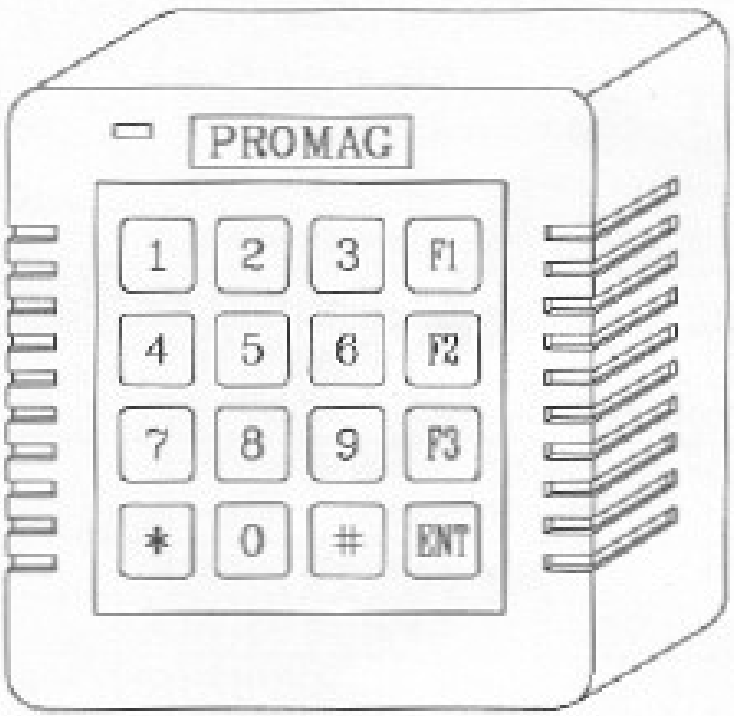
AC903

Proximity Card Access Control Terminal



Programming Manual

Installation Manual is on the other side →

PROMAG

Quick Programming Reference

[F1]- enter/exit Programming Mode (Master ID Card and/or Password may be required to enter)

[F2] or [F3]- abort the editing (or execution) of selected item and return to the Main Menu

Set Master ID/Password:	[0] [ENT] → ...
Master ID	...→ [ID Card] → [ENT]
Master ID + Password	...→ [ID Card] → [Password, 8 digits max.] → [ENT]
Master Password only	...→ [Password, 8 digits max.] → [ENT]
delete Master ID/Pwd	...→ [ENT]
Add User Record:	[1] [ENT] → [User No., 0~239] → [ENT] → ...
ID Code Record	...→ [ID Card] → [ENT]
ID Code + Password	...→ [ID Card] → [Password, 8 digits max.] → [ENT]
Password only	...→ [Password, 8 digits max.] → [ENT]
Delete User Record	[2] [ENT] → [User No., 0~239] → [ENT]
Clear User Database	[3] [ENT] → [ENT]
Load Default Values	[4] [ENT] → [ENT]
Access Mode	[5] [ENT] → [0]Armed; [1]Disarmed; [2]Locked → [ENT]
Lock Mode	[6] [ENT] → [0] Timeout *; [1]Timeout* or door opened; [2]Timeout* or door closed → [ENT]
Lock Activation Duration	[7] [ENT] → [Duration in sec., 1~127] → [ENT]
Alarm duration	[8] [ENT] → [Duration in sec., 0~127, 0= disabled] → [ENT]
Door Open Sensor Type	[9] [ENT] → [0]N.-C**.; [1]N.-O**. → [ENT]
Door Open Switch Type	[1] [0] [ENT] → [0]N.-C**.; [1]N.-O**. → [ENT]
Electric Lock Type	[1] [1] [ENT] → [0]N.-C**.; [1]N.-O**. → [ENT]
Security Alarm Type	[1] [2] [ENT] → [0]N.-C**.; [1]N.-O**. → [ENT]

** Timeout = value of "Lock Activation Duration" Setting **N.O.= normally-opened; N.C.= normally-closed*

...-G-G-G-G-...	Main Menu	...GGGGG...	Item is selected
...OOOOOO...	ID Card is expected	...GRGRG...	Password is expected

'G'= Green Light, 'R'= Red Light, 'O'= Orange Light; '-'= no Light

Buzzer beeps/ Red Light blinks 3 times	User Error (Invalid Item # or Value)
Buzzer beeps/ Red Light blinks 4 times	Database Error*

Database Errors are: Record uniqueness rules violation; User # already exists; User # does not exist; User # is out of range; Attempting to add an empty Record

How to Read an ID Card

To Read an ID Card, just bring it close to the Terminal's front panel. Reading is very fast and only takes a fraction of a second to complete. Upon successful read the Terminal will beep briefly. If you want to read this Card again, then you must take the Card away from the Terminal, wait at least for 1 second and bring the Card back to the Terminal. Then and only then will the Terminal react on this very ID Card again.

How to gain access (open the door):

- If Red Light is on- Locked Access Mode, access is not possible
- If Green Light is on- Disarmed Access Mode: access is unrestricted, press [ENT] or read any ID Card to open the door
- If Green Light is blinking briefly at a period of 2 seconds- Armed Access Mode, use your ID Card and/or Password to open the door:

If you only have an ID Card:

- Read your ID Card. The door will be opened

If you have an ID Card and Password:

- Read your ID Card. The Terminal will beep and start blinking its Green and Red Lights alternatively- Password entry is expected
- Input your Password and press [ENT]. The door will be opened

If you only have Password

- Enter your Password (as you do this, the Terminal will start blinking its Green and Red Lights alternatively) and press [ENT]. The door will be opened

Once access is granted, the Green Light will be switched on. The Green Light will stay on for as long as the Lock is activated

If, after you read your ID Card or enter Password, the Terminal beeps and blinks Red Light 3 times, this means that the ID Card or Password is invalid and access has been denied.

