

BEYOND SECURITY



INSTALLATION GUIDE

Remote Access Controller - RAC 4

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1.0 Introduction and Disclaimers

Target Audience

Please read and follow all directions carefully. These instructions are designed for use by lock installers or anyone who is familiar with common safety practices and competent to perform the steps described herein.

For a typical installation, no professional electrician is required because the RAC 4 is a low voltage installation system.

Kaba Lodging Systems is not responsible for damage or malfunction due to incorrect installation.



Warnings and Cautions

Carefully inspect windows, doorframes, doors, etc. to ensure that the recommended procedures will not cause damage. Kaba Lodging Systems' standard warranty does not cover damages caused by installation.

The RAC 4 should always be installed in a secured room or facility with controlled access to prevent access to the system.



Installation of card readers or other peripherals within elevators must only be done with prior consultation of the elevator manufacturer. A technician from the manufacturer should be present at all times for installation.



If installing the RAC 4 in an elevator cage environment, or in proximity to any other equipment that may generate high levels of electromagnetic interference, follow the installation requirements as indicated in Annex C to prevent any operational instability.

Safety Procedures

Installation is to be done following standard safety procedures with adequate equipment prescribed herein and wearing adequate protection for body safety. Power is to be off during the installation process as well as for any maintenance procedures.



CAUTION:
Wear safety glasses when using any tools.

Technical Support

For technical assistance, call:
1-800-906-4526, 1-514-340-9025

OR

Visit the Kaba Support Website:

www.kabalodgingsupport.com

NOTE:

This equipment has been tested and found to comply with 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.
- Consult the dealer or an experienced radio/TV technician for help.

Statement according to FCC part 15.21

Modifications not expressly approved by Kaba Ico could void the user's authority to operate the equipment.

Statement according to FCC part 15.19

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.

2.0 Product Description

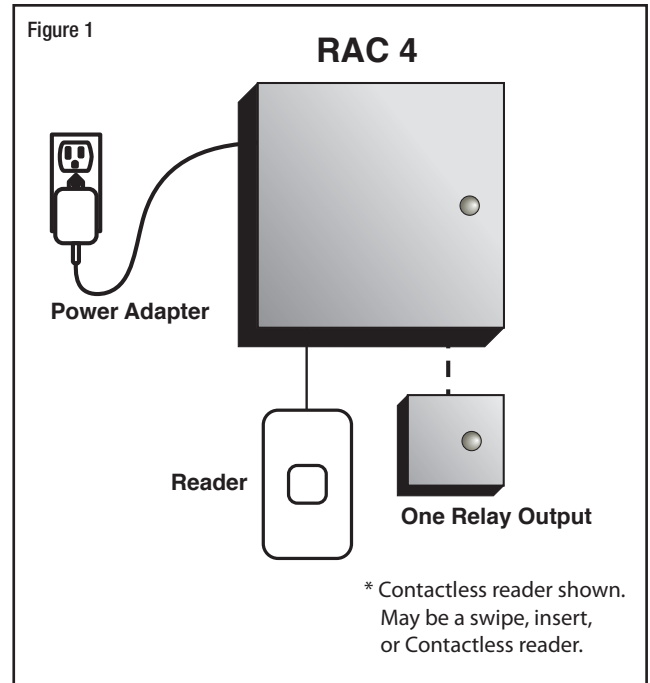
2.1 Features

The RAC 4 is designed to operate electrical locking or control devices where a stand-alone electronic lock is not practical. It provides ingress & egress access control that can be programmed with the full range of Solitaire 710 / 710-II, Generation 760 / 770 / 790, or System 700 features.

The system can control any door or access point up to 500 feet (150m) away when using a swipe, insert or extended range contactless reader, and up to 40 feet (12m) away when using a contactless reader Model R-79-1N1.

The Swipe & Contactless Card Reader can be mounted directly on doorframes as narrow as 2 inches (5.1 cm), while the insert reader can only be installed in an elevator panel.

The RAC 4 is a simple access control solution for a single card reader providing features as per the feature list below. See figure 1 for a typical configuration.

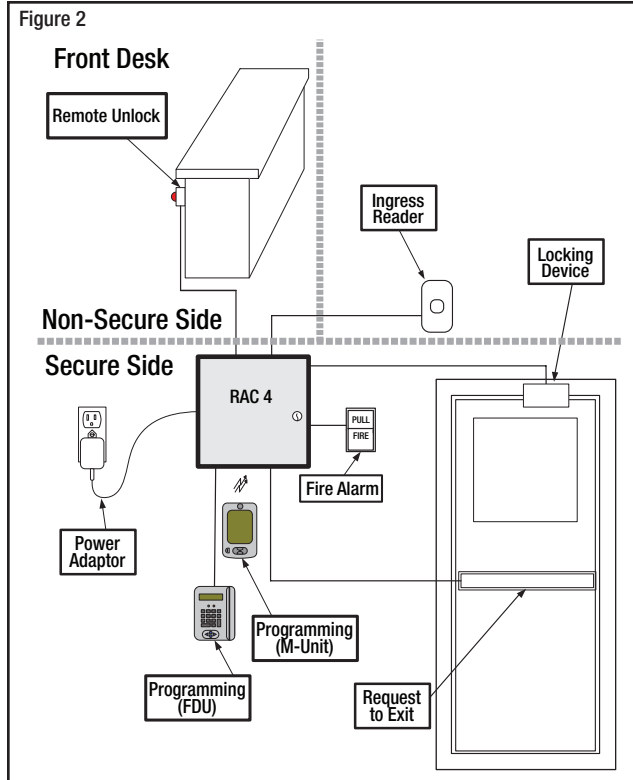


Feature List:

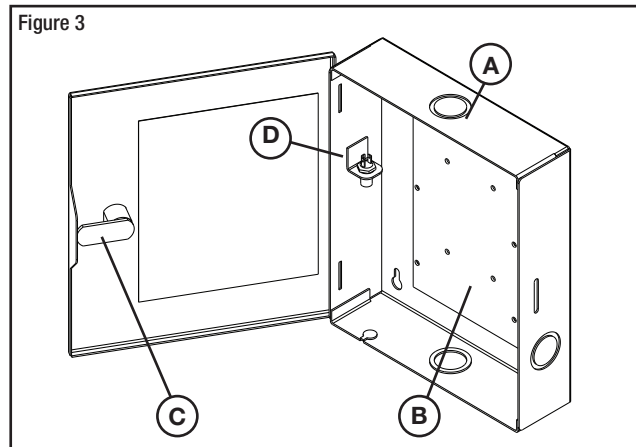
Feature	RAC 4
Relay Outputs	Single
Variable access delay	Standard
Hotel ID reinitialization feature	Standard
Power failure 3-day auto-recovery; real time clock (RTC)	Standard
Simple serial programming & auditing	Standard
Relay bypassing (passage function)	Standard
Single card reader control	Standard
RS-232 Interface for programming	Standard
Unlock delay programmable by Dip Switches	Standard
Fire Alarm Input	Standard
Remote Unlock input (No Audit in FDU)	Standard
Request to Exit (REX) input	Standard

2.0 Product Description

2.2 Components



2.2.1 Controller box



(A) RAC 4 Enclosure & Access Door: holds the controller board (PCB) and power adaptor jack. Knockouts are available on 3 sides for routing of peripheral cables.

(B) Controller Board (PCB): controls all the features of the RAC 4 system.

(C) DC Power Jack: used for connection to 12 VDC power adaptor to provide power to the controller PCB.

(D) Cam-lock with Key: to provide secure locking and to control access to the RAC 4 enclosure.

Not shown:

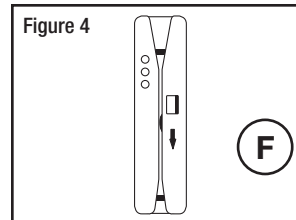
(E) Cables: cables required for connection of the controller PCB to the power adaptor jack.

2.2.2 Card readers

Card readers (F) are used with keycards to grant access to the controlled areas such as pool, gym, staff rooms, etc. Various card reader types are available depending on the location and type of locks used on the property.

