

AIC400 Series
Alarm Annunciator
User Manual
(Ver. 4.2 / May 2019)



3-350 John Street, Thornhill, Ontario L3T 5W6
Phone: +1 289 597 APEX (2739)
Toll Free: 1 866 776 2943
Email: info@APEXannunciator.com
Web: www.APEXANNUNCIATOR.com

Technical Specification:

Size Variety

The AIC400 Annunciators come in various sizes from 4 to 48 windows. Each unit has also eight RGB LEDs to monitor the system status such as Power Failure, System Ready, Common Alarm, ...

The AIC400 can be expanded up to 10 units to cover higher number of alarm points.

Inputs

The AIC400 supports all input types (Dry Contact, Wet Inputs, Normally-Closed, Normally-Open).

Each input is optically isolated up to 2000VAC. All inputs are bi-polar and can accept AC and DC signals in a wide range of voltages including "24V", "48V", "90V to 180V", "150V to 250V", ...

The system Response Time is selectable from 1ms to 1sec.



Display

Each 24mm x 22mm window is equipped with a super bright, Multi-color, low power consumption LED. The standard system comes with three LED colors (Red, Green and Yellow), called RGY set. Different states of each LED can be set to one of these colors via the ALCON software just in a few seconds. This advanced feature allows the user to assign a specific color to each LED state according to the project requirements.

Beside the 24mm x 22mm windows, system has eight additional full color LEDs to monitor the System status. Three of these LEDs are to indicate the 'System Ready' and 'Power Supplies Status'. The other five LEDs can be configured to monitor other parameters.

User can also set the brightness of the LEDs in a range of 10% to 100%. This feature can help to reduce the system power consumption significantly and it is very important for a longer hold up when using standby batteries.

The Alarm Labels are field-configurable easily by printing on translucent film.

Field Programmable

The majority of system parameters are programmable via the USB port using the ALCON software:

The following parameters are configurable for each individual channel:

- LED color of each window
- Input setting (Normally Open / Normally Close)
- Alarm Sequence
- Alarm Group (Critical/Non-critical)
- Auxiliary Relay's function

The following parameters are configurable for all channels in common:

- Common Relays function
- System Response Time
- Brightness of the LEDs
- Integral Audible volume
- Auto Mute timer
- Common Alarm Reflashing enable/disable

The type of Inputs (Dry contact or Wet Contact) are configurable by manufacturer at the time of order.

Adjustable light and sound

The LEDs' brightness and the integral Audible volume are adjustable from 10% to 100% by the built-in pushbuttons and via the ALCON software as well.

Common Output Relays

The AIC400 supports up to four common relays. Each relay provides the user with a pair of potential free NO and NC contacts to be used with 3rd party devices. Contacts are rated at 1A@24VDC or 0.5A@ 120VAC.

The common relays function can be set through the ALCON software. Each relay can be assigned to a variety of functions such as:

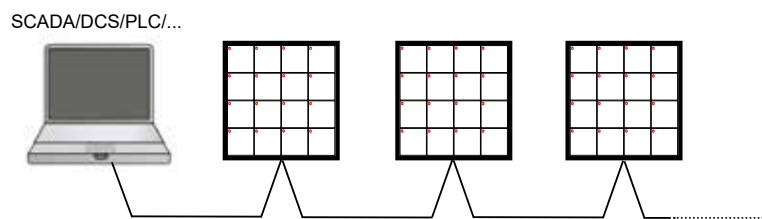
- System Ready Alarm
- Group 1 Horn
- Group 2 Horn
- Group 1 Common Alarm
- Group 2 Common Alarm
- All Groups Common Alarm
- First-up
- Ringback
- Power Supply 1 Alarm
- Power Supply 2 Alarm
- Redundant Power Supply Alarm



Communication (optional)

In addition to the above option, the standard AIC400 can be connected directly to a laptop or PC through USB port for system configuration and also to receive/send the virtual Alarms and control signals such as Acknowledge or Reset.

AIC400 supports bi-directional communication with other devices such as SCADA, DCS, PLC,... Various protocols such as Modbus Serial, Modbus TCP, DNP3 Serial, DNP3 Ethernet, BACnet MS/TP, BACnet IP, AB EtherNet IP, Allen Bradley EtherNet, AB DF1, and many other protocols are supported.



(3)

Redundant Power Supply (option)

The AIC400 can be equipped with integral redundant power supplies even with different voltage levels in order to reach the maximum level of availability and reliability.

For example:

Power supply 1: 100-260VAC/DC

Power supply 2: 24VDC

Each power supply has its own indicator on front panel. An output relay can be assigned to each or both power supplies to monitor the power supplies health.

Auxiliary Relays (Repeat Relays)

Each alarm point can be equipped with an individual auxiliary relay to provide the user with a potential free contact per alarm point for use with 3rd party devices. Both NO and NC contacts are available at the same time.

These auxiliary relays can be configured to operate in accordance with one of the following functions.

- Input Follow (Repeat): The state of each relay will change each time there is a status change to the associated input signal.
- Output Follow (Repeat): The state of each relay follows the LED status.

The auxiliary relays function can be set through the ALCON software.

Control Pushbuttons

The standard AIC400 comes with six integral pushbuttons including Acknowledge, Reset, Function/Lamp Test, Mute and two configurable buttons to control the operation. System also supports four external pushbuttons (Acknowledge, Reset, Function/Lamp Test and Mute).

Alarm Sequences

All the standard alarm sequences are supported by the AIC400 as defined in the ISA S18.1/1979 including:

- Manual Reset (M)
- Automatic Reset (A)
- Automatic Reset First Out (F3A)
- Automatic Reset First Out (F1A)
- Manual Reset First Out (F2M-1)
- Ringback (R)
- No Lock In

You can see the flow charts of these sequences at the end of this document.

Auto Mute Timer

The AIC400 has an Auto Mute Timer for unmanned applications. This feature mutes the internal buzzer and horn output relay automatically after a preset time.

Built-in Buzzer

The standard system is supplied with an integral buzzer programmed with two different tones for Critical and Non-critical alarms. System can also support the second integral buzzer and four external horns for different applications.

Event Recording (optional)

In order to track the sequence of events in a process, the AIC400 can be supplied with integral Event Recording option with up to 1ms resolution and Accuracy.

Connections

All connections are via pluggable heavy-duty connectors suitable for 28-16AWG conductors rated at 8A@300V

Mounting

- Panel Mount (standard)
- Rack-mount (optional)
- Wall-mount (optional)

Protection

- Front Panel: IP41
- Enclosure: IP20

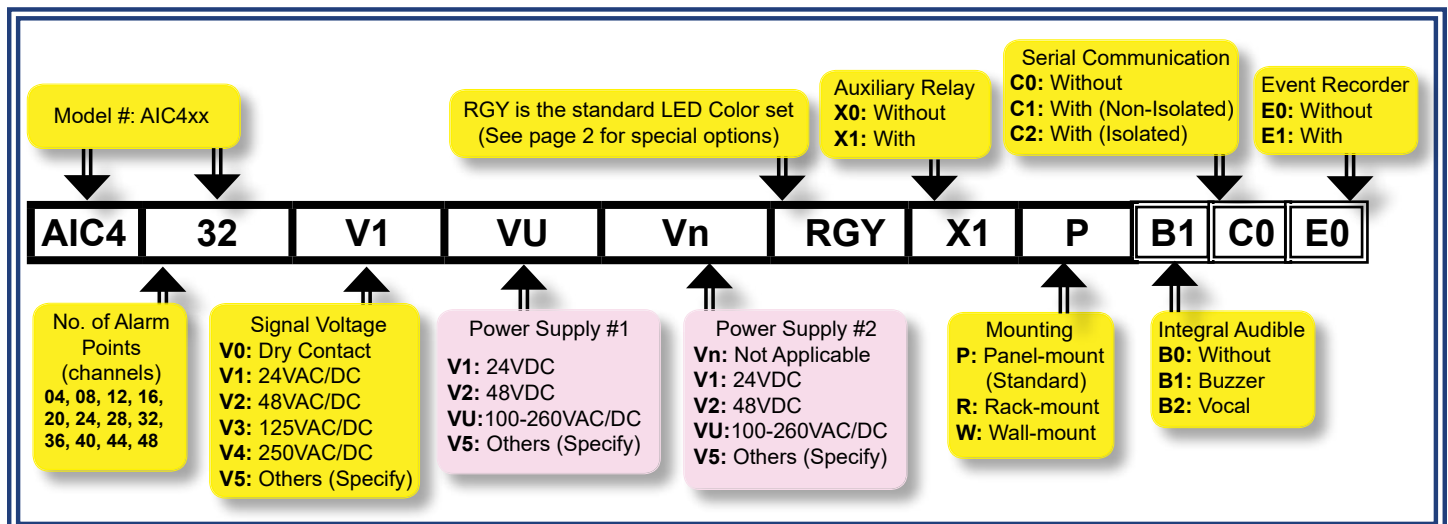
Environment

- Operating temperature: -20 to 60°C
- Storage temperature: -20 to 80°C
- Humidity 0-95% RH, non condensing

