Sagem Sécurité
SAFRAN Group

MorphoAccess™

Installation Guide

MA500 Series

Produced by Sagem Sécurité

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INTRODUCTION

Congratulations for choosing the SAGEM MorphoAccess™[1] Automatic Fingerprint Recognition Terminal. MorphoAccess™ provides an innovative and effective solution for access control applications using Fingerprint Verification or/ and Identification.

Among a range of alternative biometric techniques, the use of finger imaging has significant advantages: each finger constitutes an unalterable physical signature which develops before birth and is preserved until death. Unlike DNA, a finger image is unique to each individual - even identical twins.

The MorphoAccess™ terminal integrates SAGEM image processing and feature matching algorithms (MorphoSoft™ and MorphoImaging™). This technology is based on lessons learned during more than 20 years of experience in the field of biometric identification and the creation of literally millions of individual fingerprint identification records.

We believe you will find the SAGEM MorphoAccess™ fast, accurate, easy to use and suitable for physical access control.

The SAGEM MorphoAccess™ offers the following advantages:

- High quality optical sensor (IQS certified)
- Supports multiple input/output interfaces used in the physical access control industry.
- Local area network interface for easy interaction with other host systems.
- Compact size for easy installation and integration into your available office space.
- Intuitive man machine interface with keyboard and display, that is easy to use in both setup and operational modes.
- Open architecture, with dedicated applications implemented via MA5xx/1xx Software Development Kit.

To ensure the most effective use of your SAGEM MorphoAccess™, we recommend that you read this Installation Guide thoroughly.

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[1] The SAGEM logo and trademark are the property of *SAGEM Sécurité*.

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SAFETY INSTRUCTIONS

The installation of this product should be made by a qualified service technician and should conform to all local codes.

It is strongly recommended that a class II power supply at 12 V ±5% and 0.75 A. min be used in accordance with Safety Electrical Low Voltage (SELV) parameters. The 12 V power supply cable length should not exceed 5 meters.

This product may be installed with a power supply conforming to EN60950, in accordance with the NEC Class 2 requirements; or supplied by a listed EN60950 external Power Unit marked Class 2, Limited Power source, or LPS and rated 12 V DC, 0.75 A minimum.

In case of “Power Over Ethernet” use, the POE hub or switch features has to be conformed with IEEE 802.3-af standard. An insulation greater than 2000V is provided between MA5xx terminal and Ethernet network.

In case of building to building connection it is recommended to connect 0V to ground. This ground (ground security reference) cable must be connected with the terminal block board fixation screw marked with the universal ground symbol (see p16).

Europe information :

SAGEM hereby declares that the SAGEM MorphoAccess™ has been tested and found compliant with the following listed standards as required by the EMC Directive 89/336/EEC: EN55022 (1994) / EN55024 (1998), EN300-330 (1999) and by the low voltage Directive 73/23/EEC amended by 93/68/EEC: EN60950 (2000).

Caution: The MA500 terminal is a Class A device. In a residential environment, this device may cause interference. In this case, the user is encouraged to try to correct the interference with appropriated measures such as :

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

USA information

Caution: FCC part 15 certificates are pending.

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Responsible Party : Sagem Morpho Inc, 1145 Broadway Plaza, Suite 200, Tacoma, Washington (USA), 98402, (800) 346-2674.

Note : This equipment has been tested and found to comply with the limits for a Class B (MA520, MA521, OMA520, OMA521) or Class A (MA500) digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Canadian information

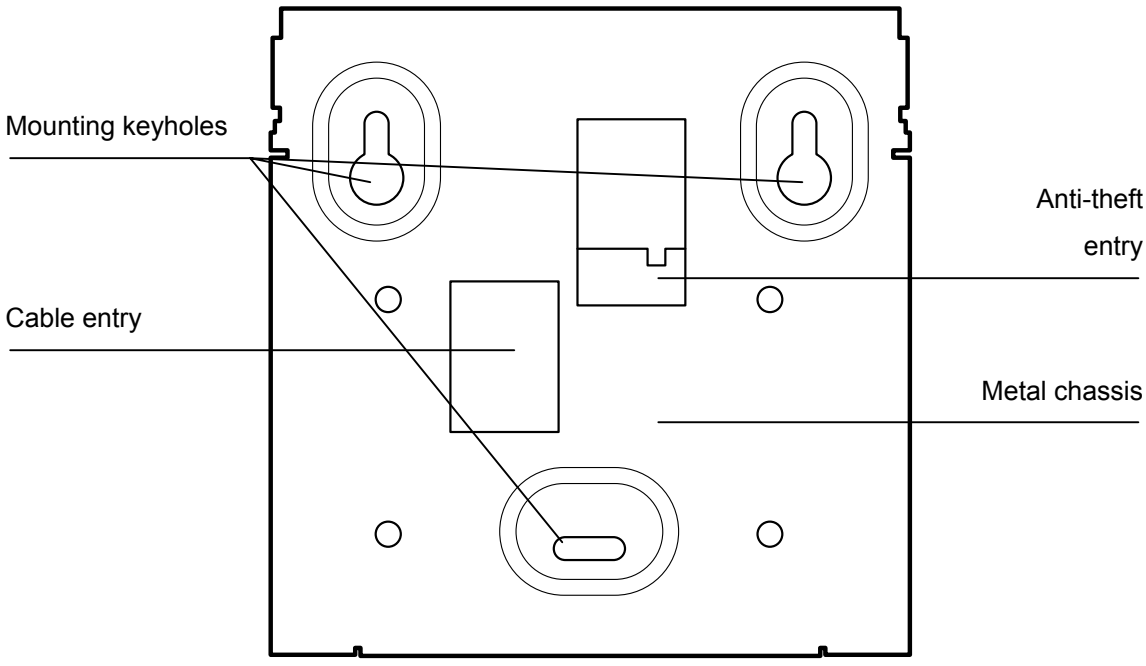
Caution: Industrial Canadian certificates are pending.

This Class B (MA520, MA521, OMA520, OMA521) or Class A (MA500) digital apparatus complies with Canadian ICES-003.

Ces appareils numériques de Classe B (MA520, MA521, OMA520, OMA521) ou Classe A (MA500) sont conformes à la norme NMB-003 du Canada.

GENERAL DESCRIPTION

MA5xx versions



MorphoAccess™ supplies:

1 Cover assembly with Chassis and 2 Secured screws for fixation

1 Secured screwdriver Torx 20

1 Chassis fixation kit (4 fixations and screws , 1 anti theft block)

OMA5xx versions

Outdoor MorphoAccess™ supplies:

1 Cover assembly with chassis and protective visor

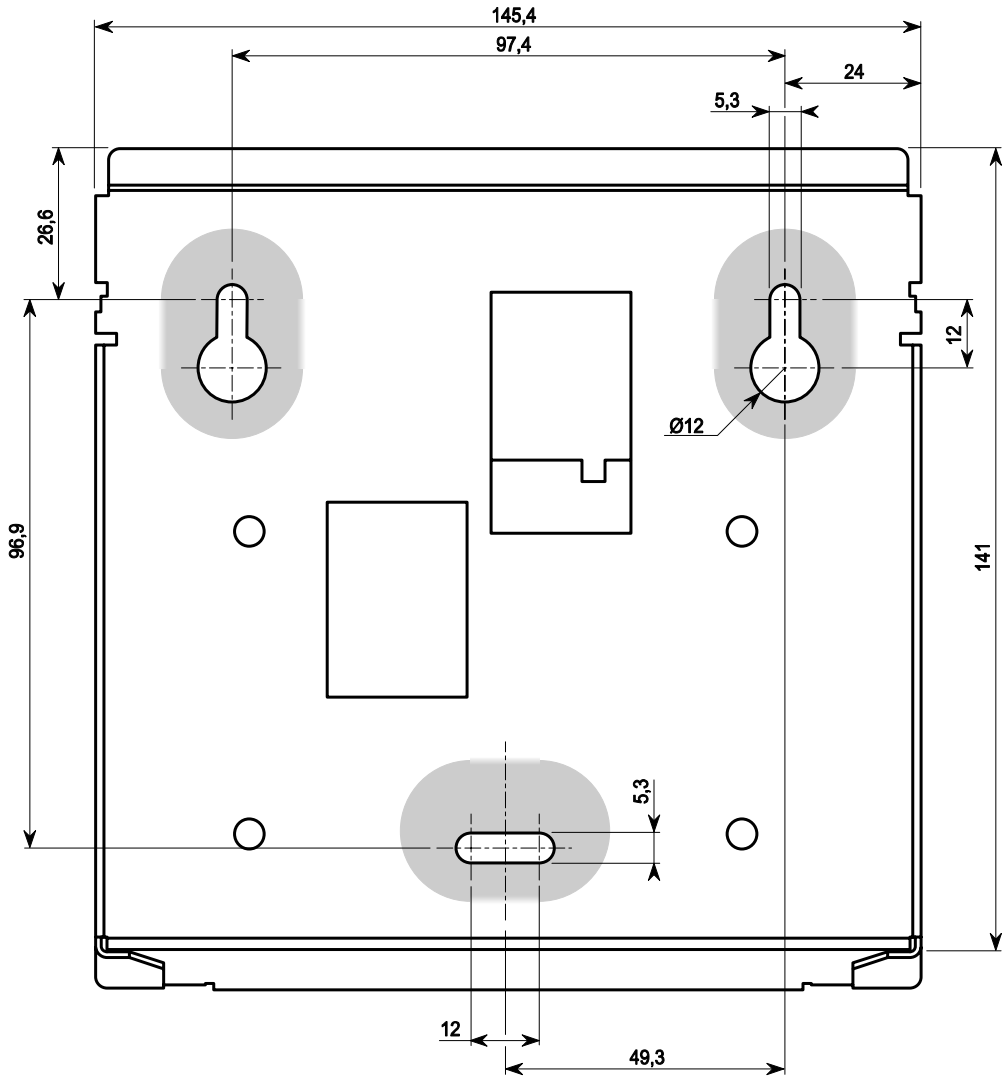
1 Secured screwdriver Torx 10

1 Chassis fixation kit (4 fixations and screws)

MA5XX VERSIONS INSTALLATION PROCEDURE

Stage 1: Drilling the mounting holes

Mounting and cable entry hole location (rear view)

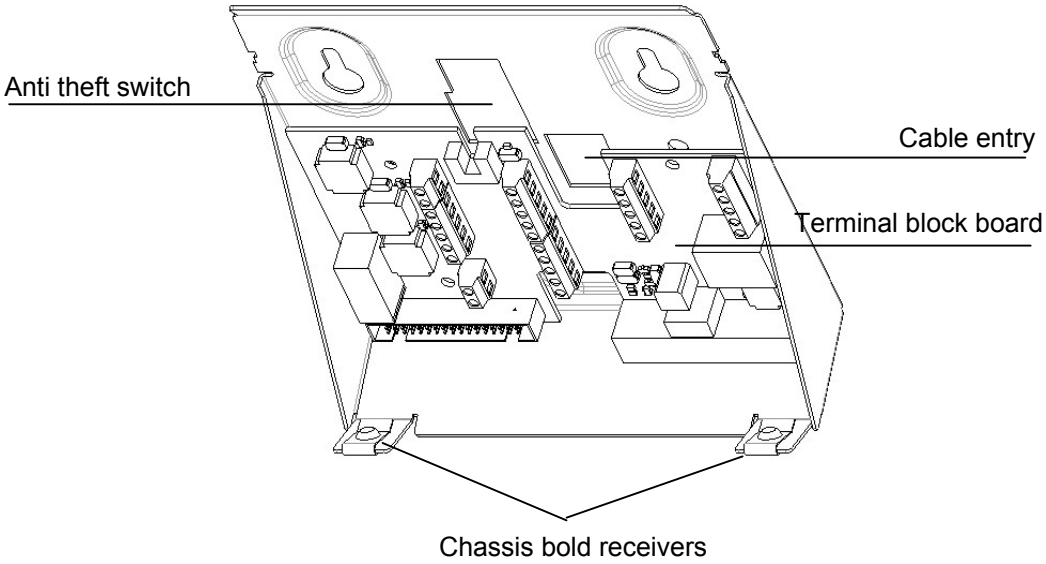


a) Using the dimensional drawing in Appendix 3, drill 2 holes for the mounting keyholes screws so that the cable entry is in a suitable position for cabling.

b) Drill the hole for the third screw in the center of the slot so that it is possible to correct the position later, if necessary.

c) The mounting screws must be 5 mm diameter maximum.

Stage 2: Mounting the metal chassis assembly



a) Disconnect the ribbon cable between the motherboard and the terminal block board so that the assembly shown above can be detached from the rest of MorphoAccess™.

b) Pass the connecting cables through the cable entry.

c) Position the chassis assembly against the wall using the two screws in the mounting keyholes.

d) Hold the chassis in place with a screw through the mounting slot.

e) Adjust the position, and fix in place by tightening all three screws.

f) Adjust the anti theft block into the hole designed for it, and fix in place the last and fourth screw.

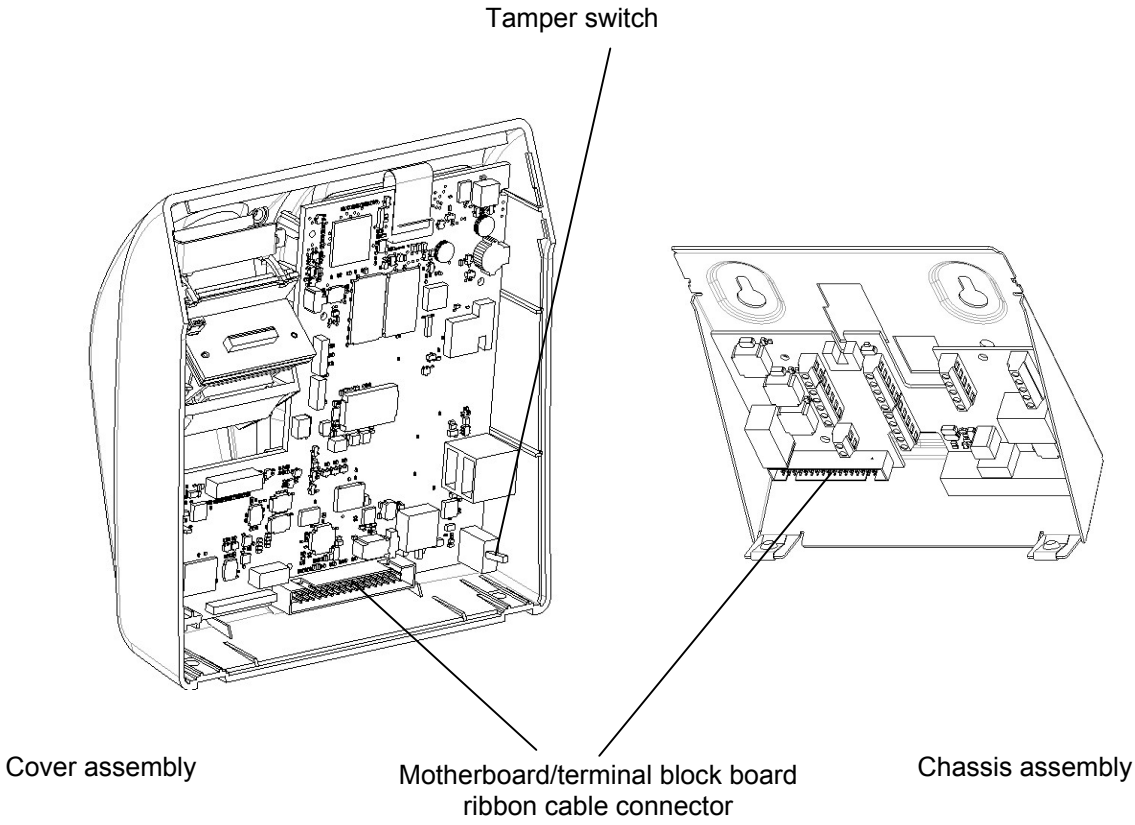
Check that nothing is interfering with the anti theft switch (opto component) and the anti theft block.