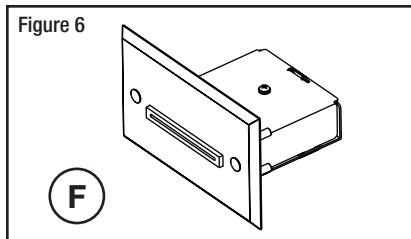
2.2.2.1 Magnetic stripe card readers

1- Swipe Card Reader: a small vertical swipe unit that protrudes from the wall.



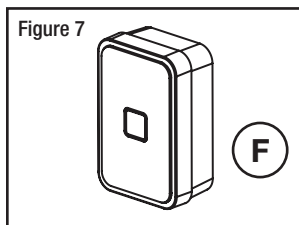
2- Insert Reader: a small wall-enclosed horizontal card reader that comes in a satin stainless steel finish. For use in elevator panels only, where enough space permits (minimum 4.5" depth required).

As the RAC 4 only supports a single relay output on the PCB, the typical application for the insert reader is to be used as an elevator call button in a common area. Multiple floor control cannot be done with a RAC 4, only the RAC 4XT with a relay expansion PCB.



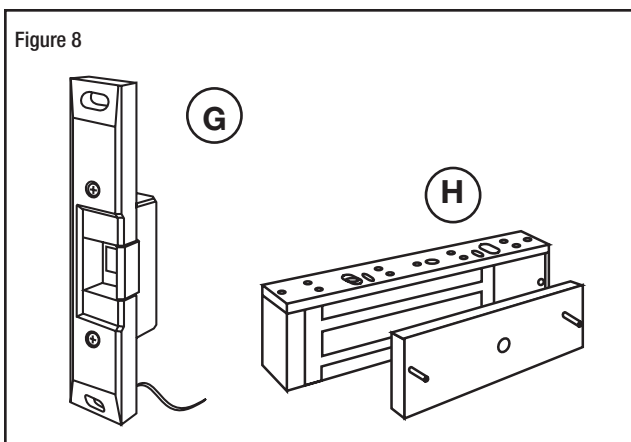
2.2.2.2 Contactless Card Reader

The Contactless Card Reader is a small vertically mounted unit that protrudes from the wall and is used with RFID-based keycards.



2.2.3 Locking devices

The RAC 4 controller PCB provides a single relay output that can be used to control an Electric Strike (G) or Electromagnetic Lock (H) as shown in Figure 8.



2.2.4 Optional peripherals

The RAC 4 can also be used with the following types of peripherals:

- Exit Devices
- Motion Detectors
- Panic Bars
- Request to Exit (REX) button
- Remote Unlock Button
- Remote Programming Interface.

3.0 Checklist and Exploded Views

3.1 Parts and Tools List

NOTE:

- Some items are dependant on the options or configuration purchased. Please ensure all parts ordered & required for installation are available before beginning.
- Parts are subject to change without notice.
- For letter designations refer to Figure 9.

RAC 4 Enclosure:

NOTE: All items above come factory installed.

- (A) RAC 4 enclosure with access door
- (B) Controller PCB
- (C) Cam-lock
- (D) DC power jack

Cables (not shown):

NOTE: Some items come factory installed.

- (E) System cables:
 - Controller PCB to adaptor jack
 - Controller PCB jumpers (card reader type dependent)

Card Reader(s):

NOTE: Type of card reader(s) dependent on system configuration ordered.

- (F) Swipe reader (see Figure 4)
- (F) Insert reader (see Figure 6) – may require additional tools as per PK3166 included with the reader.
- (F) Contactless reader (see Figure 7)

Locking Device

NOTE: Locking device(s) dependent on system configuration ordered.

- (G) Electric strike
- (H) Electromagnetic Lock

Power Adaptor includes:

NOTE: Dependent on country's electrical power requirements.

- (I) 1x North America 12 VDC output power adaptor with integrated 6 foot (1.8 m) power cable. Input power requirements of 110-120 VAC, 60 Hz.

or

- (J) 1x International 12 VDC output power adaptor with integrated 6 foot (1.8 m) power cable and interchangeable AC outlet prongs. Input power requirements of 220-240 VAC, 50-60 Hz.

Other Peripherals (optional):

- (K) Request to Exit button
- (L) Remote Programming Interface (RPI)
- (M) Remote Unlock (Not shown)

Programming Device

NOTE: Purchased separately, dependent on hotel configuration.

IMPORTANT:

Programming of the RAC 4 can only be done with the following versions of programming device software:

- ATLAS: software version 1.0 or higher
- Kaba Ilco 780 FDU: software version 6.40 or higher
- Kaba Ilco FDU 4 (G4): all versions

- (N) Front Desk Unit (FDU)
- (N) ATLAS with Infra-red Programming Module (IPM)

Installation Hardware Bag:

- (O) 4x Philips wood screw #8 x 1-1/4"
- (P) 4x Nylon anchor #6 – 10
- (Q) 4x Concrete anchor #7 – 9
- (R) 1x Strain relief connector with locking nut
- (S) 1x Strain relief bushing
- (T) 2x Diode-rectifier
- (U) 5x steel flat washer #8
- (V) 3x Crimp terminal B connector

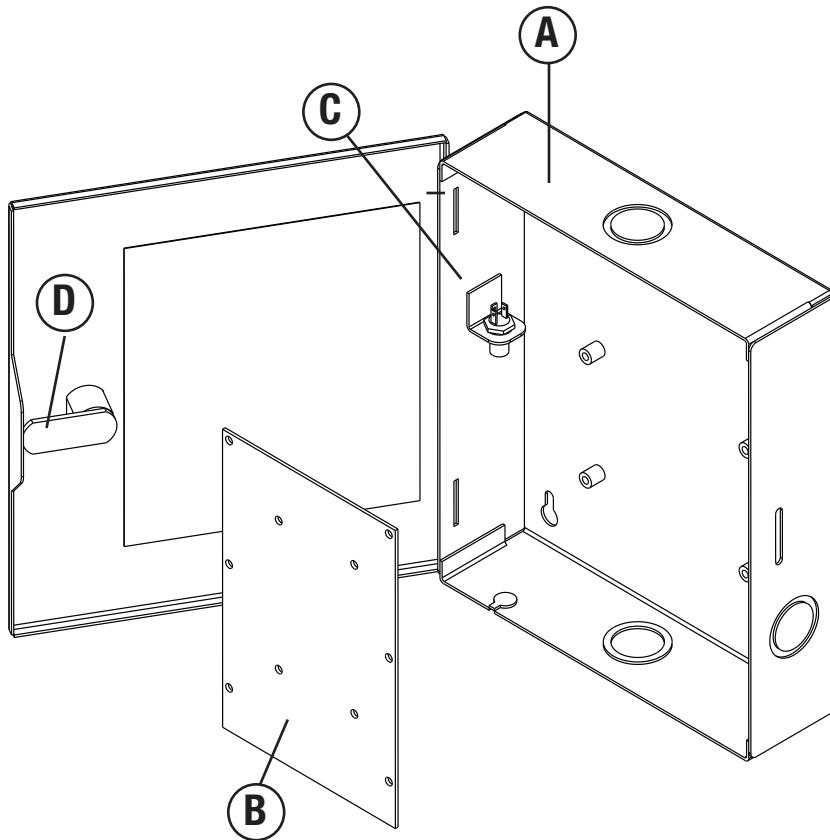
Mandatory tools required:

- Safety glasses
- Electric drill
- 9/64" (3.5 mm) drill bit
- 7/32" (5.6mm) drill bit
- 1/4" (6.5 mm) drill bit
- 3/8" (9.5 mm) drill bit
- Philips screwdriver (#2)
- Slotted screwdriver tip width 3/32"
- Adjustable wrenches
- Crimp tool (18-22 AWG)
- Pliers
- Wire cutter / stripper
- FDU/ATLAS programmed "Test lock" Keycard
- Hammer or rubber mallet
- Awl or center punch