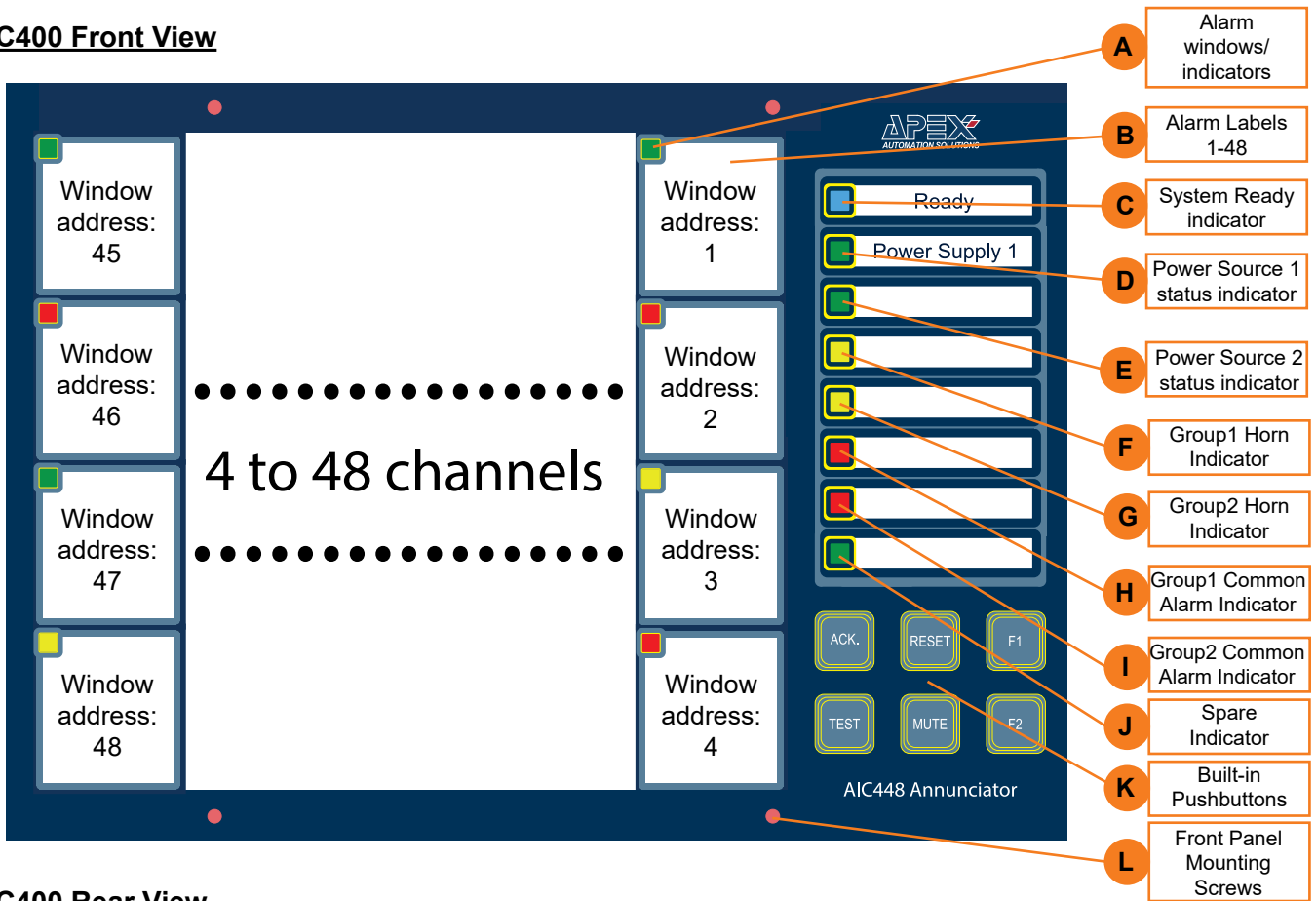
Expandability (option)

The AIC400 can be expanded up to 10 units to cover higher numbers of alarm points.

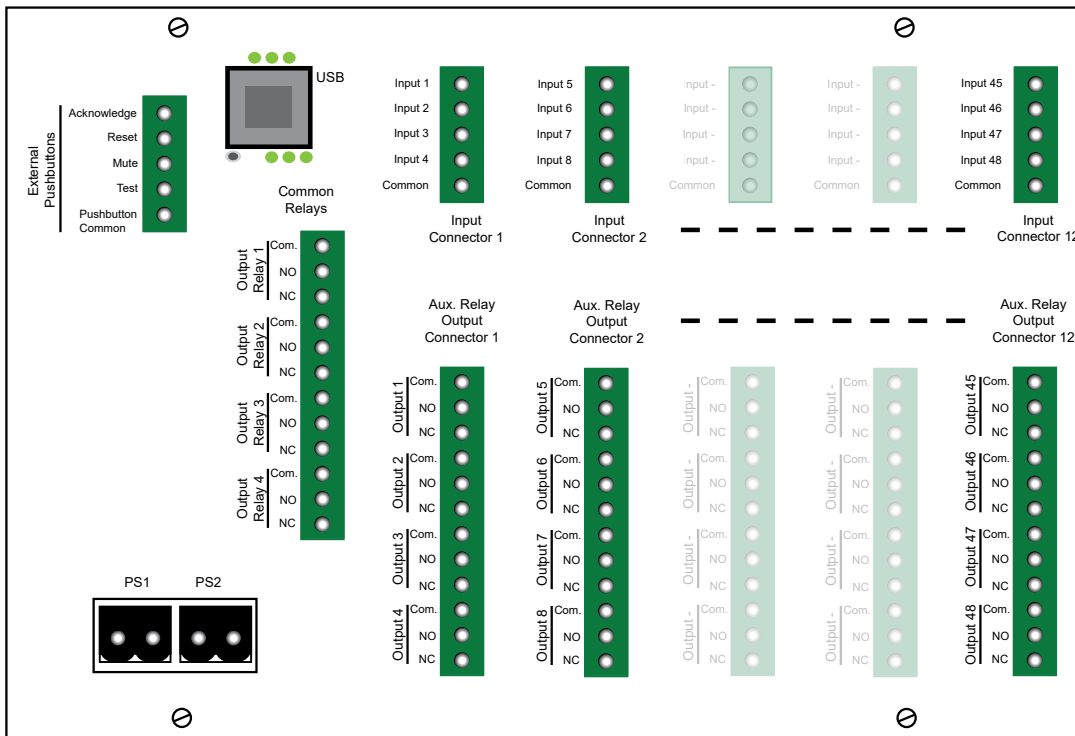
Model Number Description



AIC400 Front View



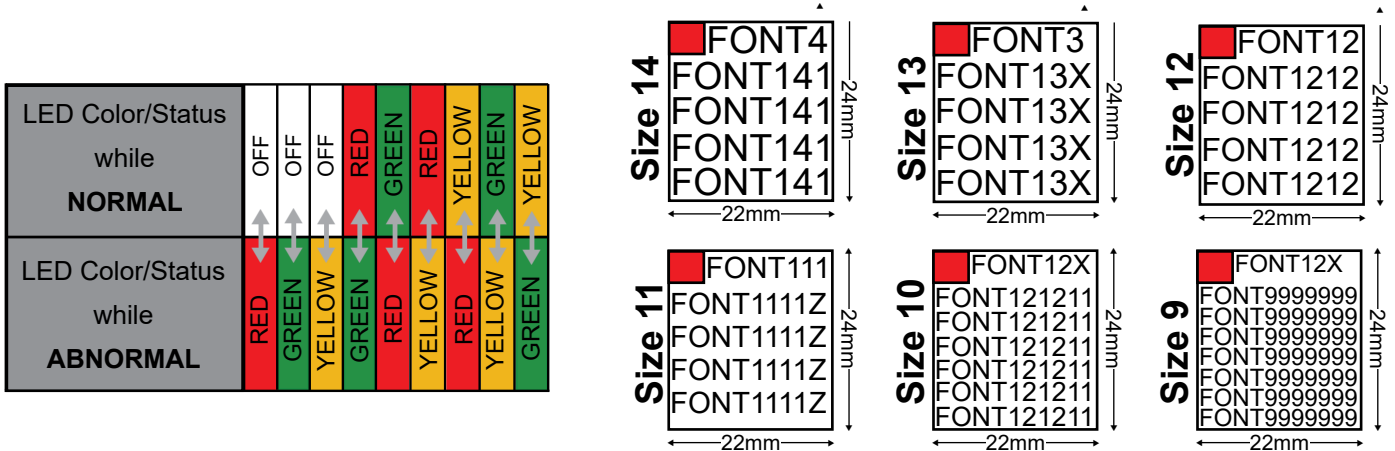
AIC400 Rear View



Any wiring diagram, system configuration and alarm labeling should refer to a proper channel numbering as shown above.

A Alarm Windows/Indicators:

Each 24mm x 22mm window is equipped with a super bright, Multi-color LED. The standard system supports Red, Green and Yellow (RGY set) LED colors. User can assign a color to each LED state according to the application requirement for Normal and Abnormal conditions as shown below. The color of each LED can be set via the Alcon software.



B Alarm Labels:

The Alarm Labels are field-configurable easily by printing on translucent film. This film will be placed behind the front panel. Number of characters of each window are shown above for different font sizes.

C System Ready Indicator:

When the entire system is functioning properly, this LED goes On and Off smoothly. A common Relay can also be assigned to this indicator to be wired to a 3rd party devices.

D Power Indicators:

These two LEDs show the availability and health of power supplies 1 & 2. A common Relay can also be assigned to these indicators as power failure alarm to a 3rd party device.

F Group 1 & Group 2 Alarm Indicators:

These two LEDs show the status of the Alarm Horn of each group. A common Relay can also be assigned to these indicators to be wired to external horns or 3rd party devices.

H Group 1 & Group 2 Common Alarm Indicators:

These two LEDs show the status of Common Alarm Horn of each group. A common Relay can also be assigned to these indicators to be wired to external horns or 3rd party devices.

J Spare Indicator:

Not in service in this unit.

K Built-in Pushbuttons:

There are six pushbuttons available on the front panel. "Acknowledge", "Reset" and "Mute" are the standard buttons to control the alarm process. "Test" button is also available for system function and lamp testing. There are also two additional buttons "F1" and "F2" for additional functions including:

Brightness Control: The LEDs' light can be set from 10 to 100 percent. To set the brightness, press and hold the F1 button and at the same time, press the Test button continuously to reach to the suitable light.