Use [F2] or [F3] to abort Password entry if you have made a mistake. You will have to read your ID Card again as well (if you have an ID Card).

General Information

You have to program the AC903 before you can start using it. Programming is performed in a **Programming Mode**. Once programming is finished, the AC903 returns to a **Normal Mode** of Operation. In the Normal Mode, the AC903 executes its access control functions basing on the data you have defined in the Programming Mode. Listed below are necessary programming steps (in their recommended order) that should be initially performed on the AC903.

Complete initial programming of the AC903 includes:

- **Performing System Initialization**. System Initialization tests the AC903's internal memory and restores its contents to a default factory state
- **Setting Master ID Card and/or Master Password**, which will be used to access Programming Mode in the future. Master ID Card and/or Master Password protect the Terminal's data against unauthorized altering
- **Editing AC903's Settings**. Settings are functioning parameters that define the Terminal's behavior and operation
- **Editing User Database**. User Database consists of User Records. Each User Record carries information about one User- Person that will assess an area protected by the AC903. User Record contains this User's ID Card Code and/or Password

Contents

1. Performing System Initialization

System Initialization tests the AC903's internal memory and restores its contents to a default factory state: Master ID Card and Password are deleted, all Settings are assigned their default factory values and the User Database is cleared of all Records. System Initialization is a recommended step during initial programming of the Terminal.

System Initialization is also the only solution in case you loose the Master ID Card or forget the Master Password and cannot enter the Programming Mode.

To perform System Initialization:

- Power off the AC903
- Open the Terminal: remove 2 hexagonal screws at the bottom of the AC903 and lift the top cover
- Short-circuit **"INIT"** header (its location is shown on *Fig.1*) using Jumper (tiny black plastic piece) or any other metal object
- Power the Terminal up while keeping **"INIT"** Header pins short-circuited. System Initialization will take about 3 seconds to complete
- If Initialization completes successfully, Green Light will be switched on and short beeps will be generated. In an unlikely event of Initialization failure, Red Light will be blinking and long beeps will be generated
- Remove the Jumper. The AC903 will resume normal operation

In case of Initialization failure, do not use the AC903 until it is repaired!

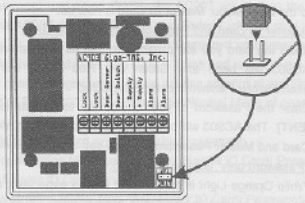


Fig. 1. Location of "INIT" header

2. Setting Master ID Card and/or Master Password

Master ID Card and/or Master Password are used to protect the AC903's internal data against unauthorized editing.

You will not be able to access the Programming Mode if you loose your Master ID Card or forget Master Password. The only solution in this situation is to perform the System Initialization (refer to the *Section 1* of this Manual).

At your option, access to Programming Mode can be protected by Master ID Card, Master ID Card and Master Password, Master Password only or nothing at all (the latter is strongly not recommended).

To set Master ID Card and/or Password after the System Initialization:

- Press **[F1]** to enter Programming Mode. The AC903 will generate 2 beeps and go into Programming Mode's Main Menu. When in Main Menu, the Green Light is blinking constantly; the AC903 is ready for command.

  You can always return to the Main Menu by pressing [F2] or [F3]
- Press **[0] [ENT]** to choose "Set Master ID and/or Password" Main Menu Item. The AC903 will beep and Orange Light will be switched on- ID Card read is expected. Further steps depend on what kind of Programming Mode access protection you have opted for:

  To set "Master ID Card" access protection:
  - Read the card you are planning to use as the Master ID Card. The AC903 will beep and Green and Red Lights will start blinking alternatively- Password entry is expected
  - Press **[ENT]** to skip Password input. The AC903 will beep and return to the Main Menu. Master ID Card is now set

  To set "Master ID Card and Password" access protection:
  - Read the card you are planning to use as the Master ID Card. The AC903 will beep and Green and Red Lights will start blinking alternatively- Password entry is expected
  - Enter the Password of your choice (up to 8 digits long) and press **[ENT]**. The AC903 will beep and return to the Main Menu. Master ID Card and Master Password are now set

  To set "Password only" access protection:
  - While Orange Light is on (ID Card read is expected), start entering a Password of your choice (up to 8 digits long). Once you input a first

digit of the Password, Green and Red Lights will start blinking alternatively thus indicating that Password entry is now in progress
  - Finish Password input by pressing **[ENT]**. The AC903 will beep and return to the Main Menu. Master Password is now set

  To disable Master ID Card and Password (strongly not recommended):
  - While Orange Light is on (ID Card read is expected) press **[ENT]**. The AC903 will beep and return to the Main Menu. Master ID Card and Master Password are now deleted
- Now you can continue editing the AC903's Settings and the User Database. Or you can exit the Programming Mode and try entering it again using the Master Card and/or Password you've just set (recommended step)

To exit Programming Mode:

- Press **[F1]**. The AC903 will return to the Normal Mode of operation

To enter Programming Mode after Master ID Card/ Password has been set:

- Press **[F1]**. If neither Master ID Card, nor Master Password are set, Programming Mode will be entered immediately (the AC903 will beep 2 times and Green Light will start blinking)
- If, after you press **[F1]**, Orange Light is switched on, this means that Master ID Card must be read. Read the Master ID Card. If there is no Password to be input as well, Programming Mode will be entered immediately (the AC903 will beep 2 times and Green Light will start blinking)
- If, after you press **[F1]** or after you read the Master ID Card, Green and Red Lights start blinking alternatively, then Master Password must be entered. Input Password and press **[ENT]**- the AC903 will go into the Programming Mode (the AC903 will beep 2 times and Green Light will start blinking)
- If Master ID Card you read or Master Password you enter is incorrect, the AC903 will beep and blink Red Light 3 times and return to the Normal Mode
- You can cancel Programming Mode access attempt at any time by pressing [F2] or [F3].The AC903 will return to the Normal Mode of operation