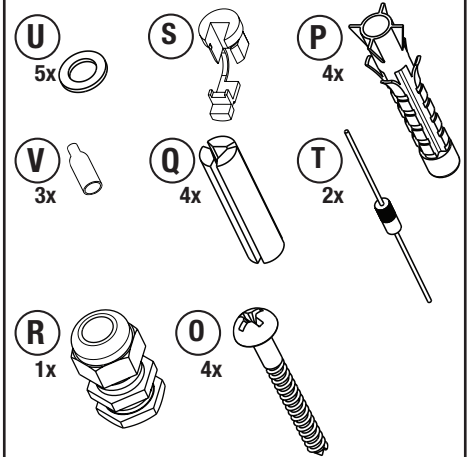
3.2 Exploded View

Figure 9

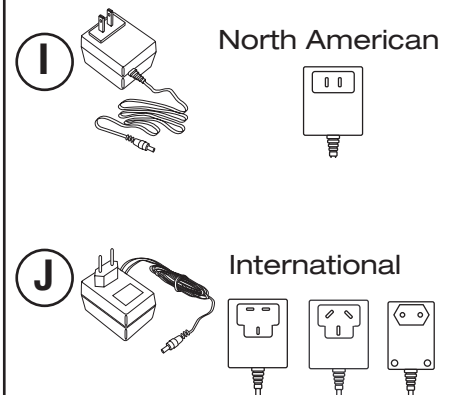
Controller Box



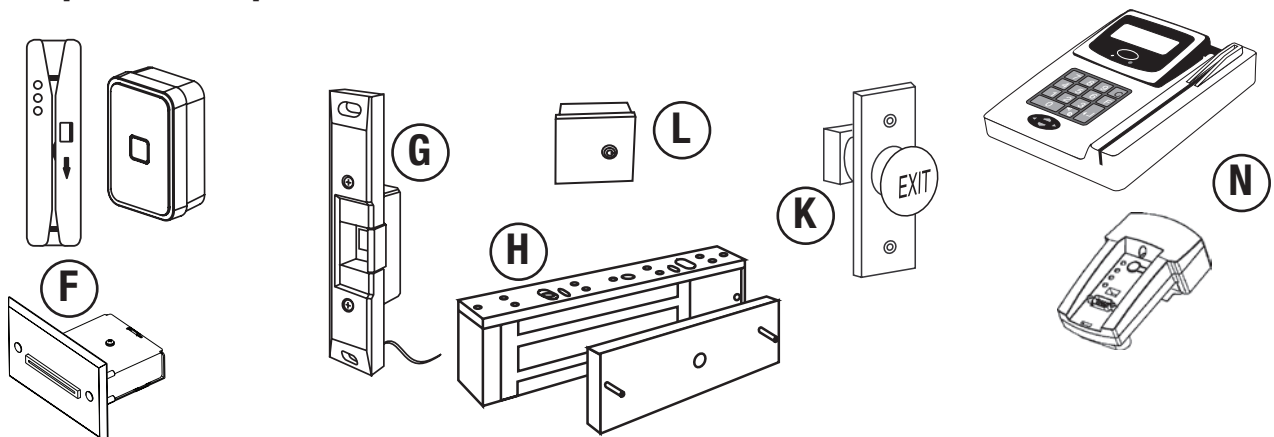
Hardware Bag



Power Adaptor



Peripherals / Optional Devices



4.0 System Installation Overview

Before starting installation:

- Ensure all components ordered and materials / tools required are available.
- Ensure all cabling is available for the peripherals / components being installed.

IMPORTANT:

All installations & wiring of RAC 4 enclosure and peripherals must comply with all applicable local building codes and regulations.



CAUTION:

Do not connect power to the enclosure until the end of the installation.



If installing the RAC 4 in an elevator cage environment, or in proximity to any other equipment that may generate high levels of electromagnetic interference, follow the installation requirements as indicated in Annex C to prevent any operational instability.

4.1 Pre-Installation Procedures

Step 1: Identify a secure location for the RAC 4 enclosure

IMPORTANT:

- Access to the RAC 4 enclosure must be restricted to authorized personnel.
- AC power must be available within 6 feet (1.8 m) of the RAC 4 enclosure.
- The location temperature must be from 32°F to 120°F (0°C to 49°C) and sheltered against weather hazards and dripping water.
- The enclosure must be installed using the hardware supplied.

Identify the location for the RAC 4 enclosure based on the following:

- Enclosure should be mounted at a workable height with clearance to completely open the access door.
- The enclosure can be placed either horizontally in the ceiling or vertically on a concrete, wood, or plaster wall.

Step 2: Identify location(s) for card reader and peripherals

Swipe, insert and extended range contactless card readers must be placed within 500 feet (150 m) from the RAC 4 enclosure, while contactless card reader Model R79-1N1 must be placed within 40 feet (12 m) of the reader power source.

The card reader should be installed in an obvious location at an ergonomic height near the access door or elevator being controlled.

Swipe card reader:

The space to use the swipe reader must be large enough to allow for adequate swipe clearance.

Insert card reader:

The insert reader must be enclosed in the elevator wall panel, so the location should be in an area with workable access.

NOTE: The minimum depth required for mounting of the insert card reader is 4.5”.

Contactless card reader:

The space to use the contactless reader must be large enough to allow for adequate clearance for the card being presented to the reader.

Remaining peripherals:

Determine the location(s) required for any other RAC 4 system peripherals (REX, motion detector, etc) and ensure that all required cabling is available as required in following steps. Install as per manufacturer's instructions and route wires to the RAC 4 enclosure for connection to the controller PCB.

Step 3: Set the desired access delay

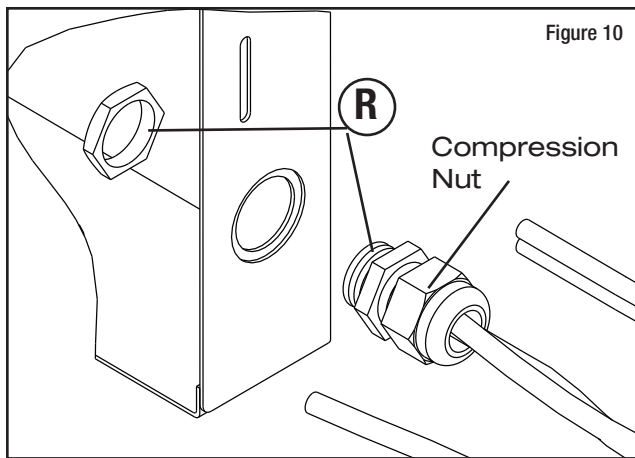
The default factory setting for the delay on access devices is 3 seconds. To change this value configure the controller PCB dip switch SW2 settings as per Annex A, Table 4.

Step 4: Install strain relief

One strain relief is provided in the hardware bag to secure the wires leading into the enclosure and to help prevent the possibility of wire tampering.

1. Determine the routing needed for all wiring of the RAC 4 card reader and peripherals, and select the enclosure knock-out to be removed for installation of the strain relief.

- Remove the selected knock-out using a hammer & screwdriver / awl, and from the inner side of the enclosure tap out the small metal disk.
- Based on the amount of wires to be routed, attach the appropriate strain relief to the enclosure as shown in Figure 10. **Do not attempt to route an excessive amount of wires. If extra strain reliefs are required please contact Kaba Ilco.**

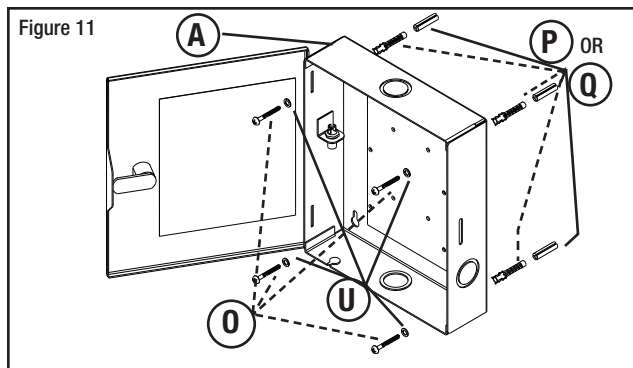


4.2 Installation & wiring Procedures

Step 5: Mounting the controller box

Install the enclosure in the desired location using the appropriate items from the hardware bag.

For easier access it is recommended to remove the access door before installation.



Step 6: Mounting and wiring card reader

For installation of the card reader(s) follow the appropriate steps listed below, depending on the type of card reader and configuration being installed.



CAUTION:

Do not exceed the maximum cable length indicated by the manufacturer of the products being connected.