g) Connect cables to terminal blocks with adequate torque conformed to screw dimensions (see the detailed instructions in the following sections)

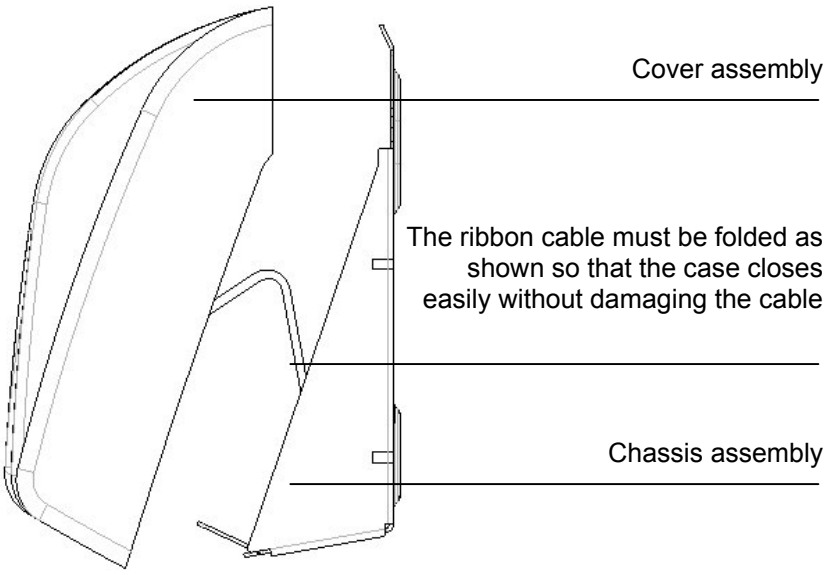
Be sure during manipulation that the power supply from the electrical source is off.

Stage 3: Connecting the chassis assembly to the cover assembly

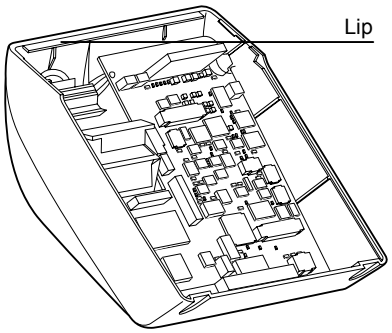
Ribbon cable connector location



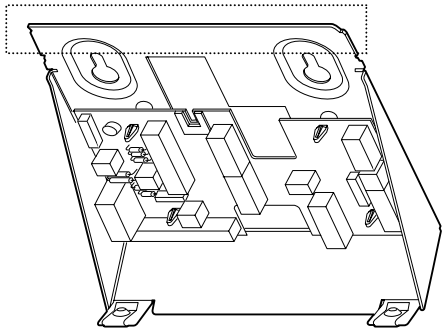
Position of the ribbon cable as the case is closed



Stage 4: Closing MorphoAccess™



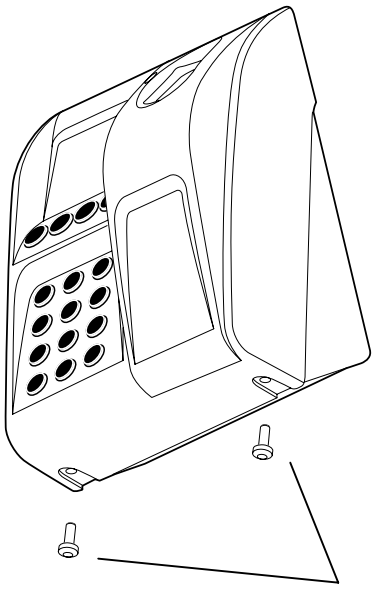
Catch for the cover assembly lip



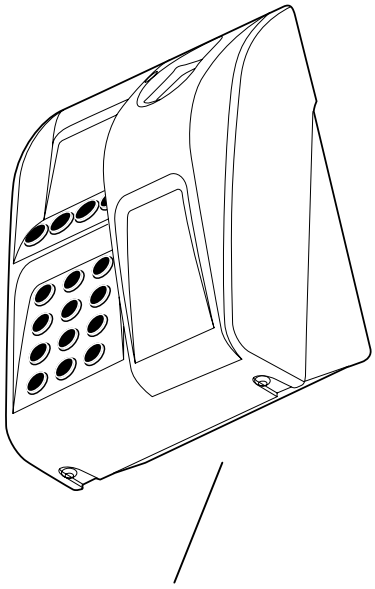
When the ribbon cable has been connected between the two assemblies (see stage 3), the cover assembly is fitted to the chassis assembly.

1 The lip on the cover slides behind the chassis, to fit over the catch shown on the diagram above.

2 The cover is fitted onto the chassis by rotating it.



Fit the two M4x16 assembly screws.
Use screwdriver TORX 20

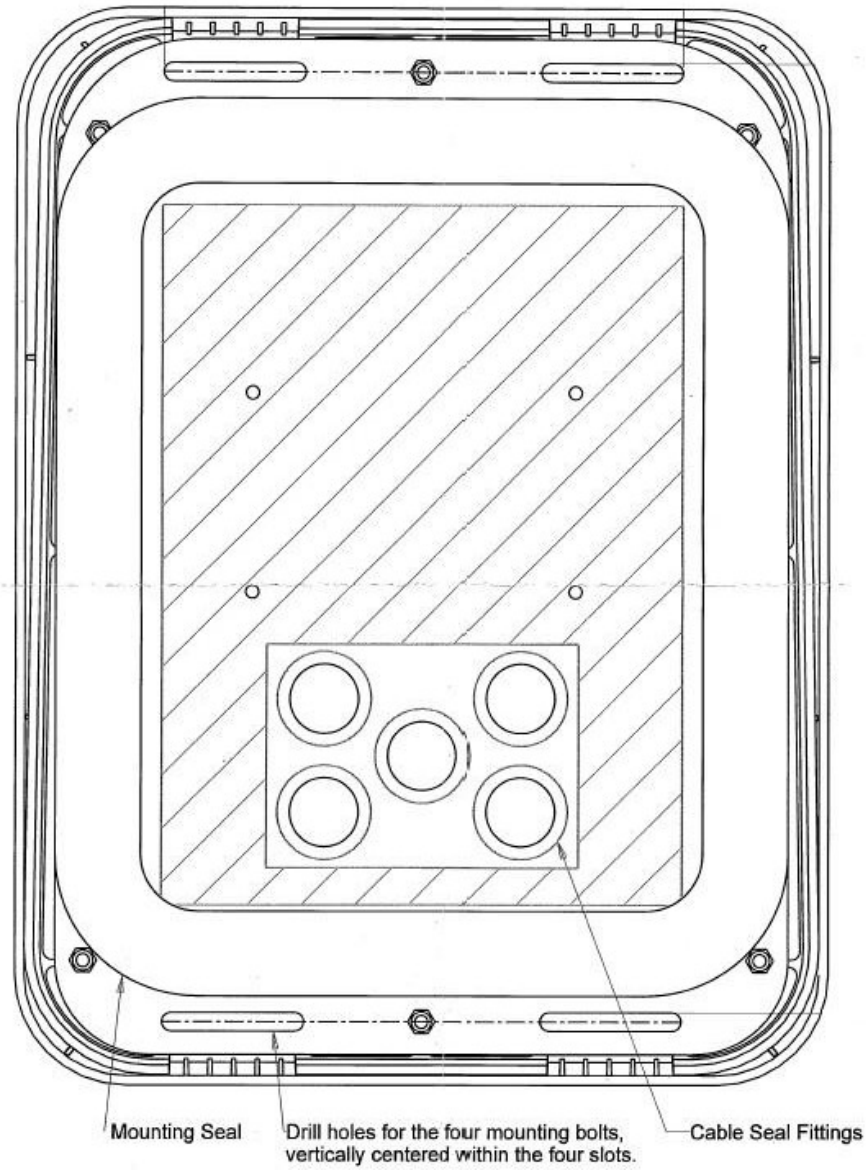


Assembled MorphoAccess™

OMA5XX VERSIONS INSTALLATION PROCEDURE

Stage 1: Drilling the mounting holes

Mounting hole location (rear view)



a) Using the dimensional drawing for OMA5xx in Appendix 3, drill holes for the four mounting bolts, vertically centered within the four slots.

b) The mounting bolts must be 5 mm diameter maximum.

