

MorphoAccess™

Installation Guide

MA100 Series



Produced by Sagem Défense Sécurité

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MorphoAccess™ Installation guide
MA100/110/120

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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.
- Supports multiple input/output interfaces used in the physical access control industry.
- Local area network interface for easy interaction with other host systems.
- Very compact size for easy installation and integration into your available office space.
- Open architecture, with dedicated applications implemented via MA1xx Software Development Kit.

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

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

All other trademarks or product names are trademarks or product names of the respective title holders.

SAFETY INSTRUCTIONS

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

It is strongly recommended to use a class II power supply at 12 V \pm 5% and 0.5 A. min according with Safety Electrical Low Voltage (SELV). The 12 V power supply cable length should not exceed 5 meters.

This product is intended to be installed with a power supply conformed 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, 0.5 A minimum.

In case of building-to-building connection it is recommended to connect 0V to ground. Ground cable must be connected with the terminal block 0V GND.

Europe information's: SAGEM hereby declares that the SAGEM MorphoAccess™ has been tested and found compliant with the below 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).

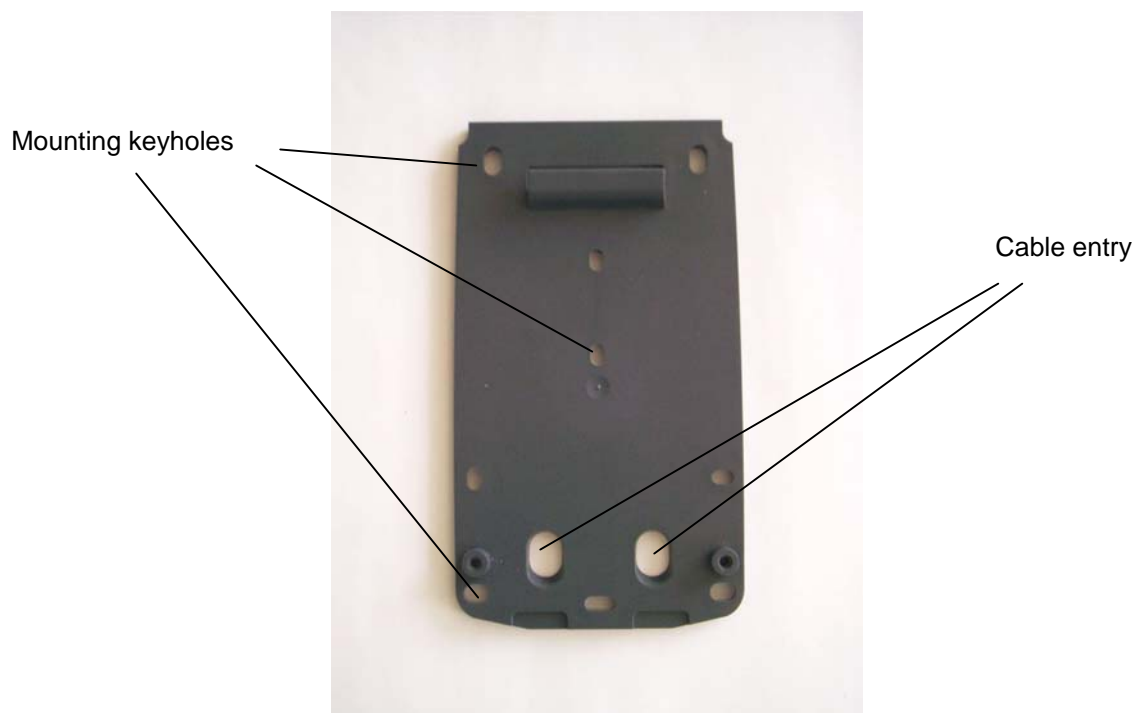
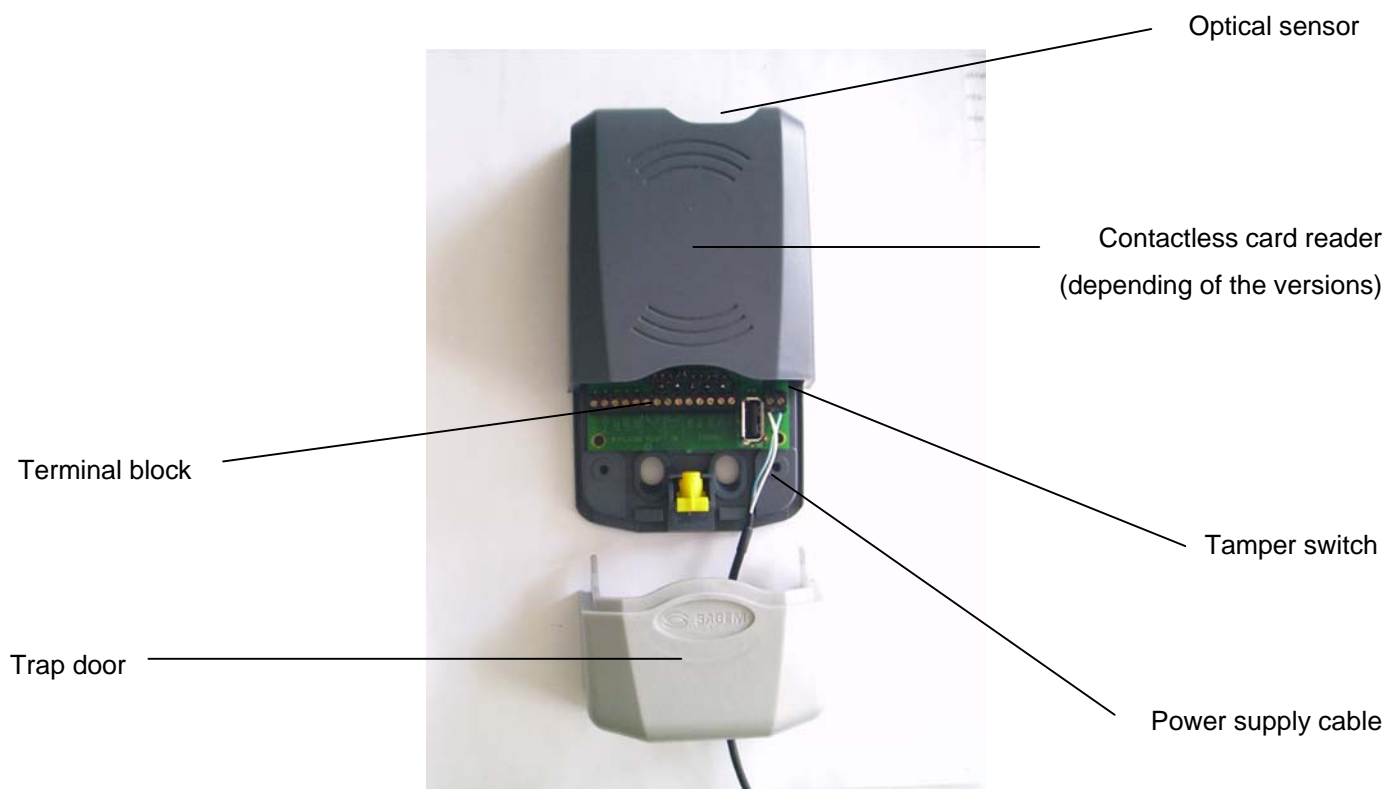
To be EMC compliant, it must be set an axial ferrite bead (1 turn with WURTH 742 7111 or equivalent) with the 12 Volts supply cable