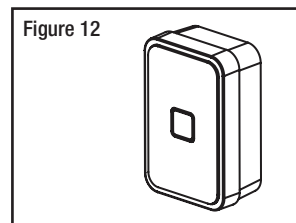
CAUTION:

Refer to the wiring label on the access door, the wiring diagram & tables in Annex A, or the detailed peripherals connections in Annex B.

IMPORTANT:

Every wire must pass through a strain relief as connected in step 4.

Model R79K-XXX Contactless card reader installation



- Remove the back plate and use it to mark the holes for the cables and screws.

Alternatively, the drilling template DT-514800 included with the reader can be used.

NOTE: Do not use the actual drawing from Annex H of this manual to mark the hole locations as this drawing is not to scale.

- Drill the holes in the wall according to the diameters indicated on the drilling template in Annex H, based on the type of surface the reader is being installed on.

Metal surface mounting: install the back plate onto the wall with the metal screws provided in the installation hardware bag.

Drywall surface mounting: tap the wall inserts (provided in the installation hardware bag) into the wall using a rubber

mallet. Install the back plate onto the wall with the wood screws provided.

3. Connect the included cable to the terminal block of the reader as shown in Annex A, Table 1. Ensure that the correct wire color is attached to the correct terminal block connection.

NOTE: For additional strain relief it is recommended to make a knot in the cable close to the terminal block of the reader.

4. Route the card reader's wire through the grommet of the back plate and assemble the front of the reader onto the back plate. Assemble together by tightening down the screw (provided in the card reader's installation bag) on the bottom of the card reader.

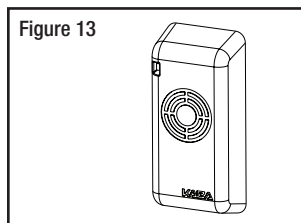
5. Connect the card reader wire to the terminal blocks of the controller PCB as per Annex A, Table 1, or refer to Annex B, Figure 1.

IMPORTANT:

Ensure that the jumper wires are also connected on the controller PCB.

NOTE: If required to differentiate between ingress & egress, ensure that the appropriate connector on the controller PCB is used.

Model R79-1N1 Contactless card reader installation



1. Remove the back plate and use it to mark the holes for the cables and screws.

Alternatively, the drilling template DT-512650 included with the reader can be used.

NOTE: Do not use the actual drawing from Annex G of this manual to mark the hole locations as this drawing is not to scale.

2. Drill the holes in the wall according to the diameters indicated on the drilling template in Annex G, based on the type of surface

the reader is being installed on.

Metal surface mounting: install the back plate onto the wall with the metal screws provided in the installation hardware bag.

Drywall surface mounting: tap the wall inserts (provided in the installation hardware bag) into the wall using a rubber mallet. Install the back plate onto the wall with the wood screws provided.

3. Connect the included cable to the terminal block of the reader as shown in Annex A, Table 1. Ensure that the correct wire color is attached to the correct terminal block connection.

NOTE: For additional strain relief it is recommended to make a knot in the cable close to the terminal block of the reader.

4. Route the card reader's wire through the grommet of the back plate and assemble the front of the reader onto the back plate. Assemble together by tightening down the screw (provided in the card reader's installation bag) on the bottom of the card reader.

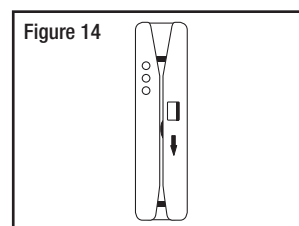
5. Connect the card reader wire to the terminal blocks of the controller PCB as per Annex A, Table 1, or refer to Annex B, Figure 2.

IMPORTANT:

Ensure that the jumper wires are also connected on the controller PCB.

NOTE: If required to differentiate between ingress & egress, ensure that the appropriate connector on the controller PCB is used.

Model R71-6XX swipe card reader



1. Identify the location for the card reader and drill a hole for the cable as per the drilling template DT-512738 shown in Annex E, or included with the card reader.

- Remove the reader's enclosure, and route the card reader wire through the hole. Use the back plate of the reader to mark the holes for the screws.

Alternatively, the drilling template DT-512738 included with the reader can be used.

NOTE: Do not use the actual drawing from Annex E of this manual to mark the hole locations as the drawing is not to scale.

- Based on the type of surface the reader is being installed on; drill the holes in the wall according to the diameters indicated on the drilling template DT-512738.

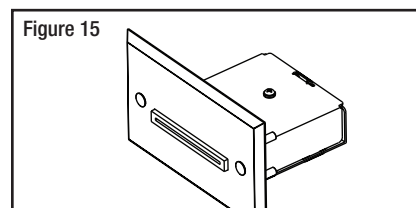
Metal surface mounting: install the back plate onto the wall with the metal screws provided in the installation hardware bag.

Drywall surface mounting: tap the wall inserts (provided in the installation hardware bag) into the wall using a rubber mallet. Install the back plate onto the wall with the wood screws provided.

- Hook the reader enclosure onto the top of the back plate and click into place.
- Tighten down the supplied set-screw (M3 x 0.5) on the bottom of the reader to secure the reader cover.
- Connect the card reader wire to the terminal blocks of the controller PCB as per Annex A, Table 1, or refer to Annex B, Figure 3.

NOTE: If required to differentiate between ingress & egress, ensure that the appropriate connector on the controller PCB is used.

Model R71-4XX Insert card reader installation



NOTE: The minimum depth required for mounting of the insert card reader is 4.5”.

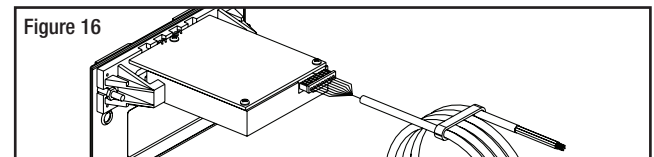
- Ensure all tools are available as indicated in manual PK3166-T, included with the insert card reader.

- Referencing the drilling template DT-512152 included with the reader, mark the location of the holes to be drilled and the rectangular cut-out to be made.

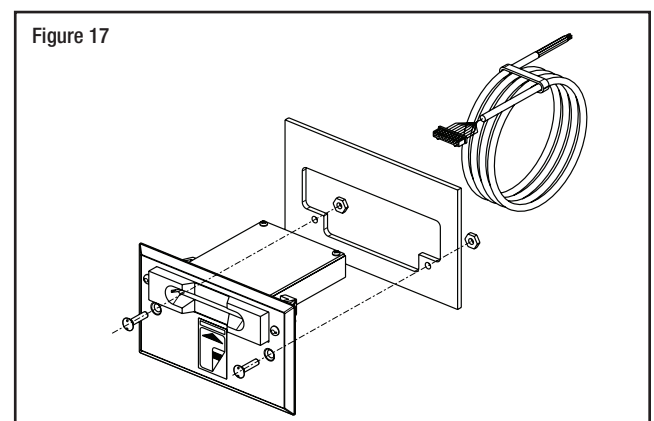
NOTE: Do not use the actual drawing from Annex F of this manual to mark the hole locations as the drawing is not to scale.

- Using the appropriate tools, cut out the rectangular hole for the reader and drill the screw holes as per drilling template DT-512152 indications.

- Attach the end of the wire with the connector to the connector at the back of the insert reader.



- Mount the insert reader to the panel by sliding the insert reader inside the cavity and using the 2 spanner screws (6-32 x 3/4”) and the two hexagon lock nuts (6-32), to screw the insert reader into the panel.



- Route the wire and connect to the RAC 4 enclosure as per connections shown in Annex A, Table 1, or refer to Annex B, Figure 3.

Step 7: Connect peripheral wiring



CAUTION:

Do not exceed the maximum cable length indicated by the manufacturer of the products being connected. In addition, the wire used to connect the peripherals to controller PCB must be of the proper gauge and type as specified by the manufacturer.



CAUTION:

Refer to the wiring label on the access door, the wiring diagram & tables in Annex A, or the detailed peripherals connections in Annex B.

IMPORTANT:

Every wire must pass through a strain relief as connected in step 4.

Follow the indications below for the different peripherals being connected. The actual items to connect will vary based on the system configuration ordered.

NOTE: Refer to detailed wiring diagrams provided in Annex B.

1. Electric strike or electromagnetic lock (locking device)

Refer to Annex B, Figure 4,5,6 & 7 for detailed wiring.