To change Master ID Card and/or Master Password:

- Enter Programming Mode using current Master ID Card/ Password
- Set new Master ID Card and/or Password
- Exit Programming Mode. Use new Master ID Card/ Password from now on

3. Navigating in Programming Mode

The AC903 is programmed in the Programming Mode. After the System Initialization, Programming Mode can be entered by pressing **[F1]**. Once you set the Master ID Card and/or Master Password, Programming Mode can only be entered by reading the Master ID Card and/or inputting Password (for more details, please refer to the *Section 2* of this Manual).

Programming Mode can be exited at any time by pressing **[F2]**.

Once Programming Mode is entered, the AC903 goes into the Main Menu. When in Main Menu, the Green Light is blinking constantly. This means that the AC903 is ready to accept a command. Main Menu consists of Items: Settings to edit and Actions to perform. Every Item has an Item Number. Complete list of all available Main Menu Items can be found later in this Section.

To select an Item, key in its Item Number and press **[ENT]**. The Green Light will stop blinking and will remain constantly on. After you finish editing an Item, press **[ENT]** again. The AC903 will return to the Main Menu- Green Light will start blinking again.

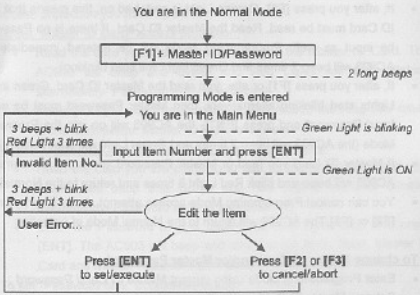


Fig.2. Selecting and editing (executing) an Item

If you make a mistake when selecting or editing an Item (invalid Item Number, value, etc...) the AC903 will beep and blink Red Light 3 times and return to the Main Menu.

You can abort Item editing and return to the Main Menu at any time by pressing **[F2]** or **[F3]**.

When in Programming Mode, if you don't perform any action for more than 1 minute, Programming Mode is exited automatically.

When keying in the code or any other number, time interval between individual digits entry may not exceed 5 seconds, otherwise input is aborted and you are returned to the Main Menu.

List of all available Main Menu Items:

0: Set Master ID Card and/or Password (refer to *Section 2*)

Database-related Items (refer to *Section 5*)

1: Add User Record

2: Delete User Record

3: Delete all User Records (clear User Database)

Setting-related Items (refer to *Section 4*)

4: Load Default Factory Values (shown in **bold** characters)

5: Access Mode (0: **Armed**, 1: Disarmed, 2: Locked)

6: Lock Deactivation Mode (**0: Timeout**, 1: Timeout/ door opened, 2: Timeout/ door closed)

7: Lock Activation Duration (**1**~127 seconds, **10** seconds)

8: Alarm Activation Duration (**0**~127 seconds, **10 seconds**)

9: Door Open Sensor Type (**0: normally-closed**, 1: normally-opened)

10: Door Open Switch Type (0: normally-closed, **1: normally-opened**)

11: Electric Lock Type (0: normally-closed, **1: normally-opened**)

12: Security Alarm Type (**0**: normally-closed, **1: normally-opened**)

4. Editing the AC903's Settings

Settings are editable functioning parameters that define the AC903's behavior and operation. Every Setting has a value you can change. Every Setting also has a default factory value. All Settings are restored to their default factory values during the System Initialization. You can also load default factory values at any time by executing "Load Default Factory Values" Main Menu Item.

Description of AC903's Settings (default values are shown in bold):

5: Access Mode. Defines the AC903's Access Mode.

=0: Armed Access Mode- access is granted in accordance with the User Database. Alarm Line is in operation (if installed and configured) and is triggered in case of intrusion or AC903 tampering. Exit Switch is in operation. Armed Access Mode is indicated by the Green Light flashing briefly at a period of 2 seconds

=1: Disarmed Access Mode- access is not restricted. Pressing **[ENT]** or reading any ID Card activates the Lock. Alarm Line is in operation (if installed and configured) but is activated only in case of AC903 tampering. Exit Switch is in operation. Disarmed Access mode is indicated by the Green Light being constantly on

=2: Locked Access Mode- access is prohibited for all Users. Alarm Line is in operation (if installed and configured) and is triggered in case of intrusion or AC903 tampering. Exit Switch continues to operate, so exit is not restricted. Locked Access Mode is indicated by the Red Light being constantly on

6: Lock Deactivation Mode. Defines when the Lock is deactivated after having been activated

=0: On Timeout- the Lock is deactivated after the period of time specified by the Lock Activation Duration Setting

=1: On Timeout/ Door Opened- same as "0" or immediately after the door is opened (whichever happens first). This option requires the Door Open Sensor to be installed and configured in order to work correctly

=2: on Timeout/ Door Closed- same as "0" or immediately after the door is closed after having been opened (whichever happens first). This option requires the Door Open Sensor to be installed and configured in order to work correctly

7: Lock Activation Duration. Defines maximum time Electric Lock will remain activated. Actual duration may be shorter if Lock Mode is set to 1 or 2

Value Range: 1~127 seconds, **10 sec. by default**

8: Alarm Activation Duration. Defines the period of time the Alarm Line will remain activated once Alarm is triggered