Stage 2 : OMA5xx fixing

a) Remove protective visor (4 small caps at each corner) before fixing OMA5xx assembly.

   Remove the 4 small caps at each corner of the protective visor , with a small screw driver

   Remove the 4 screws , with T10 screw driver supplied.

b) Adjust the OMA5xx assembly in front of the 4 holes.

c) Fix the 4 mounting bolts (2 in upper zone , 2 in lower zone)

Stage 3 : OMA5xx cabling

a) Connect necessary OMA cables to user wires (see the detailed instructions in the following sections)

Stage 4 : Closing OMA5xx

a) Mount protective visor with 4 screws and T10 screw driver.

b) Put the 4 small caps.

ELECTRICAL INTERFACE

MA5xx Terminal block board wiring

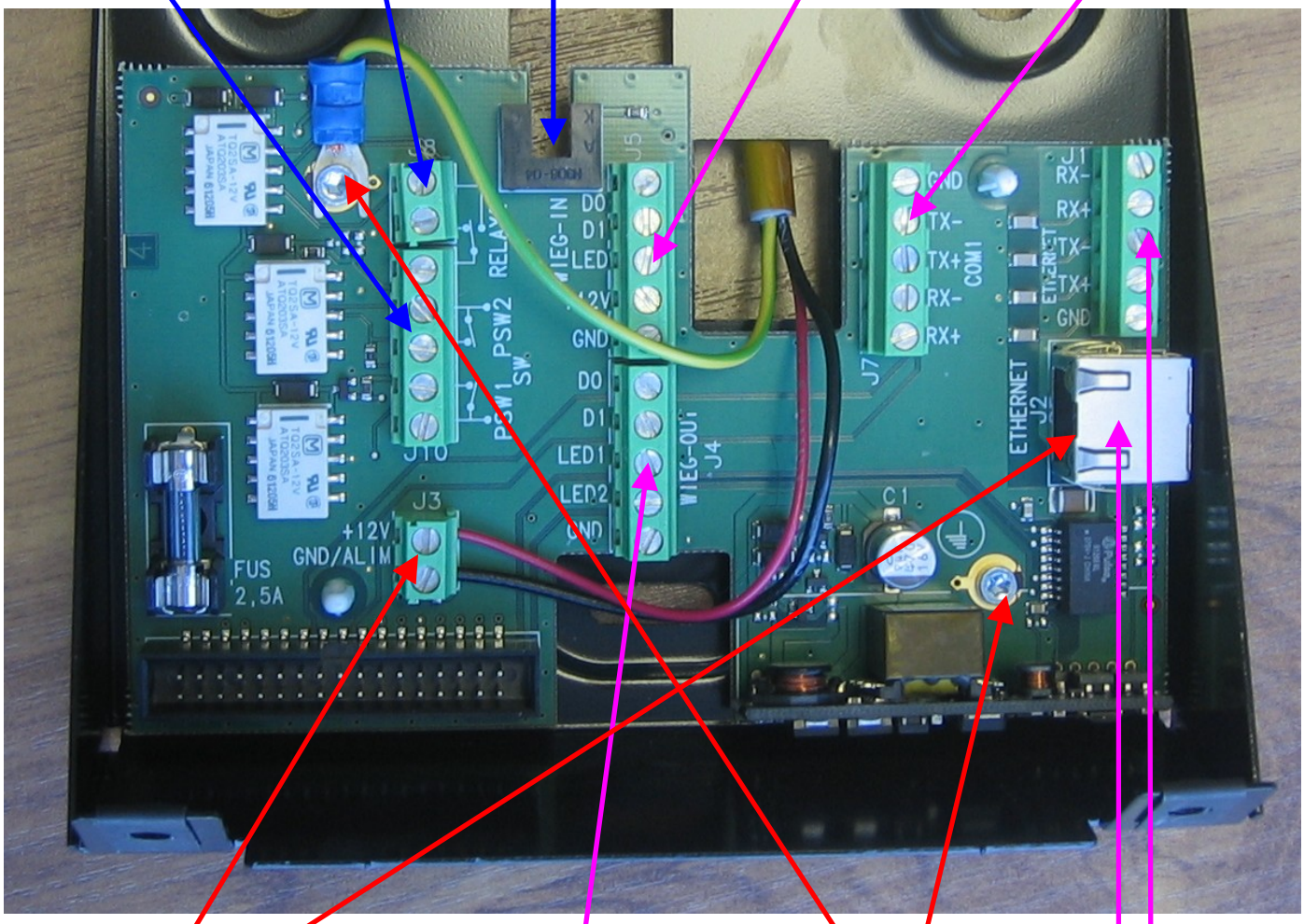
Tamper switch
Anti theft switch

Relay

Anti theft opto

Wiegand IN
Dataclock IN

COM
RS422 / RS485



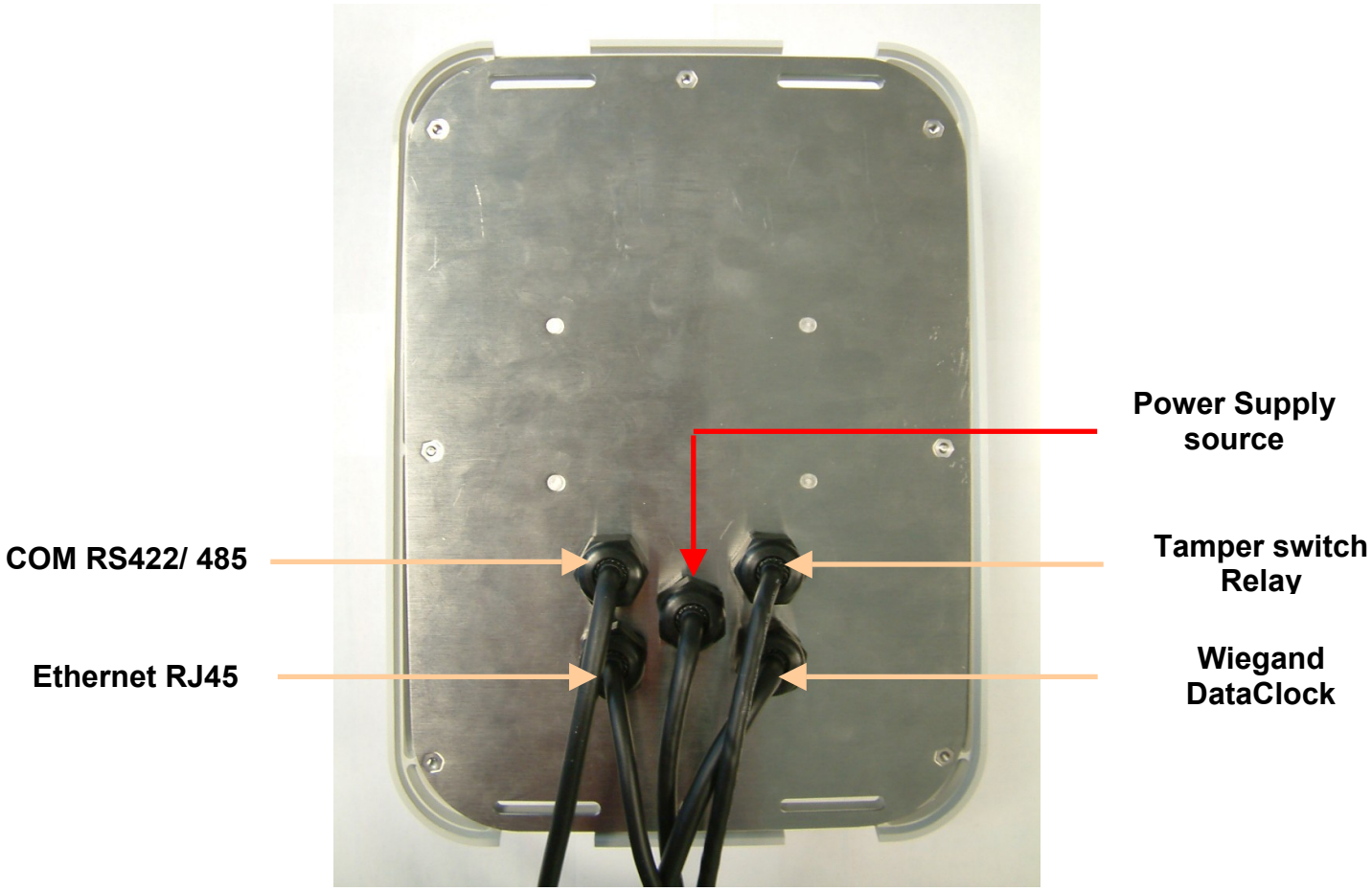
Power supply source
External +12V DC
or
Power Over Ethernet