IMPORTANT:

Kaba Ilco does not provide technical or field support for 3rd party locking devices. Please consult the device manufacturer for support.

The following table indicates the maximum recommended wire lengths that can be used for typical locking devices, based on wire gauge.

Locking Device Type	Typical Current (A)	Maximum Recommended Wire Length, One-Way (feet)			
		AWG 18	AWG 16	AWG 14	AWG 12
Electromag. Lock	0.28	170	265	425	675
Electric Strike	0.45	105	165	265	420
Double Electro. Lock	0.56	90	145	230	365
Other Devices	0.75	65	100	160	250

NOTE: The Maximum Recommended Wire Length is the approximate wire length that causes a 5% voltage loss in the wire, using a 12-volt locking device at the rated current included.

CAUTION:

This table is for reference only. Actual wiring requirements for specific devices may differ. Always follow the locking device manufacturer's wiring recommendations as well as local building codes.

- 1.1 Install and route a 2-conductor cable from the controller PCB to the desired location of the electric strike or electromagnetic lock.
- 1.2 If installing an electric strike, install the diode across the terminals of the locking device, using the crimp connectors provided in the hardware bag if needed.

IMPORTANT:

Do not reverse the diode polarity as indicated on the wiring diagram.



CAUTION:

To prevent a possible short, the diode must not be in contact with electric strike. If required cut the diode ends shorter.

- 1.3 Mount the locking device in the desired location and connect as per manufacturer's instructions. For connections between locking device and controller PCB refer to Annex A, Table 3.

2. Request to Exit button (REX)

Refer to Annex B, Figure 8 for detailed wiring.

Mount the device at the desired location and run a 2-conductor cable from the request to exit button to controller PCB connector J8, pins 3 & 4. Connect as per Annex A, Table 3.

3. Remote Unlock button

Refer to Annex B, Figure 8 for detailed wiring.

Mount the device at the desired location and run a 2-conductor cable from the remote unlock button to the controller PCB connector J8, pins 1 & 2. Connect as per Annex A, Table 3.

4. Motion Detector

Refer to Annex B, Figure 9 for detailed wiring.

Mount the device at the desired location and run a 4-conductor cable from the motion detector relay's terminal block to controller PCB connector J8, pins 3 & 4.

To power the motion detector, connect the +12V input of the motion detector to the red wire connecting the +DC OUT terminal on the power supply and the 12V input of the controller PCB (J16, pin 1), as shown in Figure 8 of Annex B. Then connect the GND input of the motion detector to the black wire connecting the -DC OUT terminal on the power supply and the GND input on the controller PCB (J16, pin 2). The use of wire connectors / caps is recommended to ensure reliable electrical connections.

5. Remote Programming Interface (RPI)

Refer to Annex B, Figure 10 for detailed wiring.

Run a 4-conductor cable from the RPI to terminal block J6 on the controller PCB. Connect as per Annex A, Table 3.

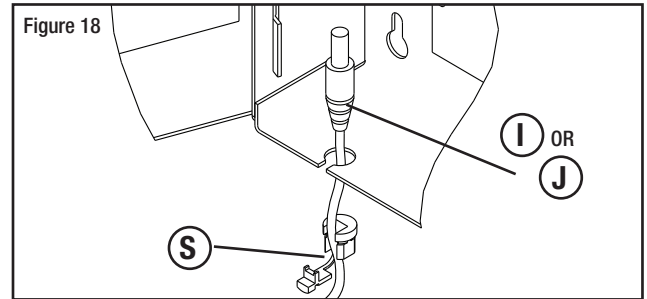
6. Fire Alarm Panel

Refer to Annex B, Figure 11 for detailed wiring.

Remove the jumper wire connected between pins 3 and 4 of connector J18 on the controller PCB and complete the fire panel installation as per manufacturer's indications.

Step 8: Install strain relief bushing (for power adaptor only)

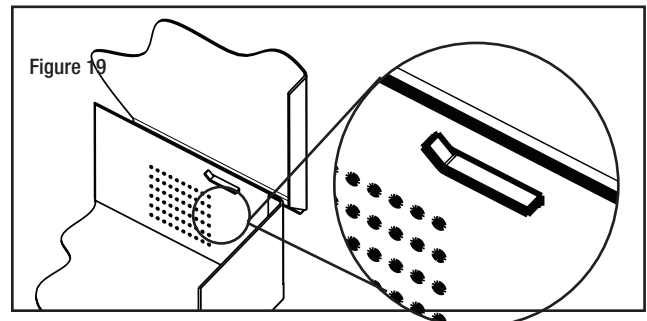
One strain relief bushing (item 'S' – see Figure 10) is provided in the hardware bag to secure the power adaptor cable leading into the RAC 4 enclosure to help prevent the possibility of wire tampering.



1. Remove the keyhole knock-out on from the inner side of the enclosure using a hammer and screwdriver or awl to tap out the small metal disk.
2. Determine the routing needed for the wiring of the power adaptor from the AC power source to the enclosure.
3. Open the strain relief bushing and route the power adaptor cable in. Leave enough cable length to plug the power adaptor's connector into the power jack inside the enclosure. To obtain the desired strain relief effect, firmly close the plug of the bushing onto the flat cable.
4. Attach the strain relief bushing with cable onto the enclosure, and connect the power adaptor's connector to the power jack on the inside of the enclosure.
5. If using the International Power Adaptor, attach the appropriate AC outlet prong to the power adaptor.

Step 9: Completing the installation

1. If the access door was removed, reinstall the door on the RAC 4 enclosure.
2. Bend the two tabs of the access door with pliers to a maximum of 30 degrees as shown in Figure 14.



3. Plug the power adaptor into the AC power source.

5.0 Settings and Operation

5.1 Testing

1. If not already done, connect the AC power adaptor, and / or turn on the AC current.
2. Verify that the Func1 (D45) and Func2 (D46) LEDs on the controller board (B) blink continuously.
3. Activate the Bypass switch, SW3 on the controller board (B).
4. Verify that the locking device is activated.

NOTE: If the locking device is not activated, verify that the Fire Alarm input is properly connected, or a jumper wire is connected.

5. De-activate the bypass switch, SW3 on the controller board (B).
6. As per the FDU or ATLAS manuals make a test card and use it on the card reader. Verify that the door unlocks. The unlock time will correspond to the delay set by the DIP switches as per Annex A, Table 4.

NOTE: The Test card will only unlock the door if the RAC 4 has never been initialized.

7. If a request to Exit (REX) button is connected, press it and verify that the door unlocks.
8. If a Remote Unlock button is connected, press it and verify that the door unlocks.
9. If the RAC 4 is connected to a fire panel and the electromagnetic lock powered by the 12 VDC output of the RAC 4, verify that the electromagnetic lock or a fail-safe electric strike is deactivated when the fire alarm is active (open input).
10. The RAC 4 is now ready to be Initialized and Programmed.

5.2 Hotel ID Initialization

1. As per the appropriate instruction manual, create an initialization keycard with the FDU or ATLAS system.
2. For **swipe card readers:** swipe the initialization keycard through the swipe card reader. The red and green LEDs on the swipe card reader should flash in sequence:

red + green once, followed by green once. Alternatively, the controller board can be verified to ensure that LED D41 is ON.

For **insert card readers:** insert the initialization keycard into the insert card reader. Verify that LED41 on the controller board (B) is on.

For **Contactless card readers:** present the initialization keycard to the reader. The green LED on the Contactless reader should turn off in sequence: rapid twice, followed by normal once. Alternatively, the controller board (B) can be verified to ensure that LED D41 is on.

5.3 Hotel ID Re-initialization

In the event the Hotel ID code of the premise is changed with a new FDU or ATLAS configuration, or a problem is suspected with the current configuration, the RAC 4 will need its Hotel ID to be re-initialized.

1. Note down the current DIP switch bank SW2 settings on the controller board (B) as this is the current delay setting for the peripherals used.
2. Set the switches on DIP switch bank SW2 on the controller board (B) to CFG #16 (OFF, OFF, OFF, OFF) as per Annex A, Table 4.
3. Verify that the initialization LED (D41) is OFF.
4. Set the DIP switch positions back to the chosen access delay settings as noted above, or reset based on values shown in Annex A, Table 4.
5. For **swipe card readers:** swipe a new initialization keycard, programmed by the new FDU/ATLAS system, through the swipe card reader. The red and green LEDs on the card reader will flash in sequence: red + green once, followed by green once. Alternatively the controller board (B) can be verified to ensure that LED D41 is ON.