Value Range: 0~127, setting to 0 disables the Alarm, **10 sec. by default**

9: Door Open Sensor Type	**N.-C.**	=0: normally-closed (N.-C.)
10: Door Open Switch Type	**N.-O.**	=1: normally-opened (N.-O.)
11: Electric Lock Type	**N.-O.**	*Types are explained in the Section 8 of the installation Manual*
12: Alarm Type	**N.-O.**	

To load Default Factory Values:

- Make sure you are in the Main Menu (Green Light is blinking)
- Press **[4],[ENT]**- the AC903 will beep and Green Light will be switched on
- Press **[ENT]** again to load default values- the AC903 will beep and return to the Main Menu. Default values are loaded
- You can abort this action at any time by pressing **[F2]** or **[F3]**. The AC903 will beep and return to the Main Menu. Setting values will remain intact

To select and edit a Setting:

- Make sure you are in the Main Menu (Green Light is blinking)
- Input the Item Number of the Setting you want to edit and press **[ENT]**
- If Item Number is valid, the AC903 will beep and switch Green Light on- Setting is selected. If Number is invalid, the AC903 will beep and blink the Red Light 3 times and return to the Main Menu
- Once Item is selected, input new Setting value and press **[ENT]**
- If new setting value is valid, the AC903 will beep and return to the Main Menu. New Setting value will be set. If Setting Value is invalid, the AC903 will beep and blink the Red Light 3 times and return to the Main Menu. Existing setting value will be preserved
- You can abort the editing at any time by pressing **[F2]** or **[F3]**. The AC903 will beep and return to the Main Menu (Green Light will start blinking again)

Example: to set the Electric Lock Type to "normally-closed":

- To select "Electric Lock Type" Main Menu Item, press **[1],[1],[ENT]**
- To select "normally-closed" Electric Lock Type, press **[0], [ENT]**

5. Editing the User Database

User Database consists of User Records. Each User Record carries an ID Code and/or Password of one User- Person that is going to access an area protected by the AC903. You can enter up to 240 User Records. Therefore, each AC903 Terminal can handle up to 240 Users, each having its own ID Card and/or Password. The User Record can be of 3 types: ID Code only, ID Code and Password, or Password Only.

Every User Record also has a User Number. User Number can be in the range from 0 to 239. You define the User Number when adding a User Record. When deleting a Record, you reference the Record to be deleted by its User Number.

If you forget (lose) the User Number of the Record, you will not be able to delete it!

For this reason, you are advised to keep thorough track of all User Records and Numbers you dispense. There is a handy table provided on page 3 of this Manual that you can use for this purpose.

You can add and delete User Records at any time. You can also clear the whole User Database at once, thus deleting all User Records. System Initialization also clears the User Database.

Each User Record must be unique.

Rules of Record Uniqueness:

- If you are adding an "ID Code only" Record, then this Record's ID Code must not duplicate an ID code of any other existing Record
- If you are adding an "ID Code and Password" Record then this Record's ID Code must be unique. However, Password may duplicate the Password of some other Record
- If you are adding a "Password only" Record, then this Password must not duplicate the Password of another "Password only" Record. It may, however, duplicate the Password of an existing "ID Code and Password" Record
- Each User Record must have a unique User Number, i.e. 2 different User Records cannot have the same User Number
- You also cannot add an empty Record, i.e. the one with no ID Card and no Password

Example:	**ID Card**	**Password**
If the User Database already has this Record...	ID Card #1	Pwd=123
...and has this Record,	---	Pwd=456
then you can add this Record...	ID Card #2	---
...can add this Record...	ID Card #2	Pwd=123
...can add this Record,	---	Pwd=123
but cannot add this Record (ID uniqueness violation)...	ID Card #1	---
...cannot add this Record (ID uniqueness violation)...	ID Card #1	Pwd=123
...cannot add this Record (Password uniqueness violation)		Pwd=456

To delete all User Records:

- Make sure you are in the Main Menu (Green Light is blinking)
- Press **[3],[ENT]**- the AC903 will beep and switch the Green Light on
- Press **[ENT]** again- User Database will be cleared (this may take several seconds to complete). The AC903 will beep and return to the Main Menu- Green Light will start blinking again
- You can abort this action at any time by pressing **[F2]** or **[F3]**. The AC903 will beep and return to the Main Menu. The User Database will remain intact

To add User Record:

- Make sure you are in the Main Menu (Green Light is blinking)
- Press **[1],[ENT]**- the AC903 will beep and switch Green Light on
- Enter User Number of your choice (in the range from 0 to 239)
- Press **[ENT]**. The AC903 will check the User Number for validity. If the User Number is out of Range (exceeds 239) or User Record with this Number already exists, the AC903 will beep and blink Red Light 4 times and return to the Main Menu.
- If the User Number you enter is valid and unused, the AC903 will switch the Orange Light on- ID Card read is expected. Further steps depend on what kind of User Record you are adding:

  For "ID Code only" User Record:
  - Read an ID Card. The AC903 will beep and start blinking Red and Green Lights alternatively- Password entry is expected
  - Omit Password by pressing **[ENT]**

For "ID Code and Password" User Record:

- Read an ID Card. The AC903 will beep and start blinking Red and Green Lights alternatively- Password entry is expected
- Input the Password (up to 8 digits long) and press **[ENT]**

For "Password only" User Record:

- Instead of reading an ID Card, key in the Password (up to 8 digits long)- the AC903 will start blinking Red and Green Lights as soon as you input the first digit
- Finish Password input by pressing **[ENT]**