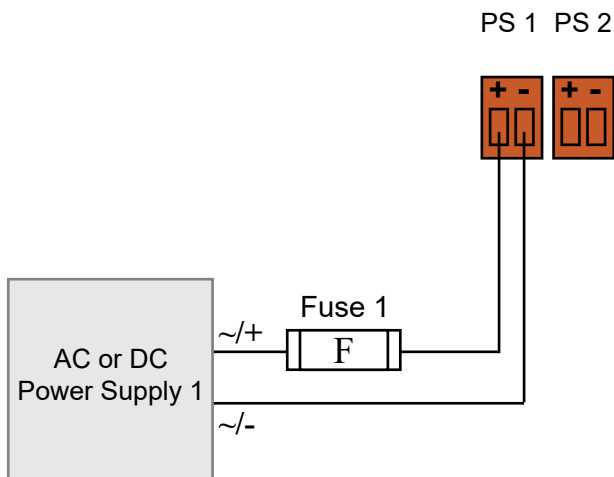
Internal Buzzer volume control: The volume of the buzzer can be set from 10 to 100 percent. To set the volume, press and hold the F1 button and at the same time, press the Mute button continuously to reach to the suitable volume.

L Front Panel Mounting Screws:

The Front Panel will be secured with easy to use screws with no need to any tools.

Power Supply Wiring

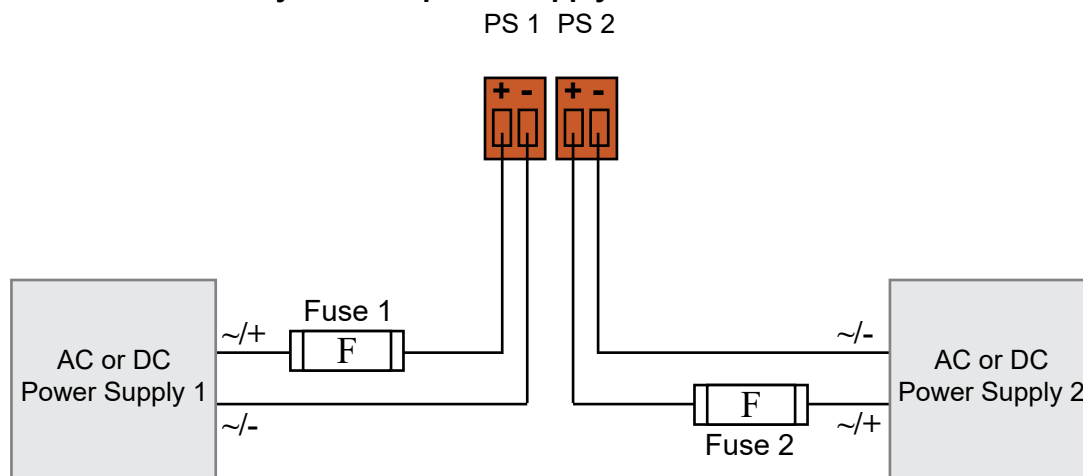
The standard AIC400 is designed to accept Nominal 24VDC (22V to 26V) power supply. Other voltages including 90-260VAC/DC (Universal) can be also selected at the time of order. Integral redundant power supplies are also available as an option at the time of order. There are two power indicator LEDs to show the status of each power supply. There are two power connectors on the back of the unit. PS1 is the main power connector when only one single power supply is in use as shown below. **An external protective FUSE is mandatory for each power supply.**



With integral redundant power supplies option, system accepts two different supplies from two different power sources. The voltage of these two can differ and should be specified at the time of order. The power supply redundancy feature provides the maximum system availability as the failure of one power source will not affect the system operation.

Two LEDs on the front panel, monitor the availability and health of the power sources. System provides a "Power Failure Alarm" when either sources are not functioning properly. Also, an output relay can be assigned to this "Power Failure Alarm" in order to send alarm signal to a third party device.

The wiring of the two power sources must be arranged as appears in the diagram below. **An external protective FUSE is mandatory for each power supply.**



Alarm Inputs

Inputs are optically isolated up to 2000VAC. These Inputs are arranged in groups of four with one common connection per group. Connectors 1 to 4 are assigned to each Input and the fifth connector is assigned to the common of these Inputs.

System can be ordered to accept Dry Contact (voltage free) or Powered (wet) Inputs.

The Inputs' type and the voltage level should be specified at the time of placing the order. Here are the available options:

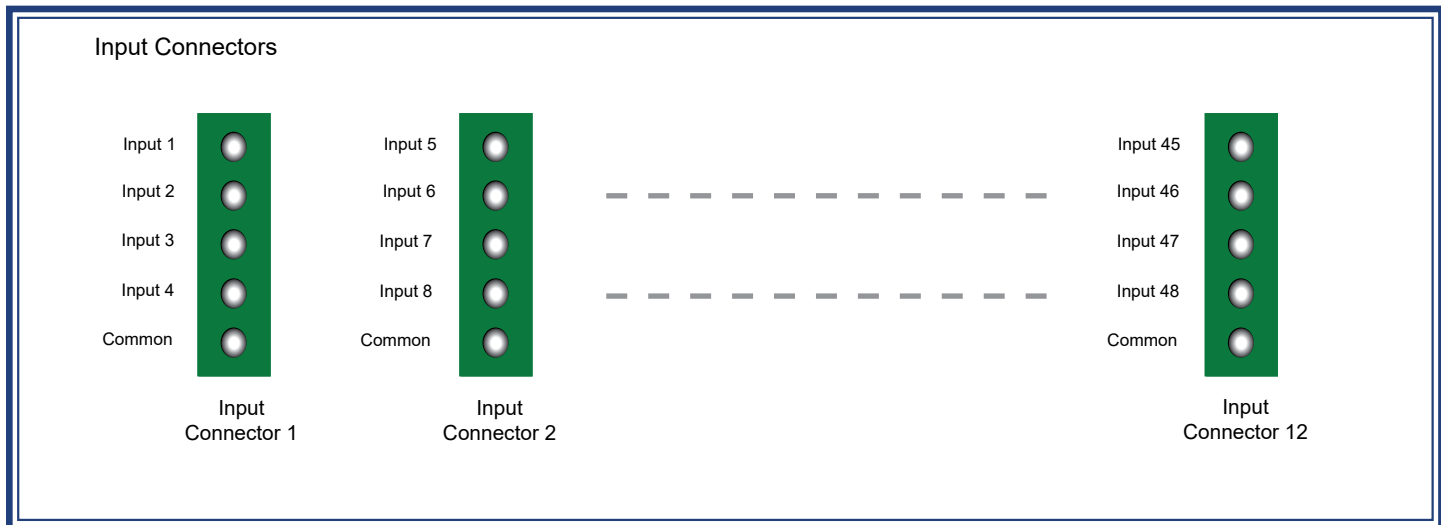
- V0: Dry Contact Inputs (The Annunciator feeds 24VDC to input contacts internally)
- V1: 24V (AC/DC) Inputs
- V2: 48V (AC/DC) Inputs
- V3: 90V to 180V (AC/DC) Inputs
- V3: 150V to 250V (AC/DC) Inputs
- V5: Other Voltages (to be specified)

Each Input can be set individually as Normally Open or Normally Closed via the ALCON software.

Note:

1- It is VERY IMPORTANT to make sure that the Inputs' type and voltage level are in accordance to the Annunciator model number and specification. Otherwise, system will be damaged.

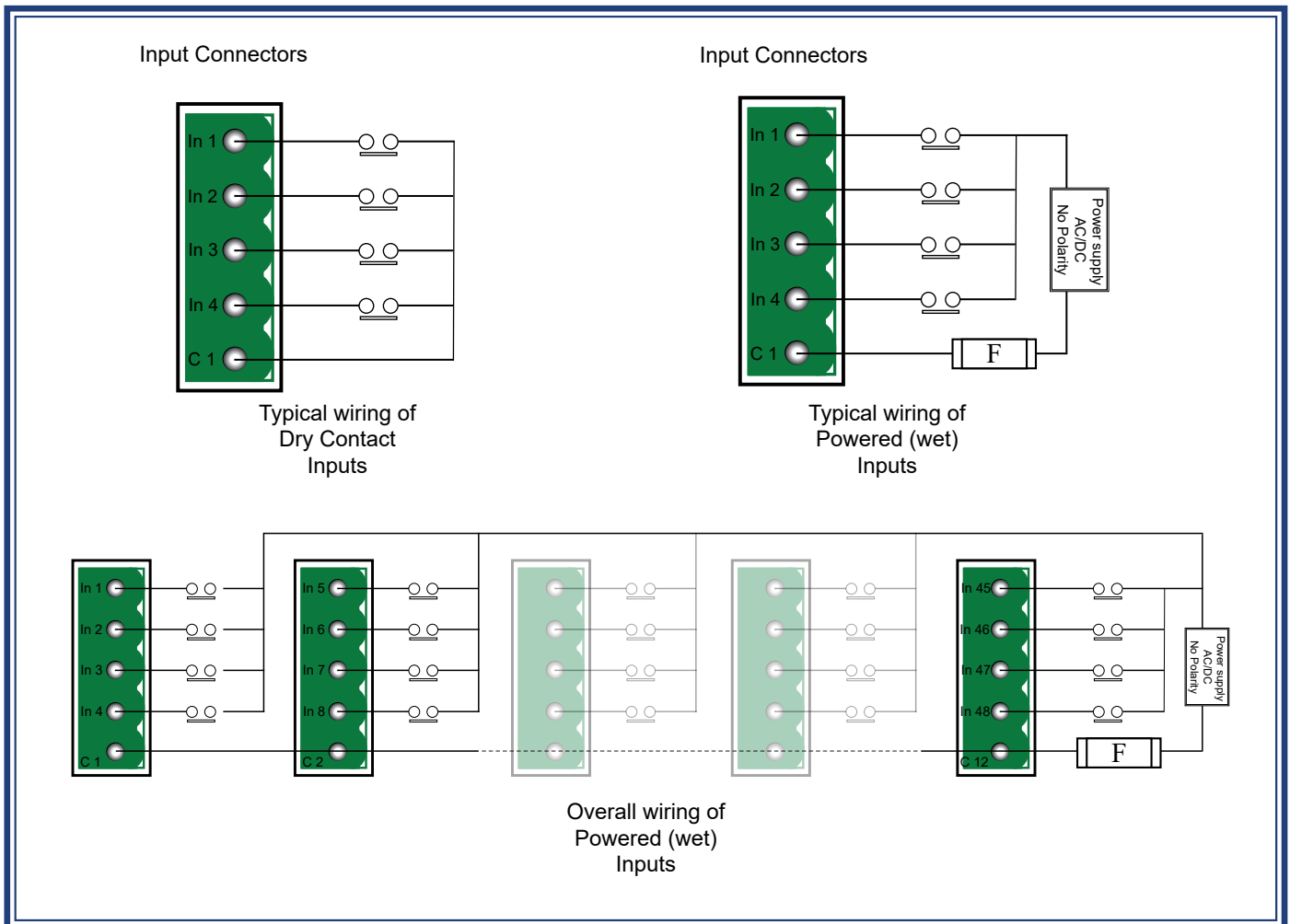
2- Improper wiring of inputs will damage the system..