Wiegand OUT
Dataclock OUT

Ground security reference

Ethernet
Terminal block
or
RJ45

OMA5xx rear view and cables



Wiring (cables colors and cables positions) is not exactly the same as previous OMA2xx/3xx family.

In order to be complied with EMC directives (See p 6), all cables coming from Access Control system must be shielded.

Both shield wires (OMA5xx cable , AC system cable) must be tied together.

Shield wire from OMA5xx cable is the wire without insulation.

Power Supply source

				MA5xx	OMA5xx
					Power cable
1	Block 1	+12V	In	Positive 12 Volts, power supply.	Red
2	Block 2	GND/ALIM	In	Ground power supply.	Black
		Ground	In	Ground security reference	yellow/green

Power supply:

Must conform to CEE/EEC EN60950 standard

9V to 16 Volts ± 5% (regulated) 1,5 Amp max (peak)

Power may come from a 12 Volts Wiegand power supply, conforming to the Security Industry Association's Wiegand standard March 1995 , able to deliver 9 Watts.

In standard operating activity, typical power consumption is 4,5 Watts.

In extreme temperature conditions, with all options (USB key , 12V output for Wiegand in), maximum power consumption is up to 9 Watts.

MA5xx terminal make use of POE functionality ; If Ethernet network is POE compatible, power supply may come from Ethernet wiring.

For systems placed in other building than supervisor one's, the **electrical security is guaranteed with a "ground connection" to the terminal.**

For a higher susceptibility level, **we recommend to the installer to connect a "ground connection" to the terminal.**

MA5xx : A cable terminal connected to "ground security reference" must be tied to the fixation designed for (see p 16).

OMA5xx : the yellow/green wire in power supply cable must be connected to "ground security reference".

Wiegand output wiring

				MA5xx	OMA5xx
					Wiegand Dataclock cable
1	Block 1	D0	Out	Wiegand D0	Green
2	Block 2	D1	Out	Wiegand D1	White
3	Block 3	LED1	In	Wiegand LED IN 1 (option)	Brown
4	Block 4	LED2	In	Wiegand LED IN 2 (option)	Grey
5	Block 5	GND		Ground for Wiegand	Black

Electrical interface conforms to the Security Industry Association's Wiegand standard March 1995, and it is 5V TTL compatible.

Data Clock output wiring

				MA5xx	OMA5xx
					Wiegand Dataclock cable
1	Block 1	D0	Out	Data (5V TTL)	Green
2	Block 2	D1	Out	Clock (5V TTL)	White
3	Block 3	LED1		NC	NC
4	Block 4	LED2		NC	NC
5	Block 5	GND		Ground for Dataclock	Black

Wiegand input wiring

				MA5xx	OMA5xx
					Wiegand Dataclock cable
1	Block 1	D0	In	Wiegand D0	Blue
2	Block 2	D1	In	Wiegand D1	Yellow
3	Block 3	LED	Out	Wiegand LED OUT 1 (option)	Orange
4	Block 4	+12V	Out	12 Volts Power output (150 mA max)	Red
5	Block 5	GND		Ground for Wiegand	Black

Electrical interface conforms to the Security Industry Association's Wiegand standard March 1995, and it is 5V TTL compatible.

Data Clock input wiring

				MA5xx	OMA5xx
					Wiegand Dataclock cable
1	Block 1	D0	In	Data (5V TTL)	Blue
2	Block 2	D1	In	Clock (5V TTL)	Yellow
3	Block 3	LED		NC	NC
4	Block 4	+12V	Out	12 Volts Power output (150 mA max)	Red
5	Block 5	GND		Ground for Dataclock	Black

COM RS422 serial port

				MA5xx	OMA5xx
					COM RS422/RS485 cable
1	Block 1	GND		Ground for RS422	Grey or White
2	Block 2	Tx-	Out	RS422 Negative Transmit	Orange
3	Block 3	Tx+	Out	RS422 Positive Transmit	Orange/White
4	Block 4	Rx-	In	RS422 Negative Receive	Green
5	Block 5	Rx+	In	RS422 Positive Receive	Green/White

RS422 interface is a full duplex communication.

COM RS485 serial port

				MA5xx	OMA5xx
					COM RS422/RS485 cable
1	Block 1	GND		Ground for RS485	Grey or White
2	Block 2	Tx-	Out	RS485 Negative Transmit	Orange
3	Block 3	Tx+	Out	RS485 Positive Transmit	Orange/White
4	Block 4				
5	Block 5				

RS485 implementation is limited to half-duplex communication. So only Tx+ and Tx- and ground reference signals are necessary.

Depending on the RS485 network, an impedance adaptation may be required.

For farthest terminal, a 120 Ohms resistor termination may be added to the terminal, by strapping block 2 and block 3.

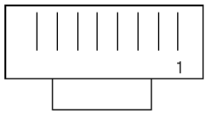
Ethernet wiring

2 ways for Ethernet wiring :

- Terminal block connection (MA5xx only)

				MA5xx	**OMA5xx** Ethernet cable
1	Block 1	RX-	In	Receive negative Ethernet	RJ45 Pin 6
2	Block 2	RX+	In	Receive positive Ethernet	RJ45 Pin 3
3	Block 3	TX-	Out	Transmit negative Ethernet	RJ45 Pin 2
4	Block 4	TX+	Out	Transmit positive Ethernet	RJ45 Pin 1
5	Block 5	GND		Ground for shield Ethernet	RJ45 Pin 7

- RJ 45 cabling connection



RJ45 Pinout	**Signals**	**EIA/TIA T568B color**	EIA/TIA T568A color	Corel L120 color
1	TX(+) Transmit Data Plus	**White Orange**	White Green	Grey
2	TX(-) Transmit Data Minus	**Orange**	Green	White
3	RX(+) Receive Data Plus	**White Green**	White Orange	Pink
4	No connection	Blue	Blue	Orange
5	No connection	White blue	White blue	Yellow
6	RX(-) Receive Data Minus	**Green**	Orange	Blue
7	Ground protection (option)	White Brown	White Brown	Purple
8	No connection	Brown	Brown	Brown

RJ45 plug pinout is compliant with 10/100 base T, IEEE802.3 Specification.