For **insert card readers:** insert a new initialization keycard, programmed by the new FDU/ATLAS system, into the insert card reader. Verify that LED D41 on the controller board (B) is ON.

For **Contactless card readers**: present a new initialization keycard, programmed by the new FDU/ATLAS System, to the contactless reader. The green LED on the contactless reader should turn off in sequence: rapid twice, followed by normal once. Alternatively the controller board (B) can be verified to ensure that LED D41 is on.

5.4 Programming and Auditing

IMPORTANT:

Programming of the RAC 4 can only be done with the following versions of programming device software:

- ATLAS: software version 1.0 or higher
- Kaba Ilco 780 FDU: software version 6.40 or higher
- Kaba Ilco FDU 4 (G4): all versions

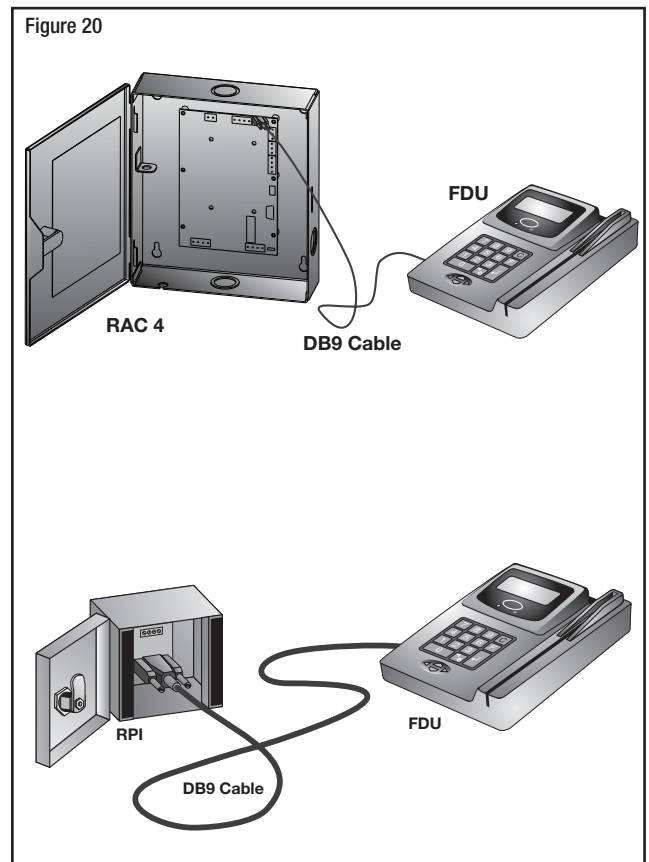
The RAC 4 can be programmed using either an FDU or ATLAS system. Refer to the appropriate steps below based on the hotel's programming system.

NOTE:

- If a Remote Programming Interface (RPI) is connected the RAC 4 can be programmed directly via the connector in the RPI.
- Unlike Kaba's electronic locks a Programming keycard is not required for the RAC 4 as the system is already in programming mode.

FDU Programming

1. Link the FDU to the DB1 in the RPI box, or to the DB9 connector (serial port J5) on the controller PCB. Refer to figure 20 for the positions of the relevant connectors.
2. For step-by-step programming instructions refer to the Kaba Ilco Lodging Access Control Reference Manual.

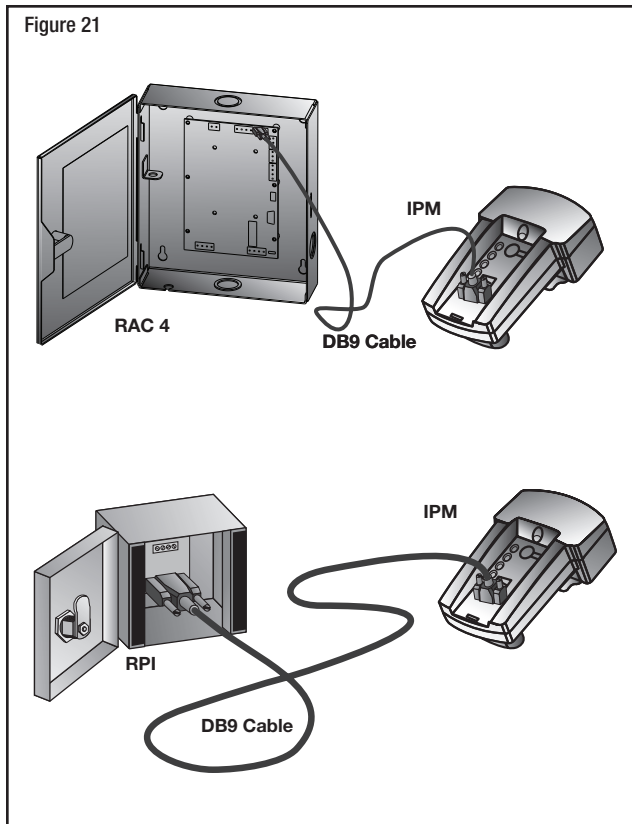


ATLAS Programming

For ease of programming the IPM kit for RAC (PN 064-511161) can be used by attaching the IPM to the RAC with the Velcro provided in the kit.

- Cut a piece of each type of Velcro from the strip provided.
 - Depending on the configuration of the system attach one side of the Velcro to either the side of the RPI, or to the side of the RAC 4 enclosure.
 - Attach the other side to the side of the IPM.
1. Connect one side of the DB-9 serial cable to the IPM.
 2. Connect the other side to the DB-9 connector (serial port J5) on the controller PCB of the RAC 4.
 3. For step-by-step programming instructions refer to the ATLAS on-line help or the ATLAS Administration manual.

Figure 21



5.6 Loading Recommendations



CAUTION:

Do not exceed the load limitations of the control panel.

The maximum recommended load for the output relay in the RAC 4 system is 1 Amp at 30 VDC.

The current supplied by the controller PCB is for the locking device used is 0.75 Amps from connector J18, pin 1. Refer to Annex A, Table 3.

5.7 System Deactivation

In order to deactivate the card reader control panel, disconnect the AC power either by removing the power adaptor from the wall outlet, or by shutting off the main breaker switch for the AC line to the wall outlet the control panel is connected to.

5.5 Power Failure

In the event of an electrical failure, the system will recover automatically and should require no additional programming if the electrical power is restored within 3 days.