The wiring diagram of Dry Contact and Powered Inputs are shown on the next page.

Alarm Inputs Wiring Diagram

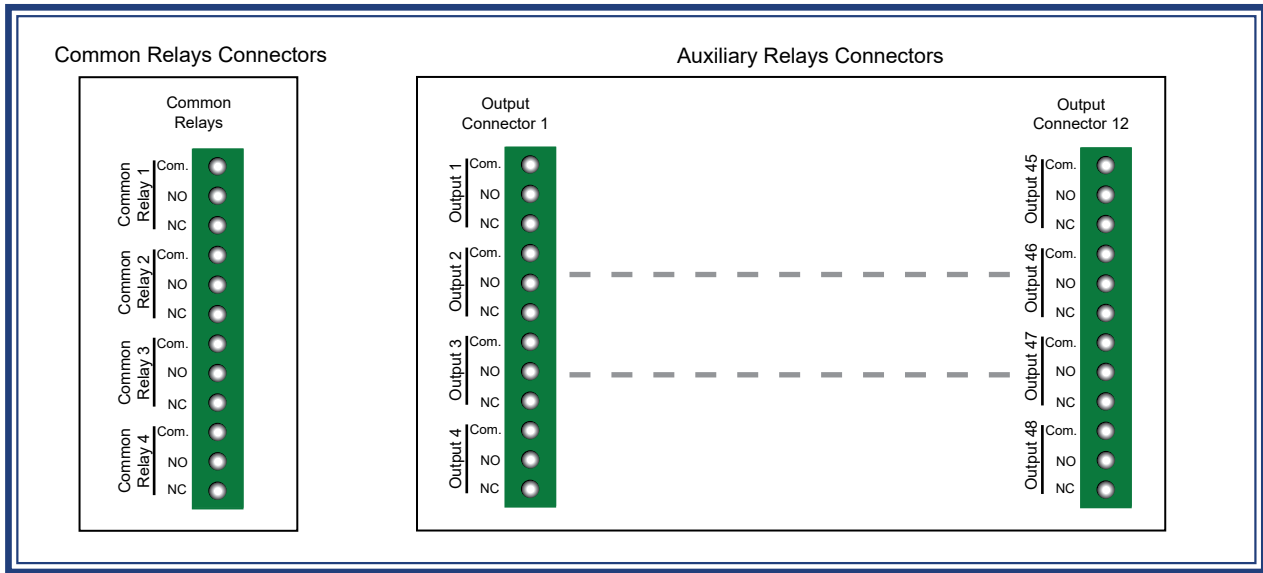
The wiring diagram of Dry Contact and Powered Inputs are shown below.



Notes:

- For powered (wet) Inputs, the common of the Inputs must be protected by an external Fuse.
- All inputs are bi-polar and can accept AC or DC voltages with no polarity restrictions.
- To minimize the effects of induced voltages, it is recommended to run the Inputs cables separately from circuits carrying heavy currents and/or high voltages.
- Normally Open (NO) and Normally Closed (NC) Inputs are both supported and are Field Selectable by the ALCON software
- Response Time is Field Selectable by the ALCON software. The default response time is 20ms

Common Relays and Auxiliary Relays



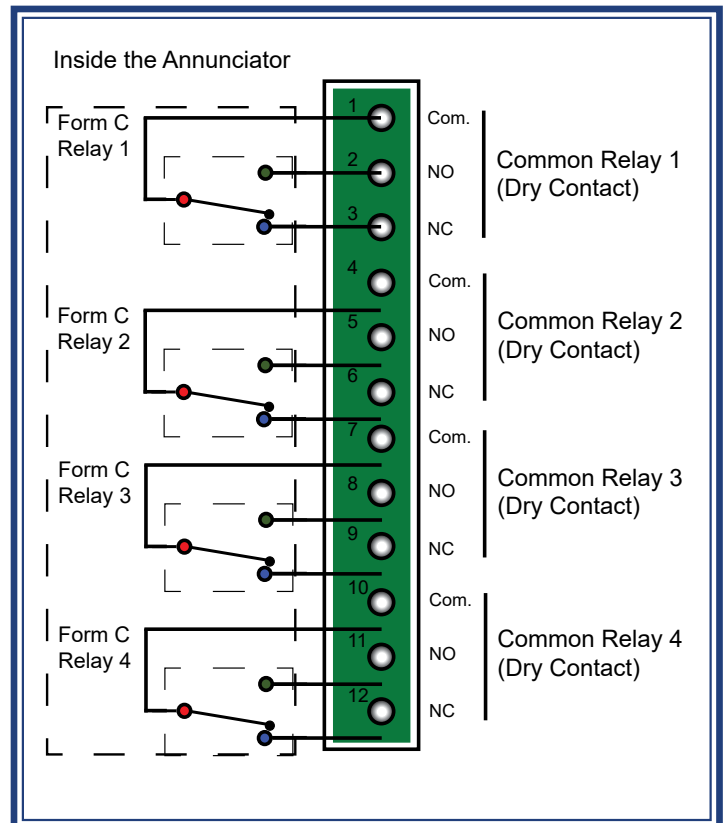
Common Relay Outputs

The AIC400 provides up to four common relays. The contact rating of each relay is 1A@ 24VDC or 0.5A@ 125VAC.

Both Normally Open and Normally Closed contacts of these relays are available at the same time.

The function of each relay can be set individually by the ALCON software to operate as:

- System Ready Alarm
- Group 1 Horn
- Group 2 Horn
- Group 1 Common Alarm
- Group 2 Common Alarm
- All Groups Common Alarm
- First-up
- Ringback
- Power Supply 1 Alarm
- Power Supply 2 Alarm
- Redundant Power Supply Alarm



Common Relays and Auxiliary Relays

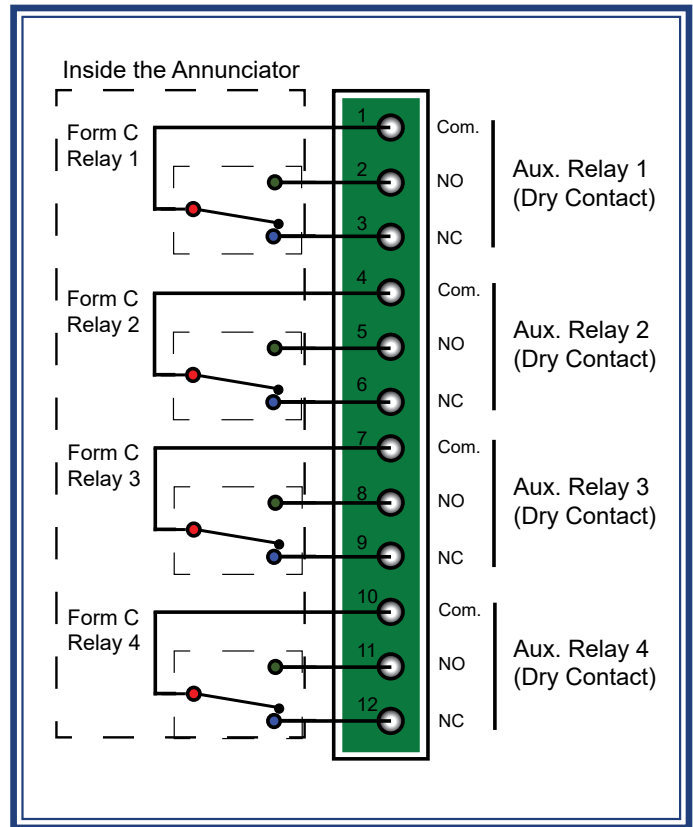
Individual Auxiliary Relays (optional)

This option provides the user with a dry contact (potential free contact) per alarm point for use with 3rd party devices. Both Normally Open and Normally Closed contacts of these relays are available at the same time. These Auxiliary relays can be configured by the ALCON software to operate in accordance with one of the following functions:

- Input follower: The state of the relay changes each time there is a change in the associated input signal contact (Repeat Relay).
- Output (display) follower: The state of the relay follows the LED On/Off status.