USA information's: This equipment has been tested and found compliant with Class B digital device requirements, pursuant to part 15 of the FCC Rules. These requirements are designed to ensure reasonable protection against harmful RF 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 interfere with radio communications. If this equipment interferes with radio or television reception - which can be determined by disconnecting and re-connecting the unit – 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.

GENERAL DESCRIPTION



MorphoAccess™ supplies:

1 Cover assembly


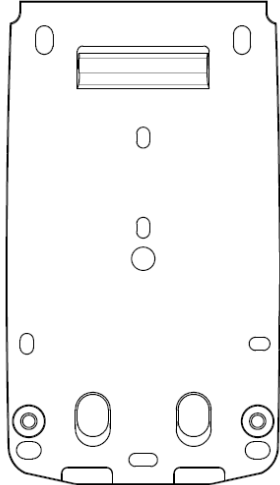
1 Chassis


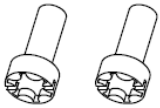


1 Trap door

2 screws for cover fixation

1 secured screwdriver Torx 20

1 secured screw for trap door fixation

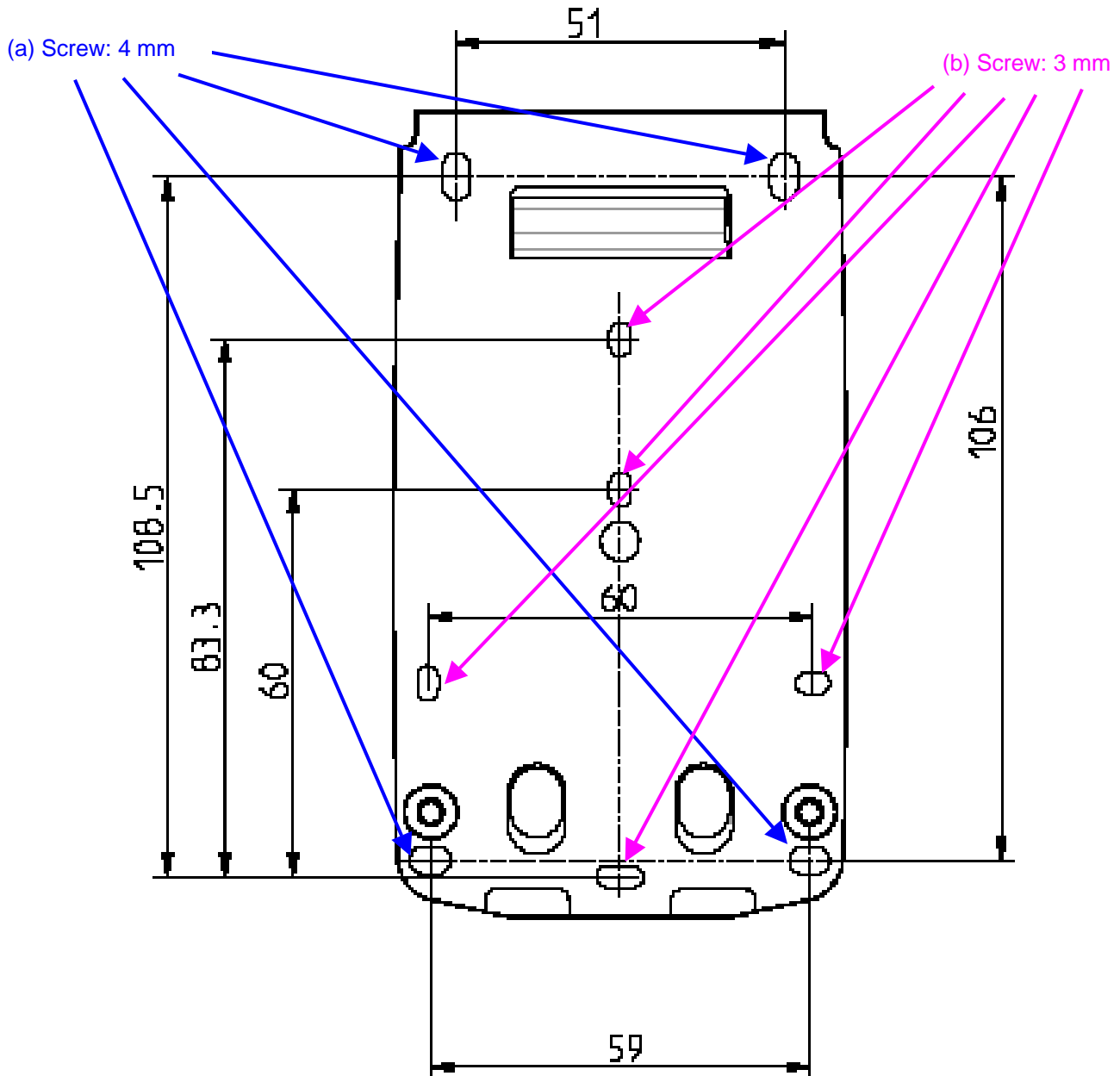
Qty		
1	Cover assembly	
1	Chassis	

1	Trap door	
2	Screws for cover fixation into the chassis.	
1	Secured screwdriver Torx 20	
1	Secured screw for trap door fixation	

In order to proceed to MorphoAccess installation, you'll need a standard 2,5mm screwdriver.