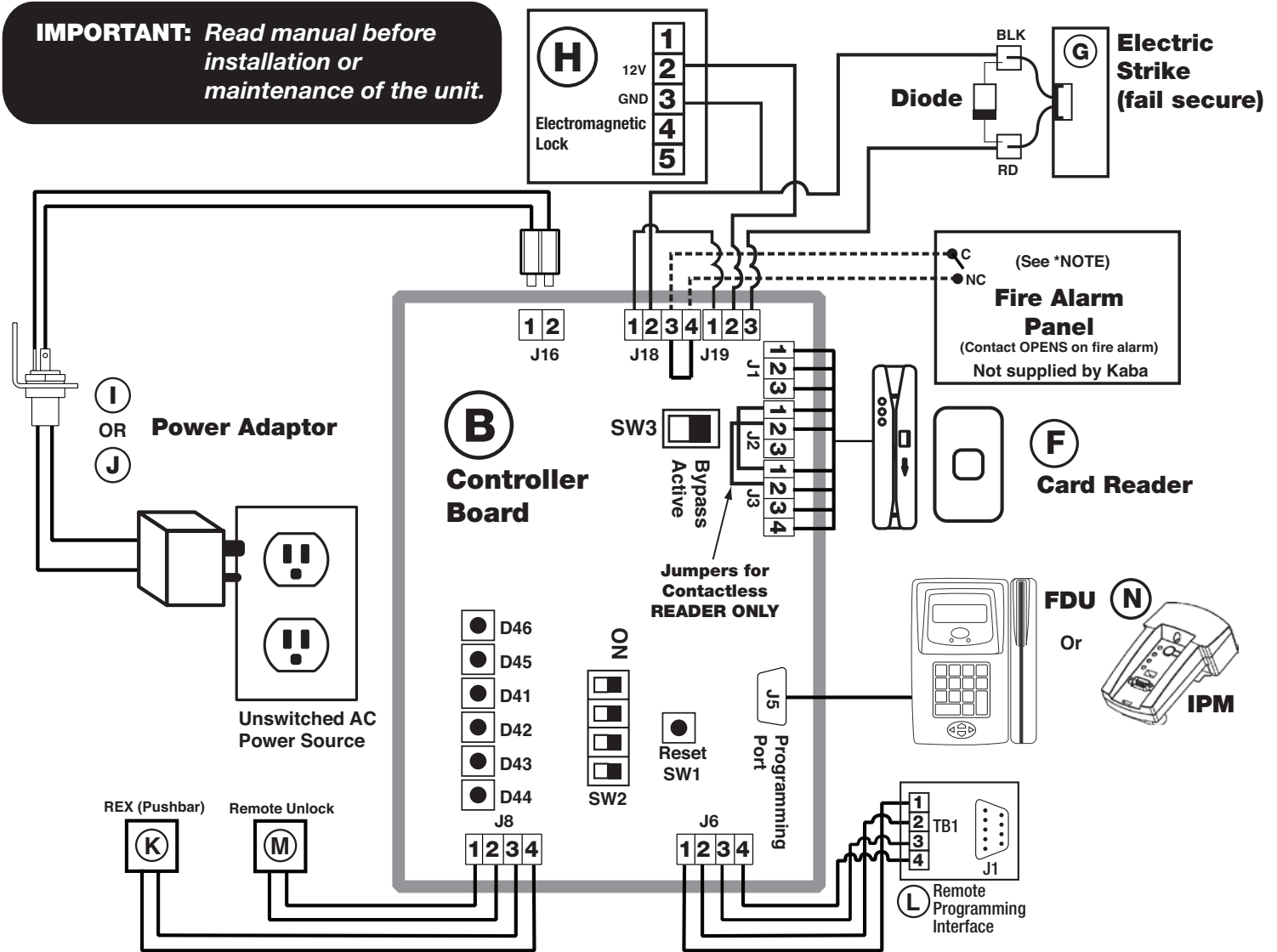
When electrical power is restored after a power failure, verify the status of the LED D41 on the controller board (B). Refer to Annex A, Table 3 for Status LED definitions. If the LED is OFF use an initialization card with the reader and perform a time reset on the RAC 4 as per the FDU or ATLAS manuals.

NOTE: When the power to the RAC 4 is lost, the controller PCB stops functioning and the on-board relay will return to its normal state. Any peripheral connected to the relay will then be either in a normally open (NO) or normally closed (NC) state, dependent on the wiring.

Remote Access Controller - RAC 4

*NOTE: Remove short from connector J18, pins 3 and 4, if fire panel contact remote interface is used

Exit Device for Push Bar Pannex and Motion Detector (See Instruction Booklet)



* For readers refer to reader install sheets.

Note: Connections required are dependant on system options purchased.
 Part numbers indicated subject to change.
 Please refer to ordering guide for current numbering.
 See detailed peripheral connections in Annex B.
 For latest part numbers please refer to the latest ordering guide or contact Kaba Customer Support.

6.0 Annex A Wiring Diagram and Tables

Table 1

Controller Board - RAC 4 Card Reader Connections									
Controller Board		Swipe	Insert	Contactless					
		R71-6XXX	R71-4XXX	R79K-1XX-XX		R79-1N1		R79-1E1	
Signal	Reader Config Ingress	Wire Color	Wire Color	Wire Color	Term Block	Wire Color	Term Block	Wire Color	Term Block
Vcc (5V)	J1 pin 1	-	-	-	-	RED	TB-2		
GND	J1 pin 2	PURPLE / BLACK	PURPLE / BLACK	BLACK	J4-2	BLACK	TB-1	BLACK	TB-7
12V	J1 pin 3	PURPLE	PURPLE	RED	J4-1	-	-	RED	TB-6
Data +	J2 pin 1	WHITE	WHITE	WHITE	J5-2	WHITE	TB-4	WHITE	TB-4
Data -	J2 pin 2	WHITE / BLACK	WHITE / BLACK	GREEN	J5-1	GREEN	TB-3	GREEN	TB-3
-	J2 pin 3	-	-	-	-	-	-	-	-
Green LED +	J3 pin 1	RED	RED	-	-	-	-	-	-
Green LED -	J3 pin 2	RED / BLACK	RED / BLACK	-	-	-	-	-	-
Red LED +	J3 pin 3	YELLOW	YELLOW	-	-	-	-	-	-
Red LED -	J3 pin 4	YELLOW / BLACK	YELLOW / BLACK	-	-	-	-	-	-

(1) Verify correct swipe reader model before connecting wires. (2) Contactless reader jumper wires must be installed as per wiring diagram:
J2 pin 1 to J3 pin 1 & J2 pin 2 to J3 pin 2 for Ingress
J12 pin 1 to J13 pin 1 & J12 pin 2 to J13 pin 2 for Egress.

(3) Wire connection to back of contactless card reader. (4) TB-1 (BLACK)
TB-2 (RED)
TB-5 (YELLOW)
Factory Connected

Table 3

Controller Board - RAC 4 Peripherals Connections			
Controller Board		Peripheral	
Signal	PCB Conn.	Wire / Conn.	Description
DB9	J5	-	Programming
GND	J6 pin 1	TB1 pin 1	Remote Programming Interface (L)
RX	J6 pin 2	TB1 pin 2	
TX	J6 pin 3	TB1 pin 3	
CGND	J6 pin 4	TB1 pin 4	
REM UNL	J8 pin 1	-	Remote unlock (M)
GND	J8 pin 2	-	
REX	J8 pin 3	-	Request to Exit (K)
GND	J8 pin 4	-	
12V	J16 pin 1	RED	Power Adaptor (E) or (F)
GND	J16 pin 2	BLACK	
FIRE ALM	J18 pin 3	BLACK	Fire Alarm
GND	J18 pin 4	BLACK	
12V LCK	J18 pin 1	-	Strike (H) or Maglock (I)
GND	J18 pin 2	-	
COM	J19 pin 1	-	
NC	J19 pin 2	-	
NO	J19 pin 3	-	

Table 4

Access Delay (SW2 on PCB)					
CFG	1	2	3	4	Sec.
1	ON	ON	ON	ON	8
2	OFF	ON	ON	ON	1
3	ON	OFF	ON	ON	3
4	OFF	OFF	ON	ON	5
5	ON	ON	OFF	ON	10
6	OFF	ON	OFF	ON	15
7	ON	OFF	OFF	ON	20
8	OFF	OFF	OFF	ON	25
9	ON	ON	ON	OFF	30
10	OFF	ON	ON	OFF	35
11	ON	OFF	ON	OFF	40
12	OFF	OFF	ON	OFF	50
13	ON	ON	OFF	OFF	60
14	OFF	ON	OFF	OFF	90
15	ON	OFF	OFF	OFF	120
16	OFF	OFF	OFF	OFF	RE-INIT

Table 2

PCB Status LEDs	
LED	Description
D41	Initialization
D42	Programming
D43	Access
D44	Relay 0
D45	Functionality 1
D46	Functionality 2

