GALILEO 32

Gas contro panel
for addressable gas detectors

Manuale / Manual

EN

1. Introduction

The present manual explains the procedures for installing, operating and programming, as well as some aspects related to the commissioning and maintenance for the control unit Galileo 32.

1.1 DETECTION CONTROL PANEL CHARACTERISTICS

The GALILEO 32 is an advanced multifunction gas detection control panel designed to control and monitor up to 32 SMART 3G detectors connected on a closed RS 485 serial loop.

Always keeping the main focus on security, the GALILEO 32 control panel has been developed according to the European standards on functional safety, the SIL (Safety Integrity Level) requirements (European Standard EN 50402). Redundancy has been implemented in every module being part of the system and with the correct installation the system comply with the functional safety requirements up to SIL 3. On the GALILEO 32 front plate, an high brightness display provides an ongoing reading of the concentration being measured and, in case of an alarm, the alarm threshold attained and the respective channel.

The unit comes into a metal cabinet complete with 24Vdc, 5A power supply and offers the possibility to allocate 2 back-up batteries max. 12V 7 Ah.

An RS232C serial port for connection to a Personal Computer is available, which permits the remote programming of the control panel with a substantial reduction in time.
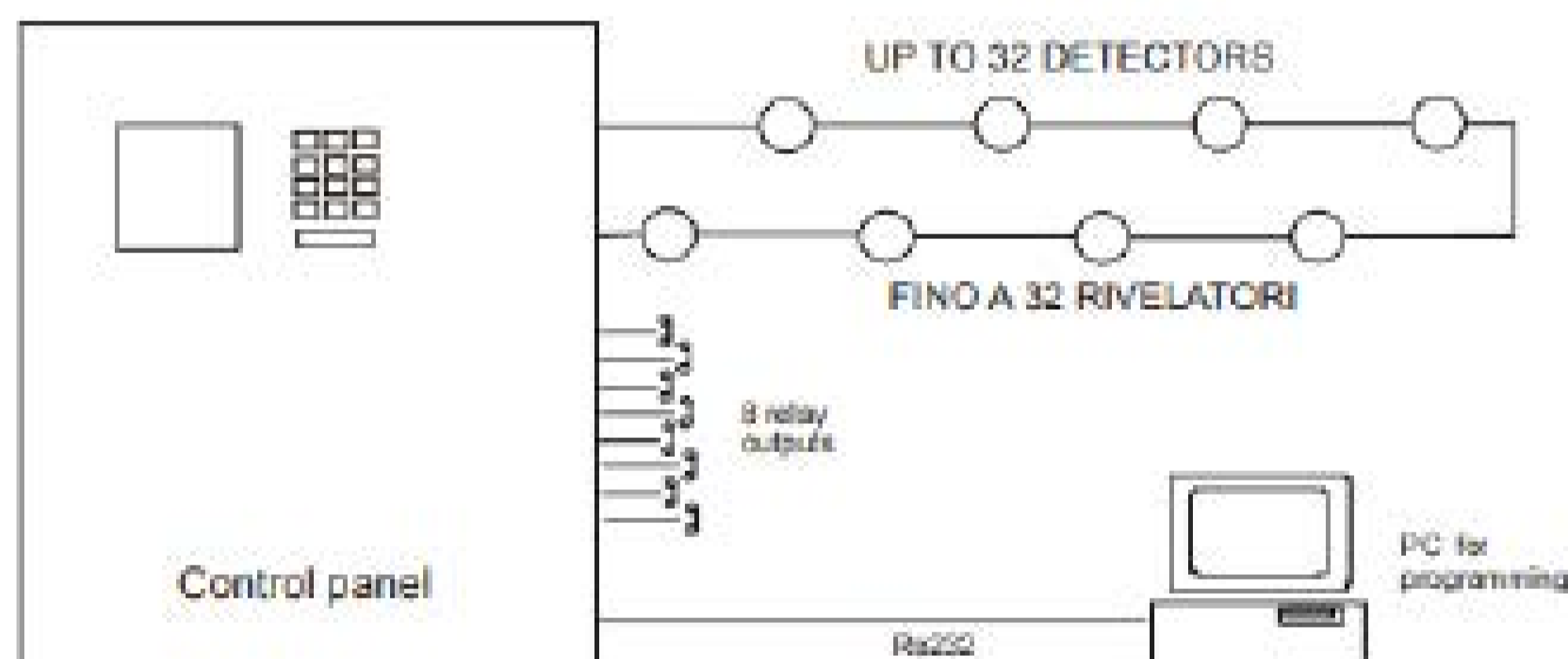
1.2 SYSTEM CONFIGURATION

Figure 1.2
System block diagram

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1.3 TECHNICAL SPECIFICATIONS

Housing	Metal cabinet 430 x 405 x 140 mm.
Inputs	Max. 32 detectors type SMART "S" on 1 x RS485 closed bus
Outputs	8 relay board mounted in the control panel
Relay contact rating	16 A 250 Vac
Serial ports	1 x RS485 and 1 x RS232
Power Supply	230V AC +/- 10% 50Hz
Power consumption	Max 10 VA
Backup battery	2 x 12V 7 Ah max
Display	LCD backlight 128x128 points
Visual indications LED	8 double LED on the front panel
Temperature	Operational 0-55°C Storage -20 / +70 C°
Relative humidity	Operational 15-85% Storage 5-85% (non condensing)

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2. Installation

2.1 CONTROL UNIT

Installation cabinet: IP20 minimum.

Devices installed in zone that have been classified and connected to control unit shall be protected with one of the types of protection listed in EN 60079-0, corresponding to their own category.

Analogue 4-20 mA detectors to be connected shall comply with the following interface specification:

- Signals < 3 mA will be interpreted as fault low.
- Signals between 3 mA and 4 mA will be indicated as negative signal.
- Signals between 20 mA and 21 mA will be indicated as signal above the measuring range.
- Signals > 21 mA will be interpreted as fault high.

Digital RS 485 detectors to be connected shall comply with the high security data transmission protocol SIL3.

Have the control unit mounted by using the three mounting holes on the back part of the cabinet.

Figure 2.1
a) Control panel cabinet

Connect the three core mains supply cable to the power supply terminals (1.5 mm^2 per core minimum) and have it secured with the appropriate cable grip.

Connect the Power supply and the RS485 line for the detectors to the terminal block before powering up the control panel.

After powering up the control panel, connect the red and black power supply cables fitted with Faston connectors to the 2 x sealed lead acid batteries (12 Vdc / 7 Ah max.). The battery should be carefully fitted inside the space at the left side of the cabinet.
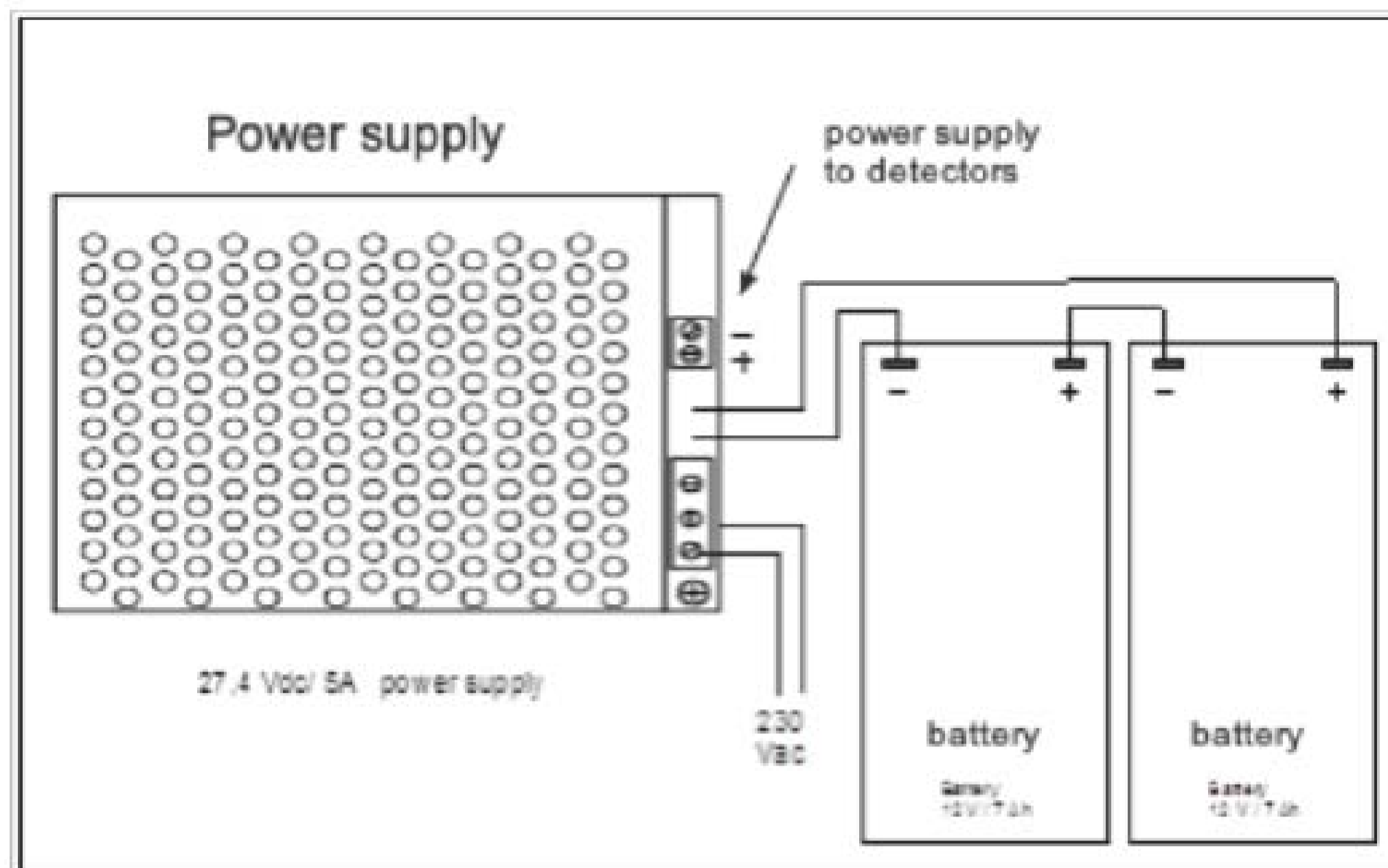
Figure 2.1
b) Power supply and battery connection details

2.2   GAS DETECTORS

GALILEO 32 gas control panel can be connected to Sensitron's SMART "S" detector version.

Detectors are to be duly installed according to the gas to be detected and in fulfilment of all EU or national rules in force. Before installing the gas detectors, we recommend to strictly follow what stated in the detectors' handbook and to consider the few rules given here below just as a generic prescription.

As a general statement, detectors should be mounted close to any possible source of release or where any eventual gas stagnation could be foreseen.

To measure a gas with specific weight higher than air, like Propane or Butane, the detectors should be installed at 30 cm. from floor. Whereas to detect a gas with specific weight lighter than air, like Methane or Hydrogen, the detectors should be placed 30 cm. from ceiling.

To detect Carbon Monoxide or Oxygen, we recommend to mount the detector at a breathing level or "nose height" about 150 cm. from floor, while for CO2 (Carbon Dioxide) detectors should be mounted at 30 cm from the floor.

For the remaining gases not mentioned as an example here above, we invite our customers to contact Sensitron or its local agent or to consult our Tutorial Guide to Gas detection. We remind that the correct positioning of a gas detector is vital to assure a prompt and accurate detection.

Communication between the GALILEO 32 and the detectors is by a closed RS485 loop. For the electrical connections, please refer to the Smart "S" detector instruction manual.

2.3   LAYOUT OF THE CONTROL UNIT MAIN BOARD

All connections of the GALILEO 32 control panel are to be performed on the main board. See below the layout.
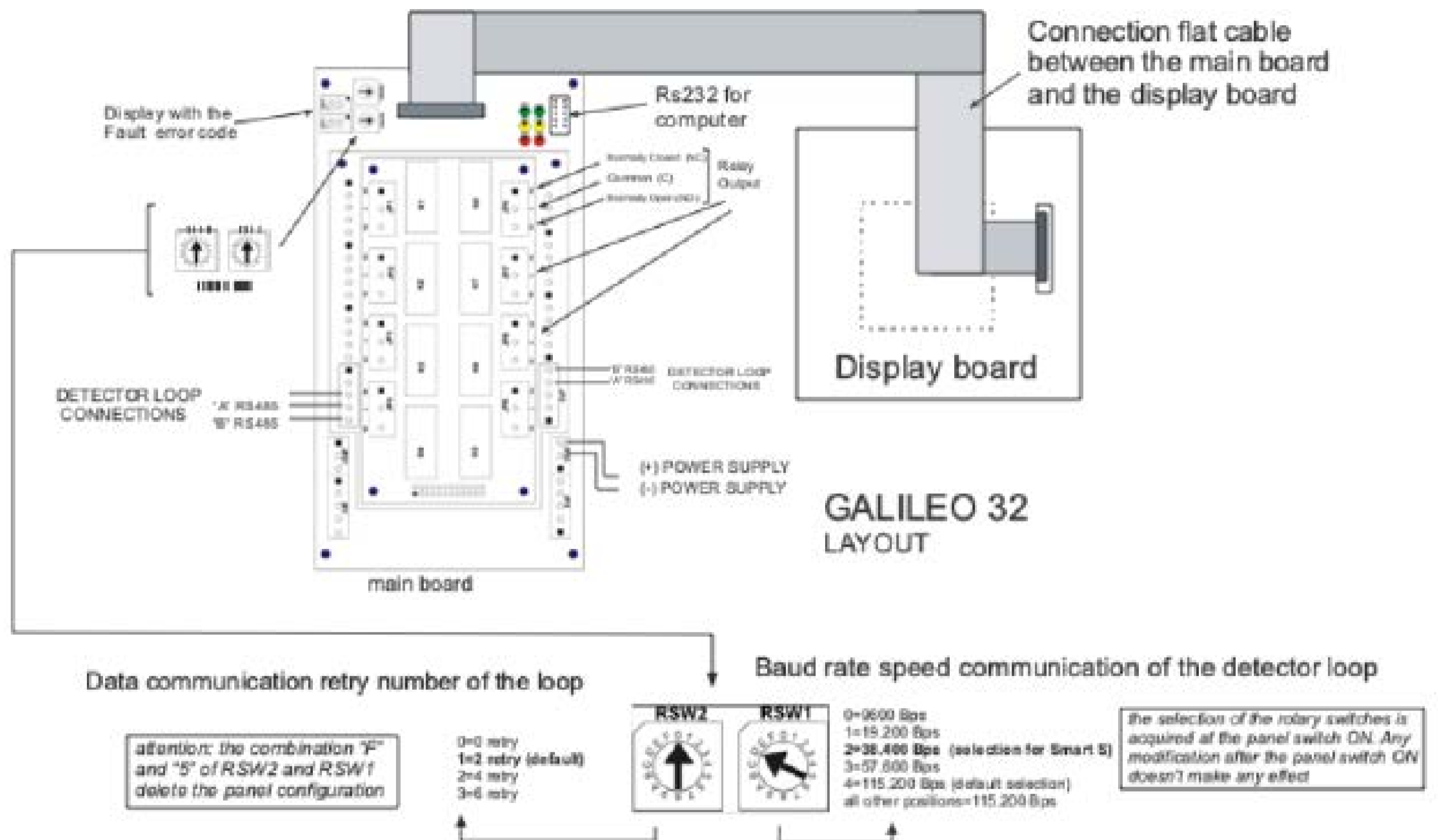

Figure 2.3
Main board layout

2.4   SYSTEM WIRING

Communication between the GALILEO 32 and the detectors is by a closed RS485 loop. The control panel constantly monitors the detectors. A break in the communication from any one of the detectors generates a Fault status in the control panel.

2.6   GAS DETECTORS CONNECTION

Wirings between the control panel and the remote devices should be made by a closed loop and by 4 wires: 2 wires for the RS485 communication and 2 wires for the power supply. The cable for the RS485 communication must an EIA RS485: 2 core wires with section 0.22 / 0.35 mm^2 and shield (twisted pair). Nominal capacity between the wires < 50pF/m, nominal impedance 120 ohm. These features can be found in BELDEN cable 9842 or similar (data transmission cable in EIA RS485). By this wiring, the line total length should not exceed 1000m.
Detectors are to be daisy chained. Absolutely avoid any star or tree mode connection to prevent interference or wrong communication.
Make sure that each multi-polar wire includes just one RS485.

For the detectors' power supply connection use a 2-wire cable with suitable section as a function of the distance and the number of detectors.

Once the installation has been completed and the system is powered-on, make sure that each detector gets at least 12 or 24 Vdc (it depends in the used power supply.

CONNECTIONS OF THE GALILEO 32 CONTROL PANEL
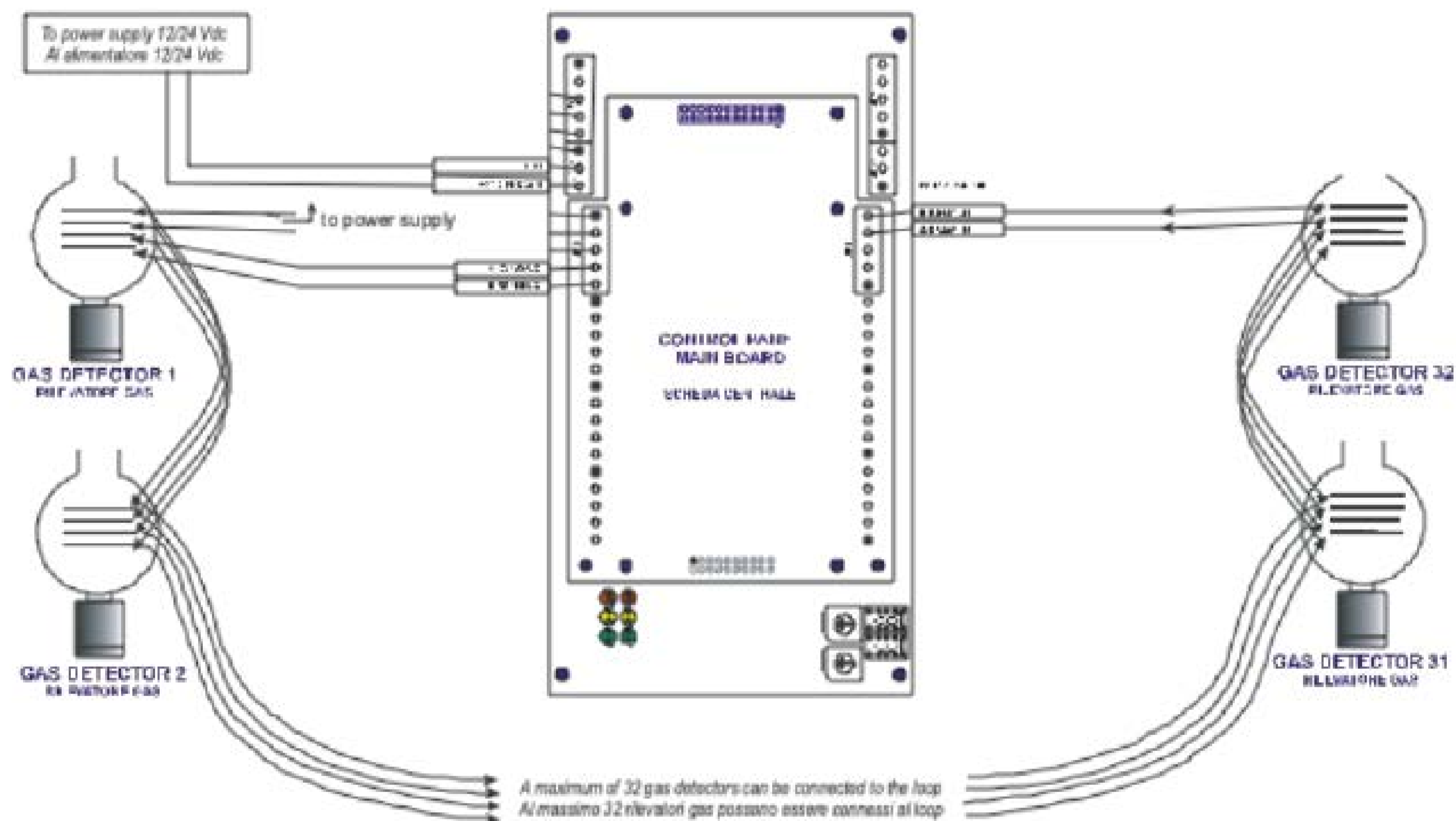### COLLEGAMENTI ALLA CENTRALE GALILEO 32

Figure 2.5
Detector connections

2.6   RELAY OUTPUT CONNECTION

For the programming of the relays functions, the PC software is required. Anyway, the relays 1, 2 and 3 are already set to trigger for System Fault (Relay 1 redundant with Relay 2) and for Emergency (Relay 3).

Relays from 4 to 8 can be configured by the user. The relay output is a single pole change over; this\ can be used to drive output devices that require a clean set of contacts, isolated from the output voltage.
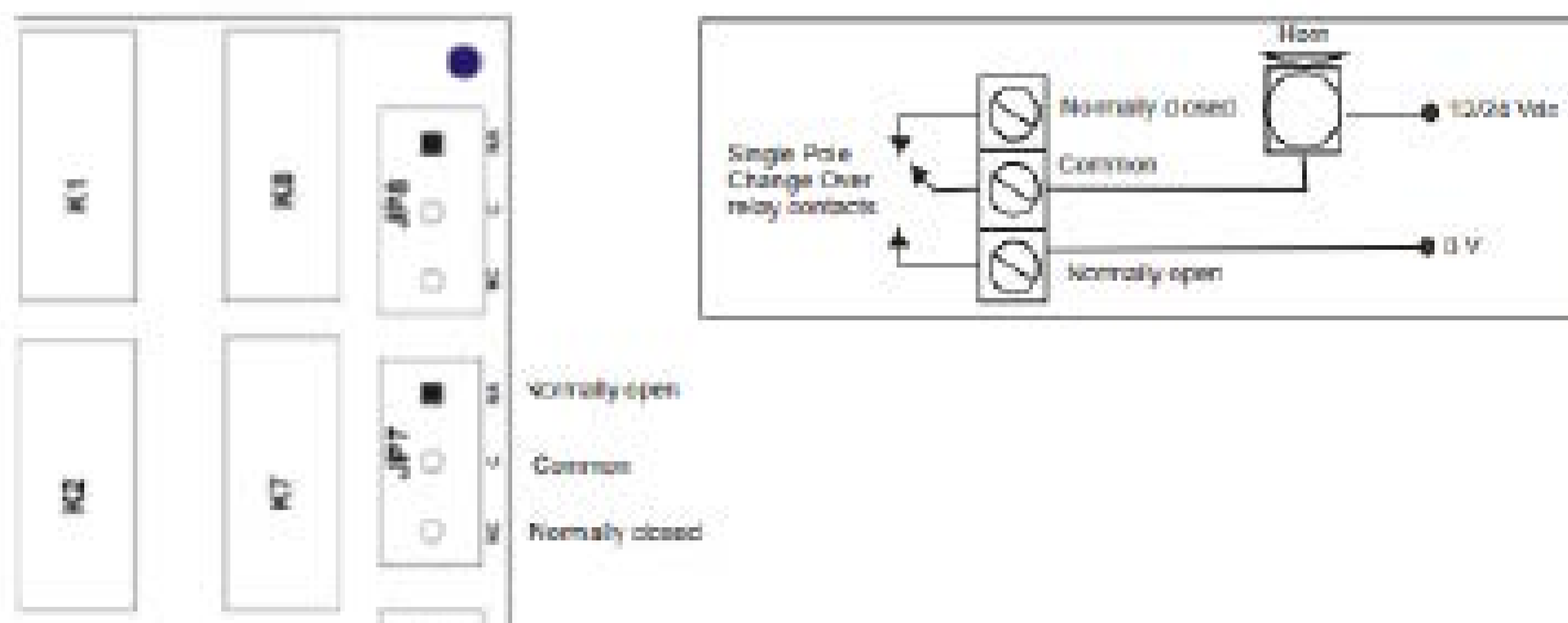

Figure 2.6
Relay output connection

2.7   SERIAL CONNECTION TO A PERSONAL COMPUTER

The control panel can be connected to a Personal Computer using the RS485 serial port, to permit initial programming.
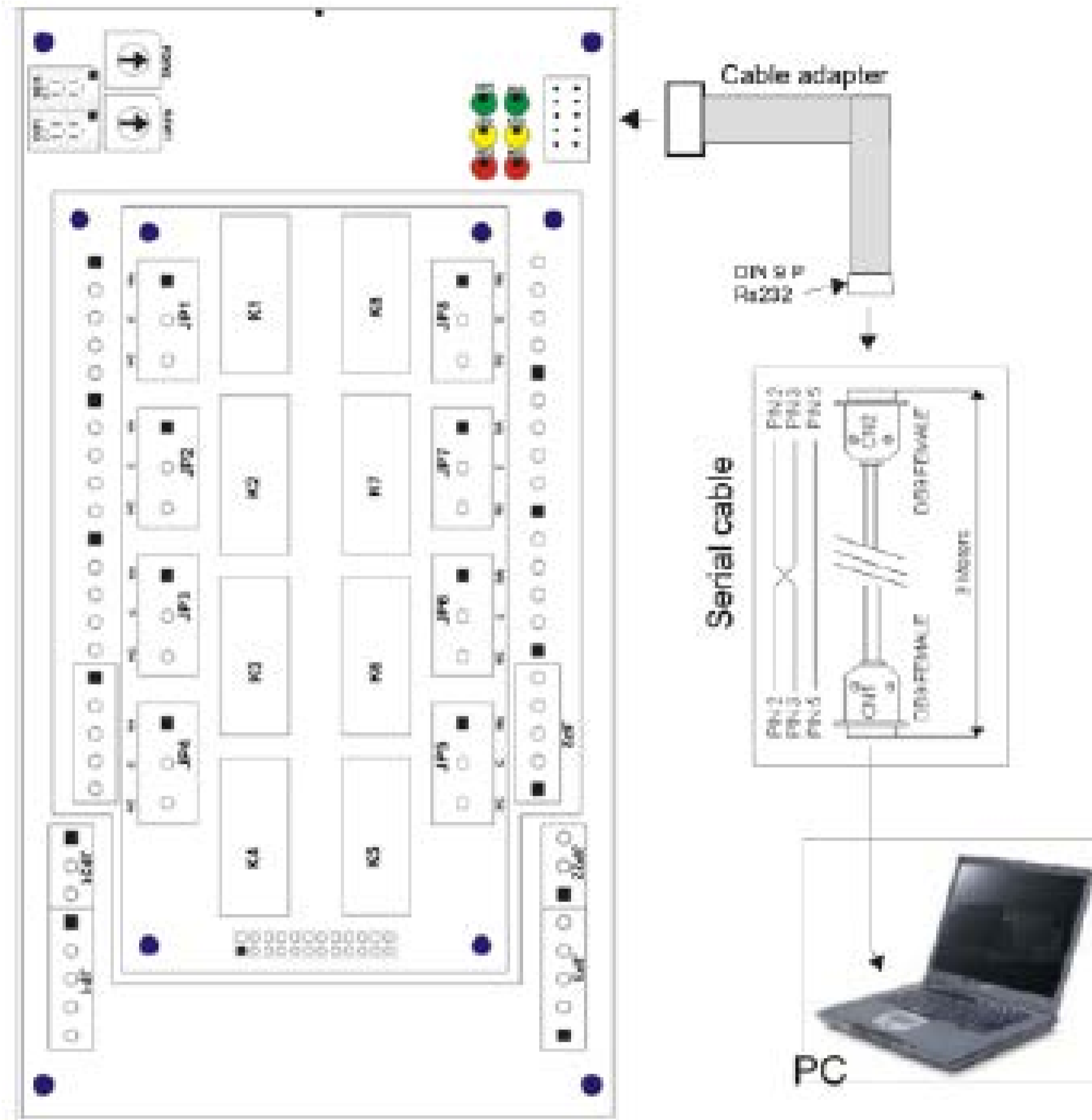Below the connection to the Personal Computer.

Figure 2.7
Personal computer connection

3. System power up and operation

The chapter explains the procedures for the operation, the commissioning and the maintenance of the control unit Galileo 32.
For the programming of the Galileo 32 control panel the PC software is required. The communication between the user and the central unit is done by means of an LCD display. In the various system states, various screens will be shown on display. A few general rules apply at any level as follows:

- - Should there is a list displayed, scrolling through may be done using the UP/DOWN and LEFT/RIGHT arrow keys. Once a selection has been made, in some menus, pressing ENTER key will switch to a more detailed view of that particular selection.
- All the arrow keys, UP/DOWN, LEFT/RIGHT are being used also to move through the parameter under change fields.
- At any display level, pressing the ESCAPE key instead will switch back to the previous view. Pressing twice the ESCAPE key will take back to the main screen.
- The same, at any display level, should the keys are not pressed for more that 3 minutes, the view will automatically switch back to the main window of the Normal mode.