The contact rating of each relay would be:

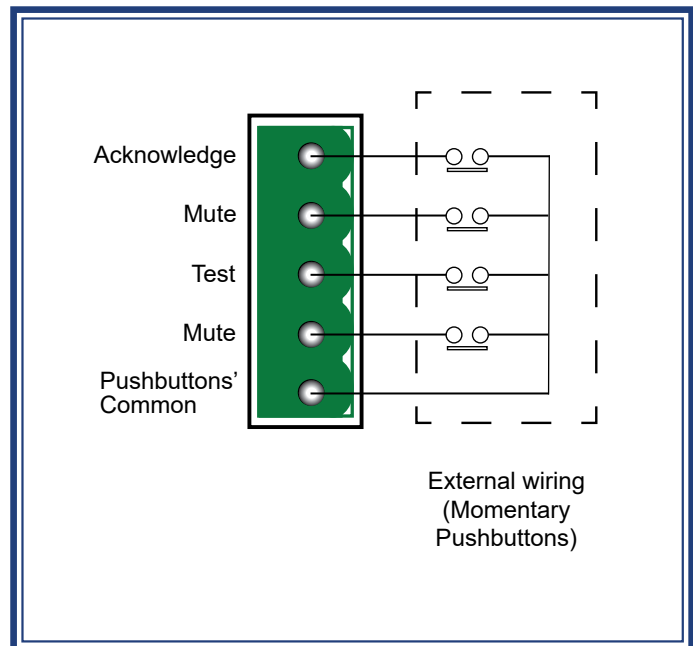
- 1A@ 24VDC
- 0.5A@ 125VAC



External Pushbuttons (optional)

As an option, external momentary pushbuttons are also supported to control the Annunciator remotely.

Momentary/Normally-Open pushbuttons will be wired to the External Pushbutton Connector as shown below.

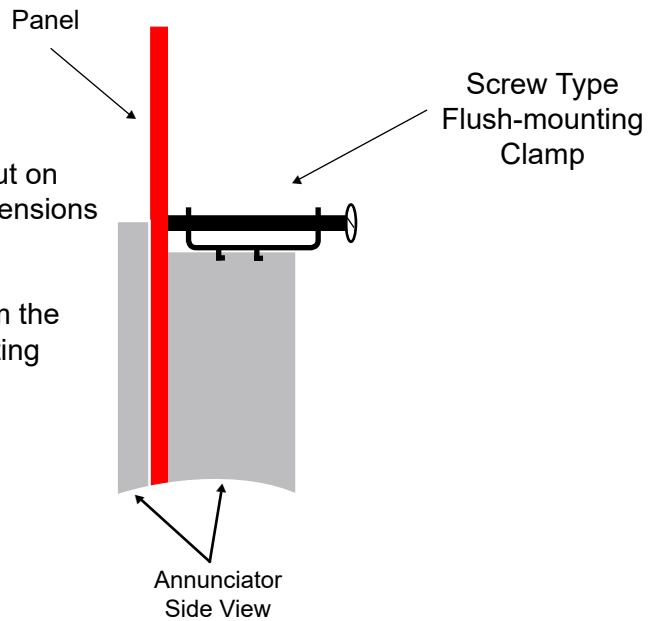


Mechanical Installation

Panel (Flush) Mount Installation

For panel-mount installation, make a cut-out on your panel. The recommended cut-out dimensions are listed below.

Insert the Annunciator inside the panel from the front opening and secure it with four mounting clamps from the back.



Panel-Mount Overall and Cut-out Dimensions

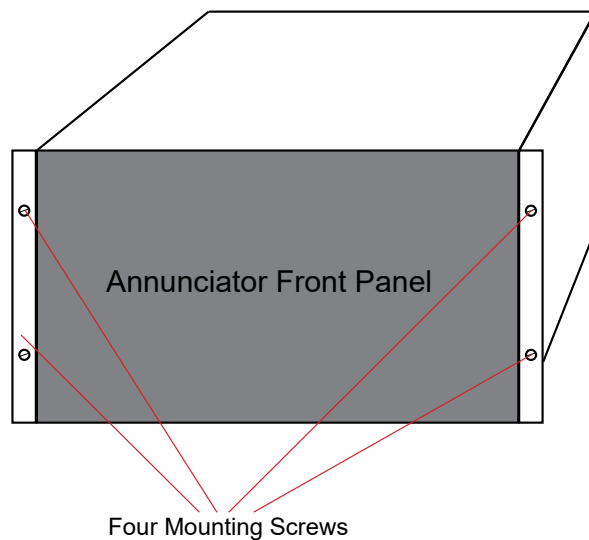
Model Number	AIC404	AIC408	AIC412	AIC416	AIC420	AIC424	AIC428	AIC432	AIC436	AIC440	AIC444	AIC448
No. of Alarm Points	4	8	12	16	20	24	28	32	36	40	44	48
Overall Width (mm)	101	126	151	176	202	227	253	278	304	329	354	380
Overall Height (mm)	150	150	150	150	150	150	150	150	150	150	150	150
Cut-out Width (mm)	89	114	139	164	190	215	241	266	292	317	342	368
Cut-out Height (mm)	141	141	141	141	141	141	141	141	141	141	141	141

The depth of all units is 130mm.

Rack-Mount Installation

For rack-mount installation, make a cut-out on your panel considering the recommended cut-out dimensions.

Drill four holes on your panel. Insert the Annunciator inside the panel opening and secure it by four screws.



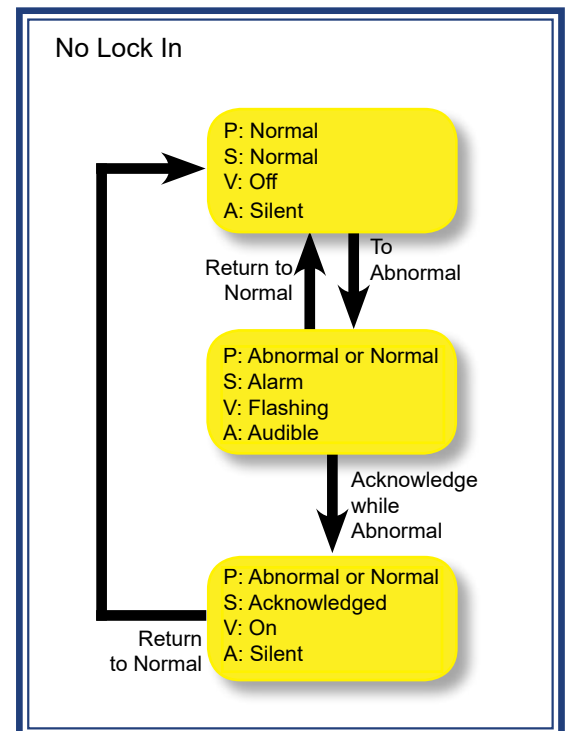
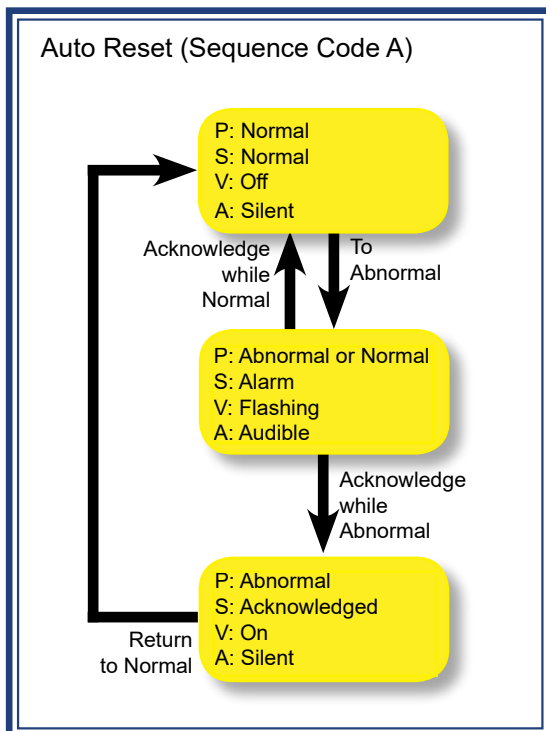
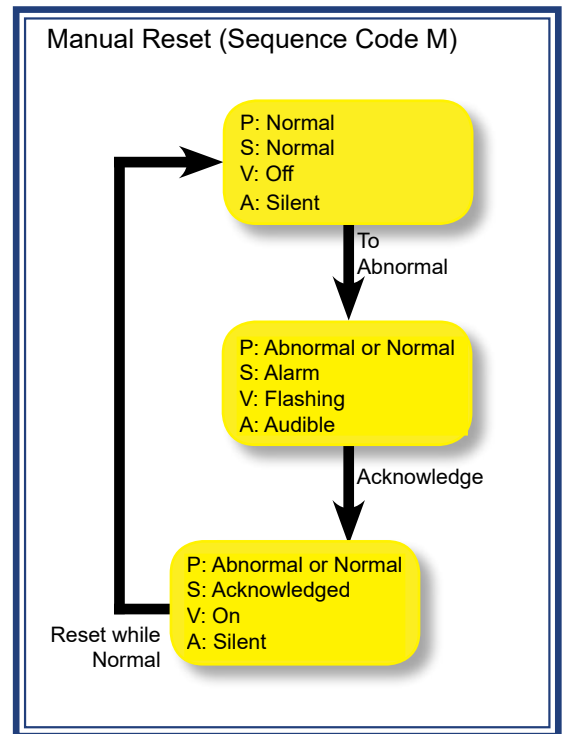
Alarm Sequences

AIC400 supports all *ISA-18.1 Alarm* sequences including:

- Manual Reset (M)
- Automatic Reset (A)
- Automatic Reset First Out (F3A)
- Automatic Reset First Out (F1A)
- Manual Reset First Out (F2M-1)
- Ringback (R)
- No Lock In

These sequences are Field Selectable through ALCON configuration software via the USB port.