RJ45 plug and Ethernet terminal block connections are compliant with Power Over Ethernet (POE) IEEE802.3 af Specification. See details page 27.

Default IP address from factory setting is : 134.1.32.214

Output relay and security switches

			MA5xx	OMA5xx
				Switch/relay cable
1	Block 1	CRO	Contact relay normally open	Red
2	Block 2	CRC	Contact relay normally closed	Orange
3	Block 3	CR	Contact relay common	Yellow
4	Block 6	TSW2_1	Tamper switch Contact 1	White
5	Block 7	TSW2-0	Tamper switch Contact 0	Green
6	Block 4	ATSW1_1	Anti theft switch Contact 1	Not available
7	Block 5	ATSW1_0	Anti theft switch Contact 0	Not available
		Ground	Not connected	Black (*)

(*) : For this interface connection , it is not recommend to connect black wire to Ground. Various ground reference are not recommended.

This terminal is part of security system. In order to prevent unauthorized access into this terminal it is the customer's responsibility to connect the tamper switch and the anti theft switch (MA5xx only) to the physical access controller (connected mode).

Anti-theft and tamper switchs ratings

2 A at 30 VDC according to the safety extra low voltage requirements (62.5 VAC max, 220 VDC max and 125 VAC max) independently of the power supply.

The tamper function is activated with the proper screw positioning, between cover and chassis.

Terminal closed : Tamper switch ON

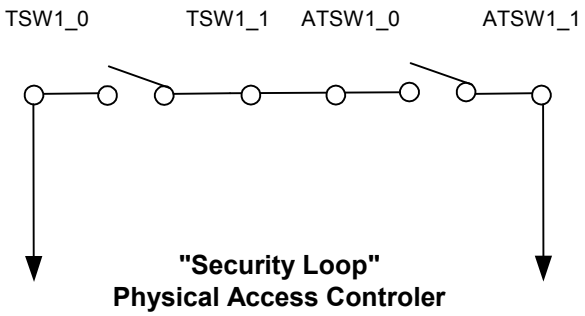
Terminal open : Tamper switch OFF

The anti theft function is activated by the anti theft block positioning in front of the opto component (not available with OMA5xx)

Terminal on wall : Anti theft switch ON

Terminal out wall : Anti theft switch OFF

“Security Loop” connection example :

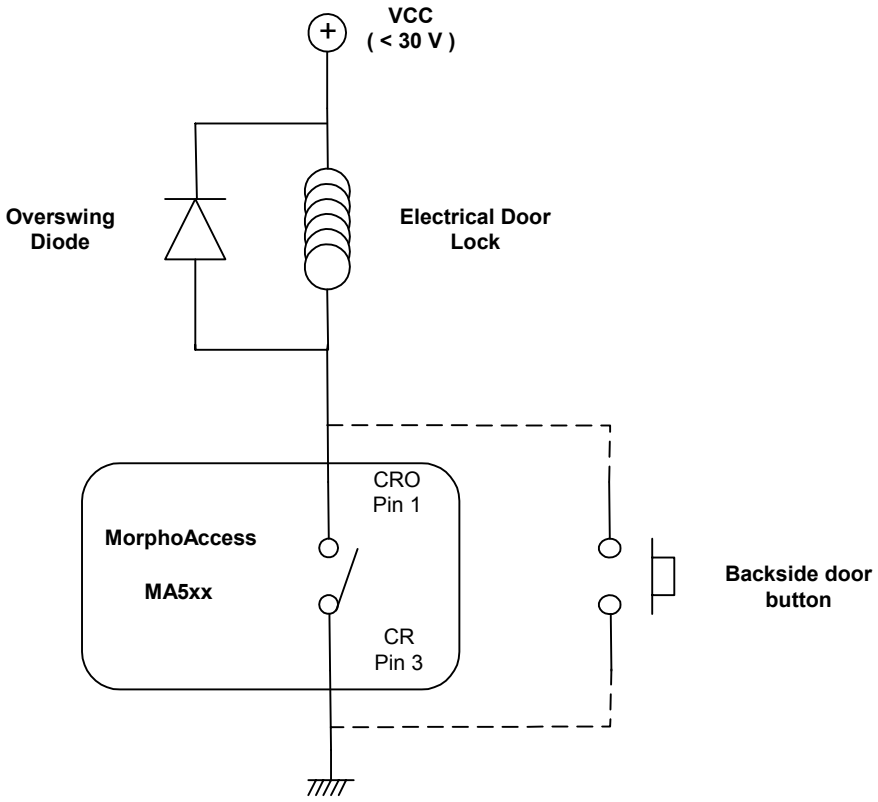


Relay ratings

2 A at 30 VDC according to the safety extra low voltage requirements (62.5 VAC max, 220 VDC max and 125 VAC max) independently of the power supply.

Inductive charge management require a parallel diode for a better contact lifetime.

Connection example about electrical door lock focus :



USER INTERFACE

The MorphoAccess™ terminal functions in three operational modes: access control with identification, access control with authentication or verification, and proxy mode.

These various modes are detailed in the *MA500 Series User Guide*.

Terminal configuration may be done locally (keyboard , USB key) or remotely (using the configuration Tool or MEMS software) , by modifying key parameter.

For MA5xx terminal management , MEMS software release must be at least v6.2.

MEMS™ : MorphoAccess Enrolment and Management System

MORPHOACCESS™ MA5XX SERIES TECHNICAL CHARACTERISTICS

Man Machine Interface

LCD display 128 x 64 pixels

Alphanumeric and function keyboard (12 + 4 keypad)

Color LED for information

Multi tone Buzzer

Clock : +/- 4sec / day (typical conditions) , minimum 24 hours backup

Biometry

Based on SAGEM MSO Biometric Module, FIPS IQS certified: 500dpi optical sensor

Template Data base:

3000 persons with 2 fingers

5 x 10000 pers with 2 fingers and MA-X license option

Identification: < 1,5s (1000 persons in database)

Authentication / verification: < 1s

Peripherals interfaces

Ethernet 10/100 Base T for remote control mode (terminal management)

RS422 for remote control mode (terminal management)

Wiegand (output) or Dataclock ISO2 (output) or COM (RS485 2 wires) for output information.

Wiegand Input Or Dataclock Input to interface an external reader

USB host for additional configuration

Relay : 1 contact (open and closed)

Tamper switch : Internal use (alarm message) and external contact.

Anti theft : External contact (indoor MA5xx only)

Power supply

9 to 16 Volts ± 5% and 1,5A peak power supply

Cable cross section depends on the length 0. 75mm^2 recommended.

Consumption : 750mA maximum rms @12V (< 1,5 A peak)

350mA typical rms @12V

Power Over Ethernet compatibility (IEEE802.3 af) :

Class 0 or Class 3 hub/switch equipment mandatory (15,4W)

MA5xx configurations

POE Alternative A compliant with RJ45 and terminal blocks

POE Alternative B compliant with RJ45 only

OMA5xx configuration

POE Alternative A compliant only

“POE Alternative A” means power on data lines : Only 2 pairs are needed.

“POE Alternative B” means power on 2 extra pairs lines : 4 pairs are required.

Size and weight

MA5xx version	160 x 145 x 75 mm
	0,800 Kg
OMA5xx version	289 x 218 x 99 mm
	2 Kg

Environnemental conditions

Operating temperature	-10 °C to + 50 °C.
Operating humidity	10 % < RH < 80 %.
Storage temperature	-20 °C to + 70 °C.
Storage humidity	RH < 95 %.
Hardness	MA5xx : IP30 (indoor use only) OMA5xx : IP65 (protection against rain and dust)
Light	We recommend MorphoAccess™ installation within controlled lighting conditions. Avoid direct exposure of sensor to sunlight. Avoid intensive UV lights.