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3.1   POWER ON

After ensuring correct installation of the Galileo 32, the unit can be switched on. When first switched on, after the "Warm Up" time (3 minutes by default – programmable 120-180 seconds) the control panel display will show an empty picture without any indication because, at the first switch ON, in the control panel there is not any programming.

Figure 3.1
a) Warm Up screen.

The control panel programming must be performed just by the Personal Computer with the dedicate configuration software (see the previous paragraph for the connection of the control panel to the PC).
For an already configured control panel, the normal screen will show eight channels (detectors) with their status:

Figure 3.1
b) Typical NORMAL state screen.

3.2   SYSTEM STATES

The system is designed so that it may be at a certain moment in one of following operating modes, which will be comprehensively explained in the following chapters:

- NORMAL
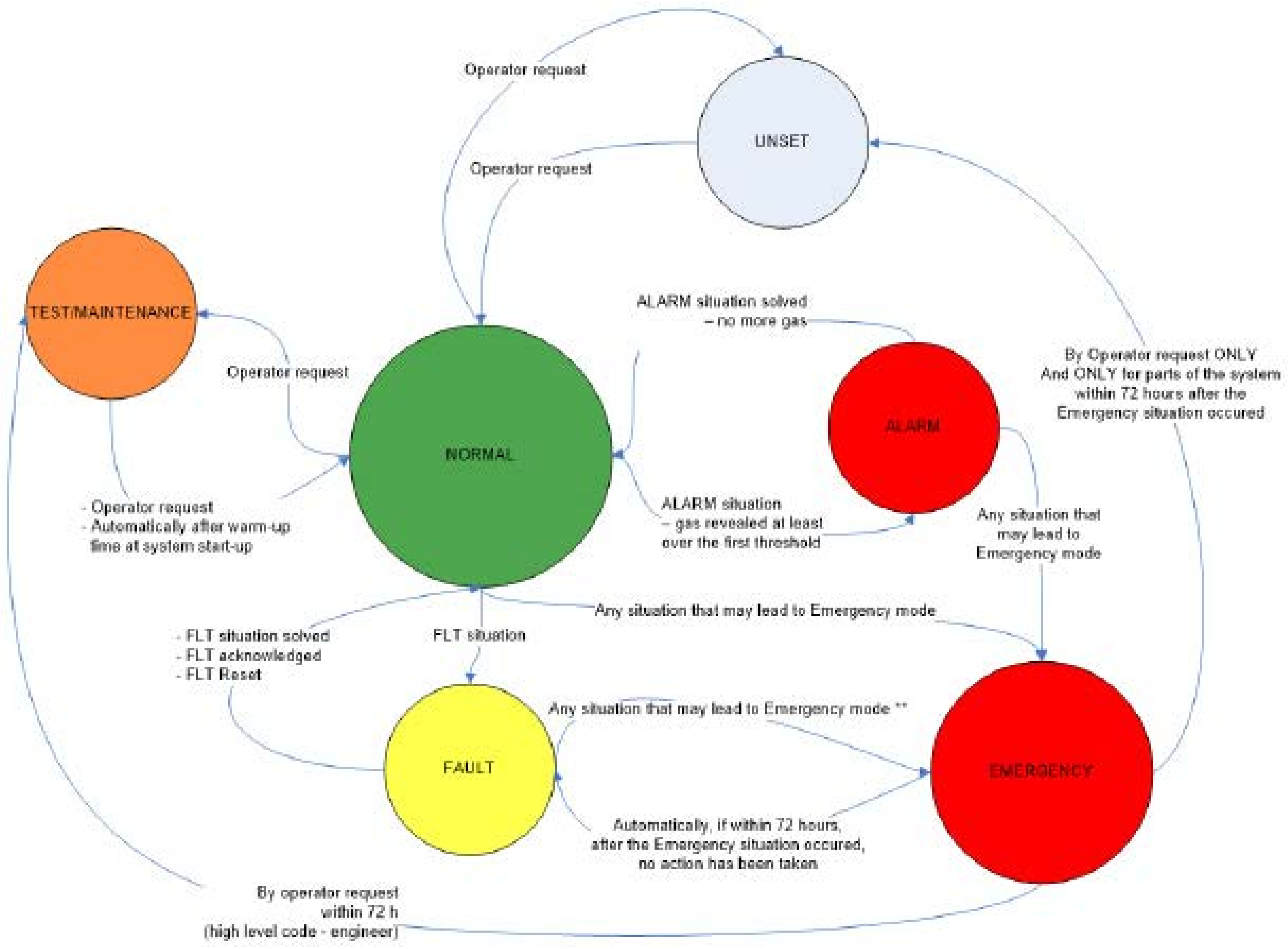- ALARM
- FAULT
- TEST/MAINTENANCE
- UNSET
- EMERGENCY

Figure 3.2
System states diagram.

3.3   NORMAL

This is the system state when everything works properly and there is no Alarm and no Fault notification. Under this condition it is possible to visualise the current status of the inputs.

On LCD display, in the main frame the 8 channels information is shown, with the actual concentration, as configured in the related channel.

Figure 3.3
Typical NORMAL state screen

3.4   ALLARM

The alarm condition will be activated according to the settings for each and every input: The activation conditions are open to programming, but for each sensor type (in effect each gas revealed) a standard configuration is defined and loaded by default, when making the settings of a certain input, through the PC software. In the alarm window the following info is available:

Figure 3.4
a) Typical ALARM state of the ACTIVE EVENTS screen

Alarmed channels review, in the case when more than one input are in alarm state simultaneously, according to the following:

If at a certain point, the signalling made by means of the LCD display of the front end panel, because of its limited capacity cannot indicate simultaneously all the gas detectors in alarm state, then the following rules are being applied:

I   The events are ordered by severity, as follows: Over-range, Alarm 3, Alarm 2, Alarm 1

II   Over-range is seen as an Alarm event with the highest severity.

III   In the case there are present also other events than alarms, like faults or emergencies, the alarm events will be in the upper side and the others in the bottom side of the display

Pressing Enter key, with a certain alarm event selected, a window is opening showing the details of the related channel as in the next image:

Figure 3.4
b) ALARM details screen

At any access level, by selecting in the main window the 1—Menu and than AC-TIVE EVENTS sub menu, it is possible to see the gas detectors in alarm state, or not yet reset.

3.5   FAULT
I   Short circuit or open circuit in a detecting circuit
II   Removal of a remote gas detector
III   Under-scale detection
IV   System fault in all the situations presented below at the paragraph related to EMERGENCY MODE.

Figure 3.5
a) Typical FAULT state of the ACTIVE EVENTS screen.

Against the fault conditions the following situations have priority:
I   Alarm signals, and/or
II   Unset of the corresponding gas detector or function, and/or
III   Putting under Test the corresponding gas detector or function. This state is meant for testing and maintenance purpose.
             The related function may be tested. A window similar with the one presented in the subchapter ALARM, will be available on the display.
IV   Should the FAULT events are combined with EMERGENCY events, then the EMERGENCY events will be in the upper side and then the FAULT events following ordered by date and time, with the most recent on the top.

Pressing Enter key, with a certain fault event selected, a window is opening showing the details of the related channel as in the next image:

Figure 3.5
b) FAULT details screen

3.6 TEST/MAINTENANCE

This state is meant for testing and maintenance purpose. The related function may be tested following an operations sequence, especially designed for this purpose. The test/maintenance condition may be activated for each one of the individual channels.

An user with the OPERATOR or MAINTENANCE level cannot put under TEST/MAINTENANCE more than 50% of the system's channels and outputs.

The signals from channels under TEST will be displayed but will not be considered, in the way that no alarm will be triggered even though the alarm thresholds are being exceeded.

In the same way, the relays under TEST, will not be activated, even if an alarm event associated is taking place while the relay is in TEST/MAINTENANCE mode.

EXCEPTION: In the case just one channel is defined, it will be possible to put that only the channel under test.

The same applies to the case when just one relay is defined. That one relay can be put under test.

3.7 UNSET

The state is useful for virtually taking off the system various parts, without physically interrupting the connection.

The UNSET condition may be activated for each one of the individual input channels and for each one of the 8 relay output.

In the same way as for TEST/MAINTENANCE mode, an user with the OPERATOR or MAINTENANCE level cannot UNSET more than 50% of the system's channels and relays.

The only exception is the ENGINEER level, which may UNSET the whole system if necessary. It is required to do so for maintenance operations in the installation where the gas detection systems is installed.

3.8   EMERGENCY MODE

Special defined state in which the systems switches in case of main unit mal-
functioning or in case of degrading of SIL level, during operation, due to system
faults that may occur.

A typical emergency situation will lead to the following screen: The situations in
which the system should pass into the Emergency Mode are as follows:

A   Malfunctioning of one of the two microprocessors from the Main
           Board of the Control Unit, detected by the microprocessor itself with
           fault notification;

B   Malfunctioning of one of the two microprocessors from the Main
           Board of the Control Unit, detected by the second microprocessor and
           yet the faulty micro still continuing to operate without notifying fault;

C   The microprocessors, memories, multiplexers, DAC's, relay drivers are
           be monitored by a self testing facility implemented into the system's
           hardware and software. The control device will notify a system fault
           should the associated procedures related to the self testing functions
           are revealing any malfunction.

4. User levels

The system has three user levels and depending on these, various options are
available. The there levels are as follows:

I   OPERATOR level (O)

II   MAINTENANCE level (M)

III   ENGINEER level (E)

Once logged in as a certain level, a letter in the top right side of the screen will
inform about the level, as follows: "O" for Operator. "M" for Maintenance and "E"
for Engineer. If the user is not logged in, the allowed operations are as per Oper-
ator level without the permission to do the "ACK" of the events.

The user passwords can be created and/modified just by the PC configuration
software.

4.1   OPERATOR LEVEL

It is the lowest user level. In all screens the options are at the minimum. The
"Operator" user may only see the system's configuration. He may browse the
system through channels and relays.

The "Operator" cannot put under Test or take out of Test mode any systems
part, nor he can Unset parts of the system, or Set parts of the system previously
unset. In normal operating mode the display will show the SYSTEM STATE and
will offer the possibility to scroll through the system channels,

The main screen for all user levels is as in the following picture:

Figure 4.1
Typical NORMAL state screen

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In the bottom of the screen, for the "Operator" level there are available the following options:

I MENU, gets the user into a sub menu
II LOGOUT, logs out the active user
III LOGIN, opens the login dialogue window

* See next chapters for details.

In case of Alarm and/or Fault, and/or Emergency the system will switch automatically to ALARM or FAULT or EMERGENCY mode.
The "Operator" user may only ACKNOWLEDGE (ACK) the event, without being allowed to RESET it.
In effect the only situation when the "Operator" should login is when acknowledging an event. The login is requested for record purposes, thus in the events log a trace is being kept about the user that acknowledged a particular event.

4.2 MAINTENANCE LEVEL

The "Maintenance" level is the middle user level. Like the "Operator" user, the "Maintenance" user may see the system's configuration. He may also browse the system through channels and relays.
Unlike the "Operator" the "Maintenance" user may also put under Test or take out of Test mode any systems part, and he can Unset parts of the system, or Set parts of the system previously unset.
*For more details see the next chapter 5 - MENU'S DETAILS

The operations allowed in the Maintenance level main screen are the same as for the Operator level plus the option 3 – CHANNEL available for the TEST, SET and UNSET operation of the channels and the relay.
In case of Alarm and/or Fault, the system will switch automatically to ALARM or FAULT mode.
*For more details see the next chapter 5 - MENU'S DETAILS

4.3 ENGINEER LEVEL

The operations allowed in the Maintenance level main screen are the same as for the Maintenance level.
In case of Alarm and/or Fault, the system will switch automatically to ALARM or FAULT mode.
In effect the only situation when the "ENGINEER" should login is when Reset an event. The login is requested for making the RESET of Alarm or Fault status. In the events log a trace is being kept about the user that Reset a particular event.
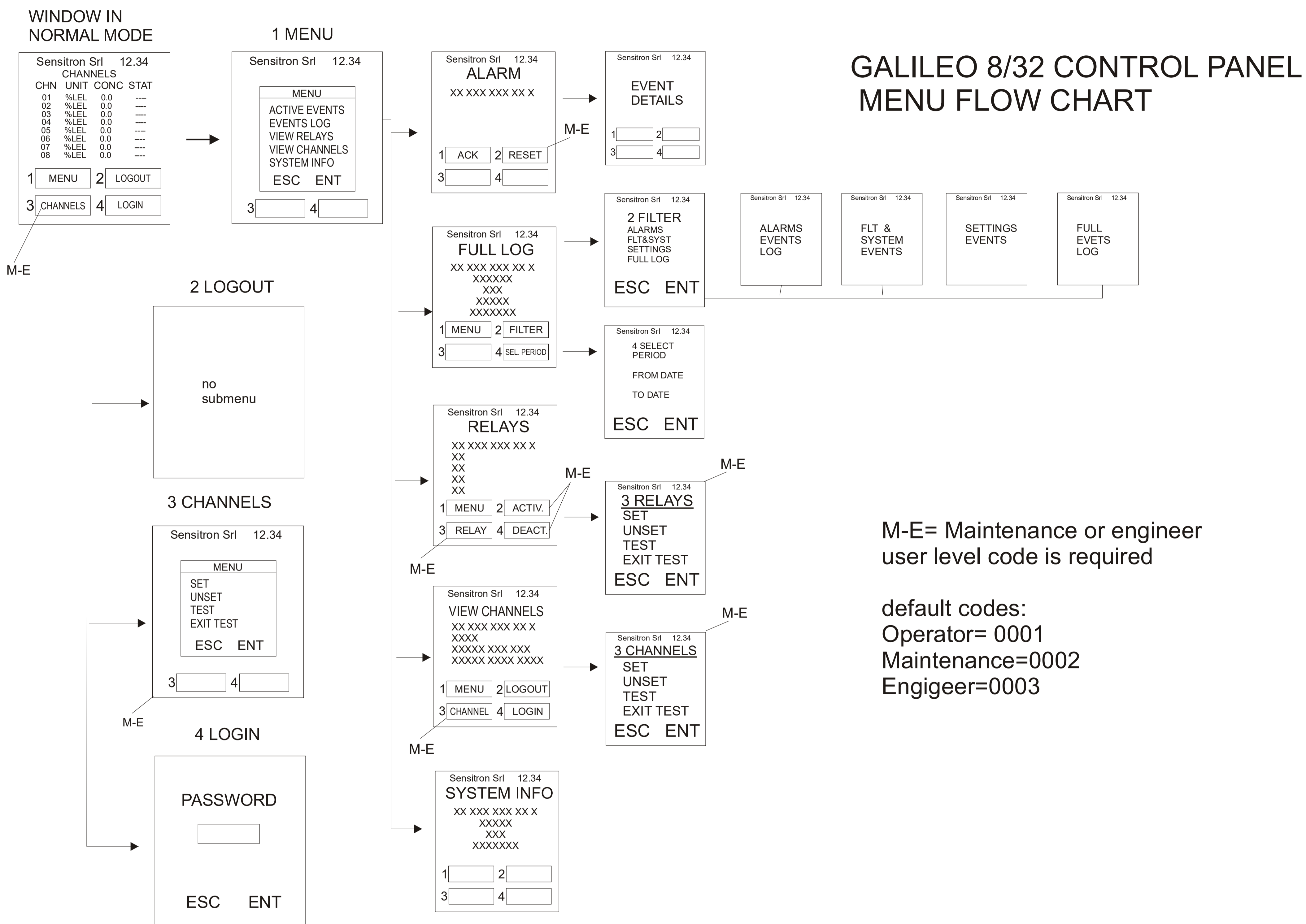For more details see the next chapter 5 - MENU'S DETAILS

5. Menu's details

In the following chapter, the various submenu's of the main screen will be detailed:

I MENU, gets the user into an operative menu
II LOGOUT, logs out the active user
III CHANNEL, puts in Test/Maintenance or Set/Unset mode the selected device
VI LOGIN,opens the login dialogue window

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GALILEO 8/32 CONTROL PANEL MENU FLOW CHART

WINDOW IN NORMAL MODE

Sensitron Srl   12.34
CHANNELS
CHN	UNIT	CONC	STAT
01	%LEL	0.0	----
02	%LEL	0.0	----
03	%LEL	0.0	----
04	%LEL	0.0	----
05	%LEL	0.0	----
06	%LEL	0.0	----
07	%LEL	0.0	----
08	%LEL	0.0	----

1 MENU   2 LOGOUT
3 CHANNELS   4 LOGIN

M-E

1 MENU

Sensitron Srl   12.34
MENU
ACTIVE EVENTS
EVENTS LOG
VIEW RELAYS
VIEW CHANNELS
SYSTEM INFO
ESC   ENT
3   4

2 LOGOUT

no submenu

3 CHANNELS

Sensitron Srl   12.34
MENU
SET
UNSET
TEST
EXIT TEST
ESC   ENT
3   4

M-E

4 LOGIN

PASSWORD

ESC   ENT

ALARM

Sensitron Srl   12.34
ALARM
XX XXX XXX XX X
1 ACK   2 RESET
3   4

M-E

EVENT DETAILS

Sensitron Srl   12.34
EVENT DETAILS
1   2
3   4

FULL LOG

Sensitron Srl   12.34
FULL LOG
XX XXX XXX XX X
XXXXXX
XXX
XXXXX
XXXXXXX
1 MENU   2 FILTER
3   4 SEL. PERIOD

2 FILTER

Sensitron Srl   12.34
2 FILTER
ALARMS
FLT&SYST
SETTINGS
FULL LOG
ESC   ENT

Sensitron Srl 12.34 — ALARMS EVENTS LOG
Sensitron Srl 12.34 — FLT & SYSTEM EVENTS
Sensitron Srl 12.34 — SETTINGS EVENTS
Sensitron Srl 12.34 — FULL EVETS LOG

4 SELECT PERIOD

Sensitron Srl   12.34
4 SELECT PERIOD
FROM DATE
TO DATE
ESC   ENT

RELAYS

Sensitron Srl   12.34
RELAYS
XX XXX XXX XX X
XX
XX
XX
XX
1 MENU   2 ACTIV.
3 RELAY   4 DEACT.

M-E   M-E

3 RELAYS

Sensitron Srl   12.34
3 RELAYS
SET
UNSET
TEST
EXIT TEST
ESC   ENT

VIEW CHANNELS

Sensitron Srl   12.34
VIEW CHANNELS
XX XXX XXX XX X
XXXX
XXXXX XXX XXX
XXXXX XXXX XXXX
1 MENU   2 LOGOUT
3 CHANNEL   4 LOGIN

M-E   M-E

3 CHANNELS

Sensitron Srl   12.34
3 CHANNELS
SET
UNSET
TEST
EXIT TEST
ESC   ENT

SYSTEM INFO

Sensitron Srl   12.34
SYSTEM INFO
XX XXX XXX XX X
XXXXX
XXX
XXXXXXX
1   2
3   4

M-E= Maintenance or engineer user level code is required

default codes:
Operator= 0001
Maintenance=0002
Engigeer=0003

5.1   MENU

In the main window in normal mode, at any user level, one may view the system's configuration details, pressing the 1 key.

- ACTIVE EVENTS (present just if some active event is present)
- EVENT LOG
- VIEW RELAYS
- VIEW CHANNELS
- SYSTEM INFO

5.1.1   ACTIVE EVENTS

Pressing ENT on ACTIVE EVENT the list of the actually active events is shown. If there are active alarms and active Faults or Emergency situations, they will be shown by splitting the window in two as below. In the upper side the Alarms and in the lower side the Faults and Emergency situations. Using the LEFT/RIGHT arrow screen will switch between the two sides of the window.

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Figure 5.1.1
a) Active Events screen with Alarm and fault

Should there are just Alarms or just Faults/Emergency situations they will be shown in the upper side of the window, respectively.
Below an example of alarm situation only:

Figure 5.1.1
b) Active Events screen with alarm only

Or in case just fault situation is present:

Figure 5.1.1
c) Active events screen with fault only

In case of a new event, the screen will switch in automatic to the Active Events list and the buzzer will sound.
Until the event is acknowledged, the user cannot come back to the main screen.
In the upper figures 5.1.1.a), b) and c) the shown events are not yet acknowledged.
When acknowledged there is a "X" under the column "A", for the related event.
In this screen there are two buttons:

I   ACK
II   RESET

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I   ACK

Pressing 1 ACK with the cursor on the active event, will acknowledge it. There are two situations:

- The user is already logged in for a previous operation that requires login. In this case pressing 1 ACK will simply refresh the screen image and show an "X" letter on the "A" column (the "Acknowledged" column).

- The user is not yet logged in. In this case the LOGIN dialogue window pops up and the user should key in the password. After which the "X" letter will be shown under the "A" column of the related active event. Practically this is the only situation when the login of an "Operator" level user is required so that a trace is being kept about the person who acknowledged the active event.

II   RESET

Pressing 2 RESET with the cursor on the active event, will reset it, so the event will disappear from the active events list. Like described above there are two situations:

- The user is already logged in for a previous operation that requires ogin. In this case pressing 2 RESET will simply refresh the screen image and delete the event line from the list.

- The user is not yet logged in.

In this case the LOGIN dialogue window pops up and the user should key in the password. After which the screen will be refreshed and the event deleted.

Note

An "Operator" level is NOT allowed to reset active events. He can only acknowledge them so that the display image may be switched back to the main screen. The reset may only be done by "Maintenance" or "Engineer" level users.

5.1.2   EVENT LOG

In the main window, at any user level, one of the options on the bottom side menus is EVENTS LOG. Using the up/down arrow keys and then selecting the "EVENTS LOG" option, followed by ENTER, one enters a submenu. The window that opens will show the most recent event, in chronological order.

Figure 5.1.2
a) Event detail screen

- Using the up/down arrow keys one may scroll through the list.
- Using the 2 and 4 keys, one may refine the search
- Pressing the ESCAPE key instead will switch back to the main window.

Should 3 minutes pass without any key pressed, the view switches to the Operator main window.

IV   **SELECT PERIOD**

Opens a query asking to select the period to be observed by entering the start and the end date.

Figure 5.1.2
b) Select period dialogue window

The date should be introduced in a 2 digit format for day, month and year: "DD/MM/YY".

As the dialogue window opens, the cursor is already in the "DD" field waiting for the day to be introduced. Keying in the day, the cursor will automatically move to the "MM" field waiting for the month to be keyed in. The same for the year after which the cursor moves to the end date "DD" field and the procedure repeats for the introduction of the complete end date. In the end, pressing ENTER, the window will next show only the selected period events.

Using the up/down arrow keys one may scroll through the new list.

To exit this view and come back to the main window press ESCAPE key.

II   **FILTER**

In any of the events views, pressing the 2 key Filter, enters in a submenu of the Event Log. Using the up/down arrow keys one may scroll through the list.

Figure 5.1.2
c) FILTER options screen

-         **FULL LOG**

The FULL LOG option shows all the events, in chronological order, starting with the most recent. Using the up/down arrow keys one may search in the event log.

-         **FLT & SYSTEM**

Choosing the Fault & System LOG option enters the faults and system events list. Using the up/down arrow keys one may search in the Flt & fault event log.

-       SETTINGS
        Choosing the Settings LOG option enters the Settings events list.
        Using the up/down arrow keys one may search in the Settings
        event log.

-       ALARMS
        Choosing the Alarms LOG option enters the Alarm events list.
        Using the up/down arrow keys one may search in the Alarm event log.

5.1.3   VIEW RELAYS

Choosing the VIEW RELAY and getting into details, one may see each and every
relay's details.

Figure 5.1.3
a) View relay screen in "Operation" user level

In the "Operator" level, the options 2-ACTIVATE, 3-RELAY and 4-DEACTIVATE are
not active. The user should be in "Maintenance" or "Engineer" level to see and to
use these options.

Figure 5.1.3
b) Relays screen in "Maintenance" or
"Engineer" levels

Using the up/down arrow keys one may scroll through the list choosing one of
the relay and press 3-RELAY to get into a submenu.

Figure 5.1.3
c) Relay screen options

By the options of this screen, unlike the Operator level, the "Maintenance" level and the "Engineer" level may:

-       Put in Set or Unset the selected relay
-       Put in Test/Maintenance and take out of Test/Maintenance the selected relay

-       SET / UNSET
  An user with the MAINTENANCE level cannot UNSET more than 50% of the system's channels and relays.
  The only exception is the ENGINEER level, which may UNSET the whole system if necessary. It is required to do so for maintenance operations in the installation where the gas detection systems is installed.

-       TEST / EXIT TEST
  Will put to TEST mode or take out of the TEST (EXIT TEST) mode the selected relay. It is possible to put in TEST mode just parts of the system at user level "Maintenance" or "Engineer". (See chapter 3.6. Test/Maintenance mode for details). If more than half of the system selected, a warning screen will pop-up.

  Until the number of relays to put in Test/Maintenance mode does not exceed the defined limits, the selected items will change the status into TEST, as in the screen bellow:
  The relay remain in TEST until the Channel Maintenance Time set for the Galileo8 control panel by the Configuration software (10-60 minutes) is expired.

Figure 5.1.3
d) Screen with relays in "Test" status

The relays in TEST status can be activated and deactivated by the options 2-ACTIVATE and 4-DEACTIVATE.
The EXIT TEST option takes out of the Test/Maintenance mode the selected relay.

5.1.4   VIEW CHANNELS

Choosing the VIEW CHANNELS and getting into details, one may see each and every channel's details (as the screen view in normal mode).

Figure 5.1.4
a) View Channels screen in "Operation"
user level

In the "Operator" level, the options 3-CHANNELS, is not active. The user should be in "Maintenance" or "Engineer" level to see and to use these options.

Figure 5.1.4
b) View channels screen in
"Maintenance" or "Engineer" level

Using the up/down arrow keys one may scroll through the list choosing one of the channel and press 3-CHANNELS one gets into a submenu.

Figure 5.1.4
c) Channels screen submenu

By the options of this screen, unlike the Operator level, the "Maintenance" level and the "Engineer" level may:

-       Put in Set or Unset the selected channel
-       Put in Test/Maintenance and take out of Test/Maintenance the selected channel

-       SET / UNSET

    An user with the MAINTENANCE level cannot UNSET more than 50% of the system's channels and relays.

    The only exception is the ENGINEER level, which may UNSET the whole system if necessary. It is required to do so for maintenance operations in the installation where the gas detection systems is installed.

-       TEST / EXIT TEST

    Will put to TEST mode or take out of the TEST (EXIT TEST) mode the selected channel. It is possible to put in TEST mode just parts of the system at user level "Maintenance" or "Engineer". (See chapter 3.6. Test/Maintenance mode for details). If more than half of the system selected, a warning screen will pop-up.

    Until the number of channels to put in Test/Maintenance mode does not exceed the defined limits, the selected items will change the status into TEST, as in the screen bellow:

    The channel remain in TEST until the Channel Maintenance Time set for the Galileo 32 control panel by the Configuration software (10-60 minutes) is expired.

Figure 5.1.4
d) Screen with channels in "Test"

The EXIT TEST option takes out of the Test/Maintenance mode the selected channel.

5.1.5   SYSTEM INFO

At any user level, choosing the SYSTEM INFO menu option will show a window with the information about the hardware and the software versions:

Figure 5.1.5
Info screen

5.2   2-LOGOUT

From the normal mode screen, pressing the F4 button will logout the actual user.

5.3   3-CHANNELS (USER LEVELS "M" AND "E")

From the main screen, using the up/down arrow keys through the list, choosing one of the channel and press 3-CHANNELS. The window below will appear.

See the previous chapter 5.1.4 – VIEW CHANNELS as the operations of this menu are the same that the VIEW CHANNELS menu.

5.4   4-LOGIN

In the main screen, pressing 4-LOGIN key a query will launch, asking for the user password, to allow entering one of the three user levels: OPERATOR, MAINTE-NANCE or ENGINEER level (see the related chapter 4- USER LEVELS).
For the OPERATOR level, login is only necessary when the operator should acknowledge active events, as described in the previous chapter. Since the events acknowledgement is an event that will be logged into the memory, it is necessary to identify the person that acknowledged the event. Therefore, for this only particular situation, login is required also for the OPERATOR level. More details on the sub-chapter 5.1.1 ACT: EVENTS.
After logging in, according to the user level the next window will be in OPERA-TOR, MAINTENANCE or ENGINEER level.