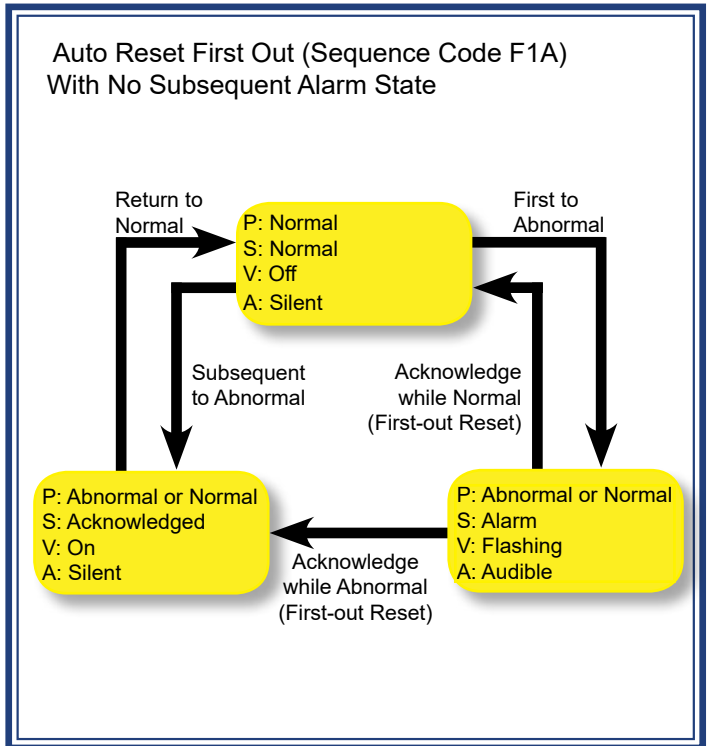
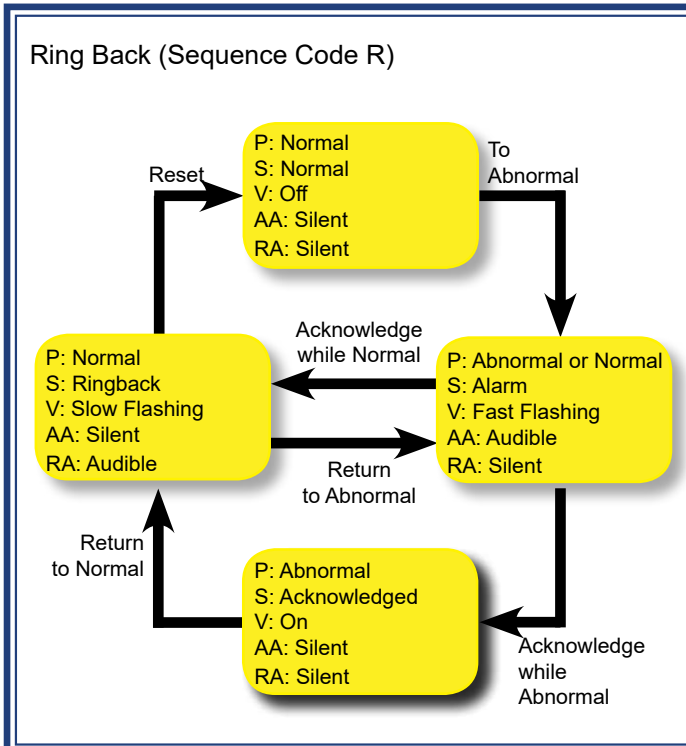
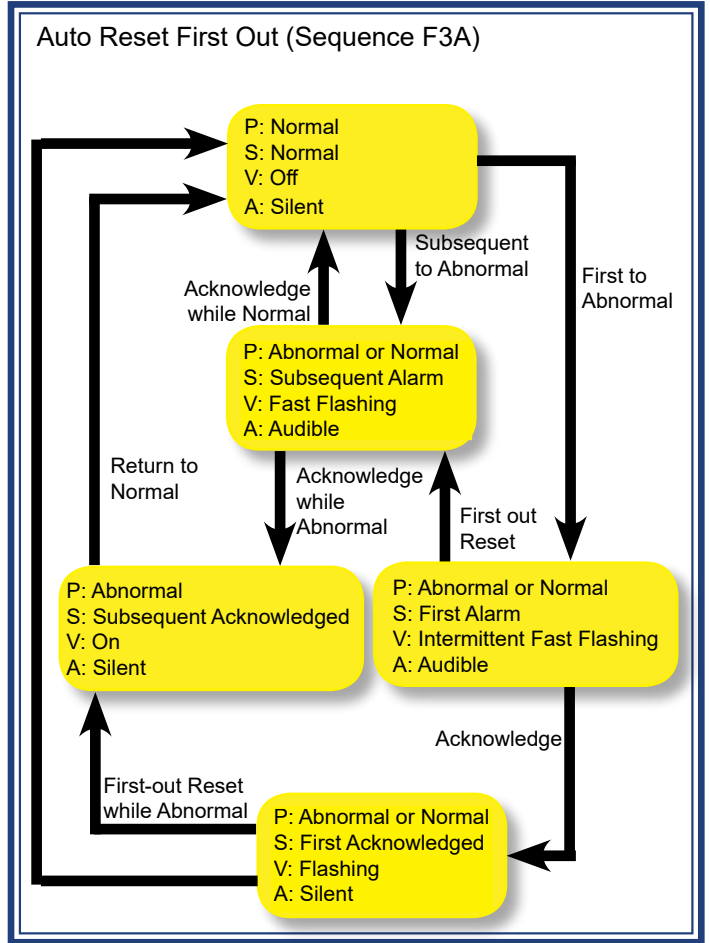
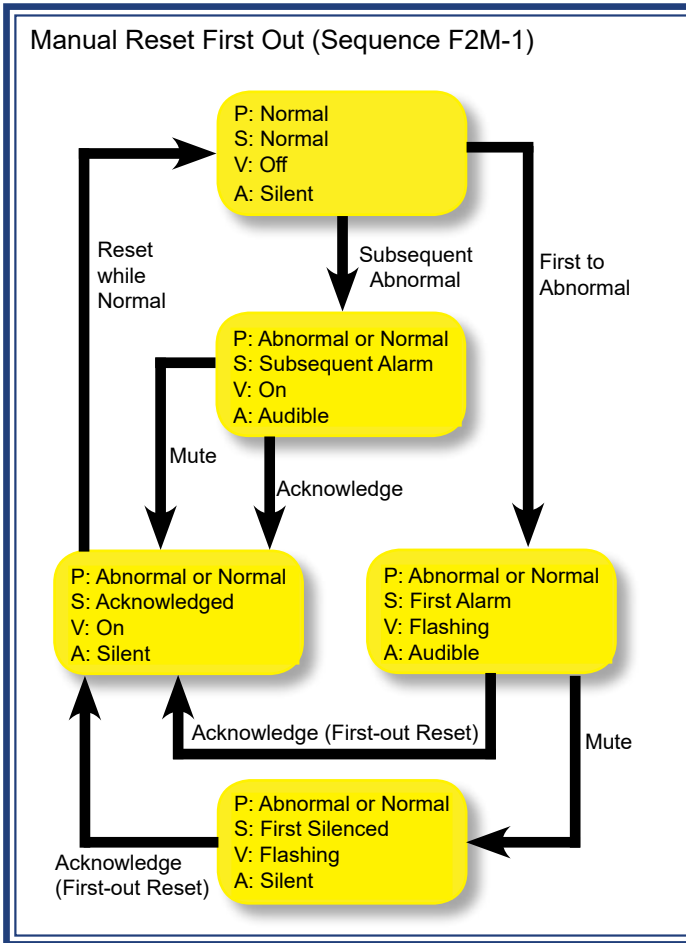
Customized sequences are also available based on request



Legends:

P: Process S: Sequence V: Visual A: Audible AA: Alarm Audible RA: Ringback Audible

Alarm Sequences



Legends:

P: Process S: Sequence V: Visual A: Audible AA: Alarm Audible RA: Ringback Audible

Parameters programming by ALCON software

The AIC400 is a fully programmable Annunciator. Most of the parameters are configurable via ALCON that is an advanced configuration software. It allows the user to create, edit, and send the required configurations to the AIC400 Annunciators via USB port.

This allows the user to save the configuration on a PC as a backup. The configuration can be loaded to the Annunciator at a later date.

ALCON is a very user friendly executable software with no installation needed.

Minimum system requirements:

IBM Compatible PC (min. 1GHz)

At least 1GB of ram memory

At least 100MB hard drive

1024x768 XGA or higher resolution

Windows 7 or higher Operating System

You need to install the USB driver on your computer first.
DO NOT connect the USB cable before driver installation is completed

The following Annunciator parameters are configurable through the ALCON software.

- 1 - Logic Sequence of each Input
- 2 - Type of each Input: NO (Normally Open) or NC (Normally Closed)
- 3 - Assigning an Alarm Group to each Input (Critical or Non-critical)
- 4 - Auxiliary Relay function of each Input; "Input Follower (Repeat Relay)" or "Output Follower"
- 5 - Common Relays' function (Relays 1 to 4):
System has four common relays. Each relay can be assigned to one of the following functions:
 - Off
 - System Ready Alarm
 - Group 1 Horn
 - Group 2 Horn
 - Group 1 Common Alarm
 - Group 2 Common Alarm
 - All Groups Common Alarm
 - First-up
 - Ringback
 - Power Supply 1 Alarm
 - Power Supply 2 Alarm
 - Redundant Power Supply Alarm
- 6 - System Response Time
- 7 - LEDs' brightness
- 8 - Built-in Buzzer volume (sound level)
- 9 - "Auto Mute" On/Off. The Auto Mute timer is adjustable

The AIC400 Annunciator comes with a flash drive. There are two EXE files in this folder (CDM21228_Setup.exe and ALCON.exe).

- 1 - Copy the APEX-Annunciator folder from the flash drive on your laptop.
- 2 - Run the CDM21228_Setup.exe. When the driver is successfully installed, then go to the next step.