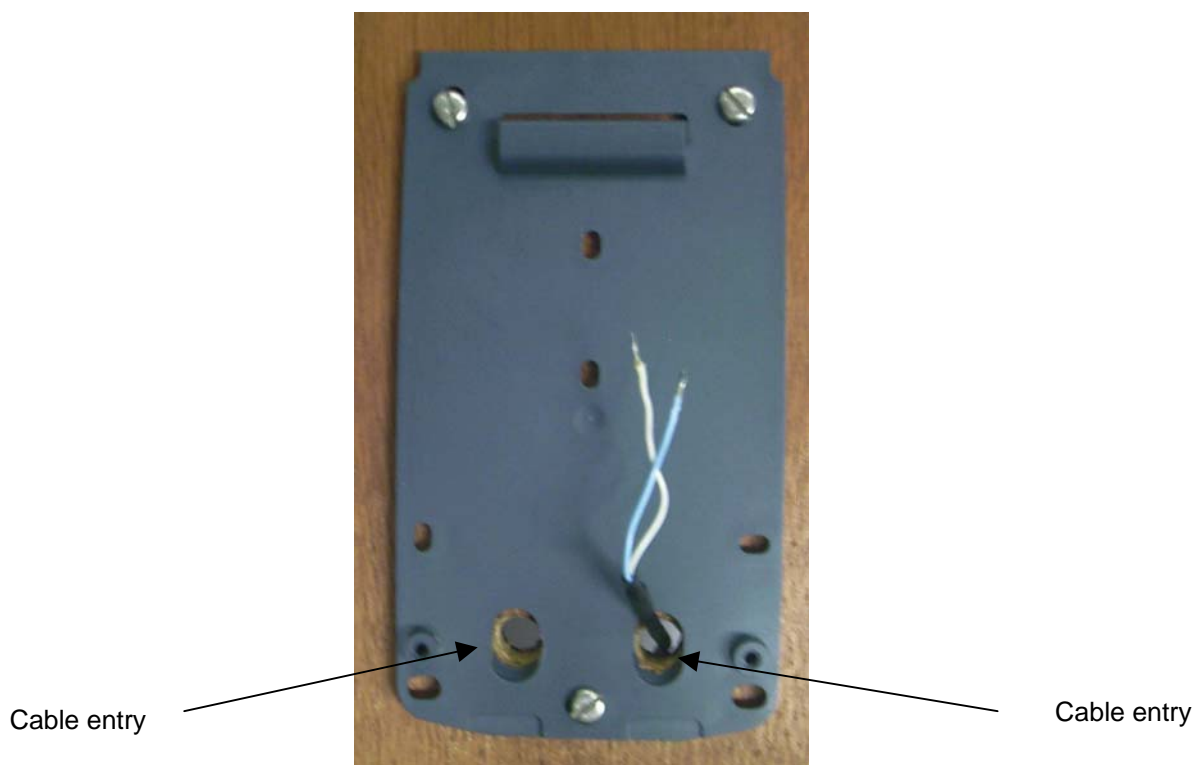
INSTALLATION PROCEDURE


Stage 1: Drilling the chassis mounting holes



- I. For choice, drill the 4 corners holes (a) for the screws for the mounting keyholes so that the cable entry is in a suitable position for your cabling, using the dimensional drawing above.
- II. In case of electric plug connections, MorphoAccess™ terminal may be installed directly on US or European plugs, with some of the 5 holes (b). So, drill the needed holes. **Exact drilling template is on page 30.**

Stage 2: Cable entries hole location and chassis fixation



I. Pass the all-connecting cables through the 2-cable entry.  **Be sure during manipulation that power supply from electrical source is off.**

II. Fit the screws chassis fixation.

The mounting screws must be 4 mm diameter maximum for corner place (a) and 3 mm diameter maximum for other places (b).