Figure 5.4
Login dialogue window

Note

After login, in the right and upper corner of the screen one should know what user level is it: "O" for Operator, "M" for Maintenance and "E" for Engineer.

6. PC configuration software

6.1   INTRODUCTION

The Configuration Software is an easy to handle user interface for each kind of communication with the GALILEO 32. The software is designed
- to upload the actual configuration data of the system or the events log
- to simplify each type of parameter change (e.g. alarm levels)
- to download modifications to the GALILEO 32
- for maintenance
- for the initial configuration of the GALILEO 32 at Sensitron or by the installer

6.1.1   MINIMUN PC HARDWARE REQUIREMENTS

Operating System: Windows XP, Windows Vista or Windows 7
CPU: Pentium 3, 500Mhz
System Memory (RAM): 256MB
Hard Disk: 400MB free space

6.2   INSTALLATION

Insert the CD-Rom and follow the instructions. A serial cable is required to connect the PC to the panel. The serial port can be a PC port or, if the PC does not have a serial port, a USB>Serial adapter.

6.3   LAUNCHING THE PROGRAM

Launch the program from the Windows program bar by clicking on MULTISCAN x x xx
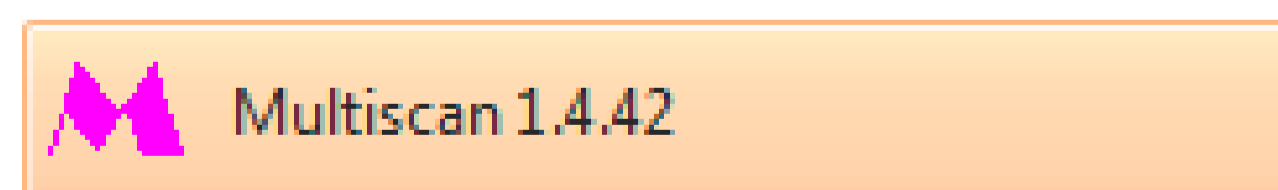
Figure 6.3
a) Program name in the Windows list

The login window will appear. Each user must be authorised to use the program. See chapter "Application User Management" in this manual to create users with relevant permissions.
The first time the program is used after installation, the only user set is Sensitron with a default password. The Sensitron user is the Administrator which is the highest level user with permissions to access all program functions.
Thus, in the window shown in fig. 6.3 b)

-           User name: sensitron
-           Password: 543210
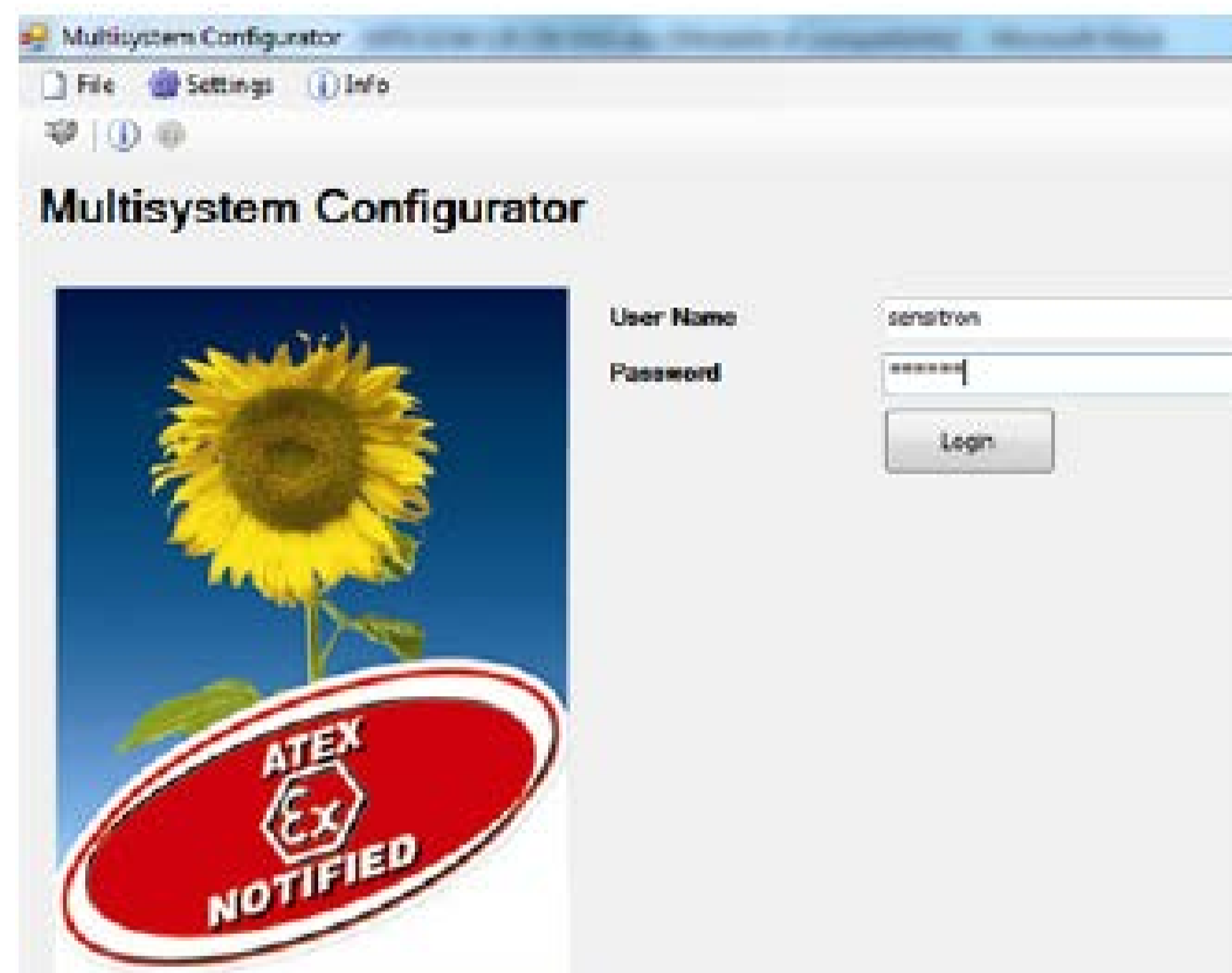
Figure 6.3
b) Program Login screen.

After logging in, the user name is displayed at the top left corner of the screen. Visible options depend on the level of the user who logged in (see chapter "Application User Management"). Figure 6.3.2 a shows the options enabled for the Sensitron user in the program homepage.

6.3.1   CONTROL PANEL SELECTION
Once logged in, the unit selection screen appears. The unit type can be selected from the list.

Figure 6.3.1
a) Panel selection screen

Figure 6.3.1
b) Panel selection screen

Select the panel: Galileo 32

Note

for Galileo 32 panel do not use the Auto Detection but select manually the panel Galileo 32.

6.3.2   PROGRAM HOMEPAGE

Figure 6.3.2
a) Program homepage (Administrator level user)

New configuration	To create a new system configuration
Open file	To open an existent configuration
Serial port	To set a PC serial port for data transfers to and from the connected CPU
Test	To test PC serial > CPU connections
Upload configuration from CPU	To upload a configuration from the CPU
Application Users Management	User and permission settings
Logout	To logout the user
Access Log	Displays the login and logout log
Info	Displays the program version
Help	Help online (to be implemented in the future)
Exit	To exit the program

6.4 PROGRAM MENU

The various program functions are only visible if the user who logged in has the permissions to use them. Configuration software includes plausibility checks on edited and new parameters.
The following chapters list program menus and describe their functions.

6.4.1 FILE

Figure 6.4.1
a) Menu file

- New
  to create a new system configuration
- Open
  to open an existent configuration

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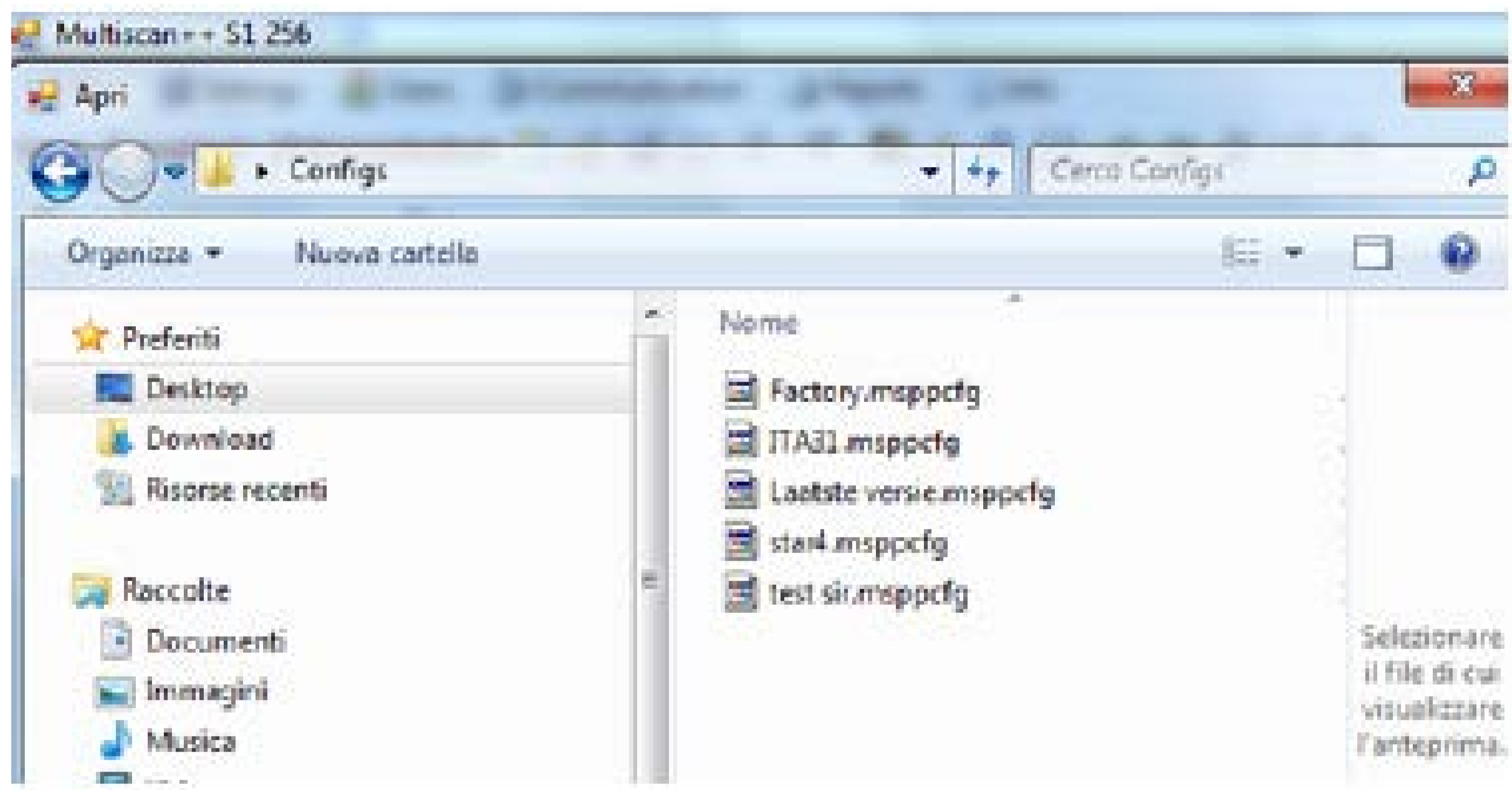
Figure 6.4.1
b) Open an existent system file

- Open Event Log File
  to display event log files previously loaded from the CPU
  (Menu: Communication, Submenu: Upload Event Log from CPU).

Figure 6.4.1
c) Open of a log event file

An event log file previously loaded and saved in the specific folder can be opened from "Open Event Log File".
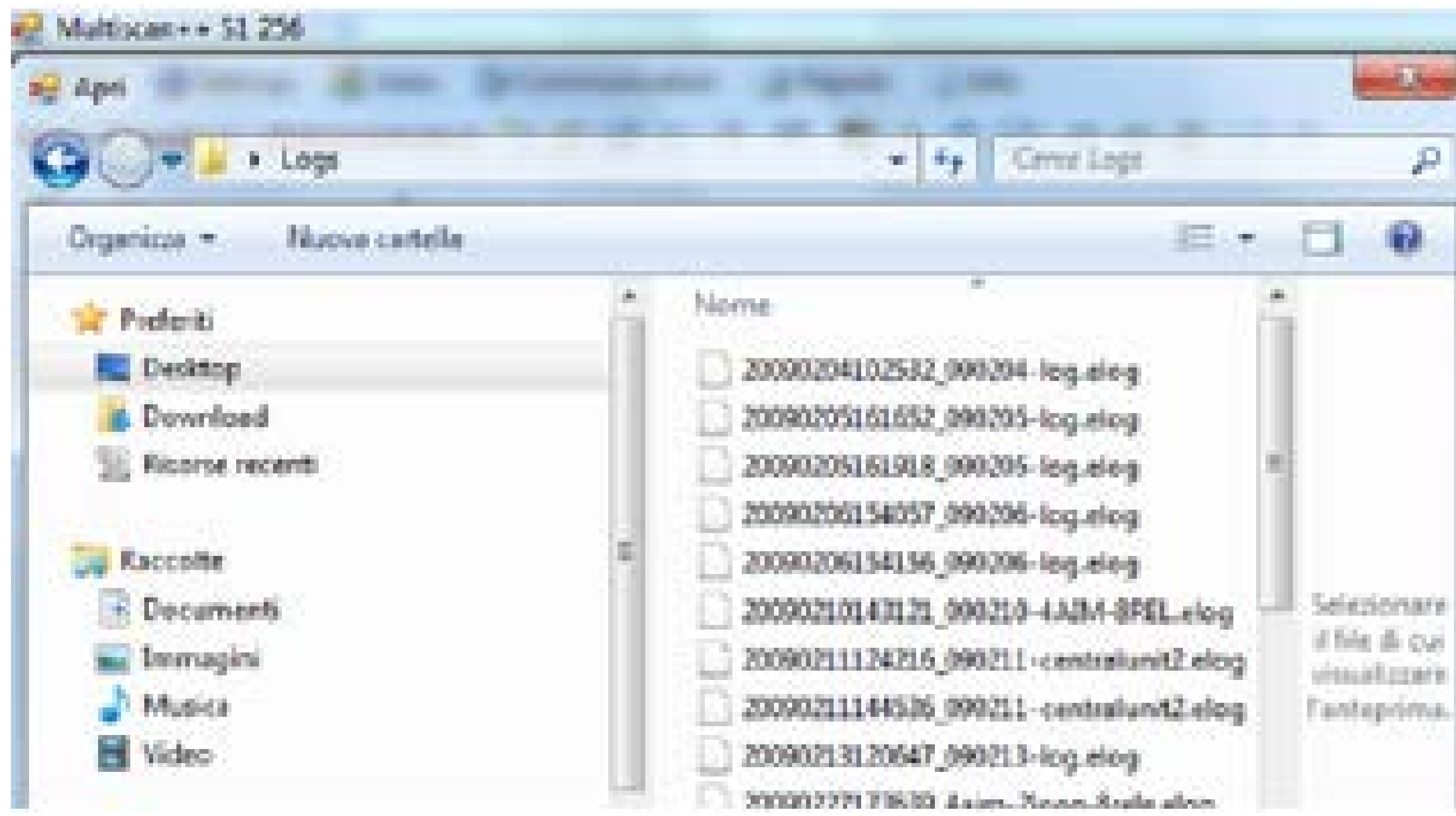
Figure 6.4.1
d) Path for the file *.elog

Figure 6.4.1
e) Event log screen

For information on reading the event log, see:
Menu: Communication
Submenu: Upload Event Log from CPU.

- Click "Save" to save changes to the system.
- Click "Duplicate" to create a new system file like the open one.
- Click "Compare" to compare the system file in the current session with another previous created one. When you click "Compare", a window appears where you can select the folder of the file to be compared.
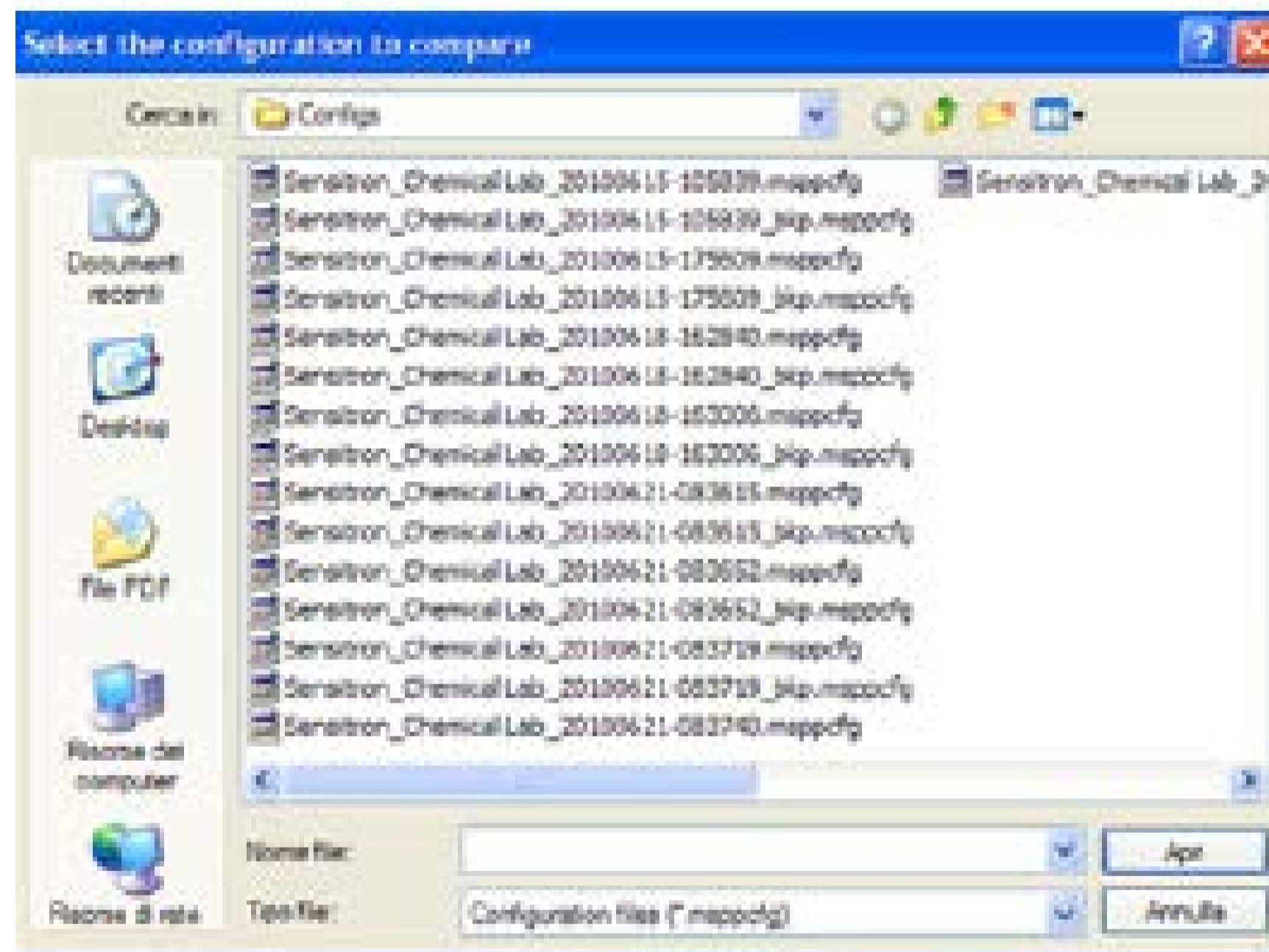
Figure 6.4.1
f) Folder of the system
file to be compared
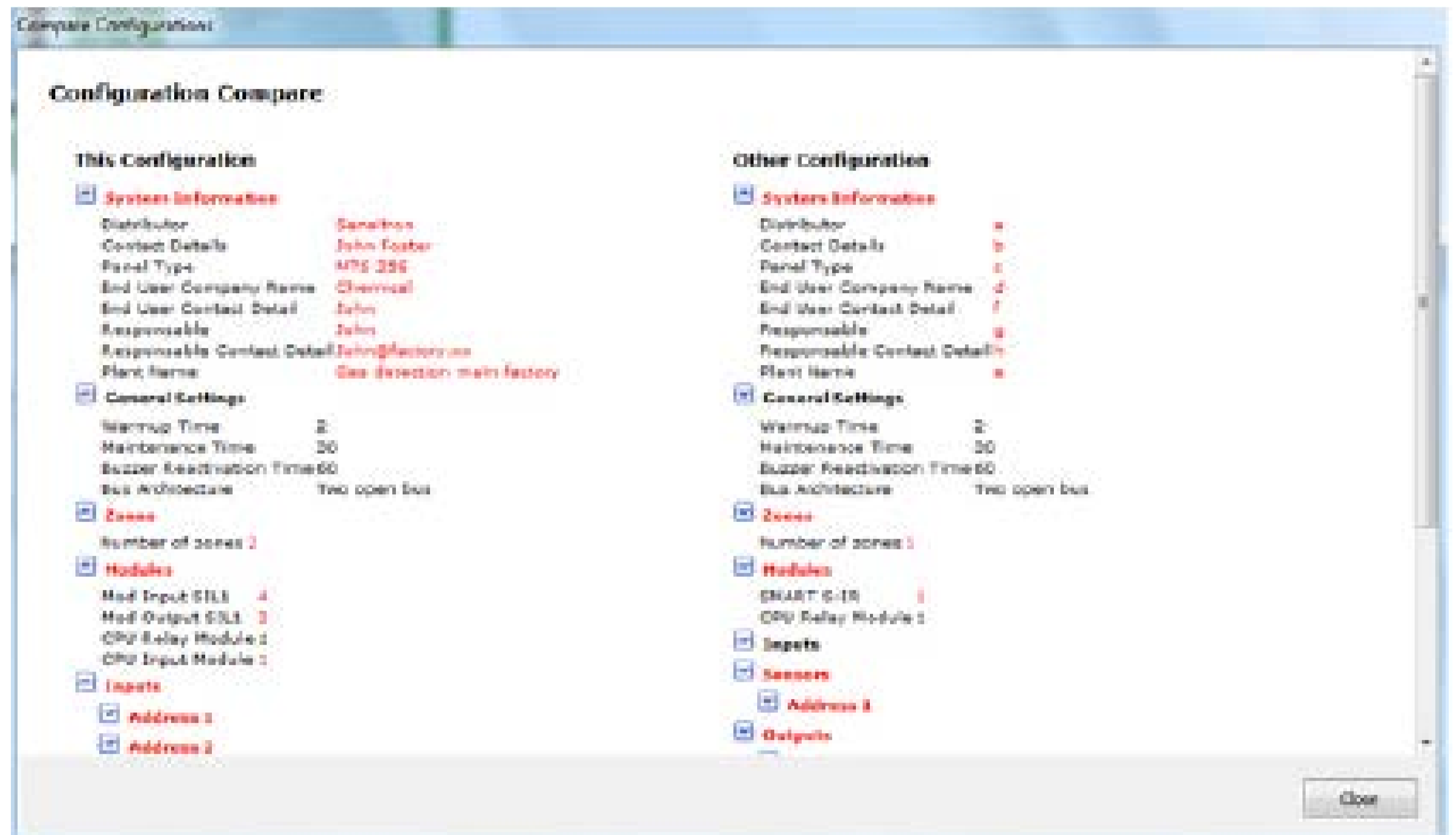
Figure 6.4.1
g) System file comparison window

-     Click "Save As" to save the system file with a new name
-     Click "Close" to close the open system file
-     Click "Exit" to exit the GALILEO 32 program

6.4.2   SETTINGS
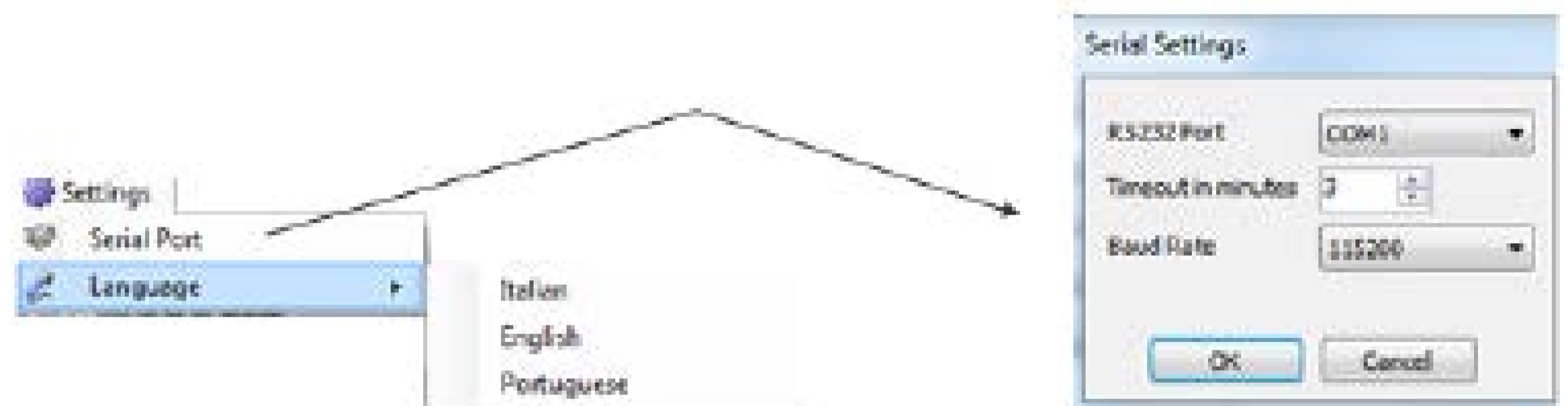
Figure 6.4.2
a) Menu settings

-     Click "Serial Port" to select the serial port and the Baud Rate for the upload and download data with the PC.
-     Click "Language" to select the GALILEO 32 software language. When creating or editing a system configuration, remember to click "Save" before changing the program language or all changes will be lost.