Recommendations

Areas containing combustibles

It is strongly recommended that you do not install your SAGEM MorphoAccess™ in the vicinity of gas stations, petroleum processing facilities or any other facility containing flammable or combustible gasses or materials.

General precautions

- Do not attempt to repair your SAGEM MorphoAccess™ yourself. The manufacturer cannot be held responsible for any damage/accident that may result from attempts to repair components. Any work carried out by non-authorized personnel will invalidate your warranty.
- Use your SAGEM MorphoAccess™ with original accessories. Attempts to integrate the MorphoAccess™ with unapproved accessories will void your warranty.
- Do not use your MA5xx SAGEM MorphoAccess™ in damp areas (swimming pool...). Protect your MA5xx from water and other liquids.
- Do not expose your SAGEM MorphoAccess™ to extreme temperatures.
- Do not expose MorphoAccess™ sensor to direct sunlight. OMA visor is able to mask sunlight. With MA terminals, a complementary visor may be added.
- Due to electrostatic discharge, and depending on the environment, synthetic carpet should be avoided in areas where the SAGEM MorphoAccess™ has been installed.

Specific precautions for radio terminals

It is recommended to install radio terminals (MA520, MA521 , OMA520 and OMA521) at 30cm or more away from metallic elements, such as iron fixation or lift gate. Performances, in term of Contactless badges reading distance will decrease when metallic elements are in close proximity to the terminal.

We advise persons with pacemaker or other electronic disposals against using this MA5x1 and OMA5x1 versions of MorphoAccess™ terminal.

Ethernet connection

It is recommended to use a category 5 shielded cable (120 OHM). It is also strongly recommended to insert a repeater unit every 90 m.

Extreme care must be taken while connecting Ethernet wire to the terminal block board since a low quality connection may strongly impact the Ethernet signal sensitivity.

It is recommended to connect Rx+ and Rx- with the same twisted-pair wire (and to do the same with the Tx+/Tx- using different twisted-pair wire).

Date / Time synchronization

If you expect to use the MorphoAccessTM for application requiring time precision we recommend that you synchronize your terminal time with an external clock at regular intervals.

The terminal clock has a +/- 40 10^{-6} (ppm) typical time deviation at +25°C. Roughly , +/- 4 sec per day.

At +50°C, the time deviation may be up to –8 sec per day

Cleaning precautions

A dry cloth should be used, specially for fingerprint sensor.

Acid liquids, alcohol or abrasive materials are forbidden.

Warning

The manufacturer cannot be held responsible if the above recommendations are not followed or if the SAGEM MorphoAccess™ is incorrectly used.

Biometrics Terminals Hot Line

To Access this service, please contact us in order to get your login. Please send an email rather than call the hot line.

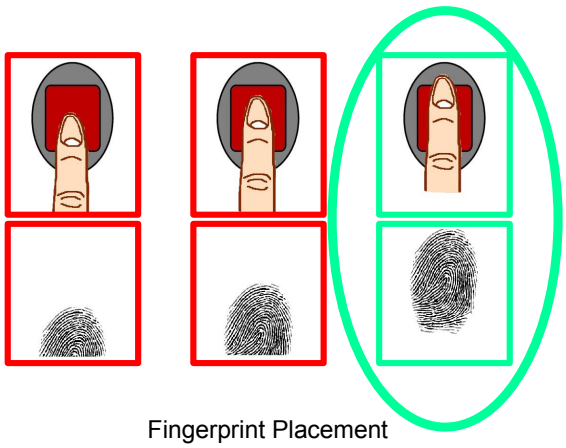
Email: mailto:hotline.biometrics@sagem.com

Phone : + 33 1 58 11 39 19 (9H00am to 5H00pm French Time , Monday to Friday)

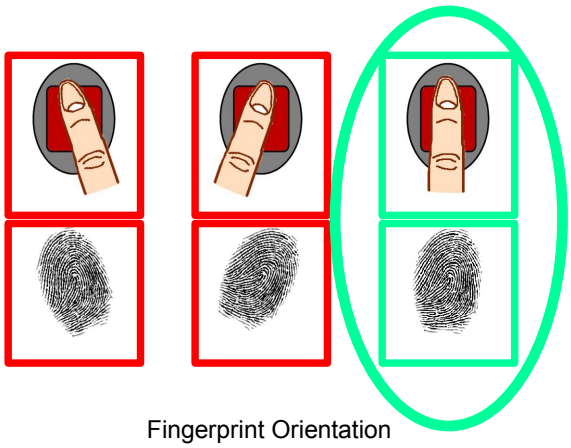
APPENDIX 1 - FINGERPRINT PLACEMENT RULES

To ensure a good quality contact of your finger on the terminal **you must leave your finger on the sensor until the sensor light is turned** off.

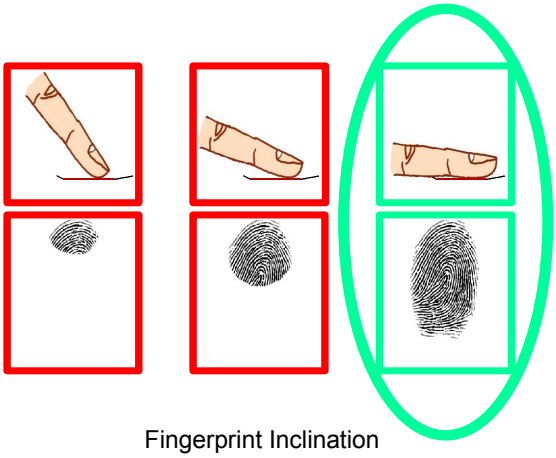
Area containing most of the information



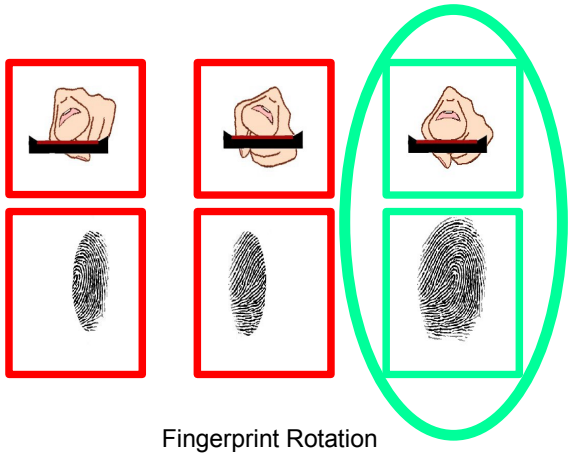
Fingerprint Placement



Fingerprint Orientation



Fingerprint Inclination



Fingerprint Rotation

APPENDIX 2 – RELATED DOCUMENTS

Administrator Information

MA500 Series User Guide

This document describes operating mode and terminal settings

MA500 Series Configuration Application User Guide

This document describes the configuration application processing

MA500 Series Parameters Guide

The complete description of terminal configuration files and registry keys
This document gives also parameters default values.