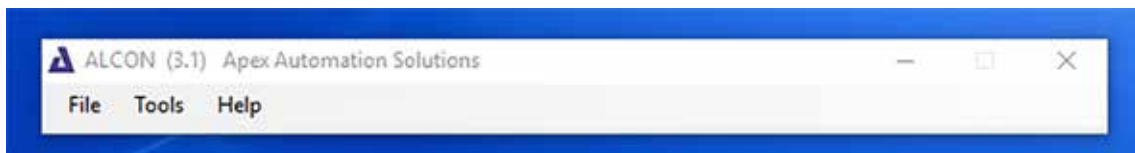
Note:

Run the CDM21228_Setup.exe **before connecting the USB cable.**

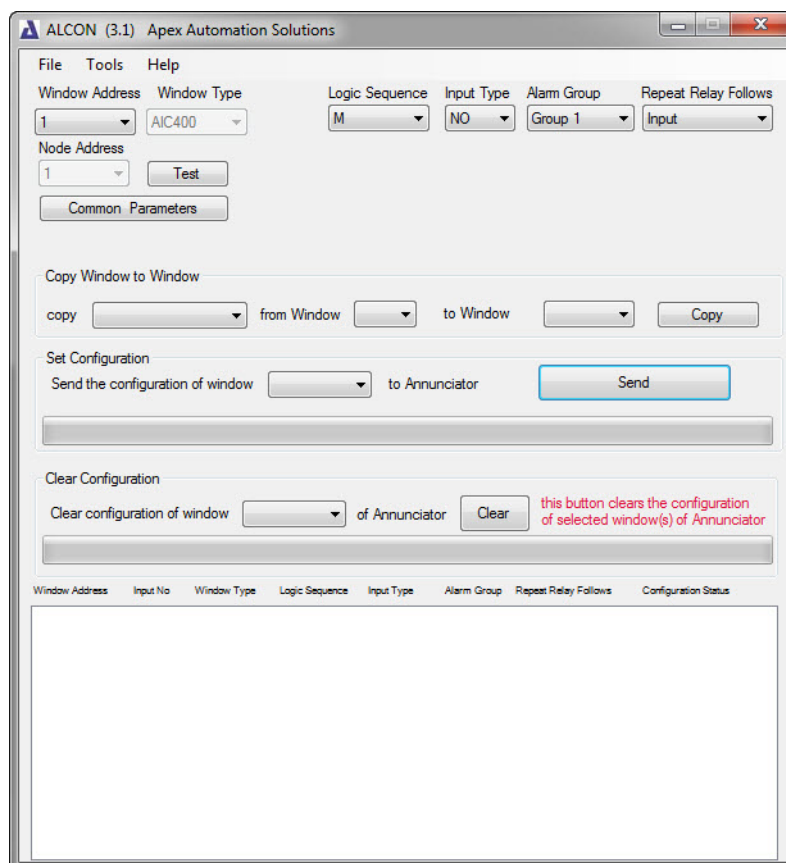
- 3 - Connect your laptop to the Annunciator with the USB cable
- 4 - Power on the Annunciator
- 5 - Run the ALCON software

The Windows Security System and/or other security software on your computer may prevent the ALCON to run as this is an Executable (EXE) file. Please make sure to allow this to run.

When you run the ALCON **for the first time**, this menu will pop up:



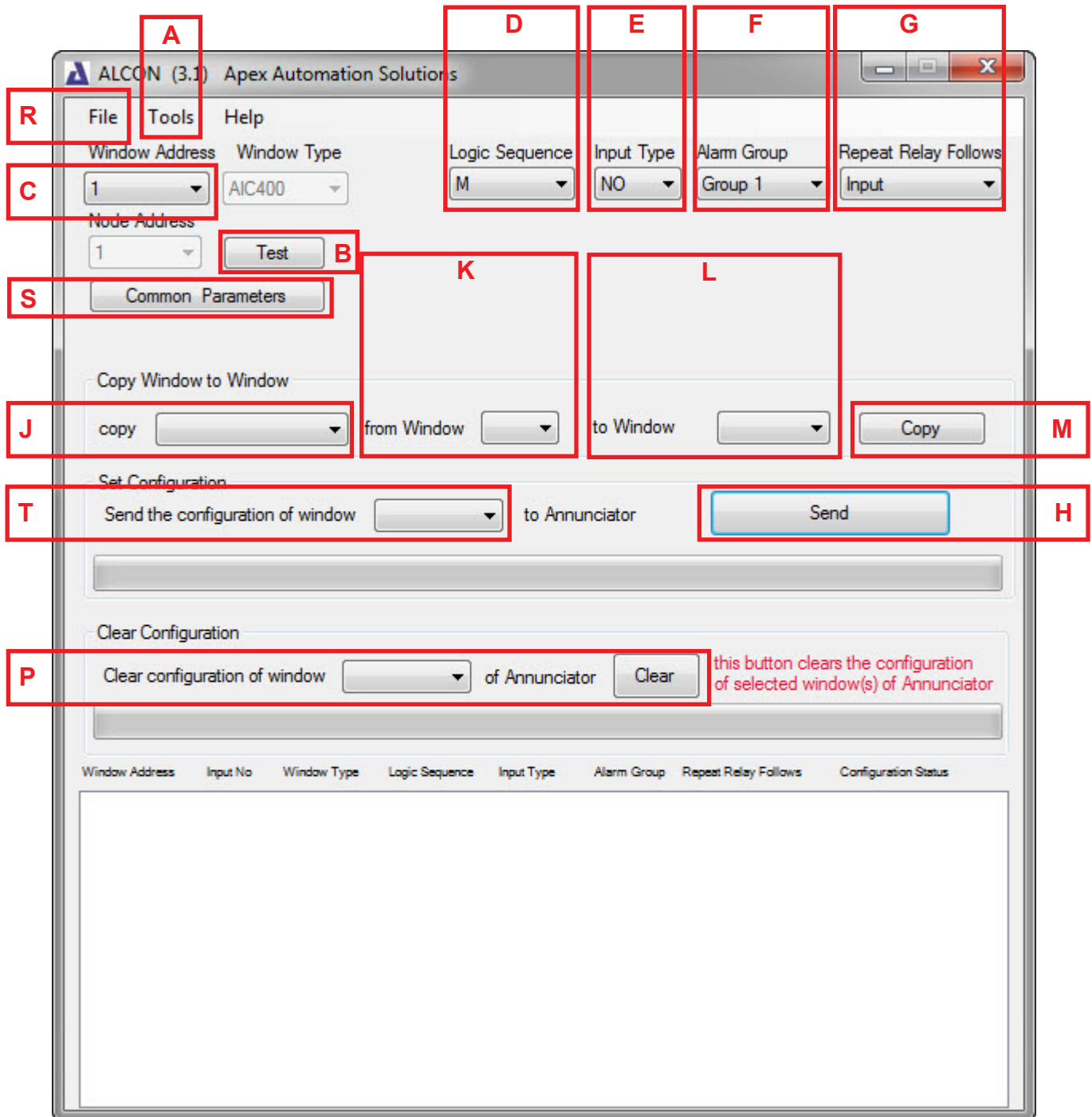
Under Tools menu, click on the “Version” and enter ‘aic400’ as your password and then select ‘No’ for saving request. The main page will pop up automatically as shown below.



ALCON Main Page

The ALCON main page is shown below.

You can find an instruction of each menu on the next page to see how to setup the parameters.