6.4.3   USERS
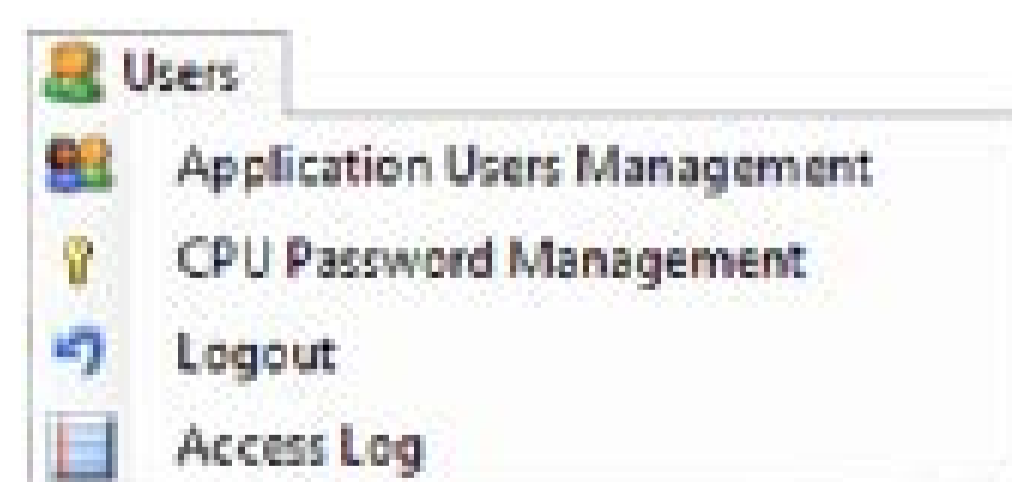
Figure 6.4.3
a) Menu users

"Application Users Management" lets you set users authorised to work with GALILEO 32 software and set their permissions.
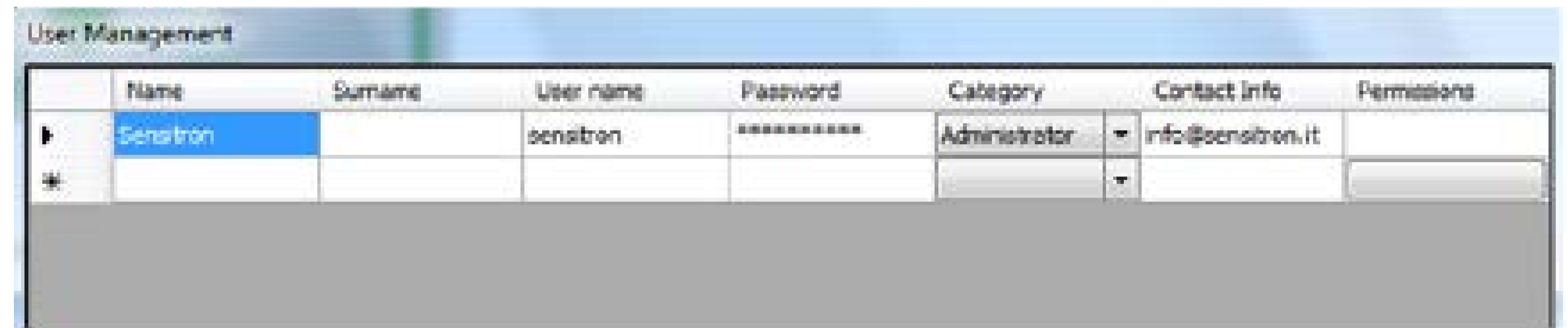
Figure 6.4.3
b) User settings window

The first time the program is used after installation, the only user installed is Sensitron with default password 543210. Sensitron is an administrator level user which is the highest level and permits access to all program functions. The Name, password and Contact Info can be changed for the Sensitron user but not the username (sensitron) and level (Administrator).
An unlimited number of users can be created, each with his own name and sur-name, password, category, contact info and permissions.
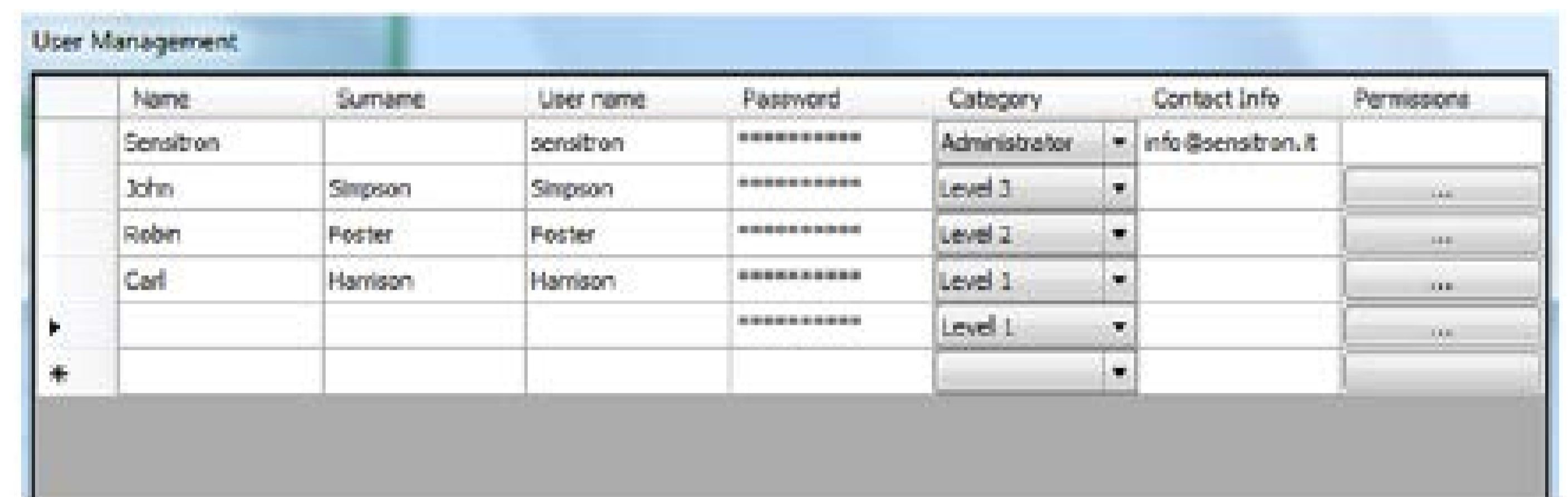
Figure 6.4.3
c) User settings window

Name and Surname	User identification
Password	Alphanumeric code for each user
Category	User permission level for the various program functions. There can be 4 levels. "Administrator" has access to all program functions. Level 1, Level 2 and Level 3 (highest level after Administrator)
Contact Info	User contact info (i.e.: e-mail, tel. num, etc.)
Permissions	This enables users to run the various program functions. Click "Permissions" to open the window with the list of GALILEO 32 program functions.
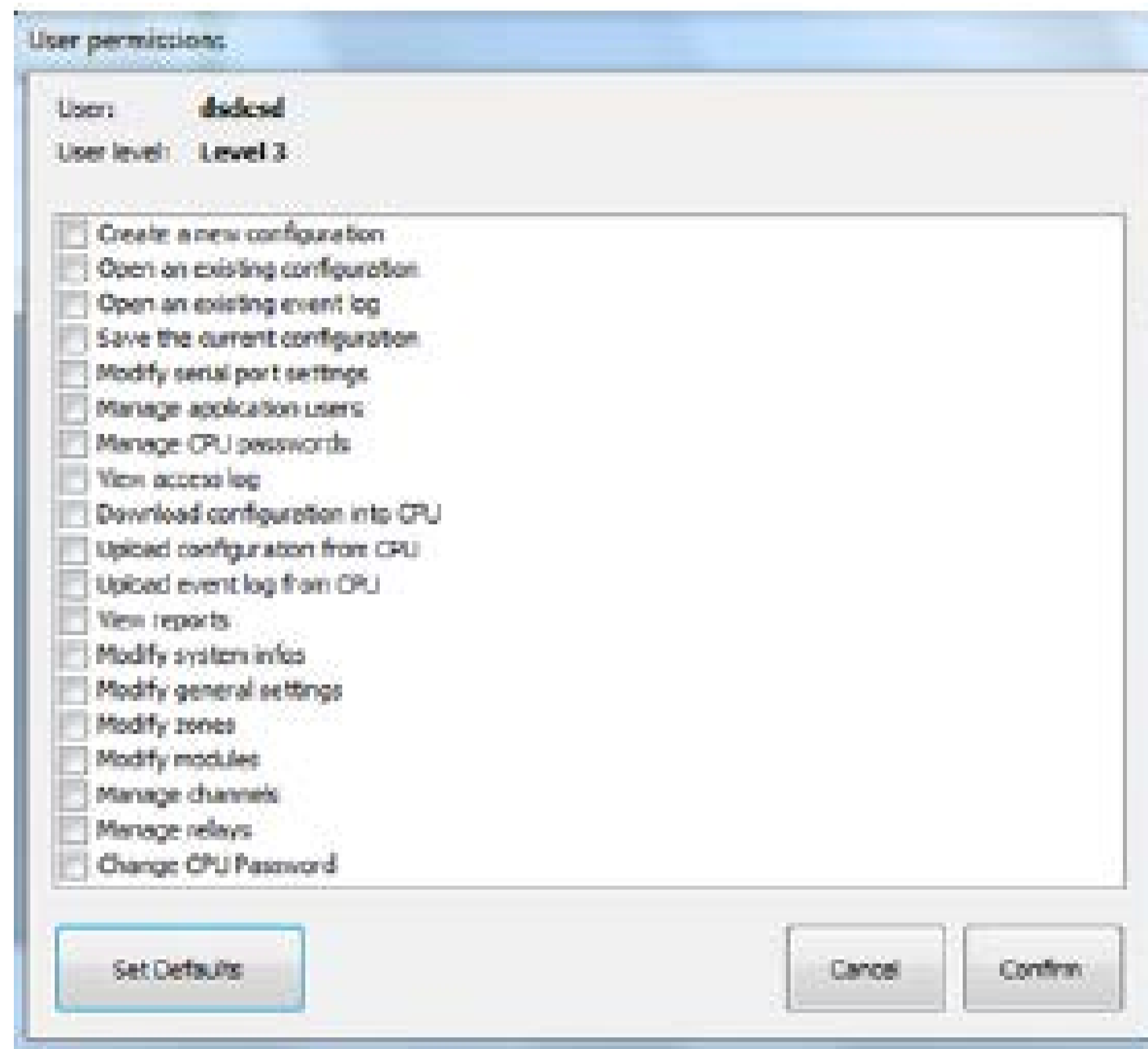
Figure 6.4.3
d) User Permissions
settings window

Flag the various boxes to enable the relevant function for the user. Click "Set De-fault", according to the user level being set (Level 1, 2 or 3), a preset selection of enabled functions are automatically assigned to the user (which can always be edited). Click "CPU Password Management" to set GALILEO 32 control panel us-ers and relevant operating levels (Operator, Maintenance and Engineer).
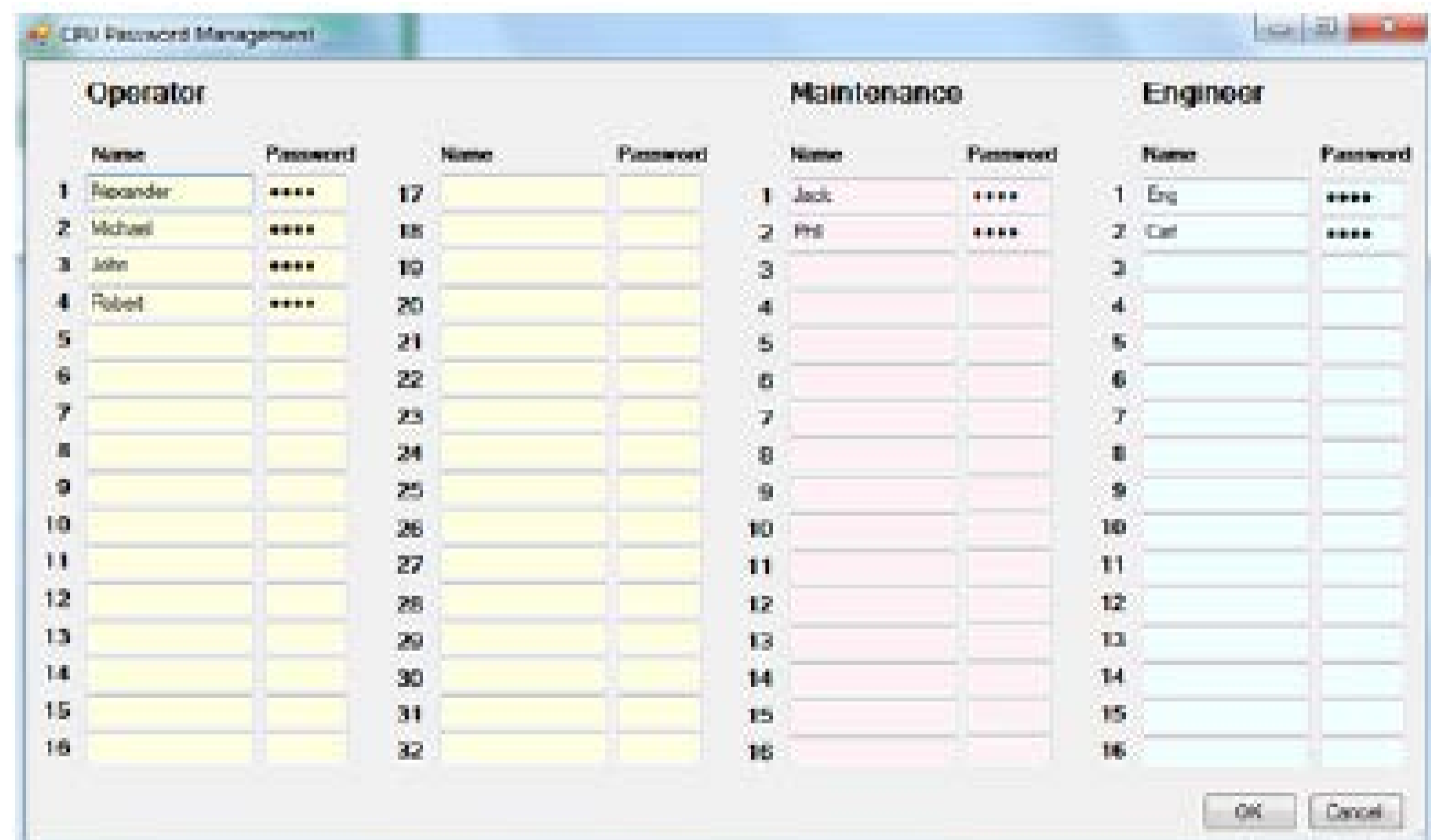
Figure 6.4.3
e) GALILEO 32 user settings
window

Up to 64 users can be set for the GALILEO 32 control panel, 32 on the Opera-tor level, 16 on the Maintenance level and 16 on the Engineer level. For user level functions, see chapter 4.3, User Levels.
Passwords must be 4 numeric digits long.

-        Click "Logout" to log the user out of the program. The Login window
         reappears where a new user can login. See chapter 5.3 and Fig. 5.3.b.
-        "Access Log" displays the program Login and Logout log as well as
         operations conducted.

Figure 6.4.3
f) Log Application window

6.4.4   COMMUNICATION
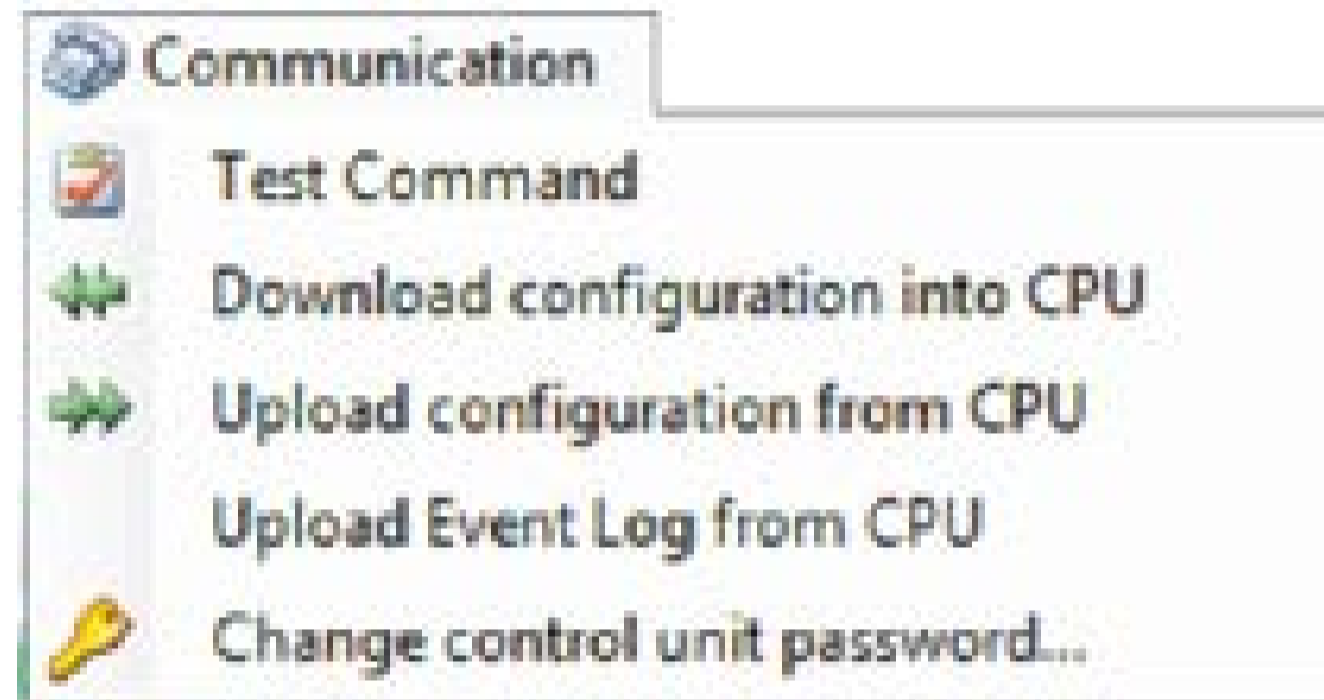
Figure 6.4.4
a) Menu communication

-          The "Communication" menu includes options for data transfers
           between the PC software and the GALILEO 32 control panel

Note

The two devices must be connected in order to transfer data between the PC
and GALILEO 32 control panel.
Connecting the PC to Galileo 8/32 — serial port / serial to USB interface
— connection at Galileo 8.
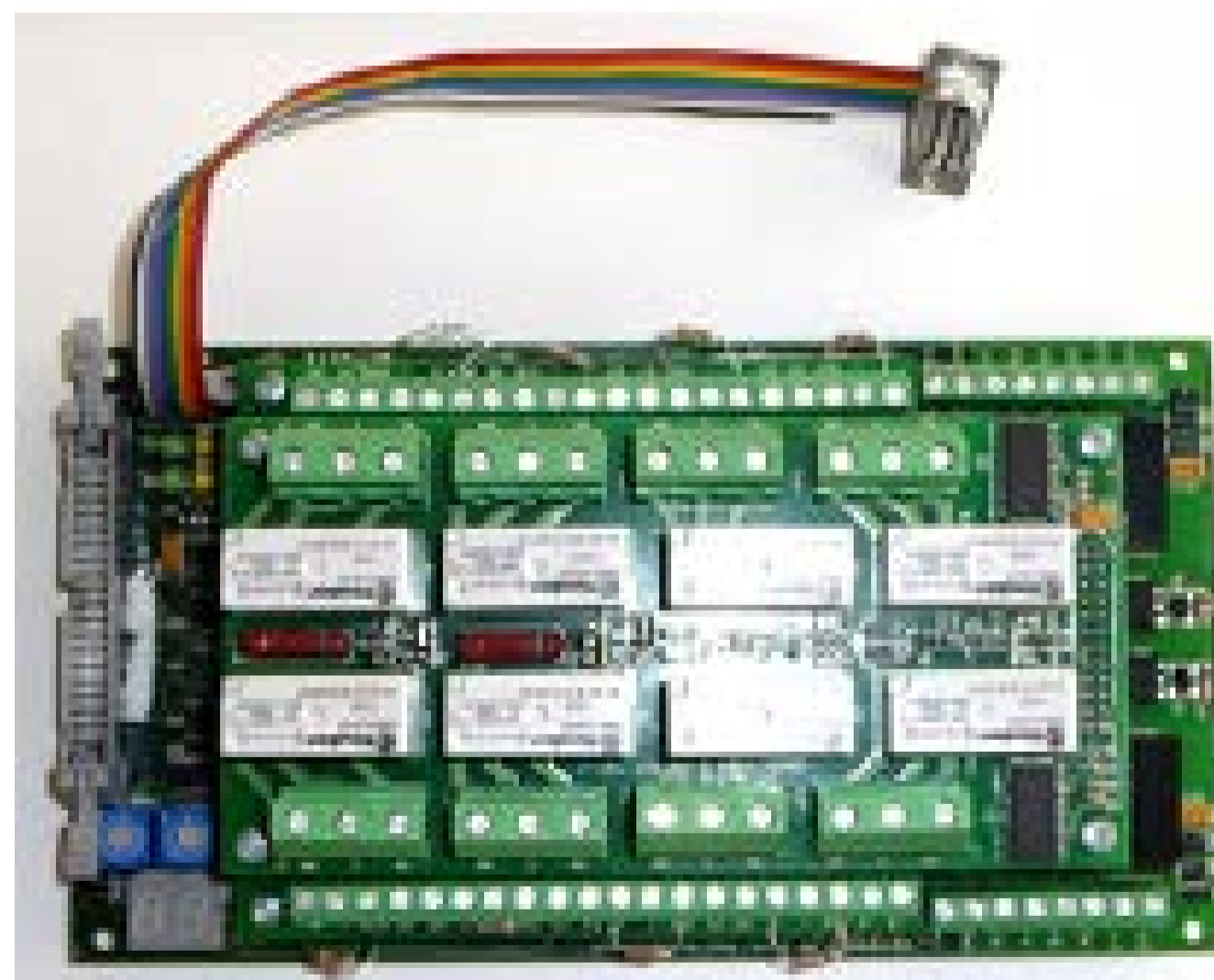
Figure 6.4.4
b) Serial communication table

The connection with the PC will be made by means of a serial port connected to Galileo 32 through the related cable (see Fig. 6.4.4 b above), connected at JP18

-        Checking the connection (test command)

-        "Test Command" lets you check whether the control panel and PC are correctly connected. Whenever data is exchanged between the control panel and PC, a password must be entered to establish the connection (Serial Password). The entered password is compared with the one that resides on the control panel and the connection is established.

Figure 6.4.4
c) Insert password

The default password is 000000 but can be changed by clicking "Change Control Unit Password".

Warning

The control panel cannot be accessed if the new password is lost.
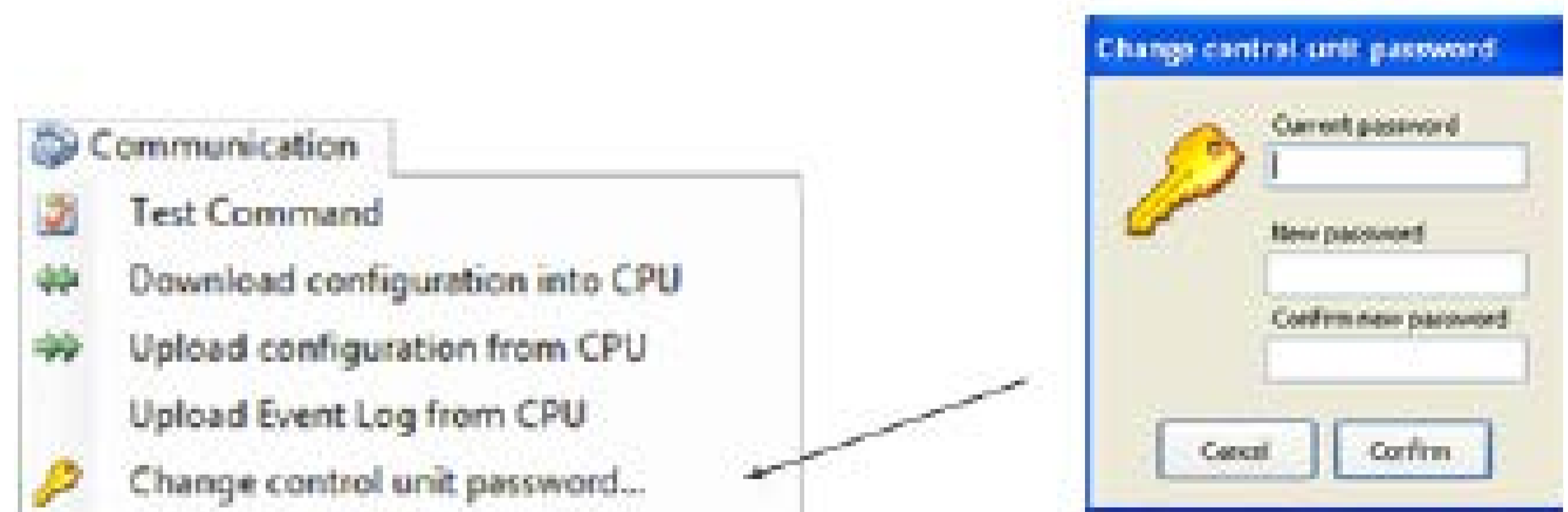
Figure 6.4.4
d) Serial password change

"Download Configuration into CPU" lets you download the system file created in the GALILEO 32 control panel.
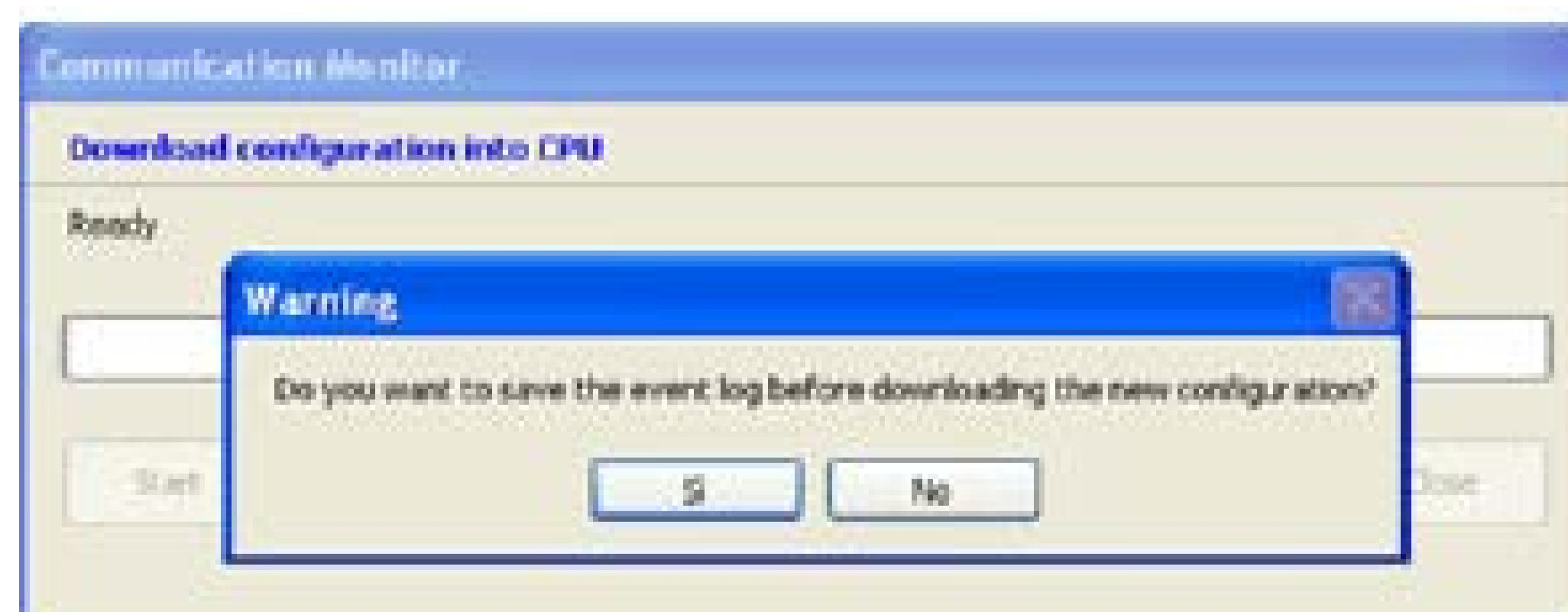
Figure 6.4.4
e) Save control panel event
log request message

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Before starting the data upload and download procedure, a warning message appears asking if you want to save the control panel event log. When a new configuration is downloaded with different data (new gas detectors, zones and system modules, new users, etc.) the control panel event log may no longer be real. Thus, we suggest you save the control panel event log on the PC by clicking Yes.