MA500 Series Enrolment application User Guide

This document describes the local enrolment process and features

MA500 Series Log viewer User Guide

This document describes the log viewer process and features

Developer Information

MorphoAccess™ Host Interface Specification

A complete description of remote management commands

MorphoAccess™ Remote Messages Specification

Details how the MorphoAccess™ sends the access control result to a Central Security Controller

MorphoAccess™ Contactless Card Specification

This document describes the MorphoAccess™ contactless card feature

Support Tools

Configuration Tool User Guide

Configuration Tool user guide, via Ethernet

USB Tool User Guide

Configuration Tool user guide, via USB key

MA500 Series Upgrade Tools User Guide

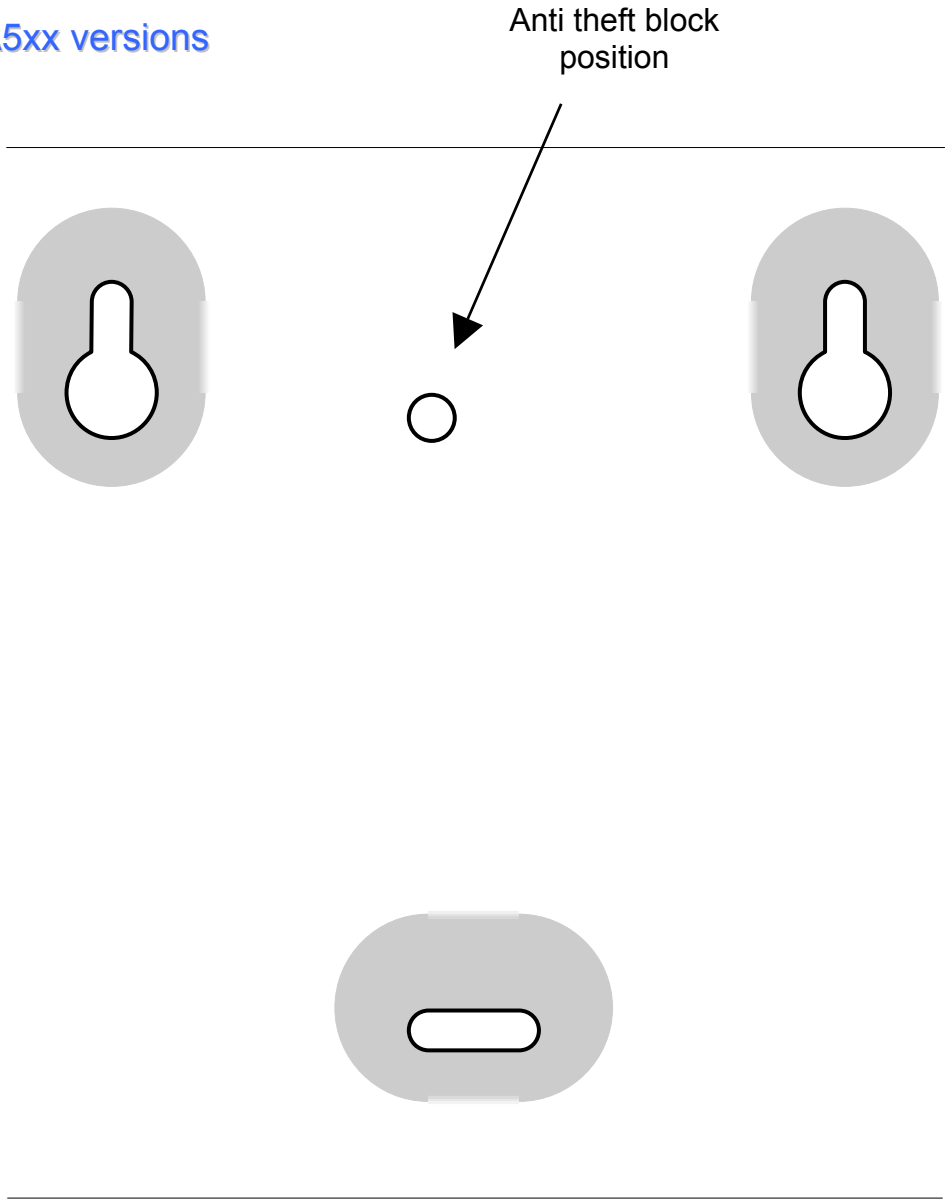
Upgrade Tool user guide about firmware upgrading procedures

Terminal Licence Management

Download a licence in MorphoAccess™ using "*Terminal Licence Manager.exe*" PC application.

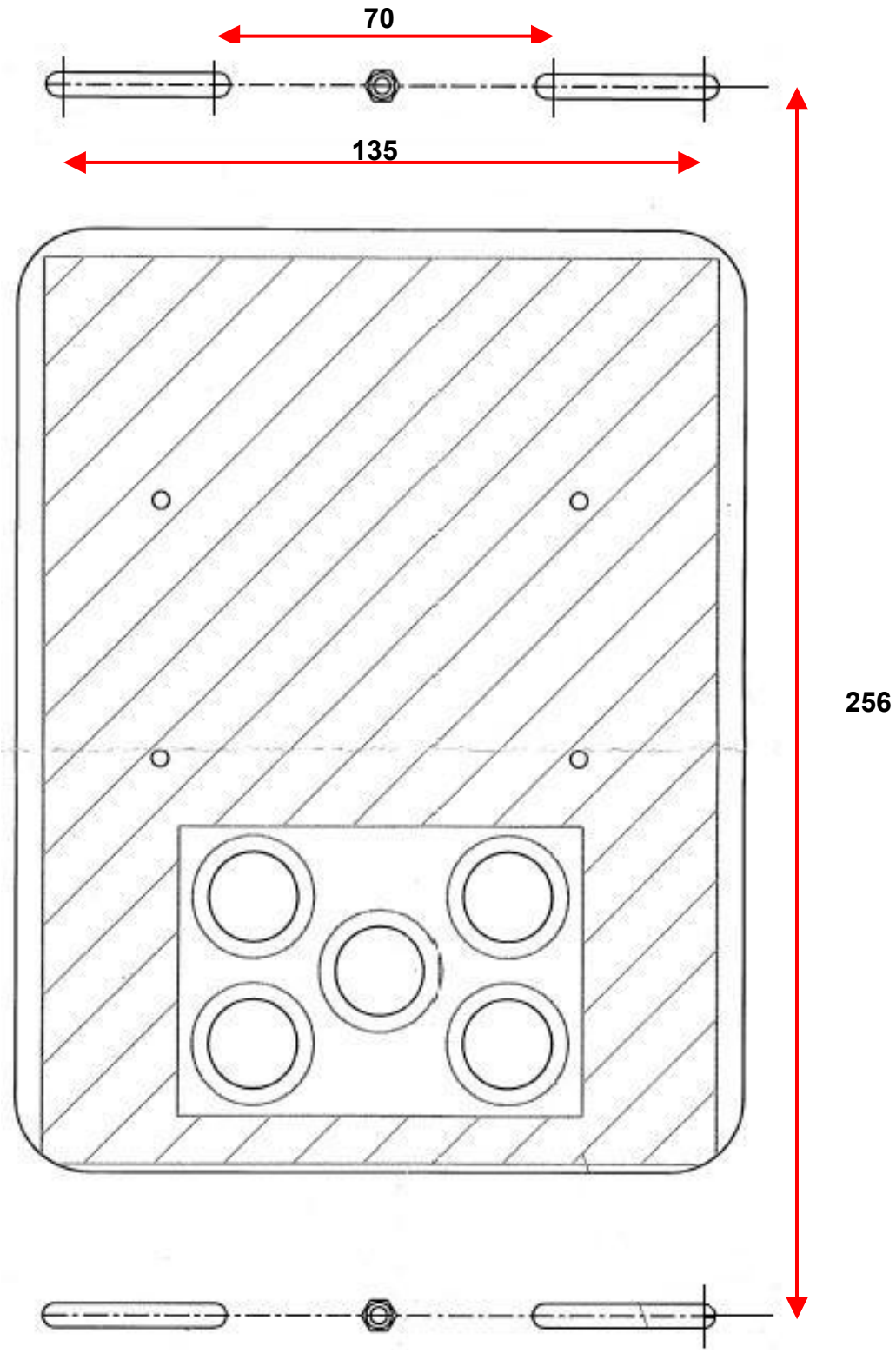
APPENDIX 3 - DRILLING TEMPLATE

MA5xx versions



Scale : 1 (Real dimensions)

OMA5xx versions



Attention : the above image dimensions do not match reality.

SUPPORT

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