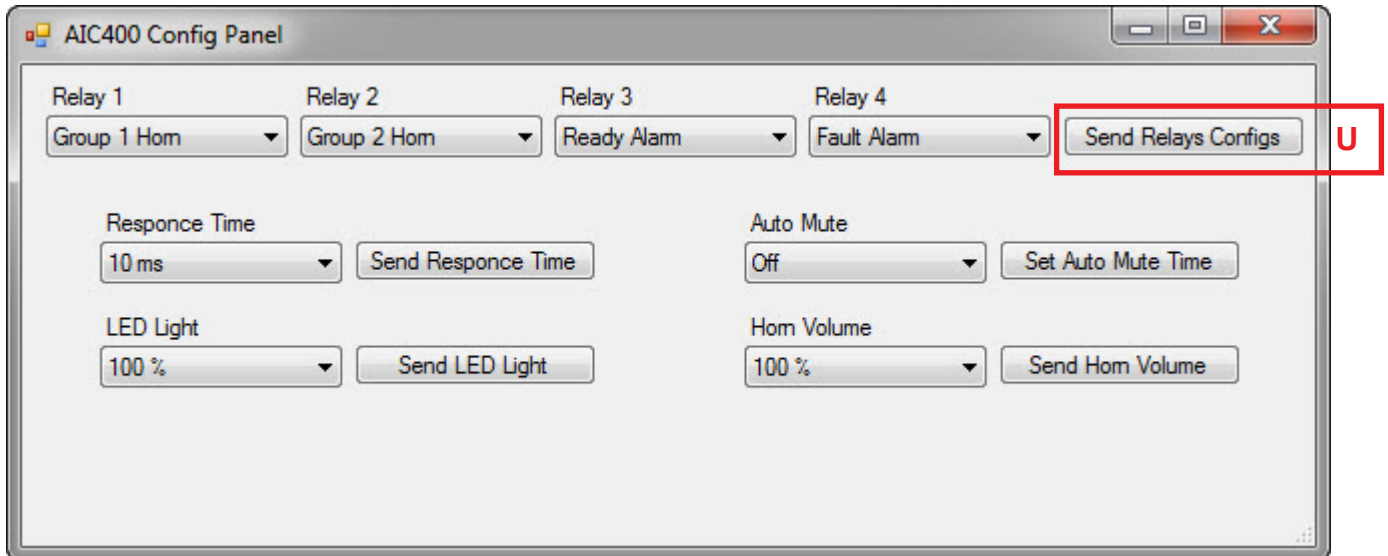


Window Parameters setup

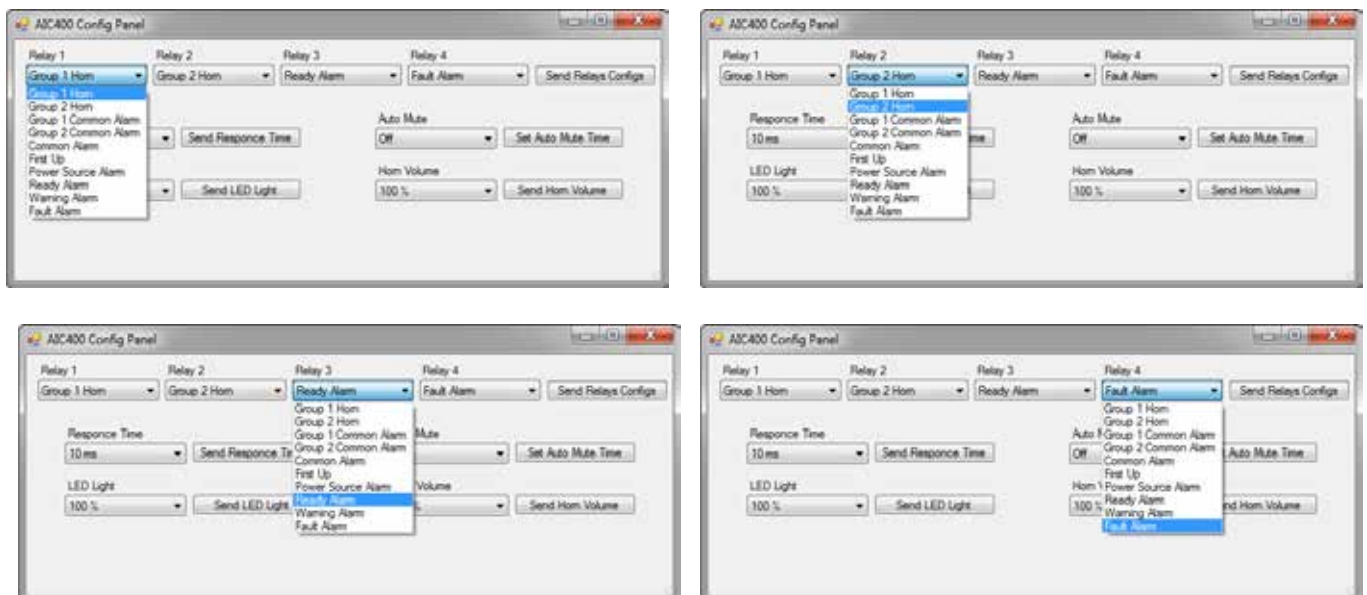
- Under the “Tools” Menu (A), go to “Com Port” Menu and select the Com Port which is assigned to the Annunciator (the active Com Port is highlighted in the list).
- Under the “Tools” Menu (A), go to “Baud Rate” menu and select 115200.
- ALCON should be able to communicate with the Annunciator now. To make sure, press the ‘Test’ button (B).
- Under the ‘Window Address’ Menu (C), select the window address (default is 1). Now you can configure the ‘Logic Sequence’ (D), Input ‘Type’ (E), ‘Alarm Group’ (F) and ‘Auxiliary Relay Function’ (G) for this window.
- Press the ‘Send the configuration of window’ button (T) and select ‘1’
- Press the “Send’ button’ (H) to send the new configuration of window ‘1’ to the Annunciator. The window ‘1’ has been configured now. This procedure must be repeated for other windows as well but there is an easier way to copy the same configuration to other windows as below.
 - Press the ‘Copy’ button (J) and select ‘All’
 - Press the ‘From Window’ button (K) and select ‘1’
 - Press the ‘To Window’ button (L) and select ‘All’
 - Press the ‘Copy’ button (M) to copy the new parameters of window ‘1’ to all other windows
 - Press the ‘Send the configuration of window’ button (T) and select ‘ALL’
 - Press the “Send’ button’ (H) to send the new configuration to all windows of the Annunciator
- You can also clear the configuration and set it to factory default setting by ‘Clear buttons (P).
- Under ‘File’ menu (R), click on “Save as” to save the new configuration on your computer for future access.
- To load a saved configuration file, open the file from the ‘File’ menu (R), and send it the Annunciator
- You can also print the new configuration for your records

Common Parameters setup

Press the “Common Parameters’ (S) button. the following menu will pop up:



Press the Relay menus (1 to 4) and assign a function to each relay according to your requirements.



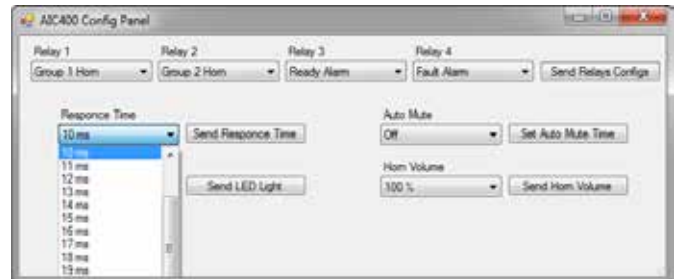
Press the ‘Send Relays Configs’ button (U) to send the Relays’ configuration to the Annunciator.

Common Parameters setup

Response Time

Press the 'Response Time' button and select a time according to your application and then press the 'Send Response Time' button.

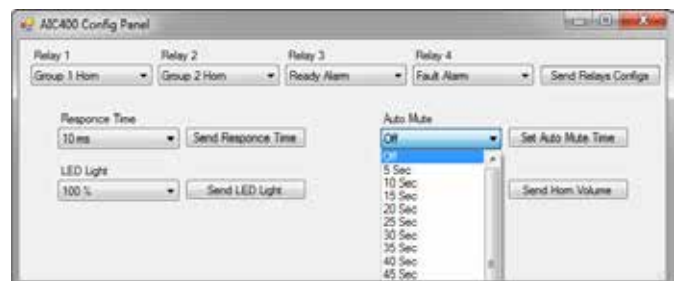
The most common time range is 10ms to 50ms.



Auto Mute

The Auto Mute function turns the internal and external audibles Off after a set time.

Press the 'Auto Mute' button and select 'Off' or pick a specific time. Then press the 'Set Auto Mute Time' button.

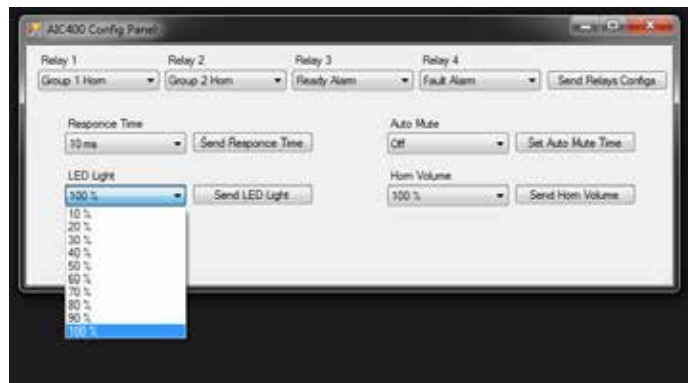


LEDs' Brightness

This feature allows you to set the brightness of the LEDs.

This option is very useful to reduce the system power consumption significantly and it is very important for a longer hold up when using standby batteries.

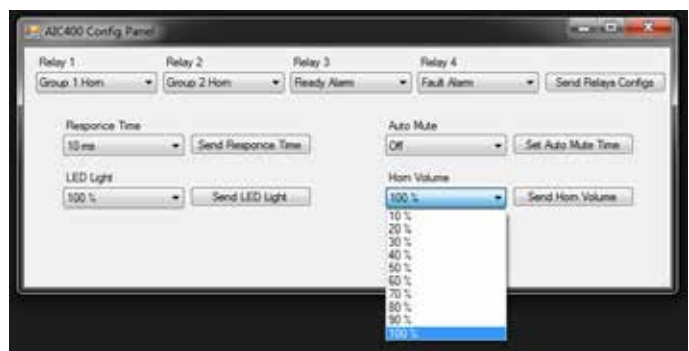
Press the 'LED Light' button and select the brightness level of the LEDs and then press the 'Send LED Light' button.



Buzzer Volume

This feature allows you to change the volume of the Built-in Buzzer.

Press the 'Horn Volume' button and select the sound level of the built-in buzzer and then press the 'Send Horn Volume' button.



AIC400 Modules



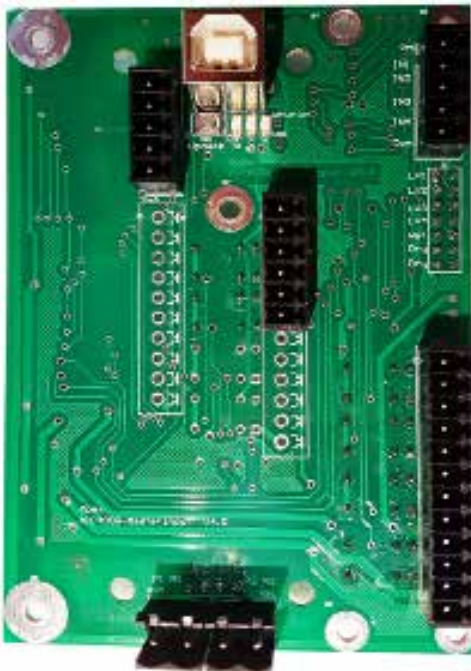
AIC400
CPU Module



AIC400
LED Master



AIC400
LED Unit



AIC400
Input Master



AIC400
Input Unit



AIC400
Power Supply
Module