The control panel serial password is required. Next click Login.
If the password is correct, data download starts and a progress bar appears.
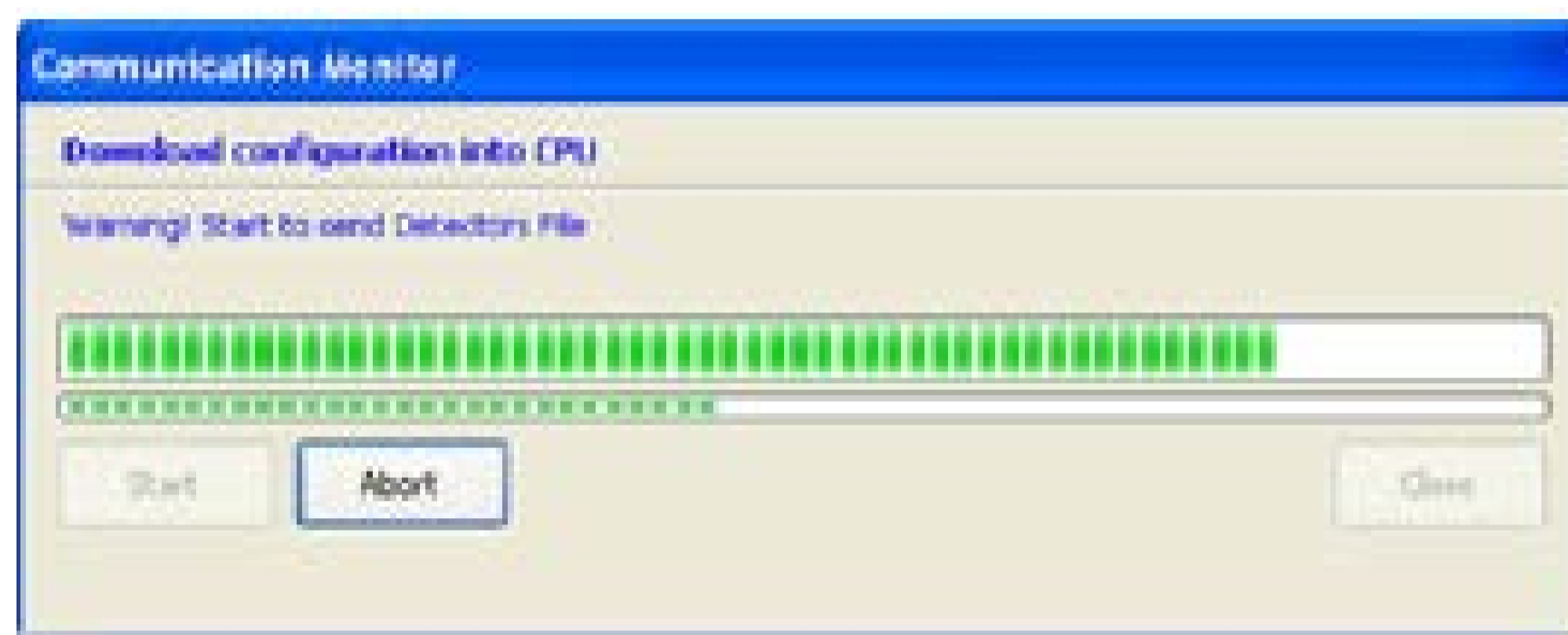
Figure 6.4.4
f) Data download to the CPU

"Upload Configuration from CPU" is the opposite procedure of data download. This lets you upload the system file to the CPU (programming resident in the CPU). The operating sequence is the same as the one for data download. See above. When data is uploaded, the system file is automatically saved in the specific PC folder "Up Load Event Log from CPU" lets you upload the event log file from the CPU.
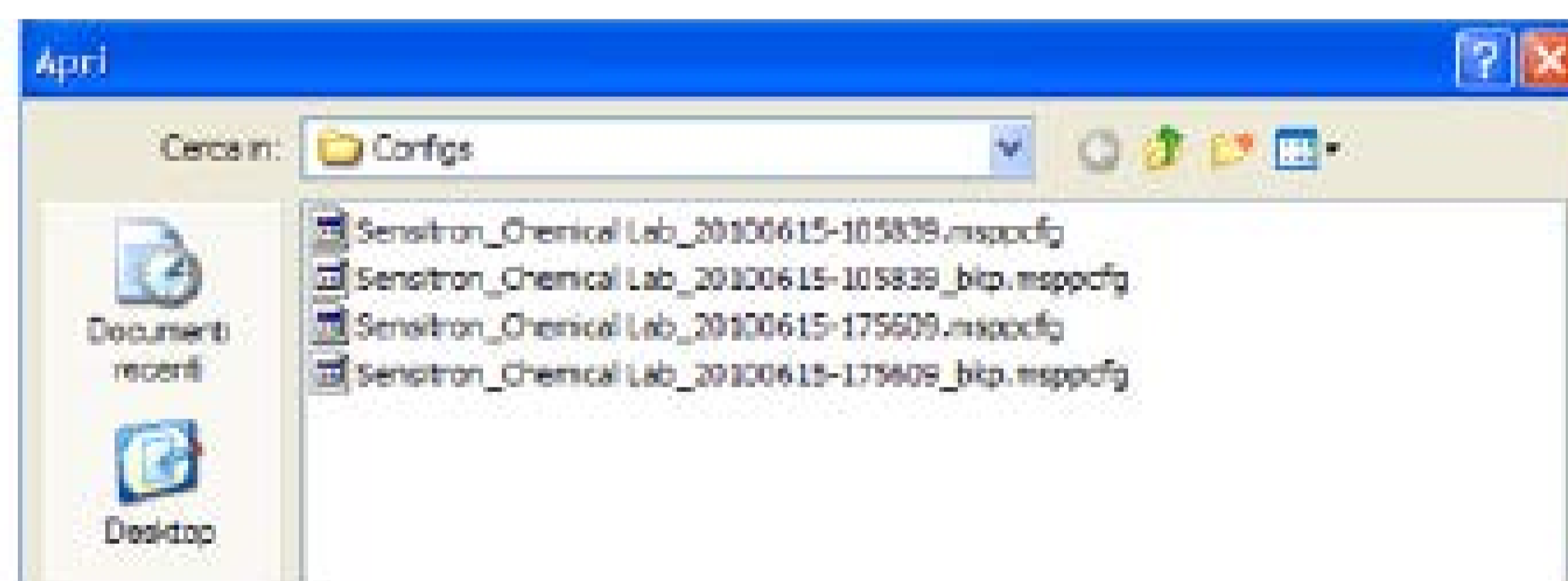
Figure 6.4.4
g) Open an existent system file

Figure 6.4.4
h) Upload event log file

After entering the password, the event log file starts uploading and this operation may take up to one minute. When uploaded, in addition to being automatically saved in the PC default folder: c:\Documents and settings \ user \ Documents \ GALILEO 32 \ Logs, events are also displayed in the specific window.

Figure 6.4.4
i) Event log window

The various columns are explained below.

Id	Event ID number. This can be used to compare an event with one in the GALILEO 32 control panel
Date	Event date and time
Event type	Event type. Events can be of the following types:

Event type	Description
Acknowledge	Acknowledge/mute an event
Reset	Reset an event
Info	Events such as user login and logout, alarm reset, etc.
Configuration	Control panel configuration error
Settings	Control panel settings were changes (i.e. reader alarm threshold)
Alarm	Alarm event
Fault	Fault event
Emergency	Emergency event (typically a power fault)
Serial trace	Event concerning data transfer on the serial port (data upload and download from PC)

Event	More detailed description of the event type
Value	Gas concentration value (for an alarm event)
Unit	Gas detector unit of measure
User	User ID for user events (Ack, Reset,Login etc.)
Device	Hardware device that generated the event (input module, Gas detector, Output module, etc.).
Area	System area
Channel	Channel ID (reader) that generated the event

Search criteria can also be entered in the window to optimize the underlying event list display. Criteria can be by event type and/or date and time. If a printer is connected to the PC, click Print Event Log to print the event list.

"Change Control Unit Password" see explanation at the beginning of chapter "Communication".

6.4.5   REPORT
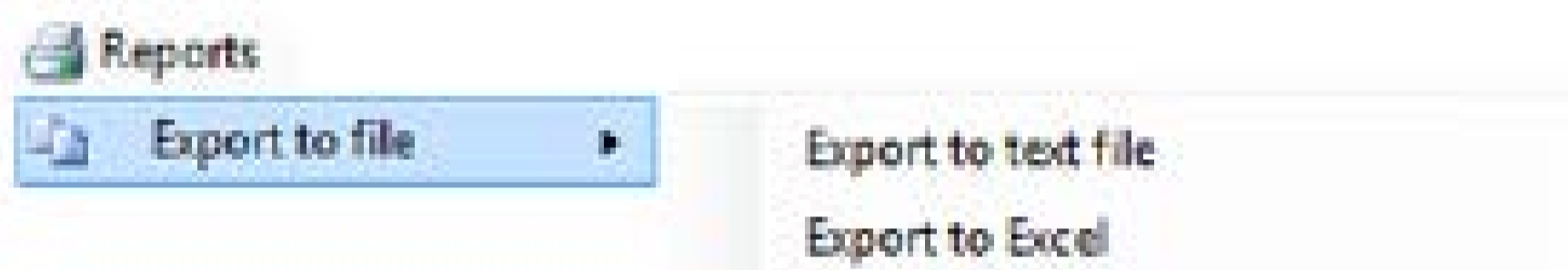
Figure 6.4.5
a) Configuration export

The Reports menu lets you export the current configuration file to be used with other programs.
There are two export formats: "Export to text file" and "Export to Excel". If exported as a text file, configuration parameters can be consulted using any text editor program (Notepad, Word, etc.).
Configuration parameters are best viewed when exported as an Excel file. Naturally, Excel must be installed on the PC.

6.4.6   INFO

Click "Info" for information on the program version (About Galileo GALILEO 32) and on the current session configuration file (Configuration File). The Help menu is currently disabled.

Figure 6.4.6
a) Info menu

6.5   MODIFICATION OR CREATION OF A NEW CONFIGURATION FILE

Via the "Open" command in the "File" menu existing configuration files will be indicated and may be chosen and opened.
If some parameters at the GALILEO 32 shall be modified, this has to be carried out as described in the following chapters.

Attention

Be careful to load the latest version of the configuration file.

If you are not sure then upload the actual file from the control panel, by the "Upload Configuration from CPU" of the "Communication" menu. Otherwise, create a new configuration file via the "New" command in the "File" menu.

6.5.1   SYSTEM INFORMATION
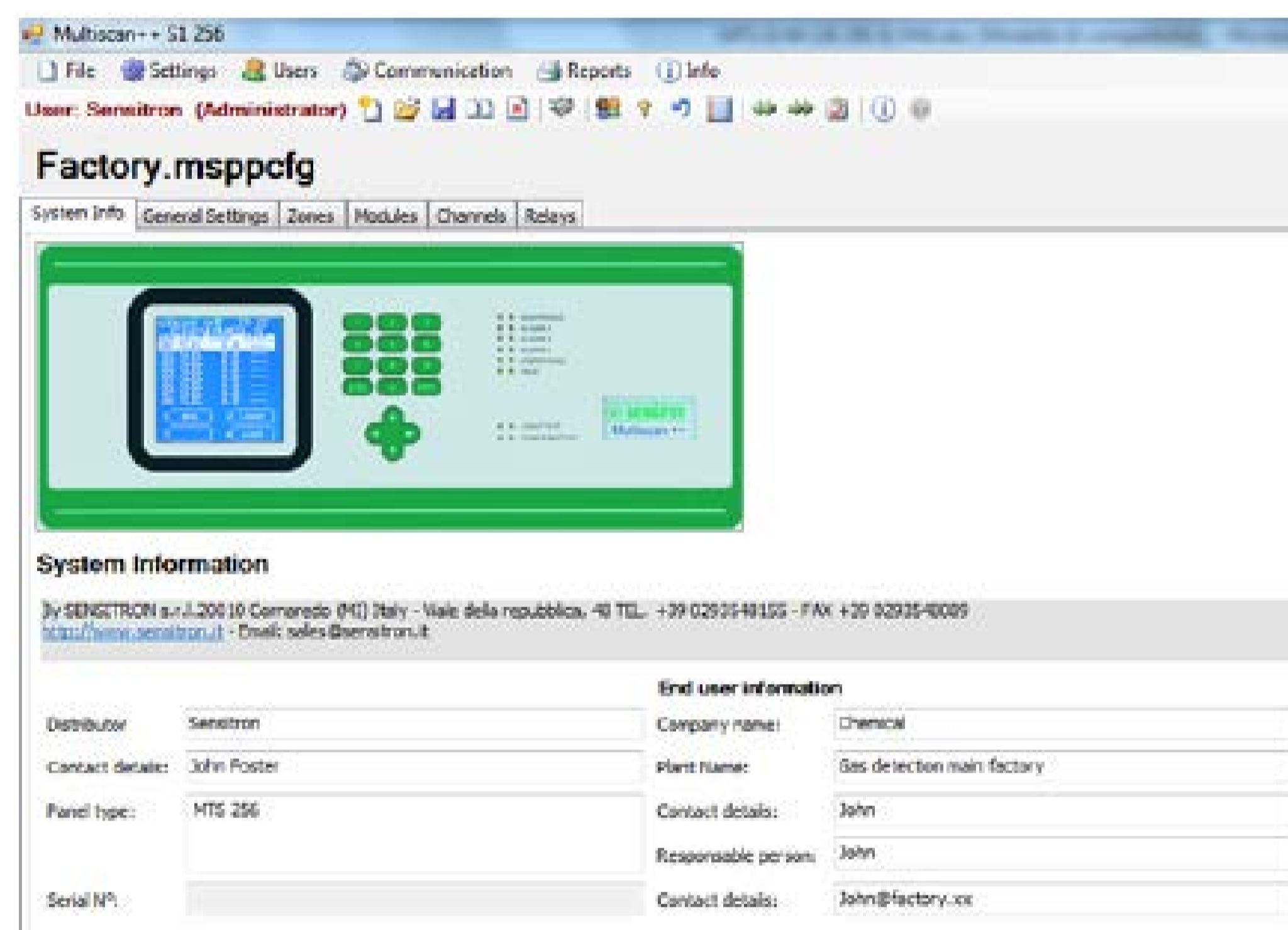
Figure 6.5.1
System Information screen

Fill the different field with the general informations regarding the site, the supplier of the system, the installation company and the names of the persons.

6.5.2   GENERAL SETTINGS
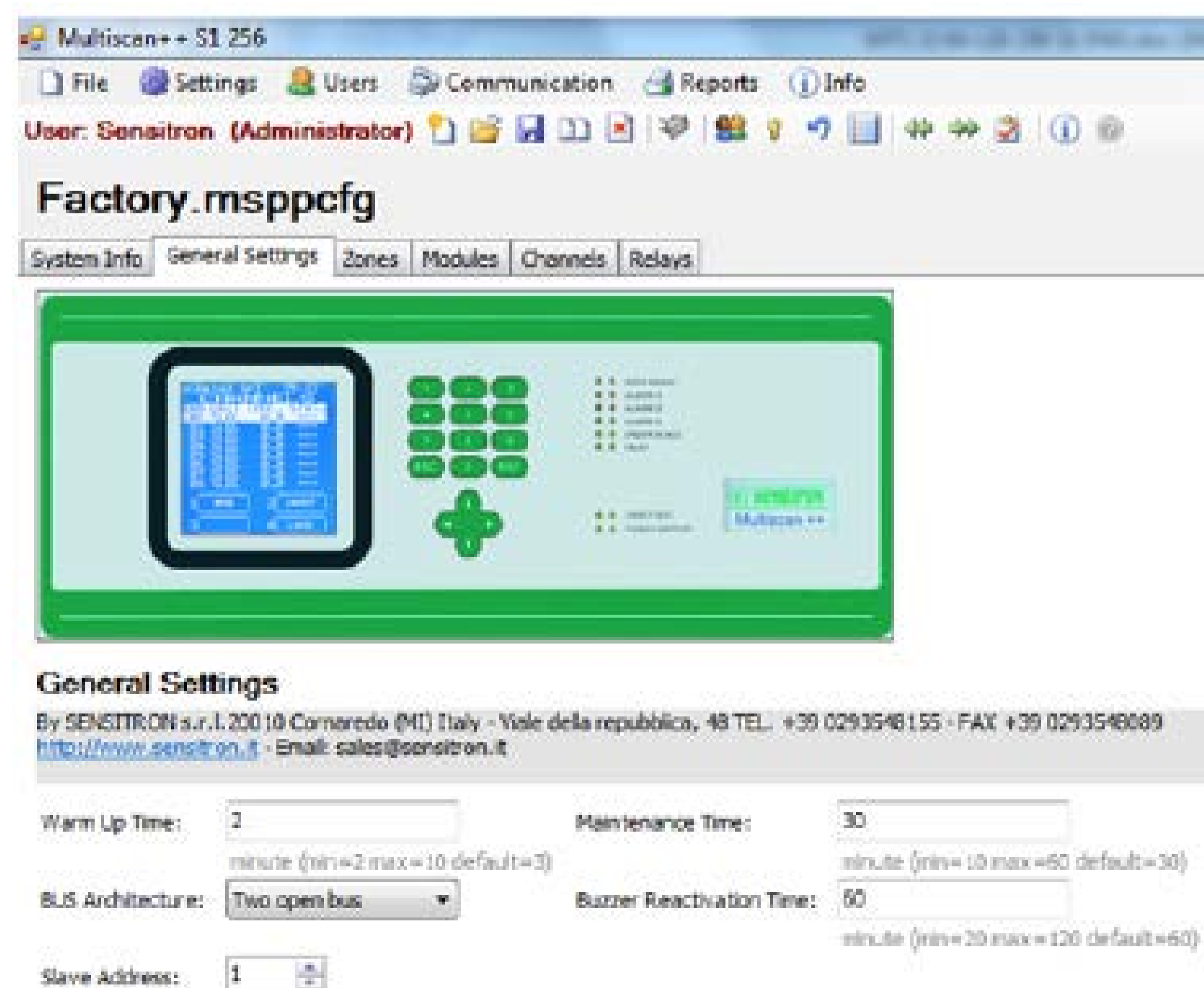
Figure 6.5.2
General Settings
screen details

In the "General Settings" it is indicated:

Warm Up Time	The warm-up time for the system after which it passes over to measuring mode (from 2 to 10 minutes; default 3 minutes)
BUS Architecture	Which type of the BUS-architecture for the modules was implemented by the installer: 2 Open Buss 4 Open Buss
Slave Address	Control panel address. If the control panel is connected to a remote Scada system
Maintenance Time	Channel Test/Maintenance time after which a channel automatically switches back to measuring mode (from 10 to 60 minutes; default 30 minutes)
Buzzer Reactivation Time	Reactivation time for buzzer after which the acoustic alarm is reactivated if the alarm conditions are still valid (from 20 to 120 minutes; default 60 minutes)

6.5.3   ZONES
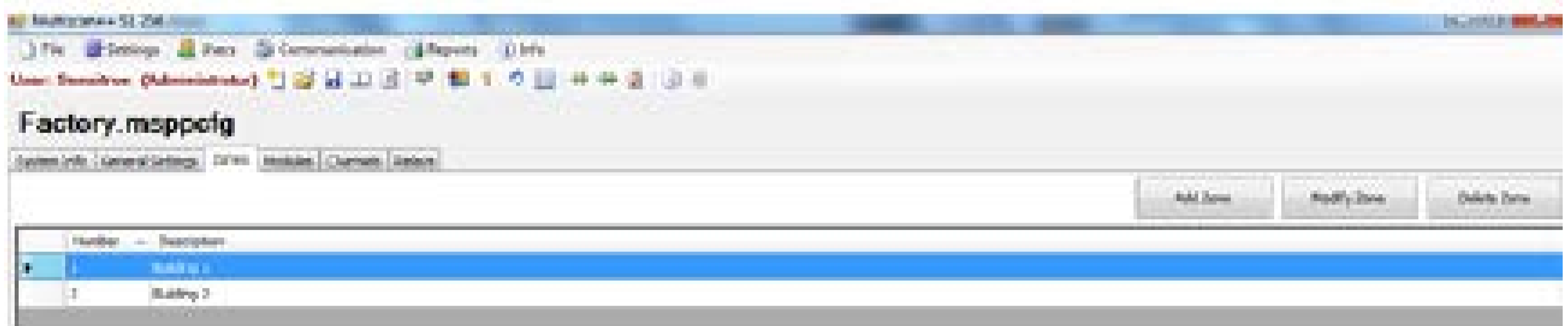
Figure 6.5.3
Zones definition
screen

The creation of zones is not mandatory for the reliable function of the gas detection system. It is an aid for the user to indicate useful additional information in the case of alarms. The definition of "Zones" allows a logical dividing of the gas detection system according the needs of the user. "Zones" may be defined in relation to

-      the physical position of modules or detectors
-      measurement tasks like "LEL-monitoring" or "toxic" for workplace safety
-      different gases like CH_4 or CO or O_2

A maximum number of 16 zones may be specified.

6.5.4   MODULES CONFIGURATION

IN/OUT modules and system detectors are set in "Input modules". The system layout must be known to correctly set the various field devices.
What you need to know:

-      Detectors and IN and OUT modules (relays) installed in the system.
-      The Zones they are in
-      The Buss (RS485 bus) they are connected to and their addresses

For information on Multisystem++S1 installation, please see chapter 2–Installing in this manual.

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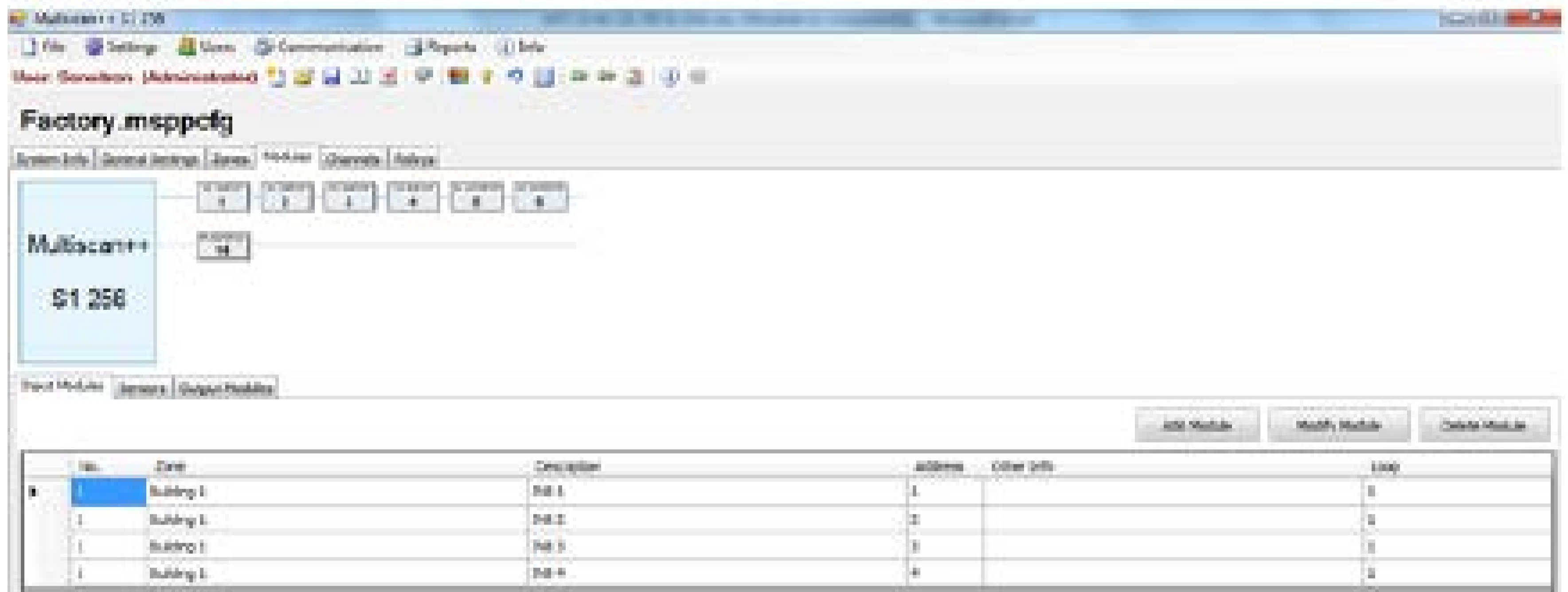
Figure 6.5.4
a) Videata periferiche
(Moduli Input)

- Input Modules
  STG/IN8-S analog input modules installed in the system are set in Input Modules.
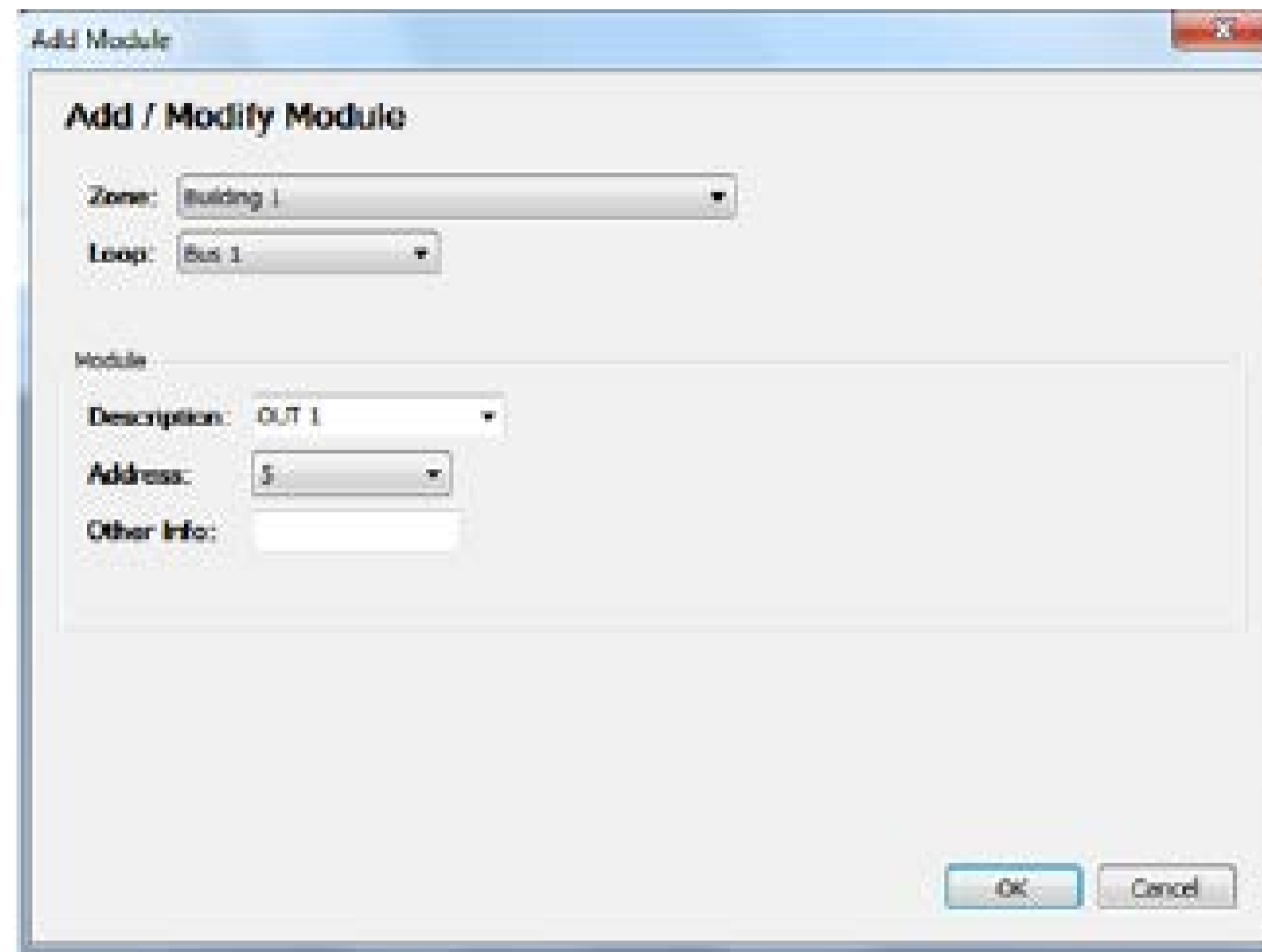 Click Add Input Module to open the window shown in Fig. 4.5.4 b.
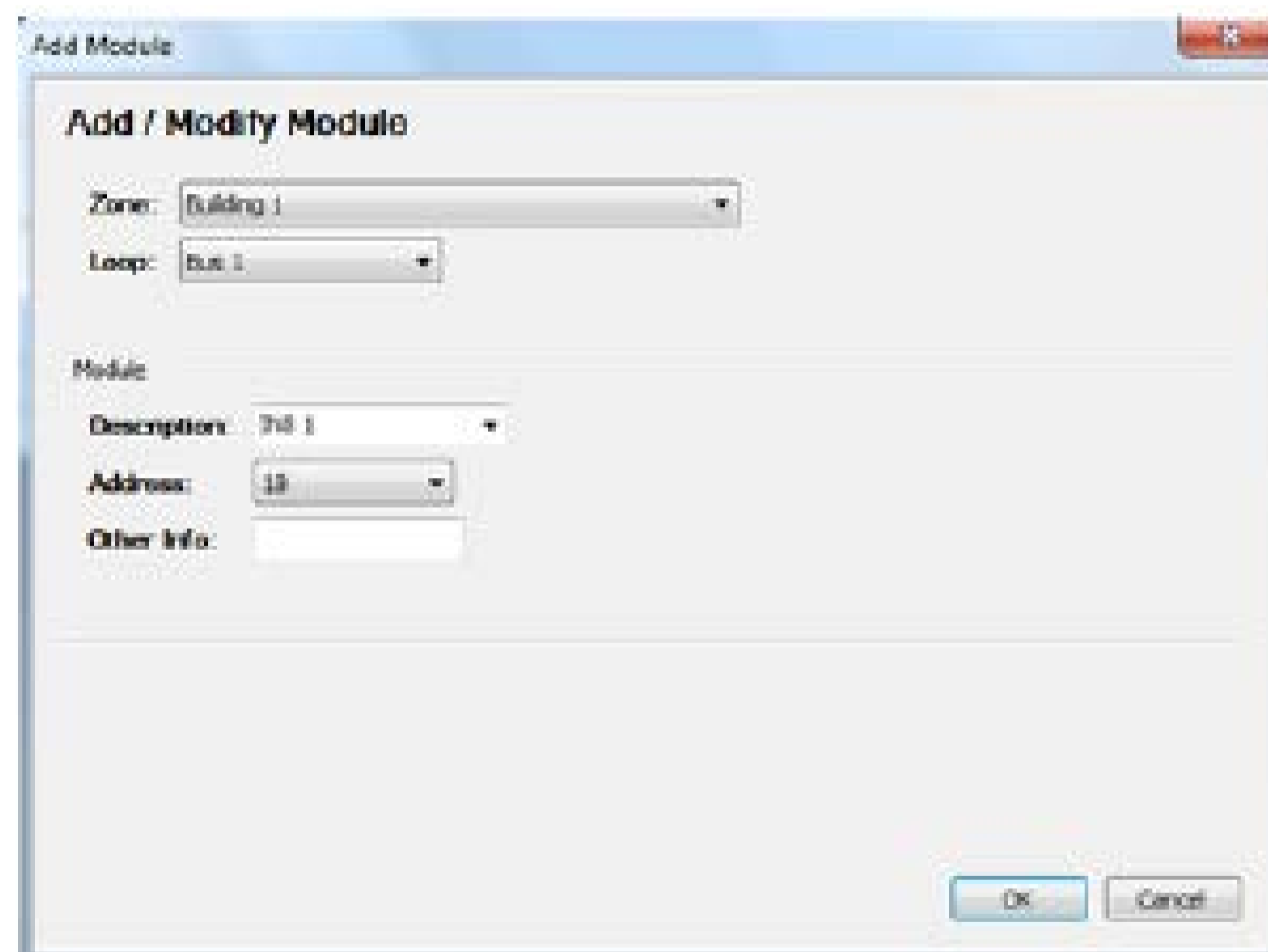
Figure 6.5.4
b) Module
configuration screen

Zone	Zone where the module is installed
Bus	Bus Number (RS485 bus) where the module is physically connected. 1 or 2 (3 and 4 optional)
Description	Module description
Address	Module address. From 1 to 256 (See chapter 2 – Installation, for further information).
Other info	Additional description

Cliccando su "Modifica Modulo Input" per modificare i parametri del modulo.
Cliccando su "Cancella Modulo Input" per cancellare il modulo.