- Once [ENT] is pressed, the AC903 will start checking the Record for uniqueness (this may take several seconds to complete)
- If Record you are adding does not violate uniqueness rules, the AC903 will beep and return to the Main Menu. New User Record is added. If Record you are adding violates uniqueness rules, the AC903 will beep and blink Red Light 4 times and return to the Main Menu. New Record is not added
- You can abort this action at any time by pressing [F2] or **[F3]**. The AC903 will beep and return to the Main Menu. The User Database will remain intact

To delete User Record:

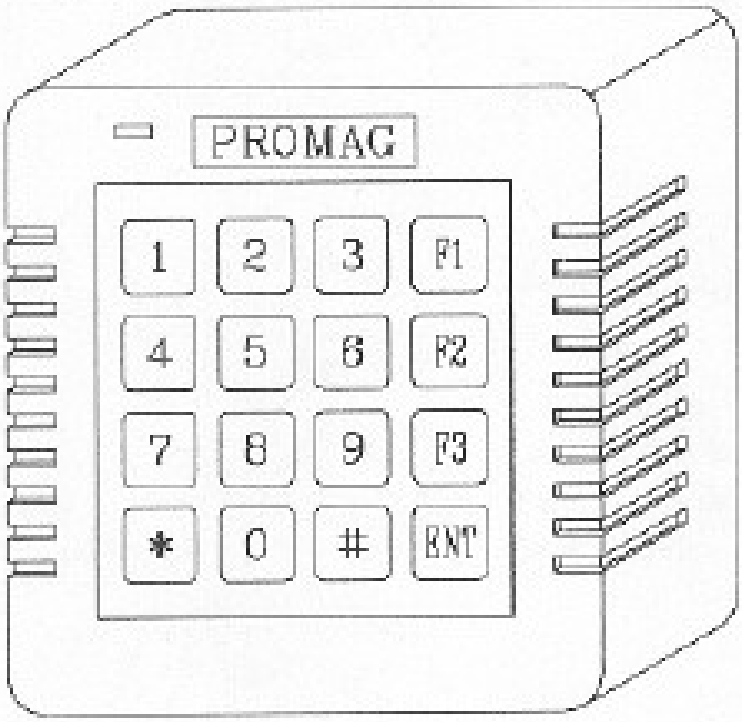
- Make sure you are in the Main Menu (Green Light is blinking)
- Press **[2],[ENT]**- the AC903 will beep and switch the Green Light on
- Enter User Number of the Record you want to delete (in the range from 0 to 239)
- Press **[ENT]**. The AC903 will check the User Number for validity. If the User Number is out of Range (exceeds 239) or there is no User Record with this User Number, the Terminal will beep and blink Red Light 4 times and return to the Main Menu. If the User Number is valid and used, the Terminal will beep and return to the Main Menu. Specified User Record is deleted
- You can abort this action at any time by pressing [F2] or **[F3]**. The AC903 will beep and return to the Main Menu. The User Database will remain intact

To edit (change) existing User Record:

There is no special Main Menu Item to edit a User Record. To make changes to the existing Record, you must delete this Record first and then add it with the desired changes.

AC903

Proximity Card Access Control Terminal



Installation Manual

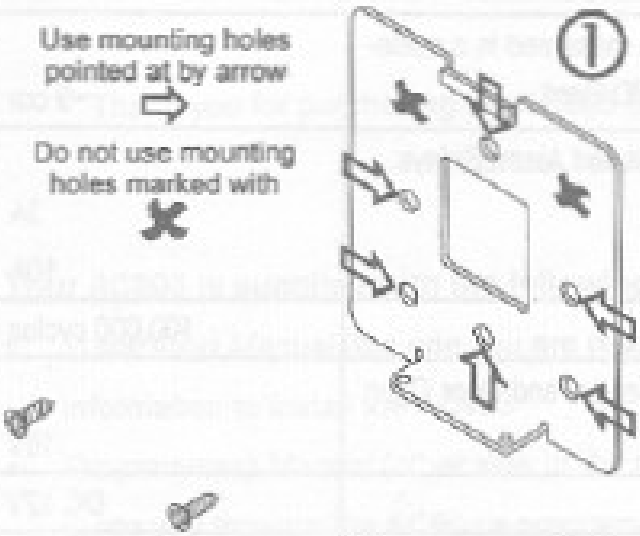
Programming Manual is on the other side →