Small head screws are required

Screw diameter = 3 mm

Screw head diameter < 7.8 mm

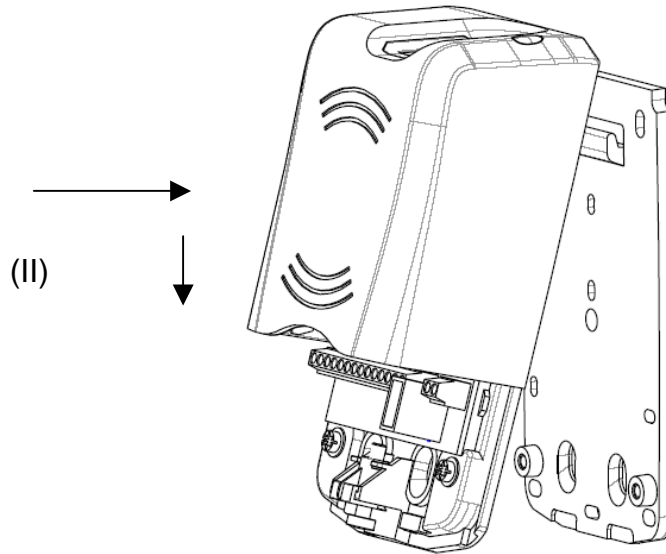
Screw head height < 3.2 mm


Screw diameter = 4 mm

Screw head diameter < 7.8 mm

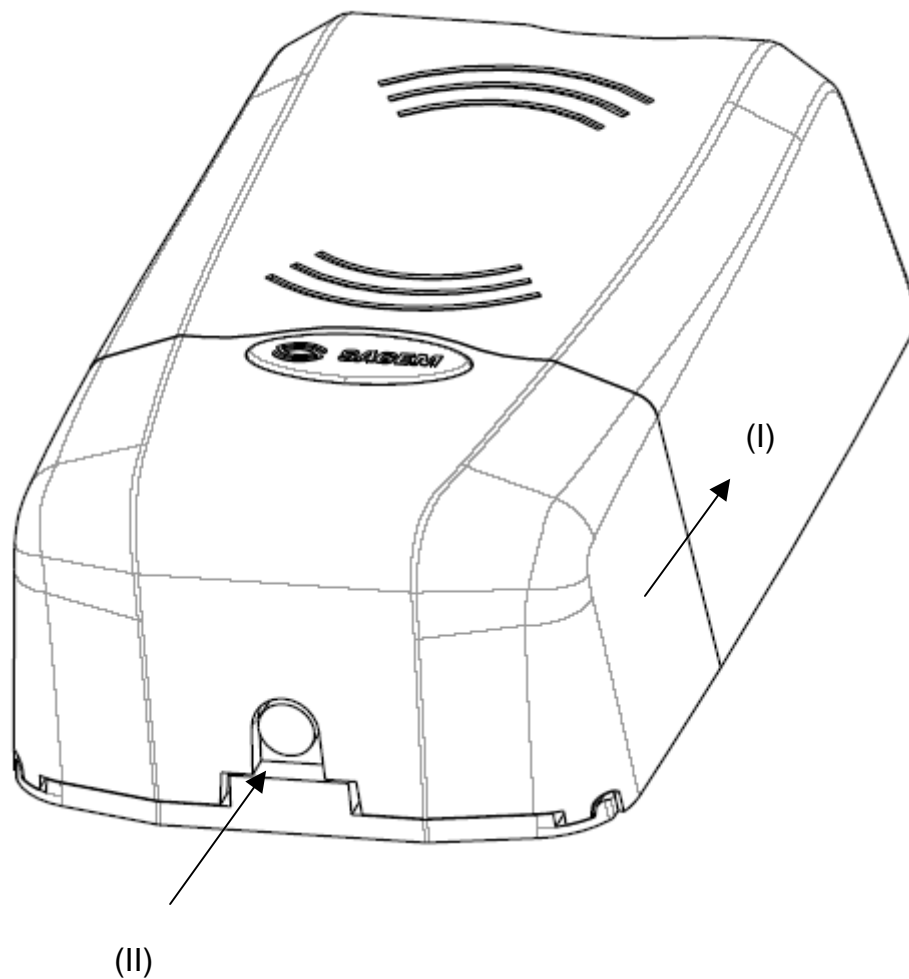
Screw head height < 3.2 mm

Stage 3: Connecting the cover assembly to the chassis



- I. Pass all connecting cable into cover entry holes.
- II. Put the cover assembly into the chassis hanging
- III. Fit the 2 screws chassis fixation, supplied with MorphoAccess™ (recommended torque : 1N.m)
- IV. Connect cables to terminal blocks with adequate torque conformed to screw dimensions (see the detailed instructions in the following sections)  **Power supply must be off**

Stage 4: Closing MorphoAccess™



- I. Push up the trap door along the cover assembly
- II. Fit the M4x14 assembly secured screw (use screwdriver Torx 20S supplied with MorphoAccess™ ; Recommended torque : 1N.m)
- III. Power on the MA1xx.

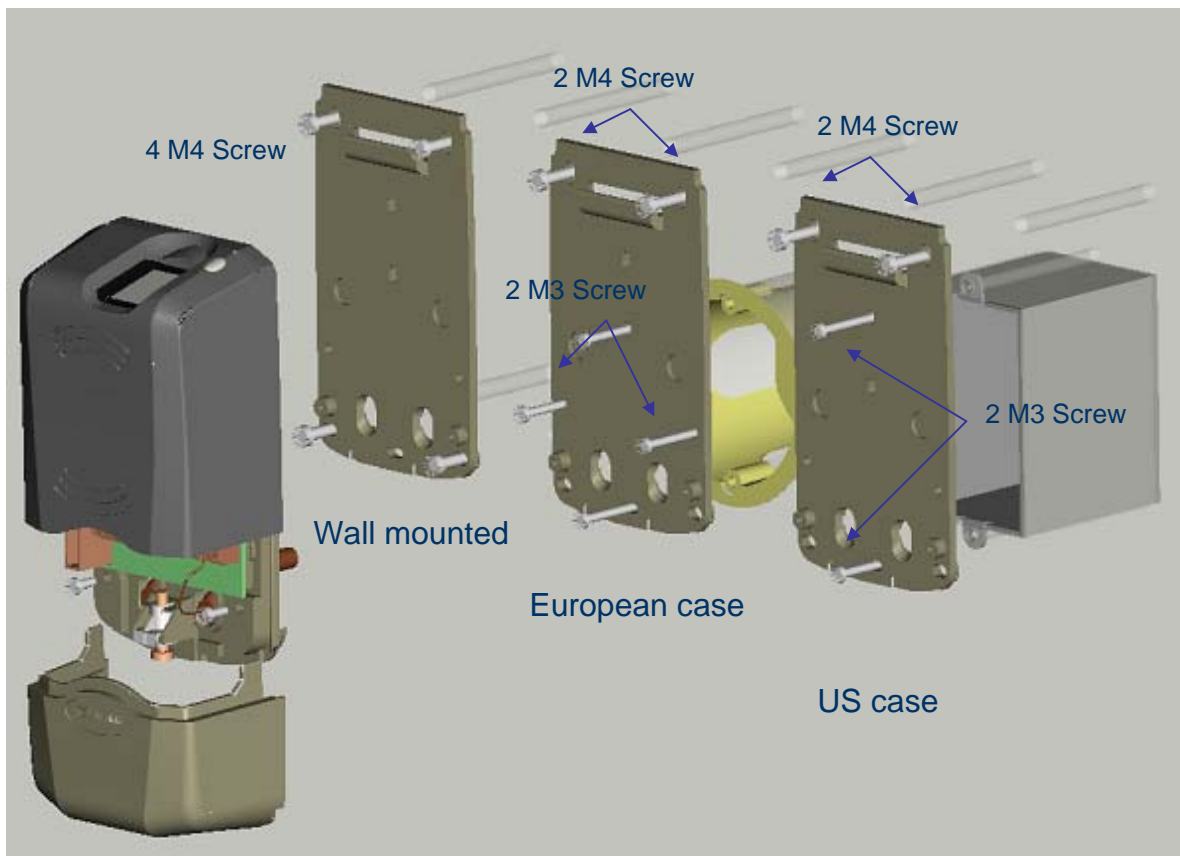
INSTALLATION PROCEDURE: SYNTHESIS

The terminal can be installed according three ways:

Wall mounted: 4 M4 screws are required.