-        Sensors
         Gas Detectors installed in the system and directly connected on the
         bus (RS485 bus) are set in "Sensors". Refer to chapter 2-Installation for
         further information.
         Click Sensors to open the window shown in Fig. 6.5.4 c.
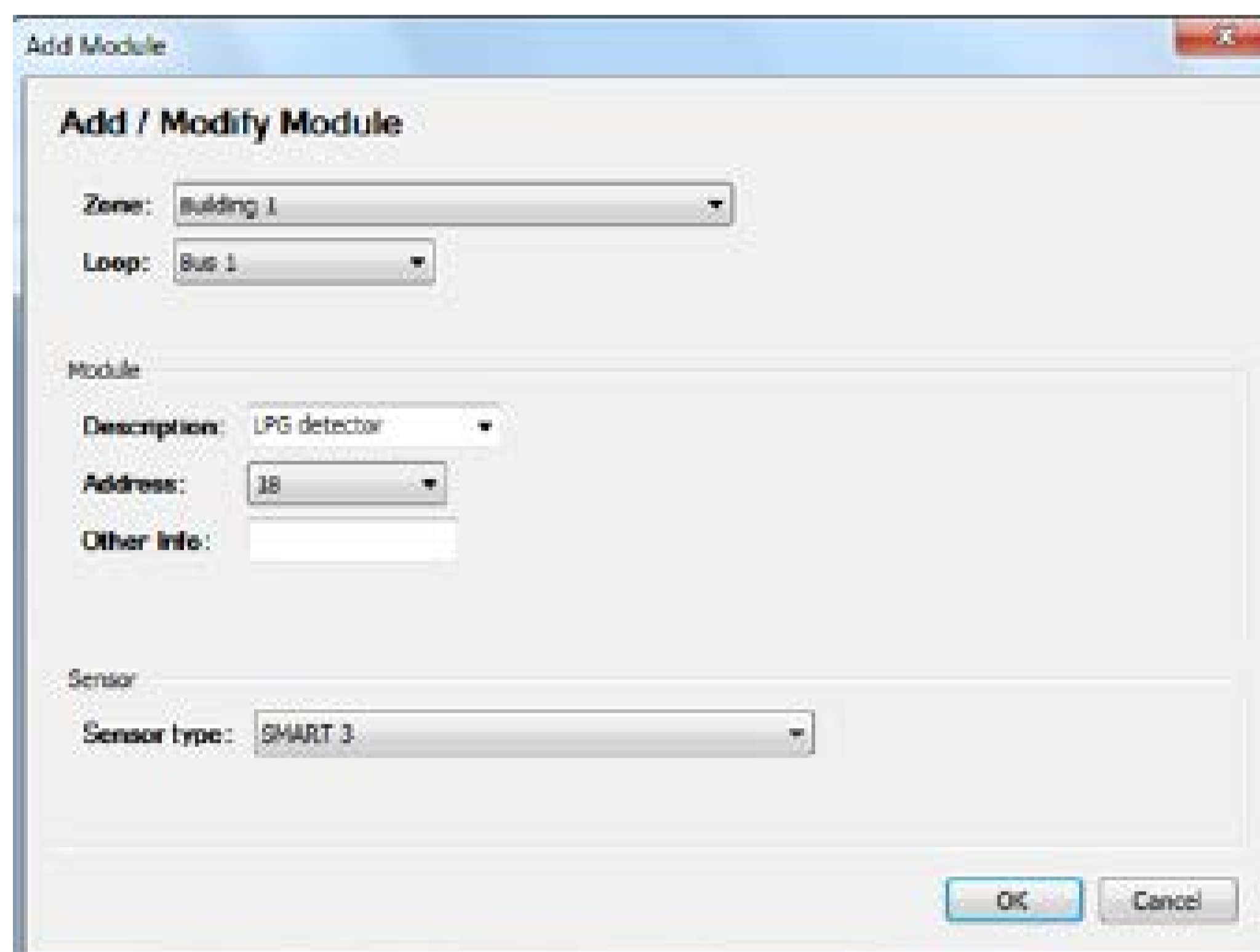
Figure 6.5.4
c) Detectors
configuration screen

Zone	Zone where the Detector is installed
Bus	Bus Number (RS485 bus) where the module is physically connected. 1 or 2 (3 and 4 optional)
Description	Detector description
Address	Detector address. From 1 to 256 (See chapter 2 – Installation, for details).
Other info	Additional description

"Modify Sensor" to edit Detector settings.
"Delete Sensor" to delete the Detector

-     Output Modules
STG/OUT16 output modules installed in the system are set in Output Module. Click Add Output Module to open the window shown in Fig. 6.5.4 d.

Figure 6.5.4
d) Outputs
configuration screen

Zone	Zone where the module is installed
Bus	Bus Number (RS485 bus) where the module is physically connected. 1 or 2 (3 and 4 optional)
Description	Module description
Address	Module address. From 1 to 256 (See chapter 2 – Installation, for further information).
Other info	Additional description

"Modify Output Module" to edit module settings.
"Delete Output Module" to delete the module

6.5.5　　　　CHANNELS

Use the "Channels" menu to enable and program single gas Detector settings in the system.

-　　　　　　Channels Overview
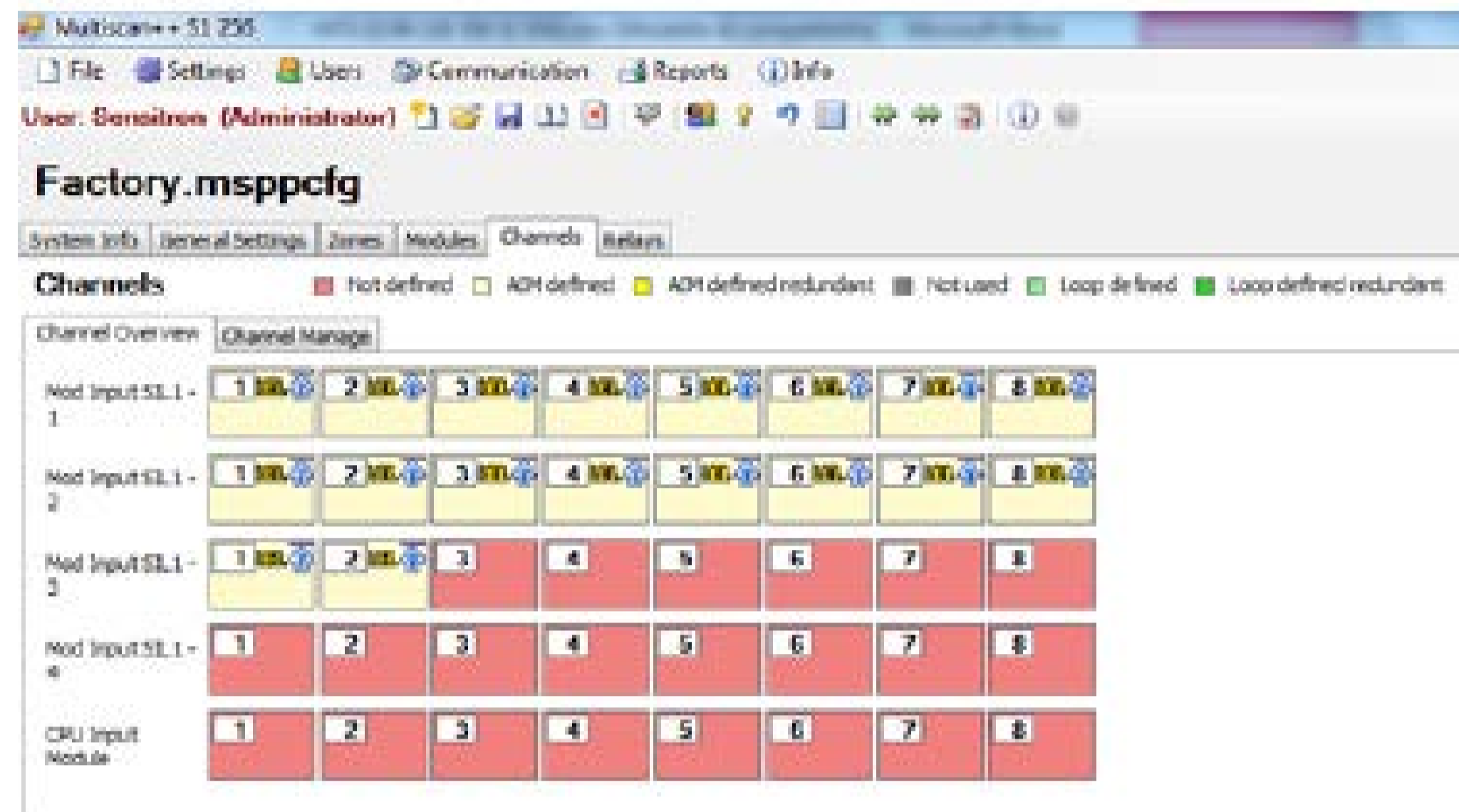
Figure 6.5.5
a) Channels map screen

The Channel Overview gives a quick overview of how many Input modules and detectors are programmed in the GALILEO 32 configuration and these are defined.

Different colours represent different characteristics like Not defined, Channel Defined, Channel Redundant etc.

To choose a channel to view its data, simply pass the mouse over the channel and the data for this channel will be shown by a popup window. Otherwise, for the modification of the channel parameters: with a mouse click on the channel and the data will be shown in the "Channel Manage" window.
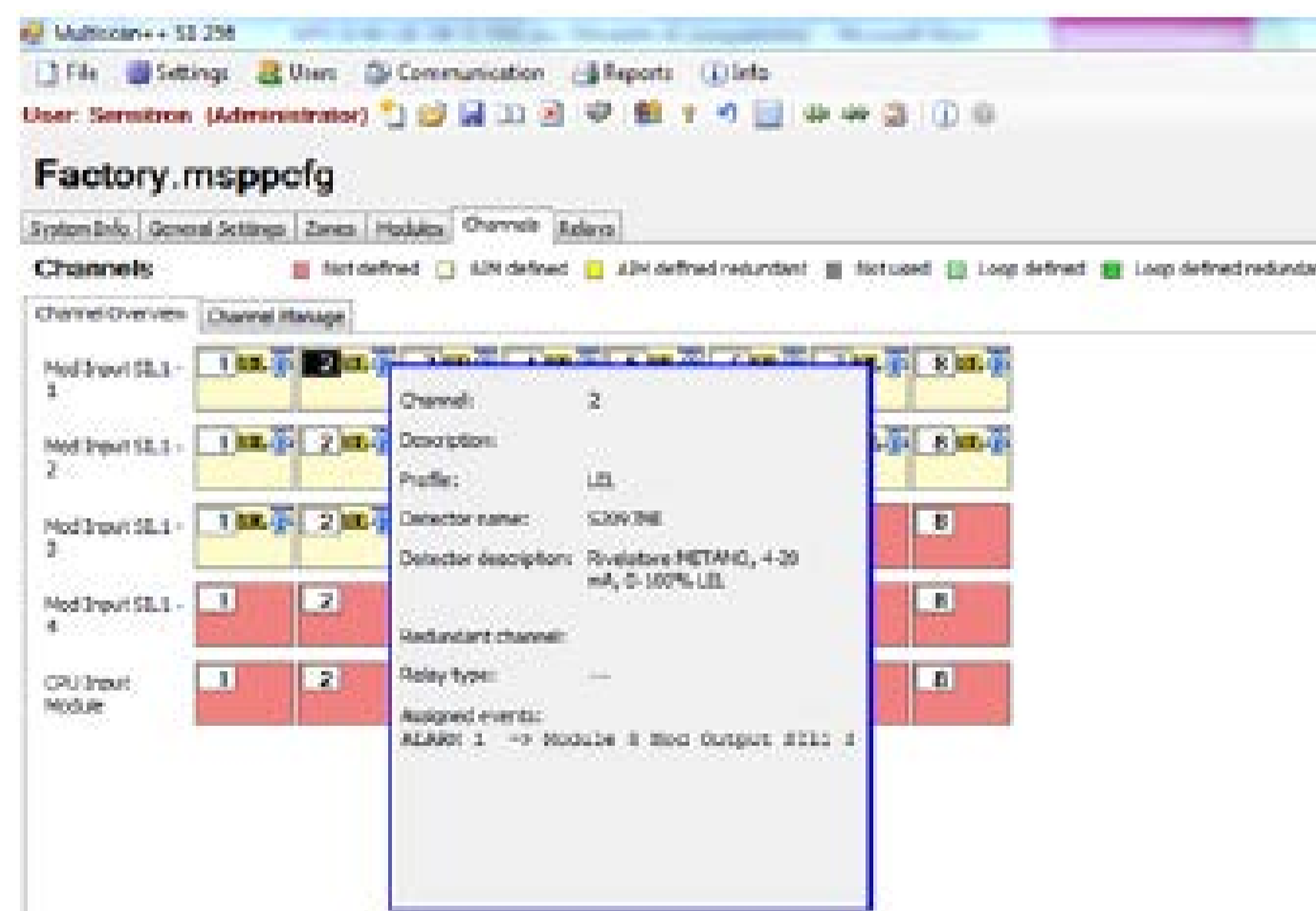
Figure 6.5.5
b) Channel popup window with the parameters

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- Channel Manage
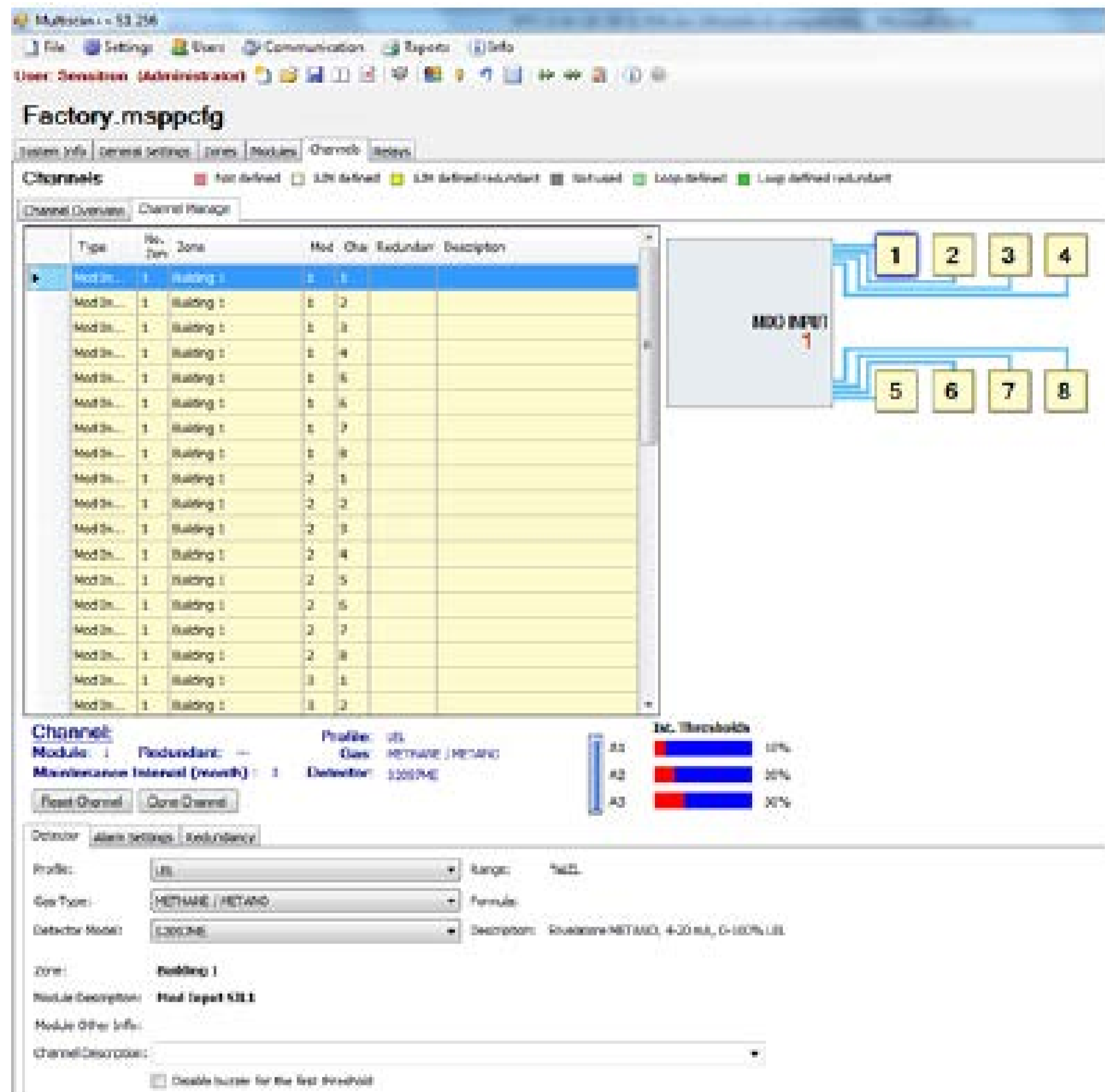
Figure 6.5.5
c) Channel details screen

- Specifying a new input-channel
An input channel is specified by the combination of three different drop down lists.

I The "Profile" specifies the measurement task, related to the gas. e.g. LEL. Related to the profile are rules for the setting options for the related channels. Therefore the menus and windows related to the management of input channels may look slightly different related to the chosen profile. Of course the chosen "Profile" must match the gas detector type connected to the input. e.g, if a ME (Methane) gas detector is connected to the input, the right "Profile" will be LEL.

Figure 6.5.5
d) Channel details screen

The available Profiles are:
- L.E.L.
- OXYGEN DEFICENCY
- OXYGEN ENRICHMENT
- OXYGEN FOR INERTIZATION
- OXYGEN MIXED MODE
- TOXIC

II   The "Gas Type" represents the list of gases belonging to the related "Profile". Choose the right gas as for the gas detector connected to the input. e.g. choose Methane if a Methane gas detector is connected to the input; choose CO (Carbon Monoxide) if a CO detector is connected to the input. And so on.

III   In "Detector model" select the code for the gas detector connected to the channel being programmed from the list. This is an additional aid to correctly enter gas detector settings. The list that appears in "Detector model" will only include those detectors that meet the characteristics of the other two criteria set in "Profile" and "Gas Type". Each gas detector code is indicated on the device identification label.

The "Channel Description" is not mandatory for the reliable function of the gas detection system. It is an aid for the user to indicate useful additional information in the case of alarms. In the case of alarms all information related to the detector(s) in alarm condition will be indicated at the display on request.
The "Channel Description" may be additional to the "zone" description and may include data according redundancy to another channel or describe the measurement task in detail.
In the submenu "Alarm Settings" the threshold values for all three alarm levels can be modified within a specified range indicated by the red bar and a sliding control.
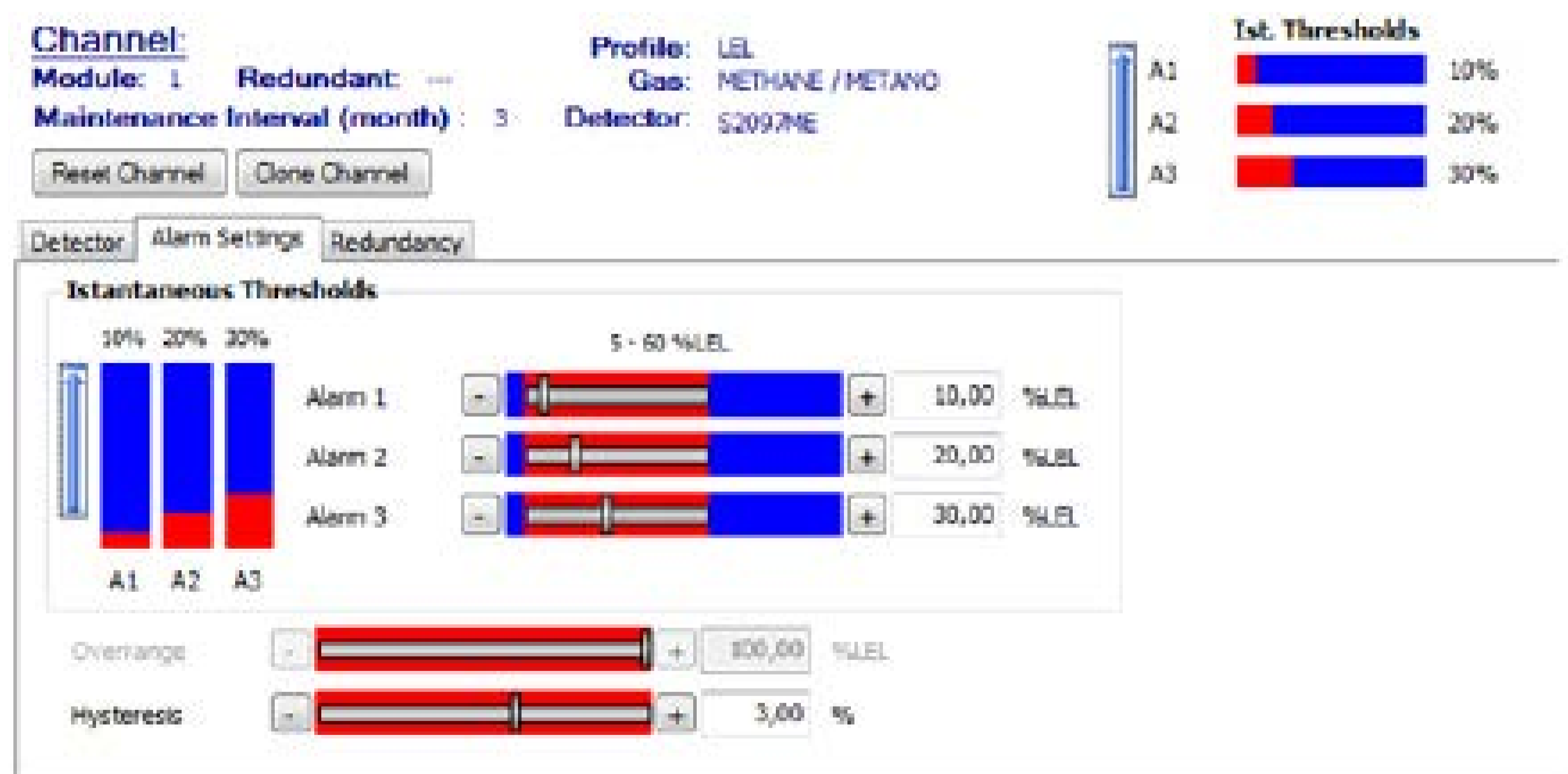
Figure 6.5.5
e) Alarm levels setting screen

The left arrow going upwards is indicating the "increasing alarms" of the LEL profile where the alarm levels from alarm 1 to alarm 3 correspond to increasing concentration.

The configuration software is checking the user input for plausibility. There are some general rules e.g. alarm level not below 5% of the measuring range, no higher alarm (alarm 2 or 3) is settable to a level lower than the lower alarm (alarm 1 or 2). Other restrictions are specified in the measurement tasks (profiles).

The horizontal red bars indicate for each alarm threshold the range within which alarms can be set or modified.

In the profile "Oxygen deficiency" the Oxygen concentration corresponding to alarm 1 will be higher than for alarm 2 and alarm 3. This will be indicated by the left arrow going downwards for "decreasing alarms".

"Overrange" typically is fixed at 100% of the measuring range. Only if in a profile a fourth alarm level is required "Overrange" will be used as this fourth alarm and the value is settable.

The "Hysteresis" value indicates how variations in the signal will be ignored when in close proximity to the alarm threshold.

- Modification of alarm levels
  The values can be modified in steps by touching the – on the left or the + on the right side of the horizontal alarm bar or by typing the numbers into the numeric indication on the right side. Due to the modification of one alarm set point also the range of the red bars for the alarms will be modified accordingly. If the typed value for an alarm level is outside of the accepted range the plausibility check will modify it automatically, e.g. when typing in the LEL profile for alarm 3 the value of "80" corresponding to 80% of the LEL this value will be corrected to "60" which is the maximum value specified in this profile. When leaving the screen after modification, the old and sets of parameters for the channel are indicated with the modified values in red, in a windows. The modification has to be confirmed with OK or may be cancelled.

- Channels Redundancy
  If the system requires a very high security level, two detectors are to be placed at each measuring point. "Profile" and "Gas Type" have to be identical.
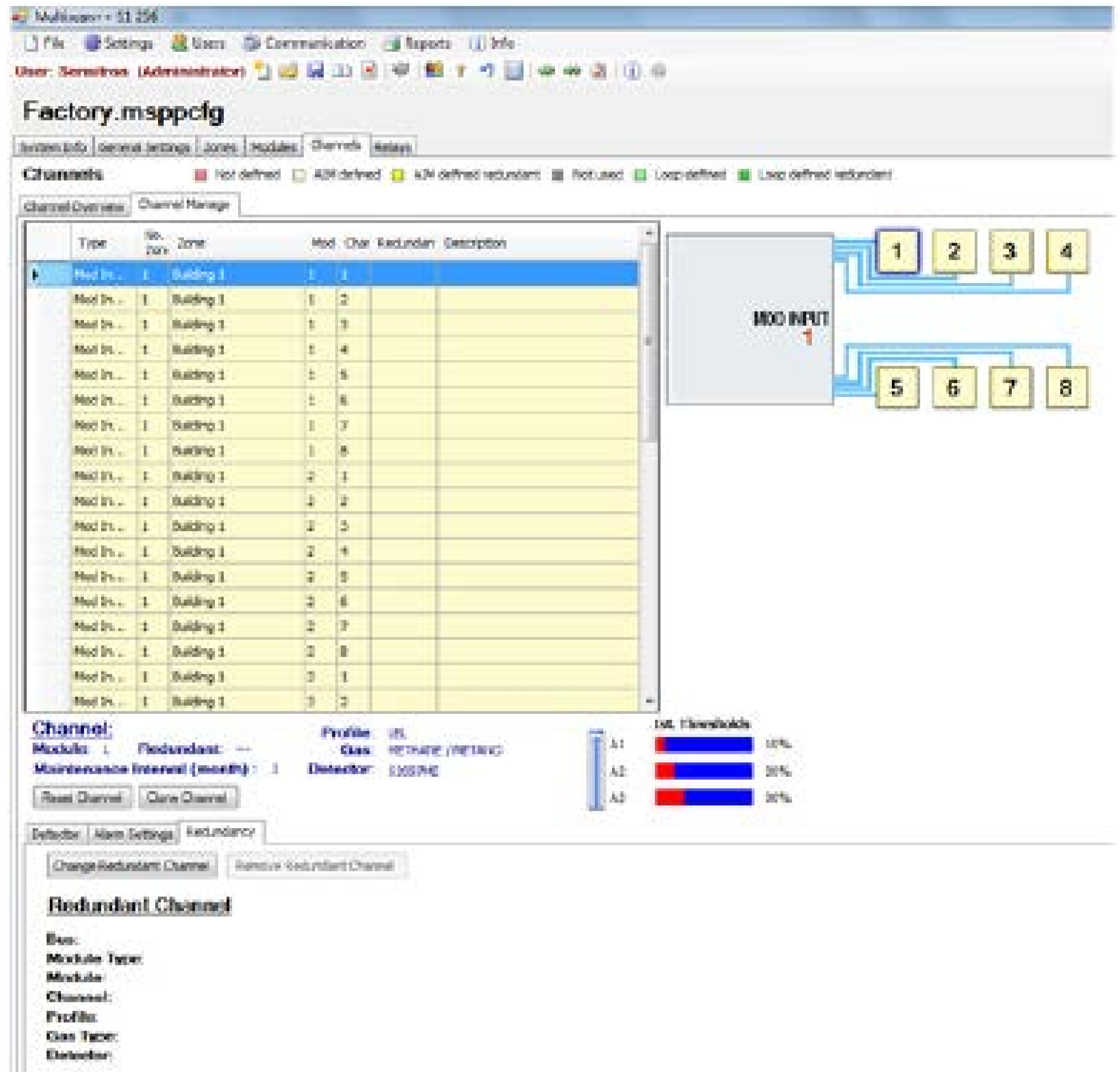
Figure 6.5.5
f) Redundancy tab in the channel
definition screen

Specifying a new redundant channel
The channel 1 of module 1 has been defined. After finishing the configuration of the channel the TAB "Redundancy" is chosen. Because actually no redundant channel is specified the information within the TAB is empty (see left bottom corner of the Fig. 6.5.5 f above).