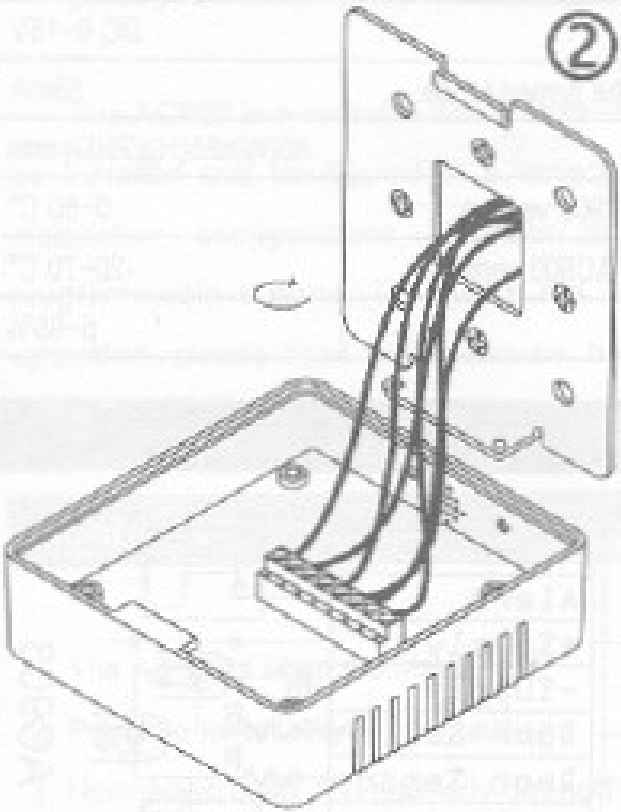
PROMAG

Quick Installation Reference

Use mounting holes pointed at by arrow ⇨

Do not use mounting holes marked with ✱



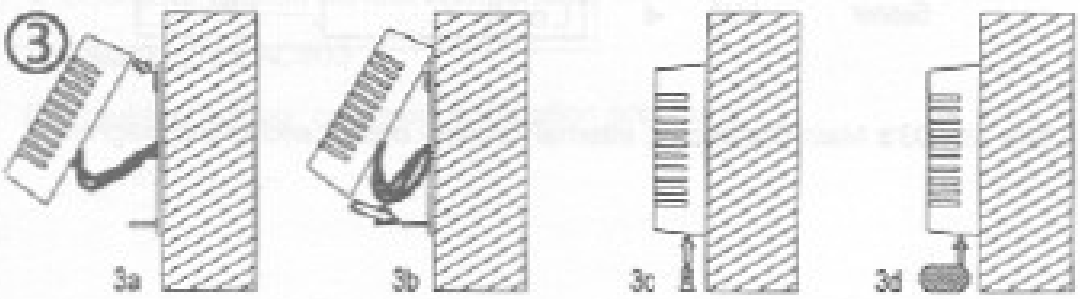


Installation Procedure:

- Install all external devices
- Run the wires to the planned location of the AC903 and make them come out of the wall through a hole app. 2–3 cm in diameter
- Install the back-plate. Position it in such a way that the wires come out through rectangular opening in the middle of the back-plate
- Connect the wires to their respective Wire Terminals. Tighten the screws using the screwdriver

Beware of short-circuits!

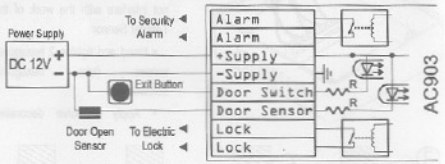
- Close the Top Cover. When closing the cover, be careful with the wires. Pull excessively long wires back into the hole, only allow for a small wire loop inside the AC903. Make sure that wires do not interfere with the work of the Tamper Sensor
- Insert and tighten 2 hexagonal screws (use hexagonal screwdriver)
- Apply adhesive decorative cover



Specifications

RFID Card average reading distance as measured in a noise-free environment using GIGA-TMS RFID Card:	~9 cm
Maximum Load Current through the Lock and Alarm Relays:	
• Inductive Load:	3A
• Resistive Load:	10A
Lock and Alarm Relays average life:	100,000 cycles
Maximum Voltage on the Door Open Sensor and Door Open Switch inputs:	16V
Nominal Supply Voltage:	DC 12V
Allowable Supply Voltage Range:	DC 9~15V
Average Supply Current as measured in the Armed Mode:	55mA
Physical Dimensions:	80(W)x85(H)x25(D) mm
Operating Temperature Range, normal AC903 version:	0~50 C°
Operating Temperature Range, extended AC903 version:	-20~70 C°
Operating Relative Humidity	5~95%

Main Connector



The AC903's Main Connector, internal circuitry details and wiring diagram

General Information

Thank you for purchasing the AC903 Standalone Proximity Card Access Control Terminal!

Your AC903 is supplied with the following documentation:

- *Installation Manual* (the one you are reading now) contains all necessary information to install the AC903
- *Programming Manual* (other side of the booklet you are reading now) will guide you through the AC903's programming

The AC903 is a versatile and feature-reach Access Control solution that can be installed and configured in a variety of ways. The Terminal has several installation configurations, different modes of operation and numerous programmable options. To ensure the AC903's satisfactory and trouble-free operation, please read both Manuals before proceeding with the Terminal's installation.

Contents

1. The AC903's Main Connector

External devices are connected to the AC903 through its Main Connector. The Main Connector is located inside of the AC903 housing.

To Open the AC903 housing (see *Fig.1*):

- Using hexagonal screwdriver (2) remove 2 hexagonal screws (1) at the bottom of the Terminal
- Lift the back-plate (3). Main Connector (4) is located under the back-plate

Main Connector has the following contacts (wire terminals):

- "+ Supply" and "-Supply" wire terminals are used to connect positive and negative lines of the 12V DC Power Supply respectively
- Terminal pairs marked "Lock" and "Alarm" are outputs of a Lock Control Relay and Alarm Control Relay respectively (max. 3A for an Inductive Load). Both Relays can be adjusted to function as "normally-closed" or "normally-opened" type (see *Programming Manual*)
- Wire terminals marked "Door Switch" and "Door Sensor" are inputs to connect an Exit Button (used to activate the Lock from inside the area protected by the AC903) and Door Open Sensor (used to detect door opening and closing). Both inputs are opto-isolated and sense "grounding", i.e. Exit Button and Door Open Sensor must be installed between the "-Supply" line and their respective sensor input. Both sensors can be adjusted to function as "normally-closed" or "normally-opened" type (see *Programming Manual*)

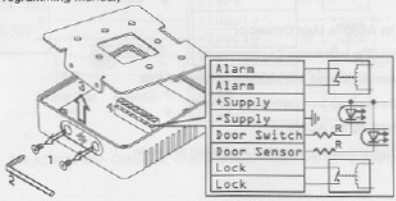


Fig. 1. Opening the AC903. AC903's Main Connector

2. Possible Installation Configurations

There are several possible installation configurations for the AC903. Additional devices you will need for each configuration are listed in *Table 1*. Please, note, that the AC903 must also be programmed accordingly in order to function as described below (see *Programming Manual* for complete programming instructions)

Minimum installation configuration:

- The AC903 only controls Electric Lock
- All Security functions are disabled (no intrusion or tampering detection)
- Once the Lock is activated, it will be deactivated after a fixed timeout (programmable by the User). There is no control of how many times the door is opened and closed while the Lock is activated

Medium installation configuration:

- Same as above but with "smarter" Electric Lock control. After the access is granted and Lock is activated, it will be deactivated just after the door is opened (or closed) thus increasing security

Full installation configuration (shown on *Fig. 2*):

- This configuration adds Alarm and makes full use of the AC903's security features. Alarm Relay is activated in case of intrusion (when door is opened without getting "permission" from the AC903 first) or when AC903 is tampered (Terminal's top cover is lifted)

Table 1. External devices needed for different installation configurations

	Power supply	Lock	Alarm	Door Open Sensor	Door Open Switch
Minimum	✓	✓	-	-	*
Modium	✓	✓	-	✓	*
Maximum	✓	✓	✓	✓	✓

Note: Door Open Switch (Exit Button) usage is optional for Minimum and Medium installation configurations. You only need to install it if your Electric Lock doesn't have an exit handle. However, for the Full installation

configuration, the Door Open Switch must be installed. This is because opening the door without getting "permission" from the AC903 first will be interpreted as intrusion, so Security Alarm will be activated.

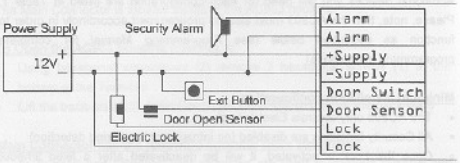


Fig. 2. Full installation configuration

Locks and Alarms with separate control and power lines

Fig. 2. shows the Electric Lock and Security Alarm that are controlled by directly applying and removing power. Some Locks and Alarms have separate power and control lines (*Fig. 3* shows 4-wire Security Alarm). These devices are controlled by short-circuiting and breaking control lines. Yet another kind of Locks and Alarms has 3 wires: ground, power and control lines (*Fig. 3* shows 3-wire Electric Lock). Device is controlled by short-circuiting the control line onto the ground.

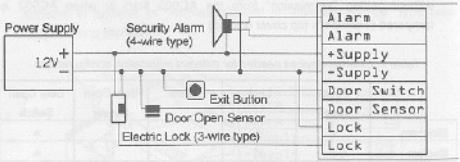


Fig. 3. 4-wire Alarm and 3-wire Lock

3. Normally-closed and normally-opened devices

Electric Locks, Security Alarms, Door Open Sensors and Exit Buttons can be of "normally-closed" or "normally-opened" type. The AC903 can be adjusted to work with both types (please, refer to the *Programming Manual*). Definitions of types for different external devices are provided in *Tables 2–5*.

Table 2. Definition of types for the Electric Lock

	normally-closed	normally-opened
when Lock Relay is activated*	Lock is latched	Lock is unlocked
when Lock Relay is deactivated*	Lock is unlocked	Lock is latched

** "Lock Relay is activated" means that Relay's contacts and, therefore, "Lock" wire terminals on the AC903's Main Connector are short-circuited*

Table 3. Definition of types for the Security Alarm

	normally-closed	normally-opened
when Alarm Relay is activated*	Alarm is idle	Alarm activated
when Alarm Relay is deactivated*	Alarm activated	Alarm is idle

** "Alarm Relay is activated" means that Relay's contacts and, therefore, "Alarm" wire terminals on the AC903's Main Connector are short-circuited*

Table 4. Definition of types for the Door Open Sensor

	normally-closed	normally-opened
when the door is closed, Sensor's contacts are	short-circuited	opened
when the door is opened, Sensor's contacts are	opened	short-circuited

Table 5. Definition of types for the Door Open Switch (Exit Button)

	normally-closed	normally-opened
when the Button is pushed, its contacts are	short-circuited	opened
when the Button is released, its contacts are	opened	short-circuited

4. Choosing access control components

Choosing adequate external devices is inherent to reliable system's operation. Observe the following recommendations when choosing access control components.

Electric Lock

- Average current going through the Lock Relay must not exceed 3A (not including momentary surges during Lock activation/deactivation due to the inductive nature of the Lock- these surges are accounted for and will not damage the AC903)
- You are recommended to choose the Lock with 12V supply voltage. This way you can power both the AC903 and the Lock from the same supply. Locks of both "normally-opened" and "normally-closed" type can be used

Power Supply

- To power the AC903, choose the Supply with DC 12V nominal supply voltage
- If you are using a single Supply to power both the AC903 and Electric Lock then the Supply's rated output current must be at least double that of the Lock (to compensate for power brownouts during Lock activation/ deactivation that can lead to the AC903 rebooting- see *Section 6* for more information on this problem)

Door Open Sensor

- Sensors of both "normally-opened" and "normally-closed" type can be used

Normally-closed type is recommended as more secure!

Door Open Switch (Exit Button)

- Switches of both "normally-opened" and "normally-closed" type can be used

Security Alarm

- Alarm Relay has the same specifications as the Lock Relay: 3A maximum average current assuming "inductive" nature of the Security Alarm
- You can use standalone Alarm or wire the AC903 to the Security System
- Alarms of both "normally-opened" and "normally-closed" type can be used

5. Installing the AC903

Described below is a typical AC903 installation. Installation layout may vary with installation environment and access control components used.

Typical AC903 Installation Layout (shown on *Fig. 4*)

- The AC903 (1) is installed on a reasonable height and close to the Electric Lock (2). Electric Lock shown is of "Electric Latch" type
- Door Open Sensor (3) is mounted along the upper surface of the door frame and inside the Room- this way it is best protected from possible burglar's attack
- Power Supply is mounted inside the Room. It is recommended to mount the Power Supply in a safe place (inside Electric Distribution Box, close to the ceiling, etc...)
- All wires are laid inside the wall or along the inner surface of the wall

Never run the wires along the outer surface of the wall!