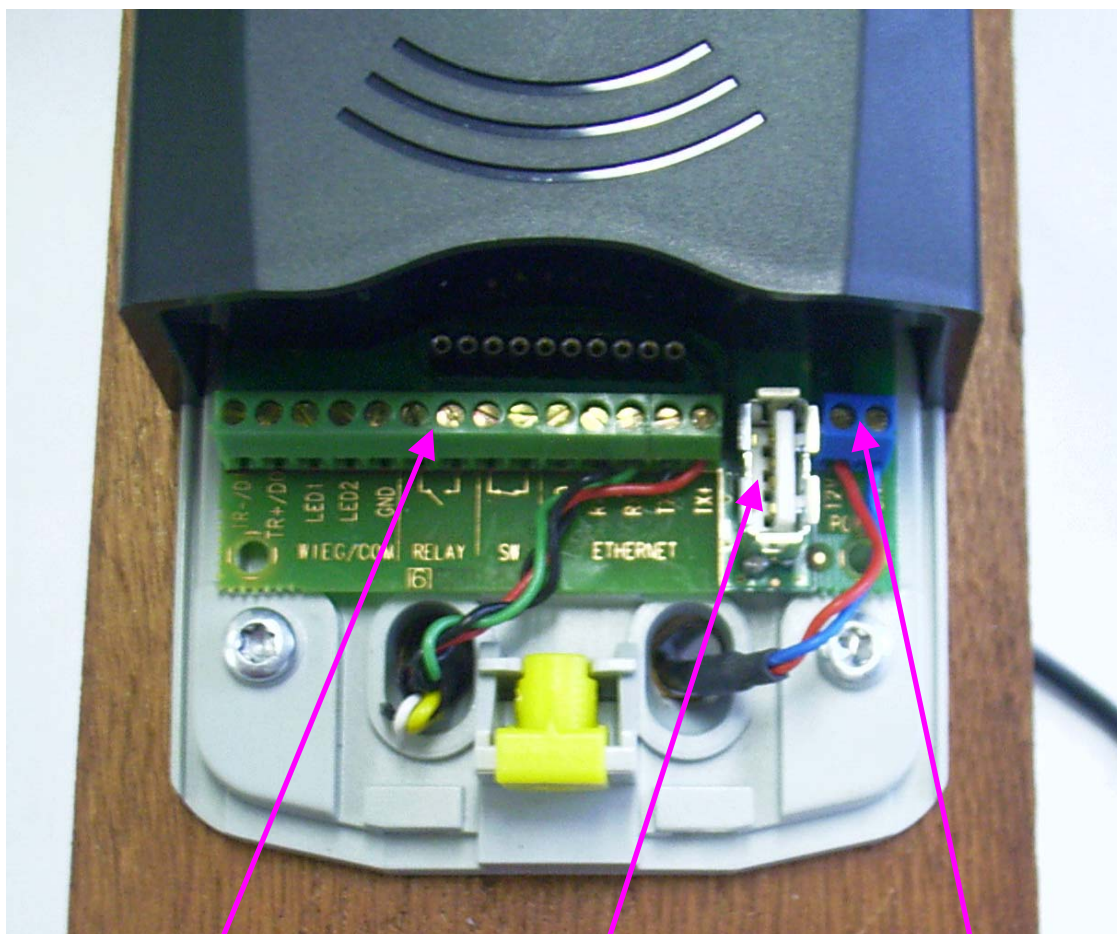
US case mounted: 2 M4 screws for the wall fixation and 2 M3 screws for the case fixation.

European case mounted: 2 M4 screws for the wall fixation and 2 M3 screws for the case fixation (vertical or horizontal mounting).



ELECTRICAL INTERFACE

Terminal block board wiring

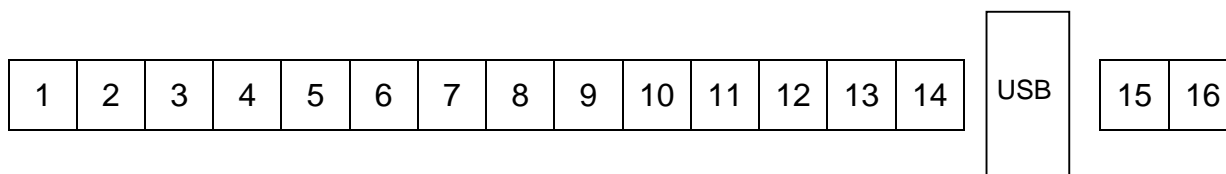


Interfaces :

- Wiegand
- RS485
- Dataclock
- Relay
- Ethernet

USB master connector

Power supply source



Pin 1	TR- / D1	Out	Wiegand D1 or RS485 TX/RX- or CLK
Pin 2	TR+ / D0	Out	Wiegand D0 or RS485 TX/RX+ or Data
Pin 3	LED1	In	Wiegand LED1
Pin 4	LED2	In	Wiegand LED2
Pin 5	GND		Ground for Wiegand / RS485 / Dataclock
Pin 6	Relay C0		Contact Relay 0
Pin 7	Relay C1		Contact Relay 1
Pin 8	TSW0		Tamper switch Contact 0
Pin 9	TSW1		Tamper switch Contact 1
Pin 10	GND		Ground for Ethernet Interface (LAN 10/100 Mbps)
Pin 11	RX-		Receive negative Ethernet
Pin 12	RX+		Receive positive Ethernet
Pin 13	TX-		Transmit negative Ethernet
Pin 14	TX+		Transmit positive Ethernet
Pin 15	+12V		Positive 12 Volts, power supply.
Pin 16	GND		Ground power supply.

