperature
 - **green**, regular temperature
 - **grey**, temperature above threshold



The left and right panels can be expanded or collapsed by means of the appropriate arrows.

The **panel on the left** allows the displayed data to be filtered and to combine or not the data in a single graph the data relating to one detector module with those of the other.

The “Combine” option displays the data on a single graph sharing both axes. “Separate” splits the data onto two separate graphs, sharing the same timeline (X-axis) but with a separate scale (Y-axis).

The “Autoscale Y” option is used to adapt the Y axis to the data being displayed. If activated, the scale adapts automatically based on the data displayed. If deactivated, the scale follows the maximum and minimum value of the selected data.

The **panel on the right** provides a breakdown of the data being monitored, via level graphs and warning icons.

“ALARM”, “WARNING” and “CUSTOMIZED” indicate the activation of the 3 main statuses of the FA100. If these are grey in colour, it means that the device is in stand-by status. If the smoke level exceeds the set thresholds, the colour change of the icons will indicate the current status.

In this panel are also shown any faults related to the two detector modules.

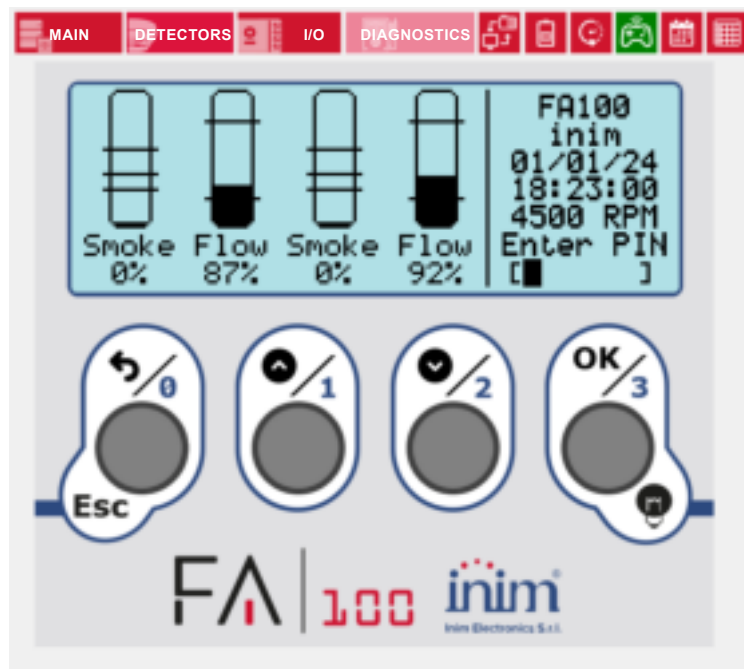
And finally there are level graphs that indicate the current value of the selected data with the indication of the maximum and minimum values.

3.3

Remote control



The FA/STUDIO software provides a section that allows remote viewing and control of the FA100 device to which connected via the  buttons.



Through this interface it is possible to use the device as if it were physically present, view what is reproduced on the display and navigate remotely through the various menus by means of the buttons that reproduce the real buttons on the front plate.

3.4 Detector modules history



The “Detector history” section shows a graph similar to the one available in the section regarding “*Detector diagnosis*”. The  “Read” button loads the historical data stored on the device relating to the detector modules.

Before starting a reading it is recommended to first read the device programming.

Note

Reading the history can take some time.



It is not only possible to read data directly from the FA100 device, but it can also be read from external files.

The  “Export” button saves the historical data that has already been read to a file, while by means of the  “Import” button it is possible to restore a previously exported backup.

The event memory table is shown in the bottom left section, where all the events are reported. These can be filtered by type and by clicking on each of them it is possible to highlight the date and time in which the event itself occurred.

3.5 Events history



The “Event history” section lists all the events present in the FA100 device memory (data log).

After having read the programming it is possible to click on  “Read”. The software will download all the events and list them on a table that can be sorted by date, event class and detail.

The  “Copy” button puts the data being viewed on the clipboard, making it possible to use this data with other software for specific analyzes or statistics or to print a report.



Inim Electronics S.r.l.

ISO 9001 Quality Management
certified by BSI with certificate number FM530352

Via dei Lavoratori 10, Località Centobuchi
63076 Montepandone (AP) - ITALY
Tel. +39 0735 705007 - Fax +39 0735 704912

info@inim.it - www.inim.it



DCMSINE0FA100-100-20240506