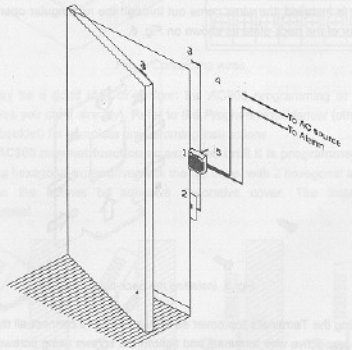


Fig. 4. Typical AC903 Installation Layout

- Exit Button (5) is mounted inside the Room approximately on the same height as the AC903 outside
- This Drawing does not show the Security Alarm. Choose location most appropriate for your installation "case".

Recommended AC903 Installation procedure

- Install Power Supply, Electric Lock, Door Open Sensor, Exit Button and Security Alarm (whichever applicable to you)
- Prepare mounting holes for at least 2-4 screws that will hold the Terminal on the wall (4 screws recommended). AC903 is mounted on the wall using its metal back-plate. Back-plate has 8 mounting holes of which 6 are available for mounting purposes (pointer at by ⇨ on *Fig. 5*).

  Mounting holes marked as "X" cannot be used!
- Perform all the wiring in accordance with the installation configuration of your choice. Run the wires to the planned location of the Terminal and make them come out of the wall through a hole approximately 3 cm in diameter. The hole should be located in such a way that when the back-plate is installed, the wires come out through the rectangular opening in the center of the back-plate as shown on *Fig. 6*.

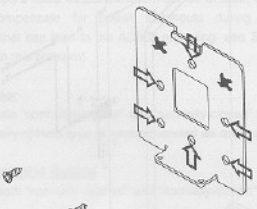


Fig. 5. Installing the back-plate

- Holding the Terminal's top cover as shown on *Fig. 6* connect all the wires to their respective wire terminals and tighten the screws using screwdriver
- Close the AC903's top cover as shown on *Fig. 7-1* and *Fig. 7-2*. When

closing the cover, be gentle on the wires. Pull excessively long wires back into the hole, only allow for a small wire loop inside the AC903; make sure that the wires do not interfere with operation of the Tamper Sensor.

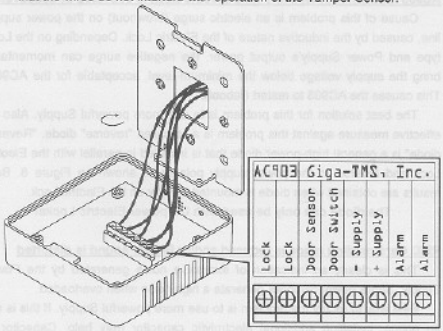


Fig. 6. Connecting wires

- It may be a good idea to perform the AC903 programming at this point (unless you did it already). Refer to the *Programming Manual* (other side of this booklet) for complete programming instructions

  AC903 may not function as expected until it is programmed!
- Using hexagonal screwdriver lock the top cover with 2 hexagonal screws
- Cover the screws by adhesive decorative cover. The installation is complete!

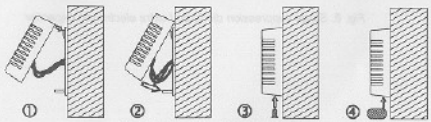


Fig 7. Closing the AC903's top cover

6: Troubleshooting: common installation problems

AC903 resets (reboots) every time Electric Lock is activated or deactivated

Cause of this problem is an electric surge (brownout) on the power supply line, caused by the inductive nature of the Electric Lock. Depending on the Lock type and Power Supply's output power, the negative surge can momentarily bring the supply voltage below the minimum level, acceptable for the AC903. This causes the AC903 to restart (reboot).

The best solution for this problem is to use more powerful Supply. Also an effective measure against this problem is a so-called "reverse" diode. "Reverse diode" is a general high-power diode that is installed in parallel with the Electric Lock and reverse to the power supply polarity as shown on Figure 8. Best results are obtained when diode is mounted directly on the Electric Lock.

The diode can only be used with DC power Electric Locks!

RFID Card reading range is reduced and/or Buzzer sound is distorted

This is clearly an indication of excessive noise generated by the Power Supply. Some Power Supplies generate a high noise when overloaded.

Best way to rectify the problem is to use more powerful Supply. If this is not an option, installing additional electrolytic capacitor may help. Capacitor is installed in parallel with the Power Supply (mind the polarity!). Capacitance should be about 2000uF per 1A of load. That is, if you are using a 1.5A Electric Lock, best results will be achieved with capacitance of at least 3000uF.

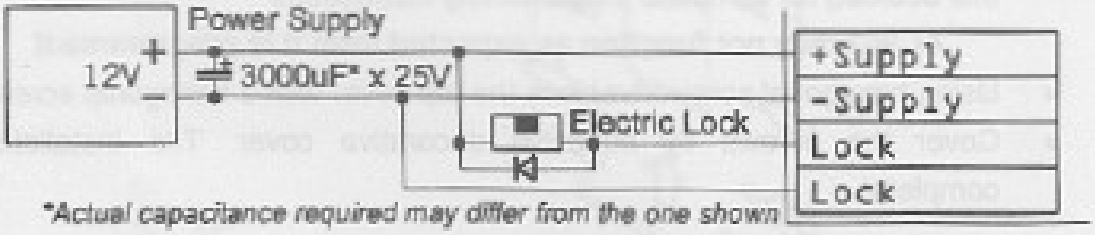


Fig. 8. Surge suppression diode and extra electrolytic capacitor