Power supply cable

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
---	---	---	---	---	---	---	---	---	----	----	----	----	----	----	----

Pin 15 +12V Positive 12 Volts, power supply.


Pin 16 GND Ground power supply.

Power supply:

Must be conformed to CEE/EEC EN60950 standard

12 Volts ± 5% (regulated) 0.5 Amp.

It could be coming from 12 Volts Wiegand power supply, conforms to the Security Industry Association's Wiegand standard March 1995.

 For EMC compatibility , in order to be EC and FCC compliant (EN55022 , EN 55024 , FCC part 15 , EN 300330) , it must be set an axial ferrite bead (1 turn with WURTH 742 7111 or equivalent) with the 12 Volts supply cable.

Wiegand output wiring

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
---	---	---	---	---	---	---	---	---	----	----	----	----	----	----	----

Pin 1 TR- / D1 Out Wiegand D1

Pin 2 TR+ / D0 Out Wiegand D0

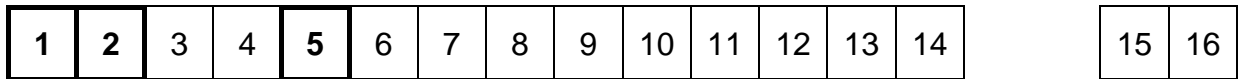
Pin 3 LED1 In Wiegand LED1 (option)

Pin 4 LED2 In Wiegand LED2 (option)

Pin 5 GND Ground for Wiegand / RS485 / Dataclock

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

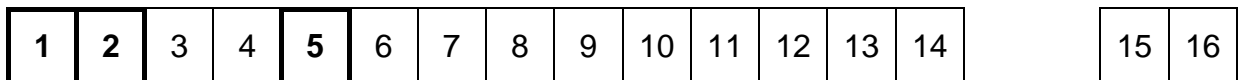
Data Clock output wiring



Pin 1	TR- / D1	Out	Clock
Pin 2	TR+ / D0	Out	Data
Pin 5	GND		Ground for Wiegand / RS485 / Dataclock

The electrical interface is 5V TTL compatible.

COM RS485 serial port

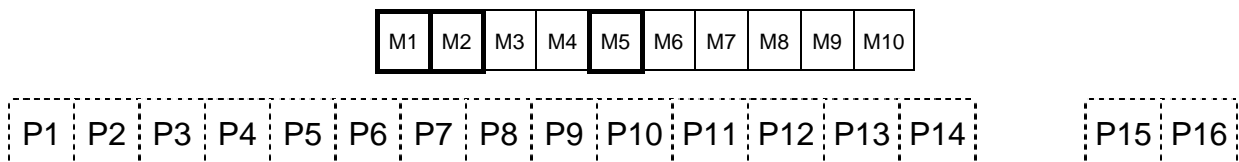


Pin 1	TR- / D1	Out	RS485 TX/RX-
Pin 2	TR+ / D0	Out	RS485 TX/RX+
Pin 5	GND		Ground for Wiegand / RS485 / Dataclock

For a half-duplex RS485 connection, only Tx/Rx+, Tx/Rx- and ground reference signals are necessary.

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

A 120 Ohms resistor termination may be added to the terminal, by strapping pin 1 and pin 2 of the auxiliary connector.



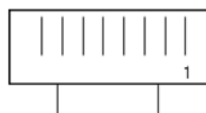
Ethernet wiring

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
---	---	---	---	---	---	---	---	---	----	----	----	----	----	----	----

Pin 10	GND	Ground for Ethernet Interface (LAN 10/100 Mbps)
Pin 11	RX-	Receive negative Ethernet
Pin 12	RX+	Receive positive Ethernet
Pin 13	TX-	Transmit negative Ethernet
Pin 14	TX+	Transmit positive Ethernet

Default IP address from factory setting is : 134.1.32.214

RJ 45 cabling recommendation:



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

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

Output relay

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
---	---	---	---	---	---	---	---	---	----	----	----	----	----	----	----

Pin 6	Relay C0	Contact Relay 0
Pin 7	Relay C1	Contact Relay 1

Relay ratings

1 A at 30 VDC according to the safety extra low voltage requirements (42.4 VAC max, 60 VDC max) independently of the power supply.

Tamper switch


1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
---	---	---	---	---	---	---	---	---	----	----	----	----	----	----	----

Pin 8	TSW0	Tamper switch Contact 0
Pin 9	TSW1	Tamper switch Contact 1

Trapdoor closed:	Switch ON
Trapdoor open:	Switch OFF

Tamper-switch ratings

50 mA at 20 VDC max according to the safety extra low voltage.

 This terminal is part of security system , it is customer responsibility to connect the tamper switch to physical access controller , in order tp prevent access into this terminal.

USER INTERFACE

MorphoAccess™ terminal works upon three principles: Access control with identification, access control with authentication or verification, and proxy mode.

MA1xx modes

Identification mode:

Local identification (fingerprint capture) with a local base

Equivalent to MA2xx/MA3xx mode 0

MA100 default mode

Authentication (verification) mode:

MA120 and MA110 allows contactless card reading minutiae and fingerprint capture for verification.

MA120 uses MIFARE cards. MA110 uses iClass² cards.

Version MIFARE equivalent to MA2xx/MA3xx mode 3

MA120 and MA110 default mode

“Merged” mode:

Identification and authentication are both allowed.

Equivalent to MA2xx/MA3xx mode 5

Proxy mode:

Command sending to the MorphoAccess™ 1xx

The application is controlled by host.

Equivalent to MA2xx/MA3xx mode 2

app / bio ctrl / identification = 0

app / bio ctrl / Authent x = 0

The MorphoAccess™ 1xx series manages one base of 500 persons with 2 fingers, locally or remotely.

² IClass is a trademark of HID company, subsidiary of Assa Abloy.

MA1xx Configuration

MA100 identification mode

Identification	Minutiae (fingerprint)	app / bio ctrl / identification = 1 Matching finger vs. data base template MA100 default mode
----------------	---------------------------	--

MA120 Authentication (verification) modes and identification mode

These modes may be configured with different variations.

Card data is composed of ID data, or ID + minutiae data.