After touching the button "Add Redundant Channel" the right screen occurs.

Figure 6.5.5
g) List for choosing the redundant channel

Chose the Redundant channel and confirm by Accept.
If the chosen Redundant channel has a different configuration, the configuration will be automatically modified, matching the configuration of the other channel (a small message will appear at the right part of the screen)

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6.5.6   RELAY OUTPUTS

Via the menu "Relay", the characteristics of the outputs on the remote output modules STG/OUT16 S being part of the system are enabled and programmed.

- Relay overview
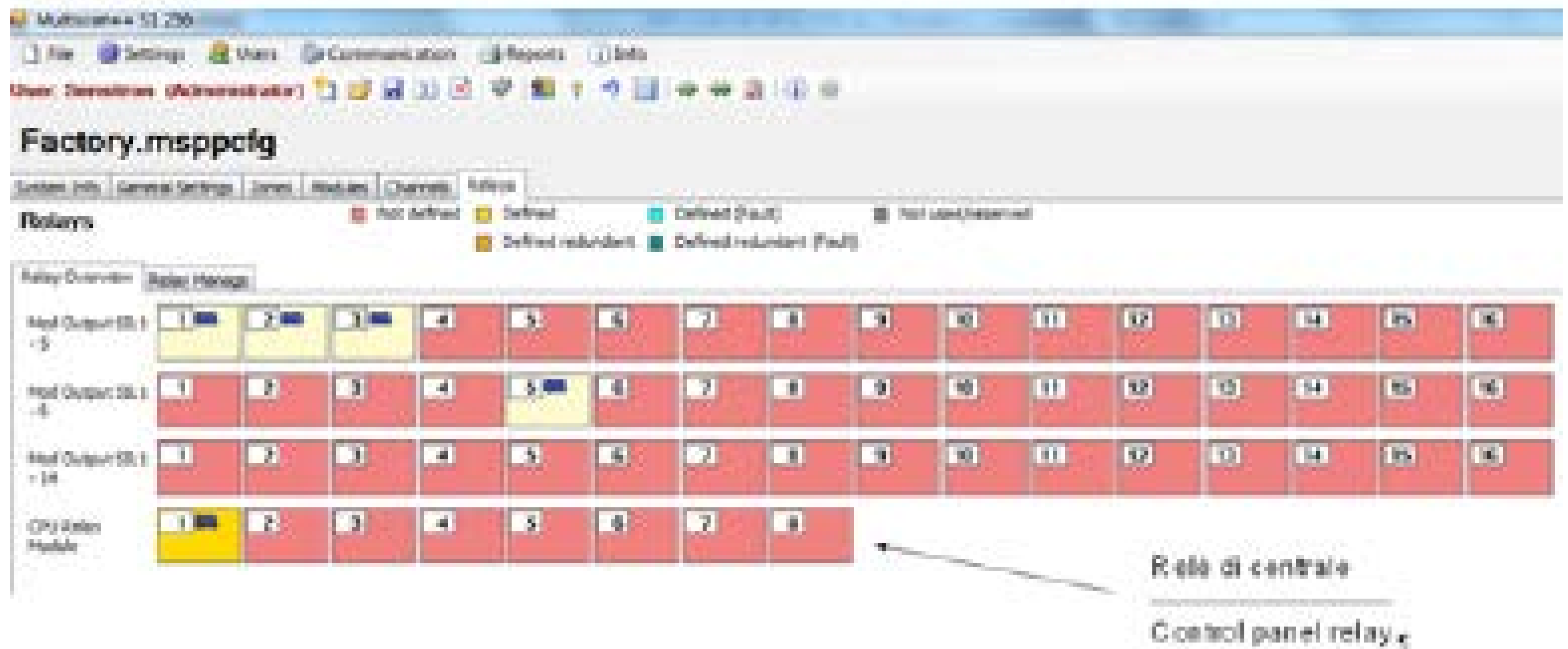
Figure 6.5.6
a) Relay output overview screen

The Relay overview gives a quick overview of how many output modules (RIO Out STG/OUT16 modules with or without extension relay board) are presently used in the GALILEO 32 and how many Outputs are defined. Different colours represent different characteristics like redundant or non redundant, defined or not defined Outputs.
To choose a Relay Output to view its data, simply pass the mouse over the Output block and the data for this Output will be shown by a popup window. Otherwise, for the modification of the Relay Output parameters with a mouse click on the Output block and the data will be shown in the "RIO Output Manage" window.
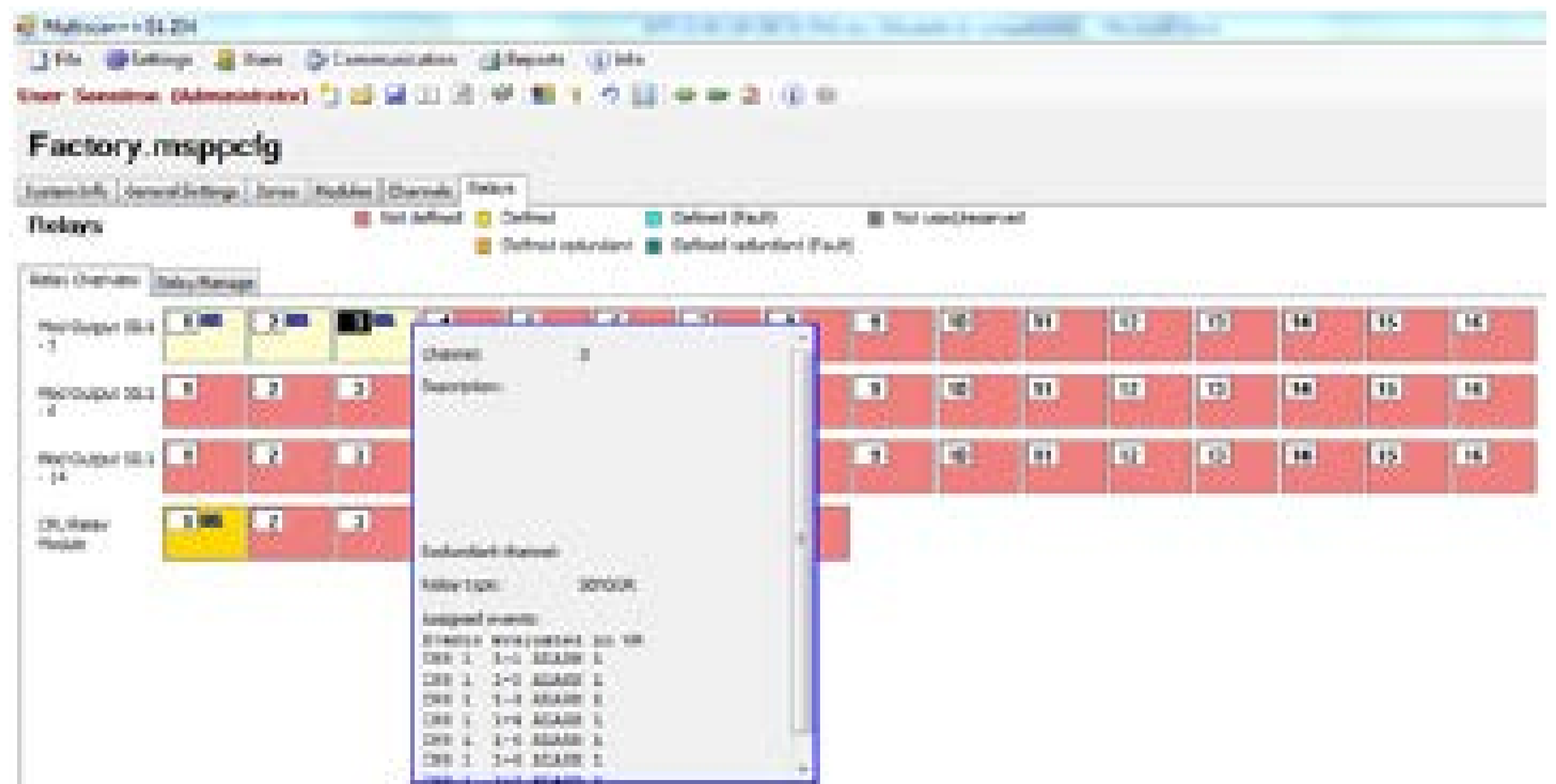
Figure 6.5.6
b) Output popup window with the parameters

-    Relay Output Manage
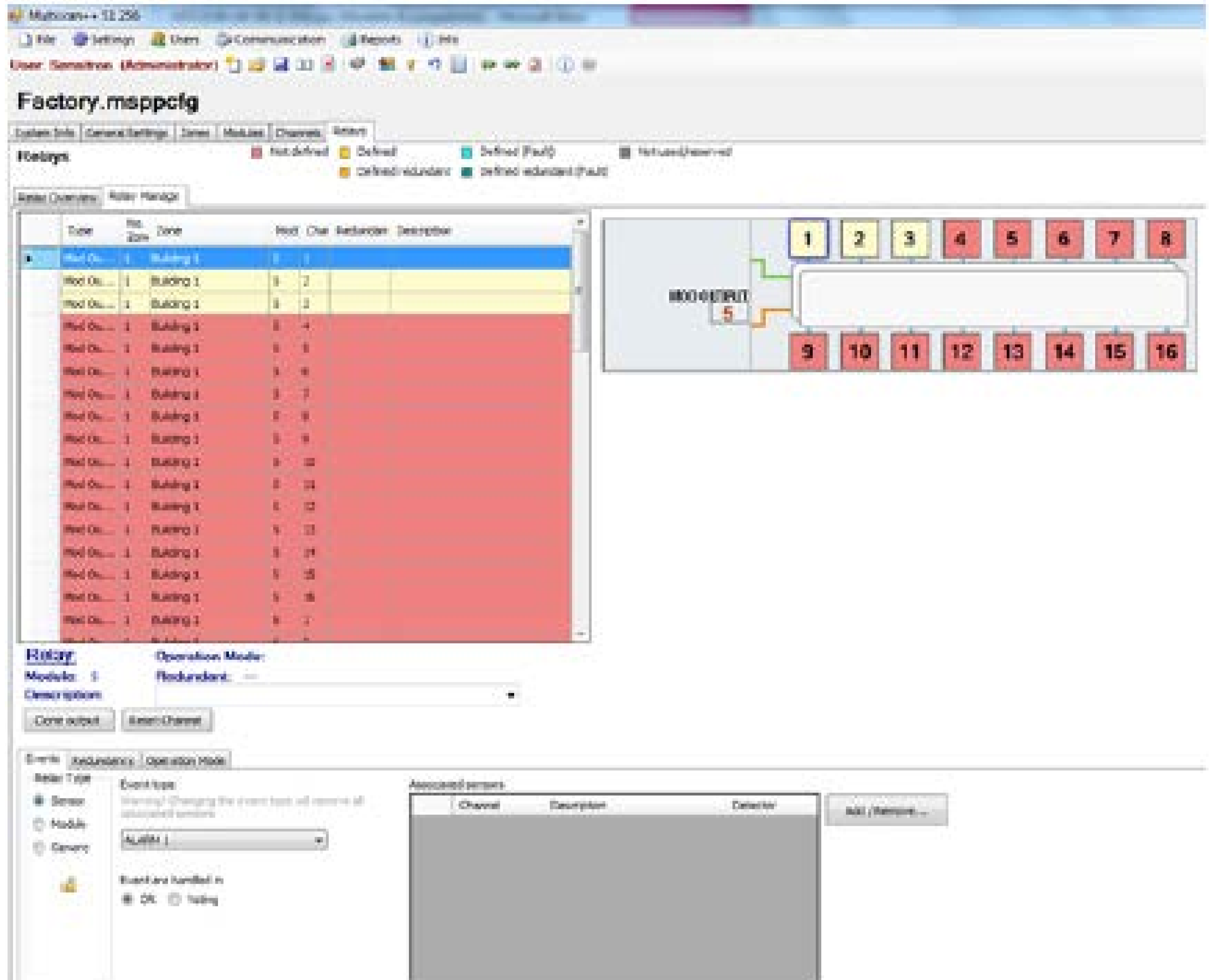
Figure 6.5.6
c) Outputs details screen

The Relay Output Manage screen allows programming the event(s) that activate the outputs. Available options are as follows:

-    Events: to program the event and the output to activate
-    Redundancy: in systems where a higher safety level is requested, 2 outputs can be used for the same activation.
-    Operation Mode: it sets the output operative mode (steady, pulsed and timed)
-    Relay Type: Select if the output is to be activated by a Sensor event (alarm, fault, under scale etc.) or a Module event (Input or Output modules) or a Generic event (generic fault, power supply failure, Test etc.)
-    Event Type: It depends on the setting of the Relay Type option. E.g.: in case of Sensor event, the event type can be: Fault, Alarm 1, Alarm 2 etc.
-    OR: OR Mode. The output gets activated whenever one of the events associated to this output enters an alarm or failure condition.
-    Voting: A settable quantity of events would happen at the same time to activate the output.
-    Associated Sensors / Modules: it is the window where the events associated to the output can be chosen (with the Add/Remove key) and shown.

- Add / Remove: To add or remove the events from the Associated Sensors Modules window.
- Programming of a new Relay Output: Selecting the new output, by the Relay Type mode select if it is a Sensor event, a Module event or a Generic event.
- Sensor event: select Sensor in Relay Type. Then go to the Event Type and select the type of the activation between: Underscale, Alarm1, Alarm2, Alarm3, Overange, Overscale and Fault.
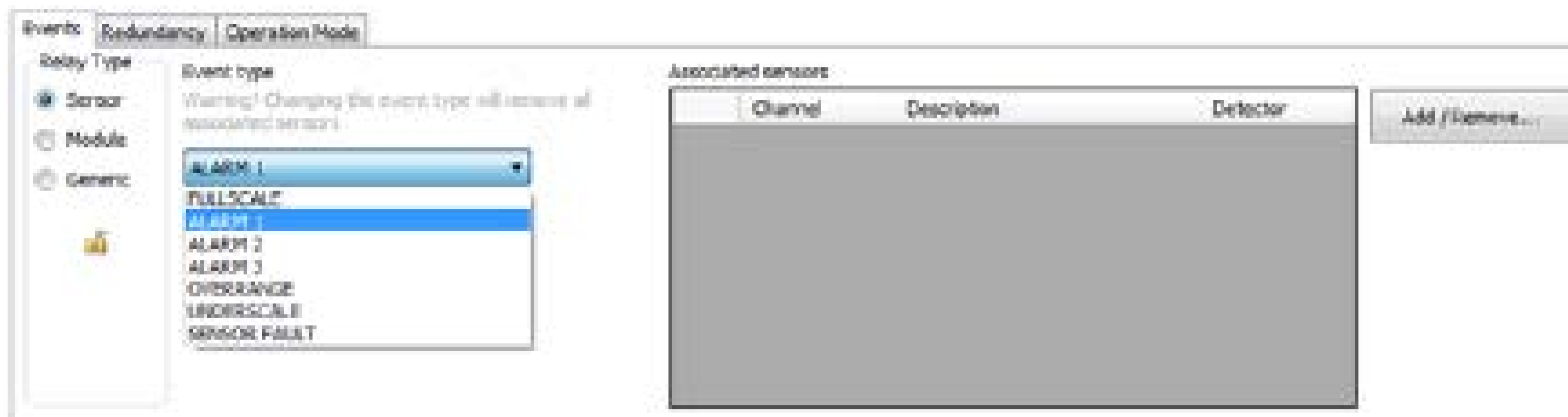

Figure 6.5.6
d) Sensor event

By pushing Add / Remove, the screen will allow you choose the channel address or the input channels (to be associated to an output).
An open or closed lock on the left side is indicating the non latching or latching status of the relay output.
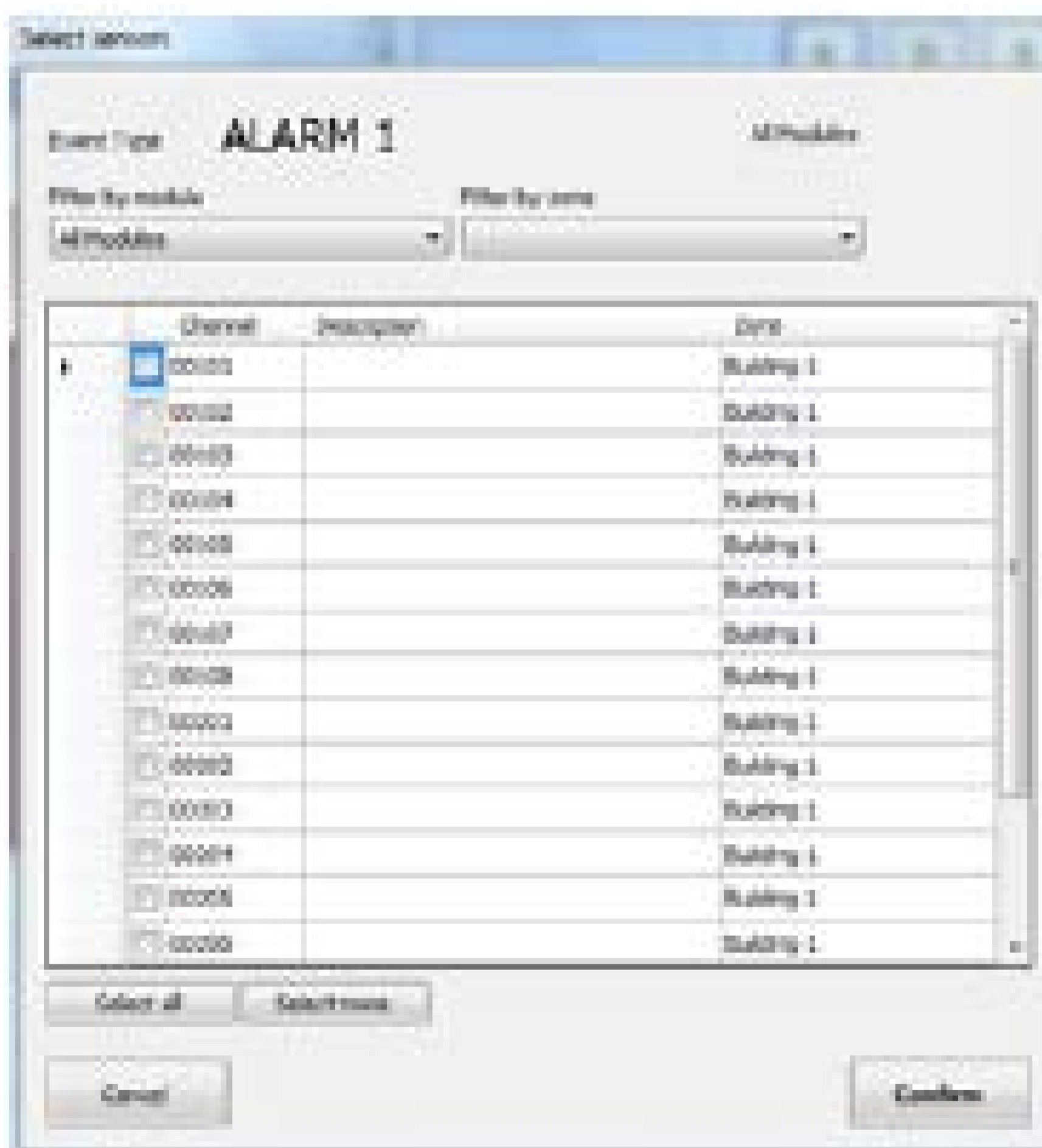
Figure 6.5.6
e) Channel choice screen

After pushing the "Confirm" key, the output will be set with an event coming from one or more sensors.
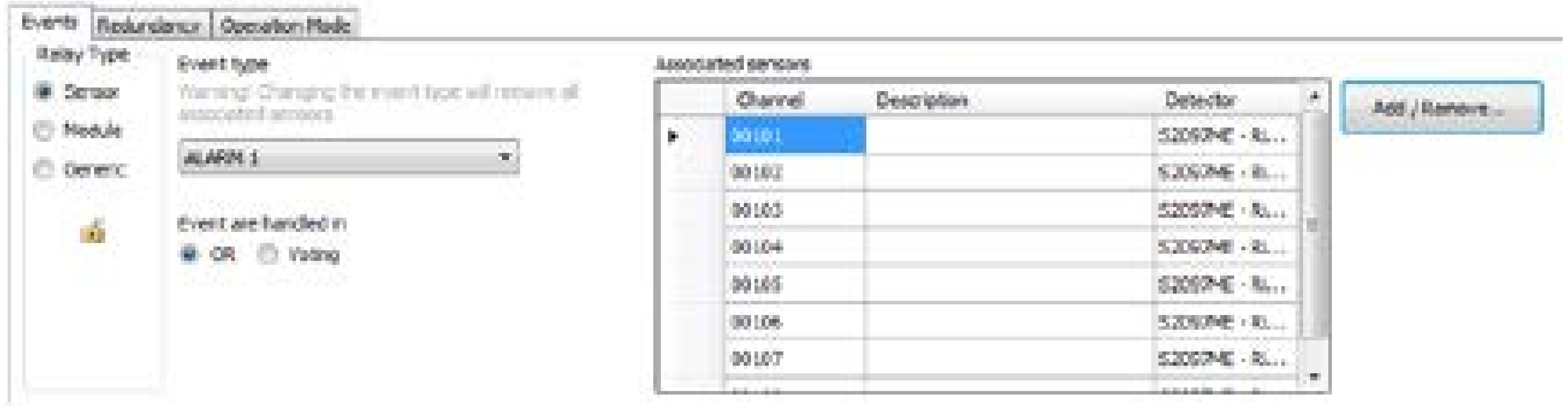
Figure 6.5.6
f) Output setting summarizing screen

It is not possible to select different types of events associated to just one output. An output set for the Alarm 1 cannot be set for the Alarm 2 or 3 as well.

- Module event: Select Event Module to associate an output to a Fault or an Off Line mode.

Figure 6.5.6
g) Module output setting summarizing screen

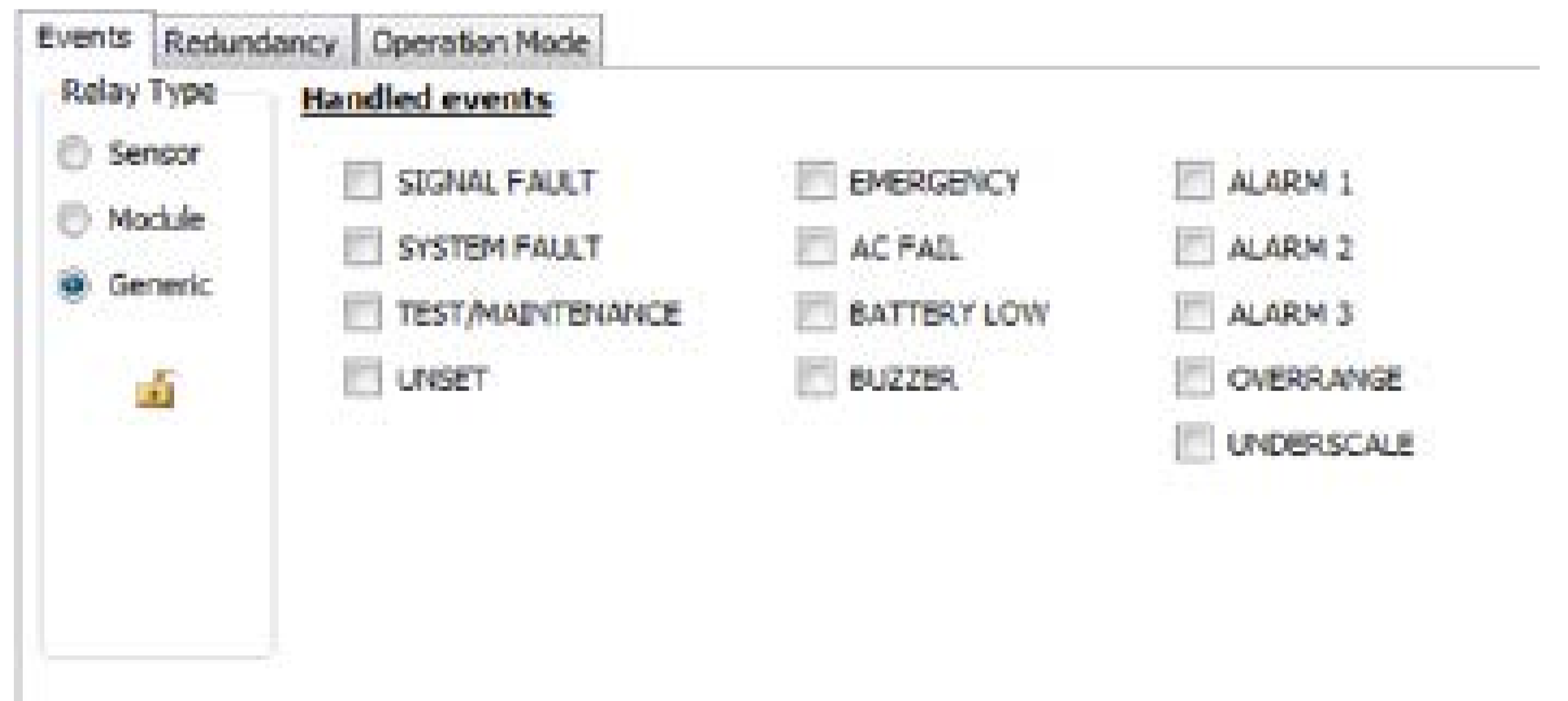- Generic Event: select Generic Event to associate an output to the system events mentioned here below.

Figure 6.5.6
h) System event output setting screen

-     OR and Voting functions
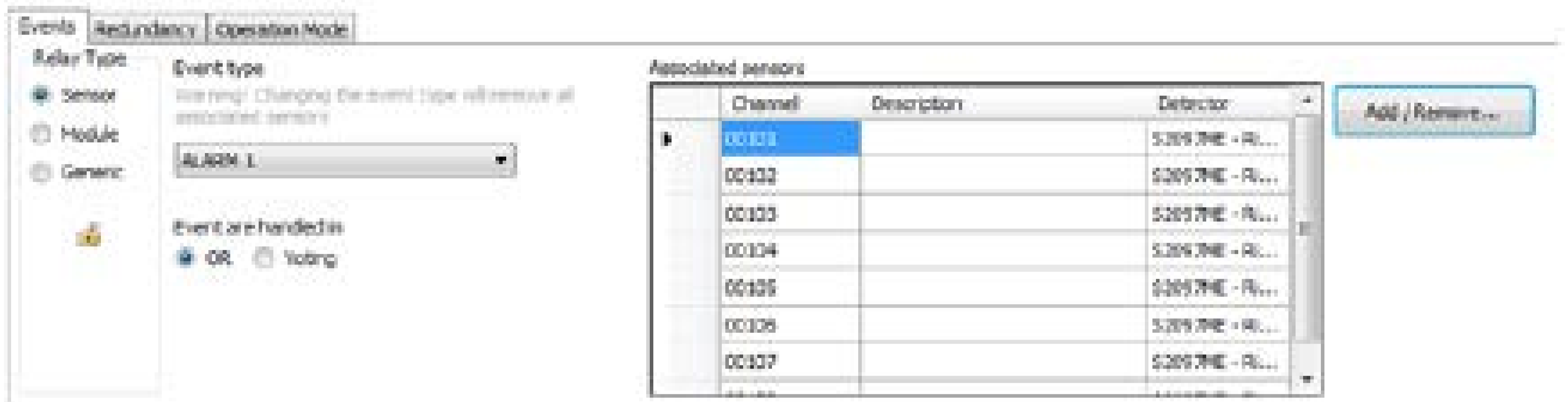
Figure 6.5.6
i) OR and Voting functions

-     OR function
By selecting OR, a single event (between the events shown in the Associated Sensors summarizing screen) is enough to activate the output.