Terminal may choose the data type, or leave the card decide.

		Card dependant	Terminal dependant
		app / bio ctrl / authent card mode = 1	app / bio ctrl / authent card mode = 0
Authentication	ID (card)	Card mode tag = ID only No check on MA1xx (Visitor mode)	app / bio ctrl / bypass authentication = 1 app / bio ctrl / authent ID contactless = 1 ID check vs. MA1xx data base <hr style="border-top: 1px dashed black;"/> app / bio ctrl / bypass authentication = 1 app / bio ctrl / authent ID contactless = 0 No check on MA1xx (Visitor mode)
	ID (card) and Minutae (fingerprint)	Card mode tag = PK app / bio ctrl / bypass authentication = 1 No check on MA1xx (Visitor mode)	app / bio ctrl / bypass authentication = 0 app / bio ctrl / authent PK contactless = 0 app / bio ctrl / authent ID contactless = 1 ID verif. vs data base Matching finger vs base template <hr style="border-top: 1px dashed black;"/> app / bio ctrl / bypass authentication = 0 app / bio ctrl / authent PK contactless = 1 Matching finger vs card template MA120 and MA110 default mode
Identification	Minutae (fingerprint)	app / bio ctrl / identification = 1 Matching finger vs data base template	

MA120 “Merged mode”

This is the combination of both configurations (identification and authentication); both card detection and identification are running simultaneously. For more details, see *MA1xx User Guide Document*.

MORPHOACCESS™ MA1XX SERIES TECHNICAL CHARACTERISTICS

Man Machine Interface

Color LED for information

Buzzer

Biometry

Based on SAGEM Compact Biometric Module: 500dpi optical sensor

Template Base: 500 persons with 2 fingers

Identification: < 1,5s

Authentication / verification: < 1s

Peripherals interfaces

Ethernet 10/100 Base T for remote control mode.

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

Relay: 1 contact

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

Power supply

9 to 16 Volts \pm 5% power supply (500mA max @12V, 200mA typ. @12V)

Cable cross section depends on the length 0.75mm² recommended.

Size and weight

- 142 x 84 x 46 mm
- 220 g.

Environmental conditions

Operating temperature	-10 °C to + 45 °C.
Humidity	10 % < RH < 80 %.
Hardness	IP53 (MA1xx placed vertically along wall)
Light	The MorphoAccess™ should be installed in controlled lighting conditions. Avoid direct exposure to sunlight or UV lights.

IP53 means protection against rain (60° max from vertical) and dust.

Storage conditions

- Temperature - 20°C to 70°C.
- Humidity < 95%.

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.
- Do not use your SAGEM MorphoAccess™ in damp areas (swimming pool...). Protect it from water and other liquids.
- Do not expose your SAGEM MorphoAccess™ to extreme temperatures.
- Use your SAGEM MorphoAccess™ with original accessories. Attempts to integrate the MorphoAccess™ with unapproved accessories will void your warranty.
- 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 (MA120, MA110) with a certain distance (> 30 cm) from metallic elements , such as iron fixation or lift gate. Performances, in term of Contactless badges reading distance will decrease when metallic elements will be closer to the terminal.

Ethernet connection

It is recommended to use a category 5 shielding 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 low quality connection may strongly impact Ethernet signal sensibility.

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

Date / Time synchronization

If you expect to use the MorphoAccess™ for application requiring high time precision we recommend to synchronize regularly your terminal time with an external clock.

The terminal clock has a $40 \cdot 10^{-6}$ ppm time deviation.

Cleaning precautions

A dry cloth should be used.

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 email rather call the hot line.

Email: <mailto:hotline.biometrics@sagem.com>

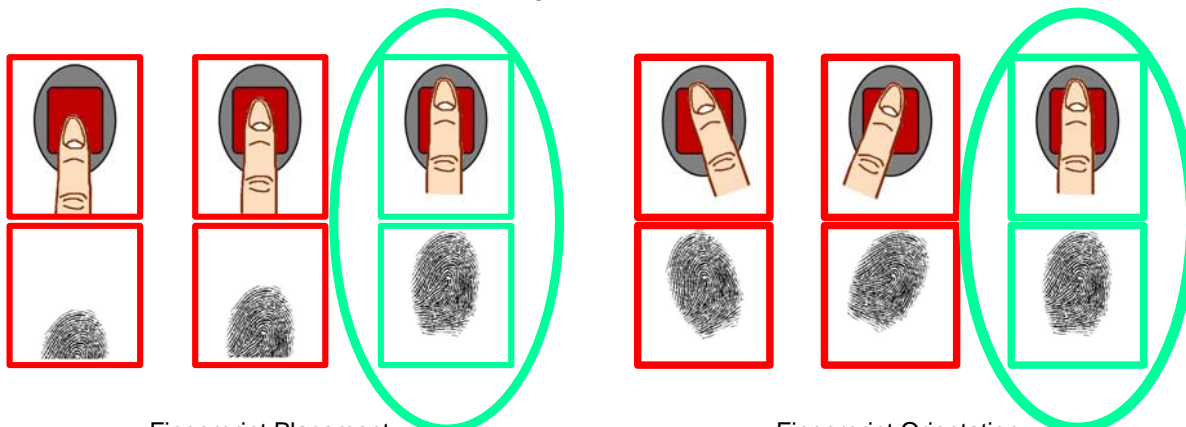
Tel: + 33 1 34 30 39 19 (Monday to Friday, 9H00am to 6H00pm)

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 sensor light is turned off.**