-     Voting function
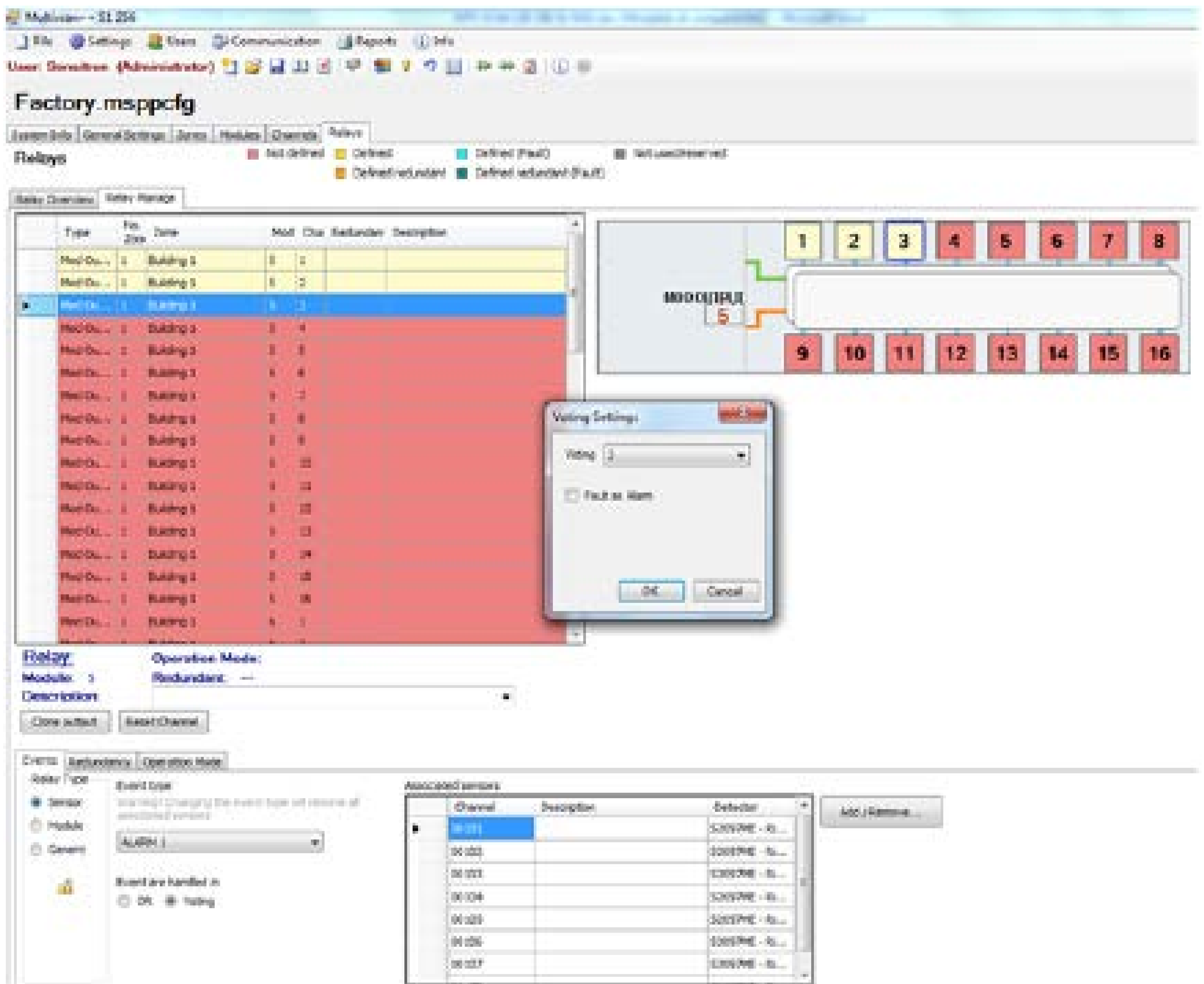
Figure 6.5.6
j) Output events details screen:
VOTING combination

After associating the output (sensors) to the respective channels choose the Voting (And) option. The "Voting Setting" window will appear in the middle of the monitor. Select the number (quantity) of the events that have to activate contemporaneously in order to activate the selected output.

E.g. By setting 2, at least 2 events associated to the output and present in the associated sensors window will be necessary to activate the output.

By selecting the "Fault as Alarm" tick, if one of the sensors associated to the output will be in Fault mode, it will be considered as Alarm and one event less will be enough to activate the output.

-        Outputs Redundancy
         In systems that require higher safety, 2 outputs can be used for a single activation (or to activate two distinct actuators that put the same system in safety conditions). The settings procedure for two redundant outputs must be practically identical.
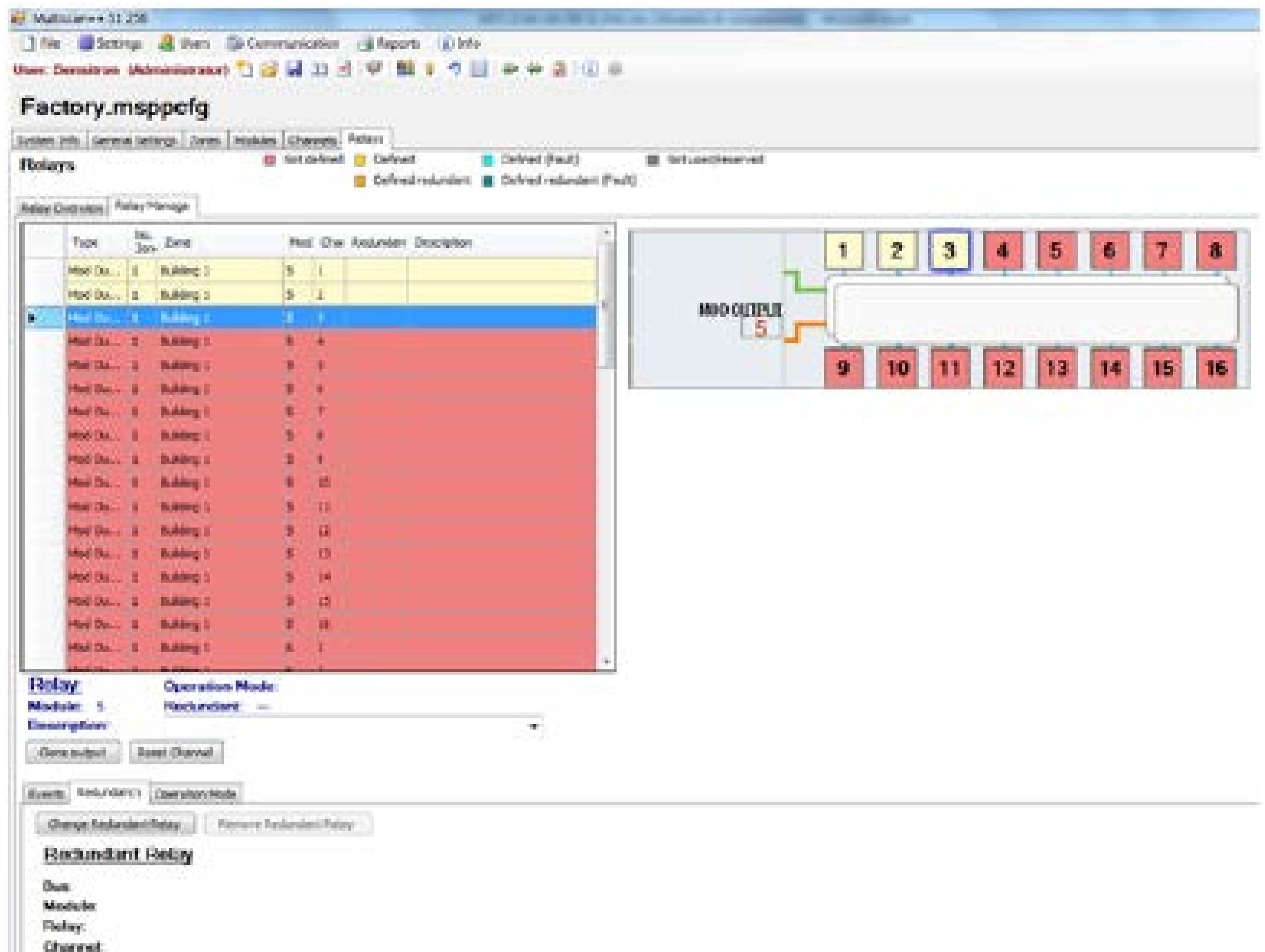

Figure 6.5.6
k) Redundancy tab in the outputs definition screen

- How to program a Redundancy Output.
  The output 1 of module 5 has been defined. After finishing the configuration of the relay the TAB "Redundancy" is chosen. Because actually no redundant relay is specified, the information within the TAB is empty (bottom left of Fig. 4.5.6 k above).
  After pressing the button "Add Redundant Relay" the right screen occurs (Fig. 6.5.6 l)

Figure 6.5.6
l) List for the redundant output

- Chose the Redundant output and confirm by Accept.
  If the chosen Redundant output has a different configuration, the configuration will be automatically modified, matching the configuration of the other output (a small message will appear at the right part of the screen)

In the output configuration screen, the Redundant output will appear in the lower left part of the screen.
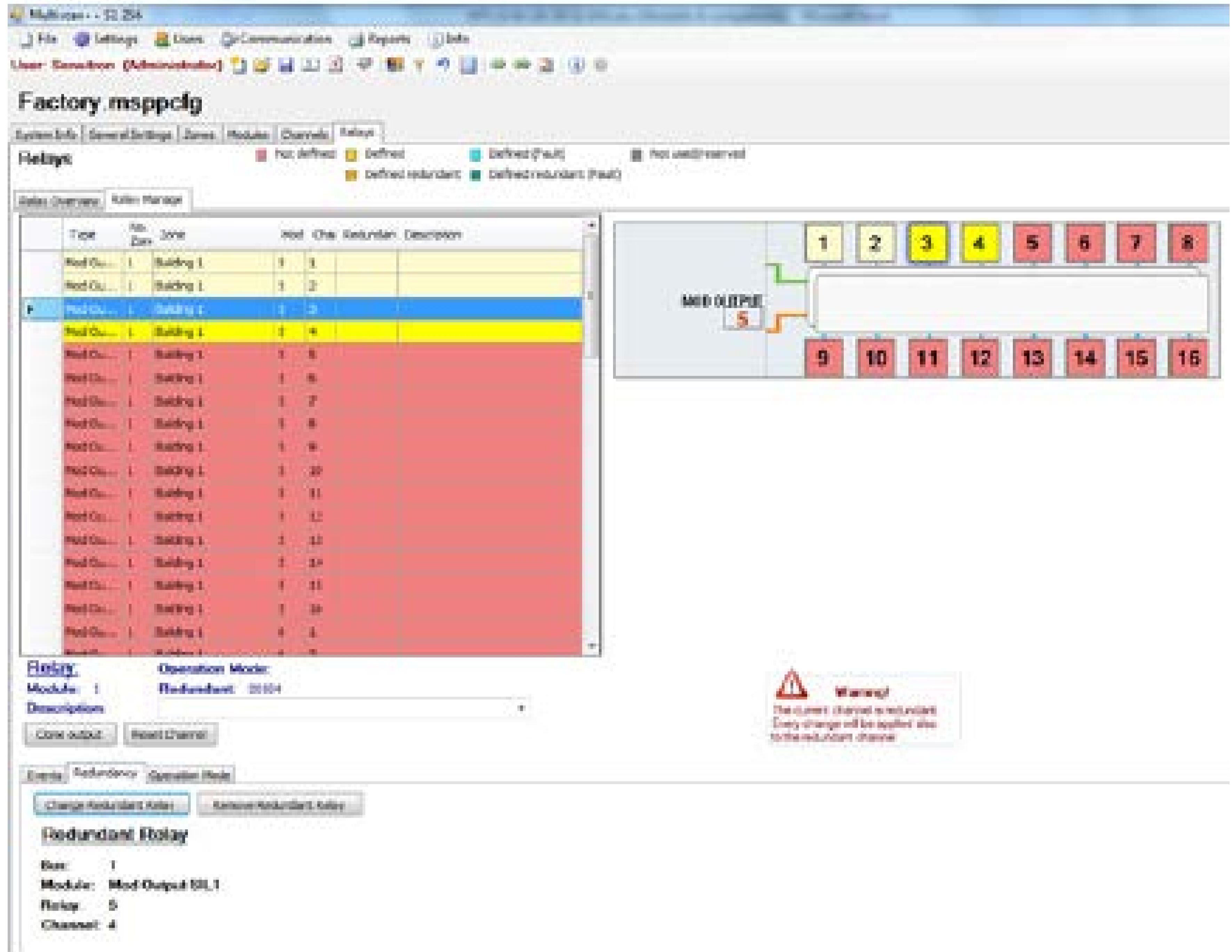
Figure 6.5.6
m) Outputs details screen showing a defined
relay with redundancy

- Outputs "Operation Mode"
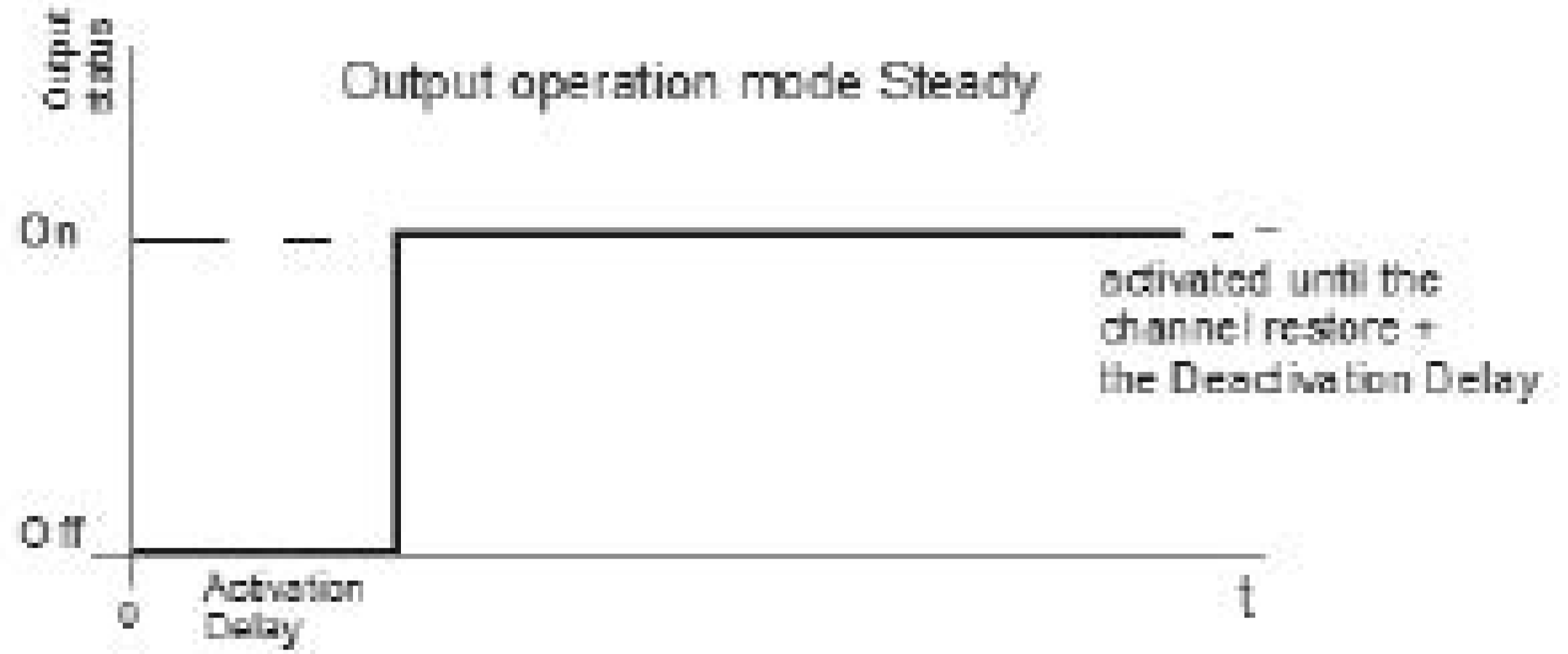There are three options for the output Operation Mode

Figure 6.5.6
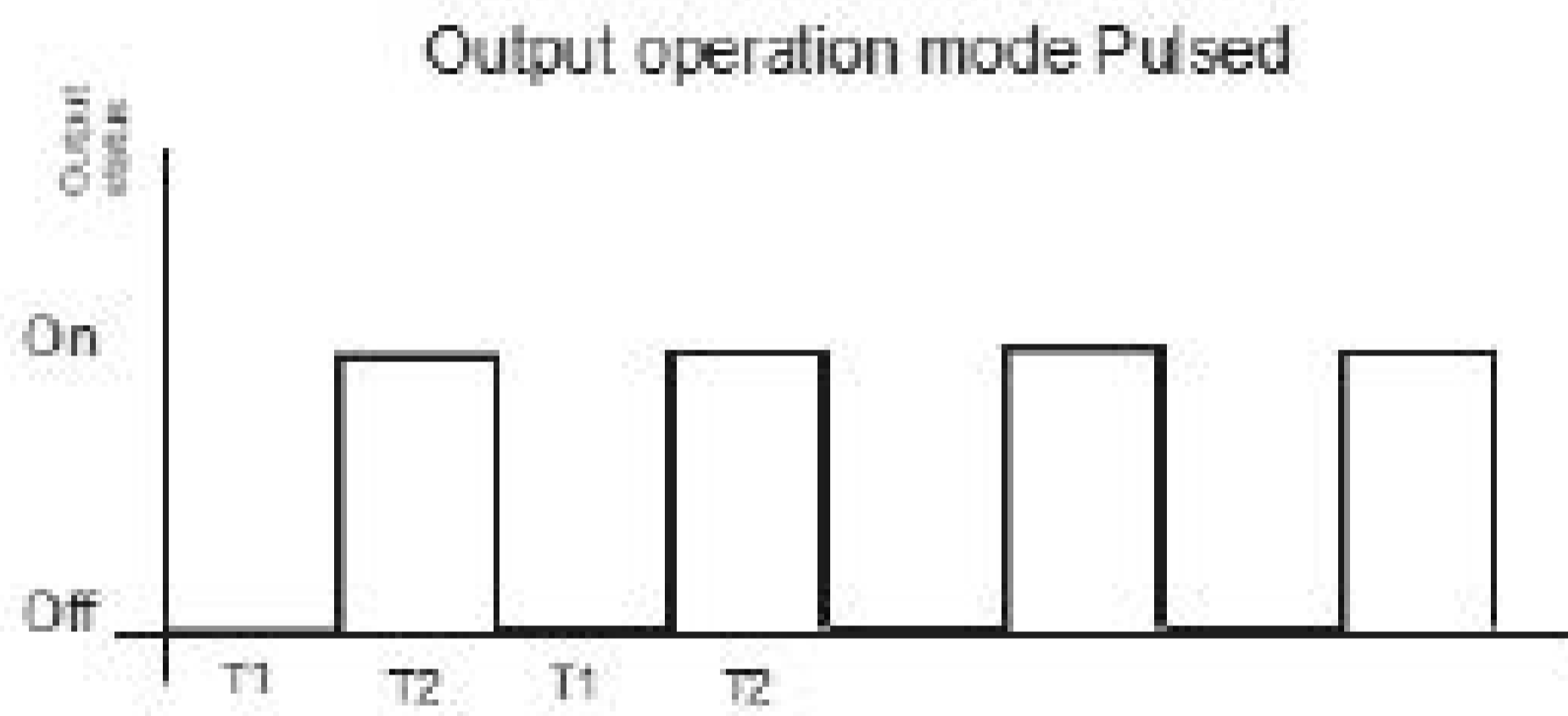n) Output operation mode

- **Steady**
  follows the course of the alarm; alarm activated, output activated after a possible activation delay; alarm restored, output low after a possible de-activation delay.
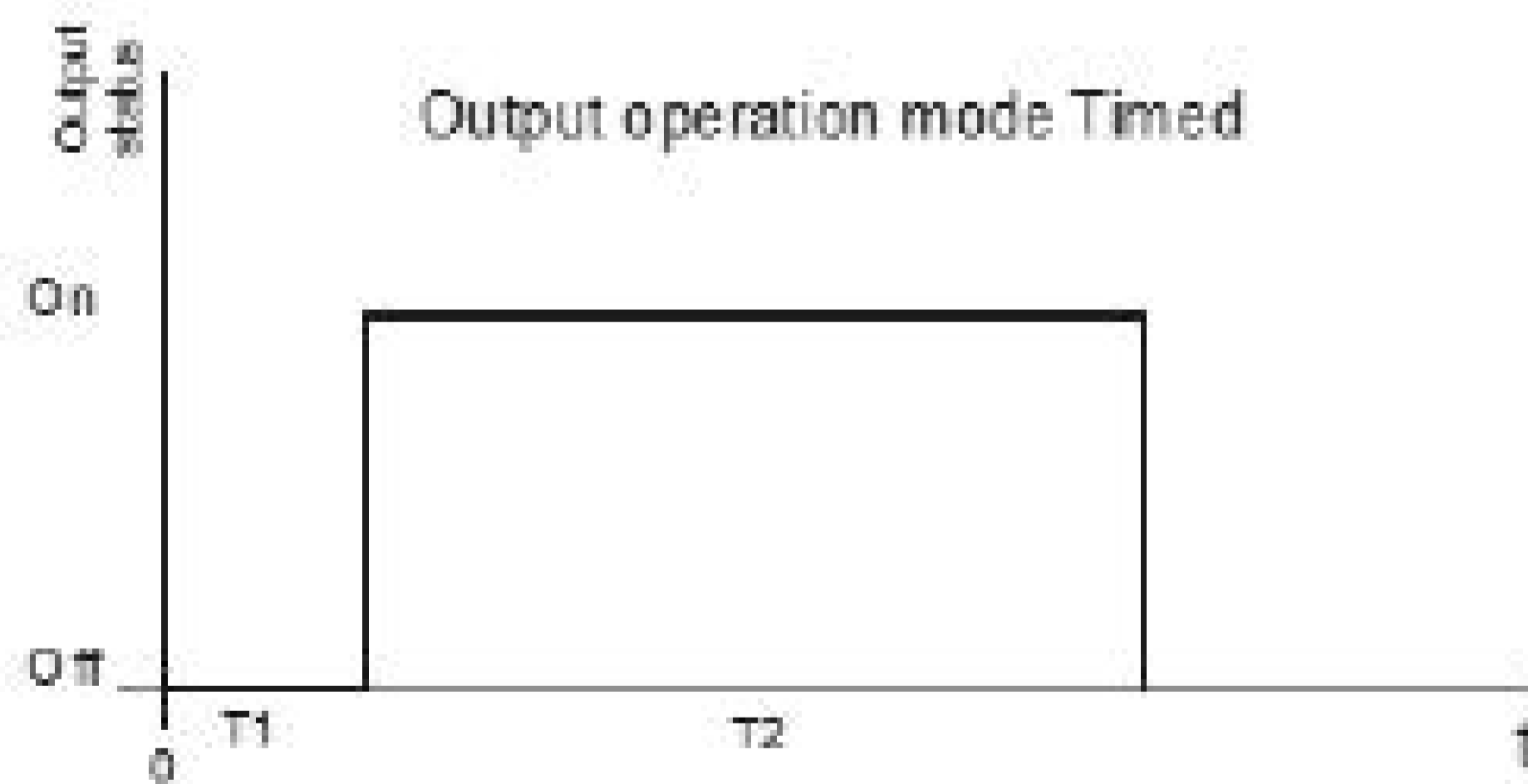

Output operation mode Steady

activated until the channel restore + the Deactivation Delay

- **Pulsed**
  flashing mode with the ON and OFF times adjustable

Output operation mode Pulsed

- **Timed**
  single pulse with an adjustable delay activation time and an adjustable duration time

Output operation mode Timed

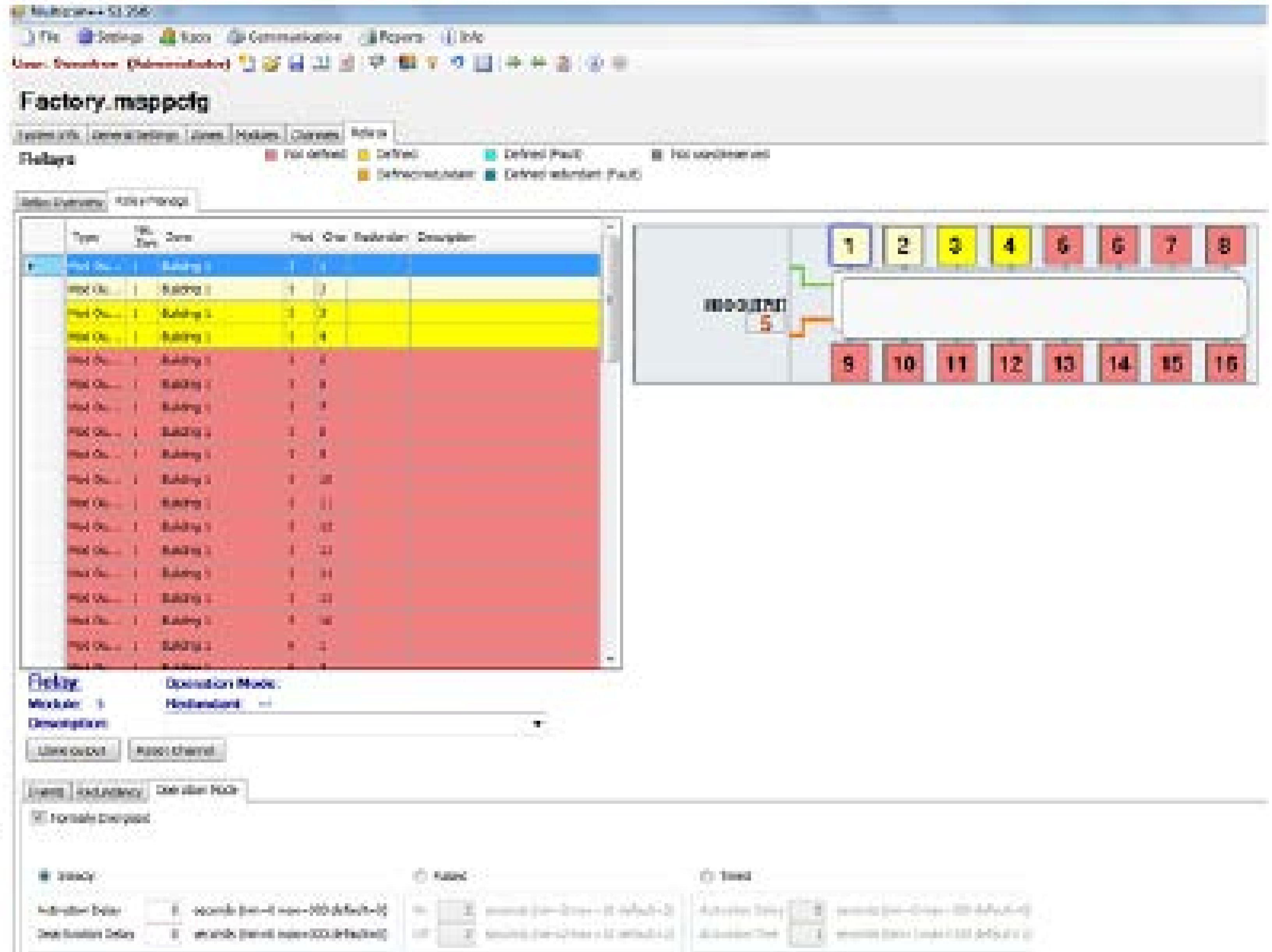- The Normally Energized option defines if the output is normally activated or not, in normal operation.

Figure 6.5.6
o) Outputs "Operation Mode" windows

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