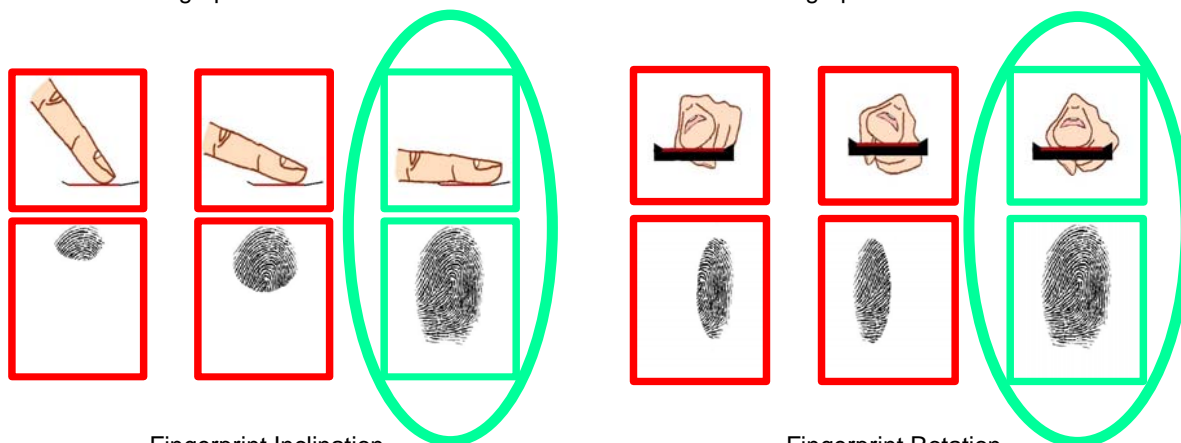


Area containing most of the information



Fingerprint Placement

Fingerprint Orientation



Fingerprint Inclination

Fingerprint Rotation

APPENDIX 2 - BIBLIOGRAPHY

MA1xx User guide

This guide describes terminal settings and operating modes.

MA1xx Host System Interface Specifications

Describes MorphoAccess™ MA1xx communication protocol (Ethernet interface) for remote management.

MA1xx Remote Messages Specifications

Completes specifications describing remote messages of MA1xx communication interfaces (Wiegand, Dataclock, Ethernet and Serial).

MA1xx Contactless Card Specification

This document describes the MA12X contactless card features

Finger Positioning

Highlight finger-positioning principles (See Appendix 1)

MA1xx Configuration Tool User Guide

This tool allows changing your terminal configuration through Ethernet.

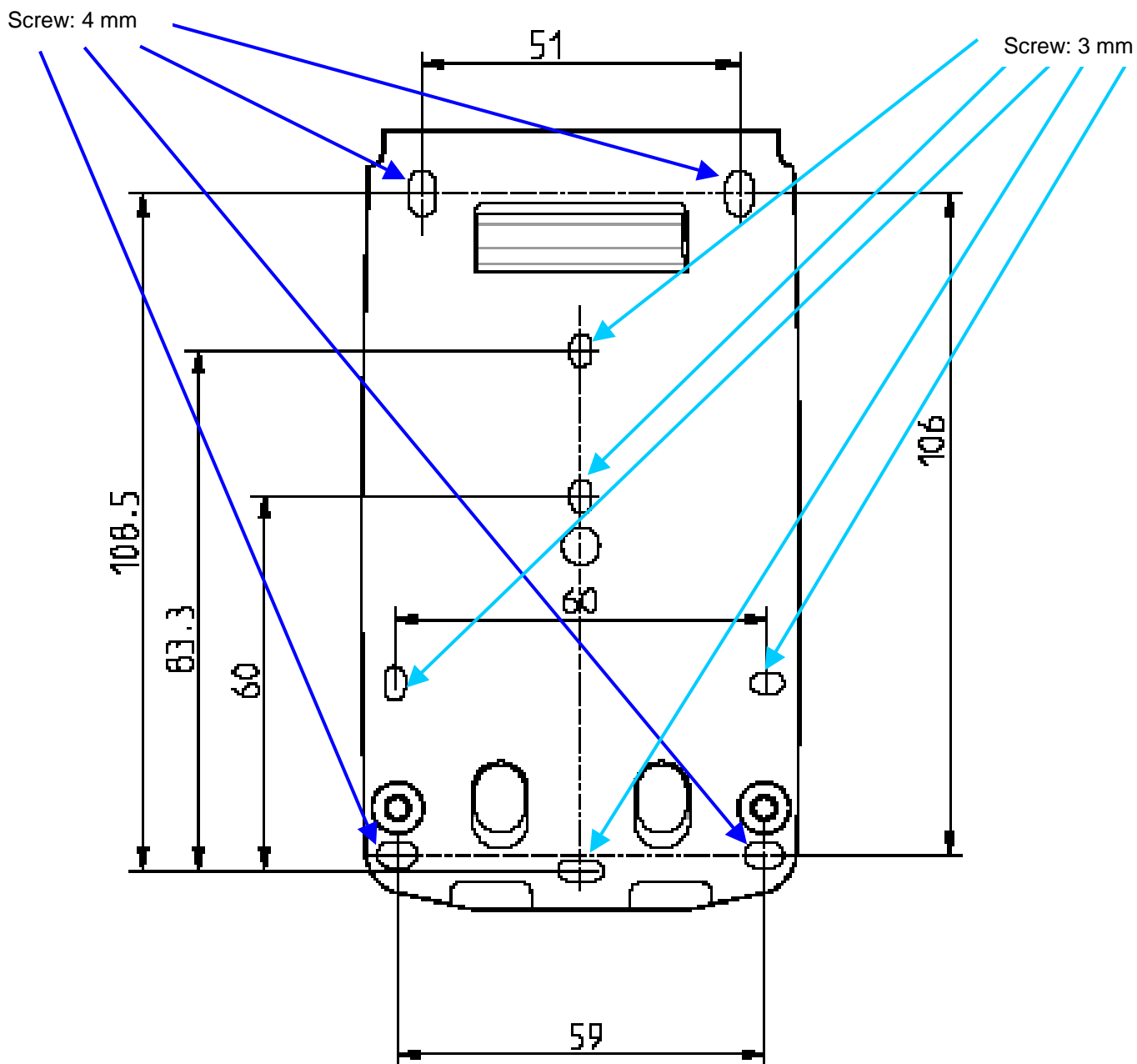
MA1xx USB Network Tool User Guide

This documentation focuses on the *USB Network Tool*.

MA1xx Upgrade Tool User Guide

Details about firmware upgrading procedures.

APPENDIX 3 - DRILLING TEMPLATE



SAGEM Défense Sécurité

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Société anonyme à directoire et conseil de surveillance

au capital de 36 405 229 € 562 082 909 RCS PARIS