6.0 Annex B Peripheral Wiring Diagrams

Figure 1: Contactless Reader Wiring

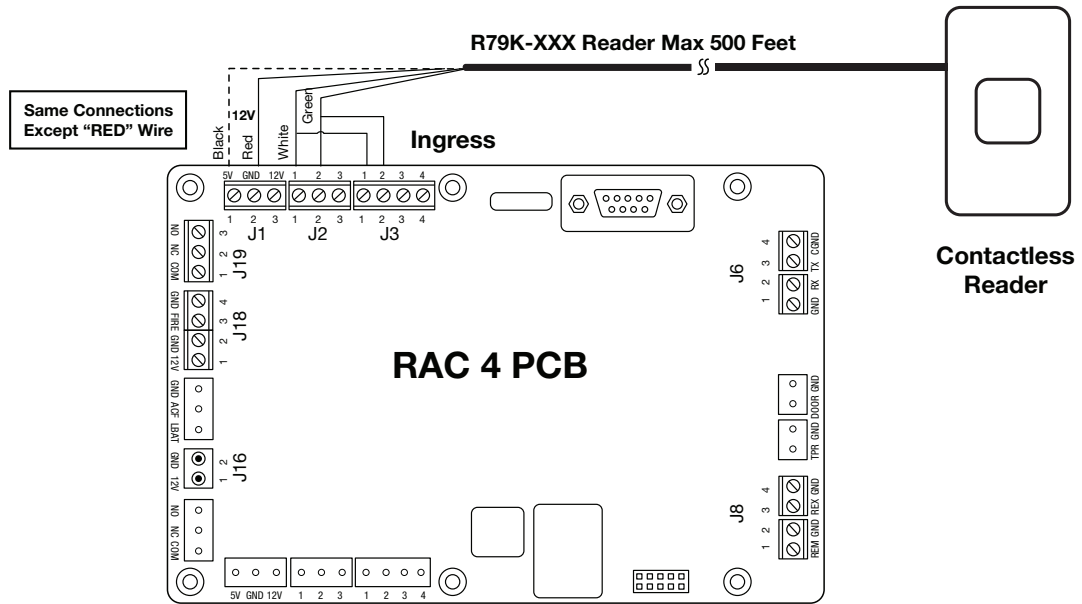


Figure 2: Contactless Reader Wiring

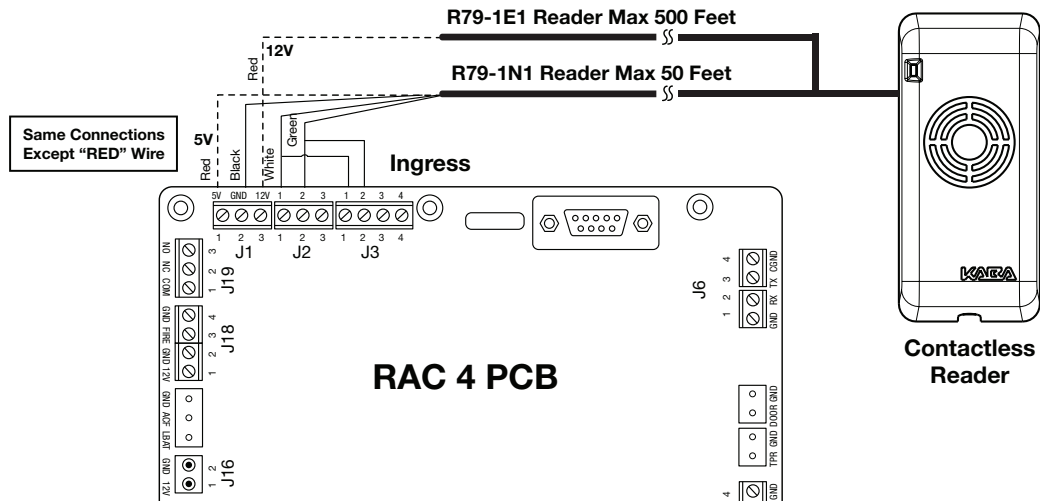
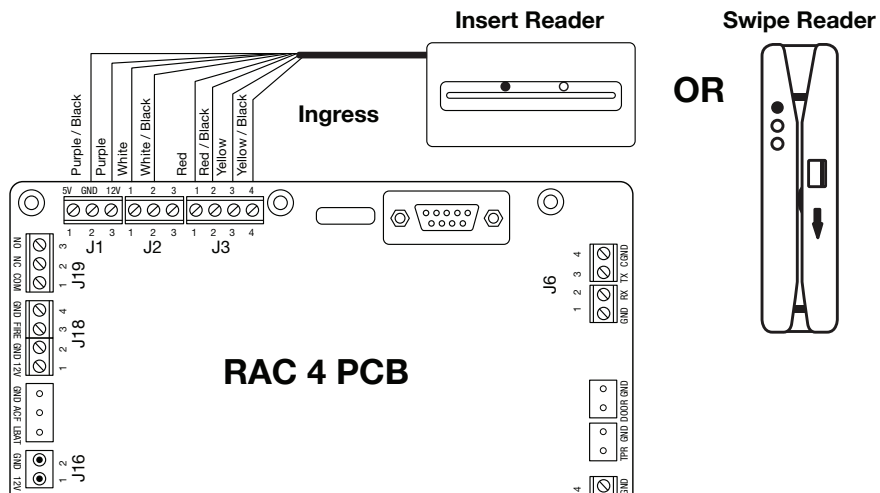


Figure 3: Insert and Swipe Reader Wiring



6.0 Annex B Peripheral Wiring Diagrams

Figure 4: Strike Wiring (Fail Secure)

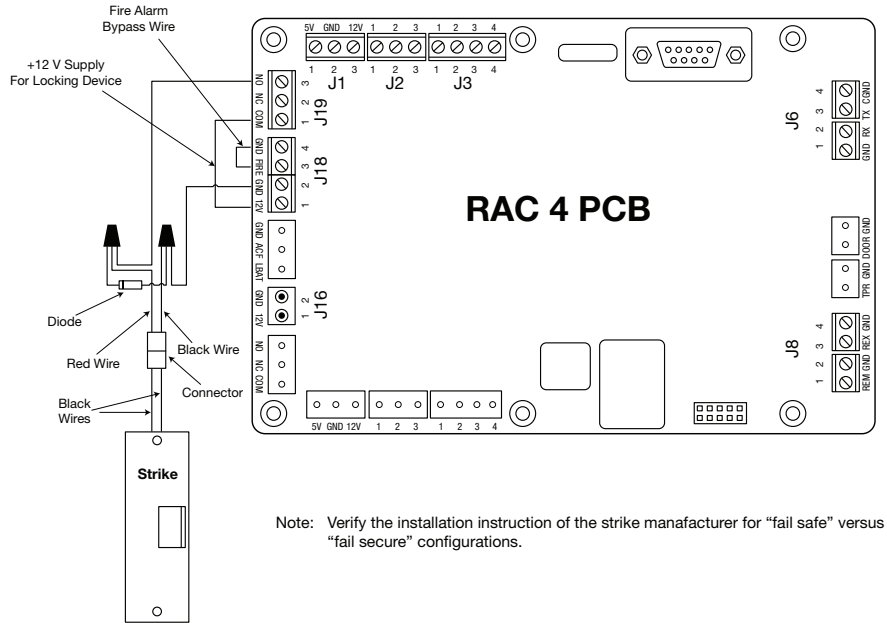
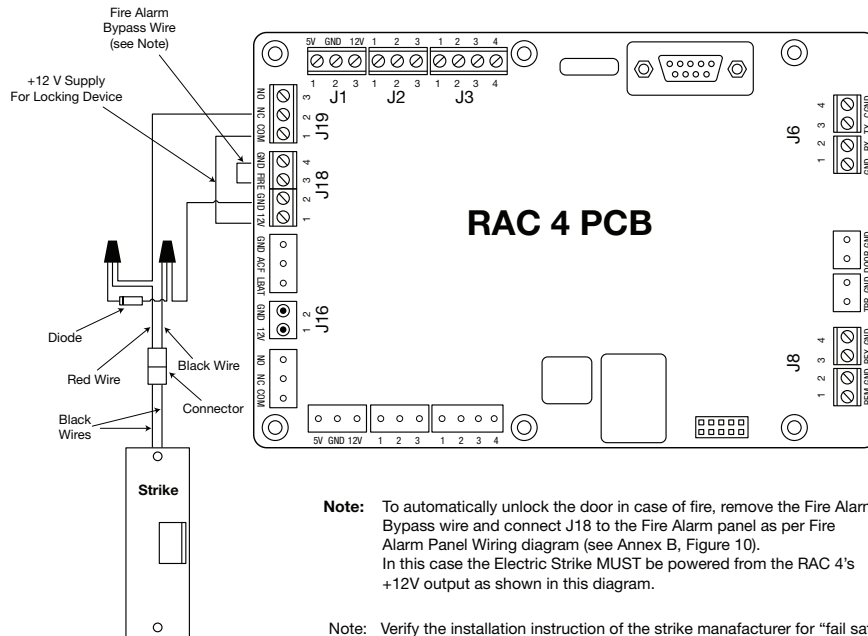
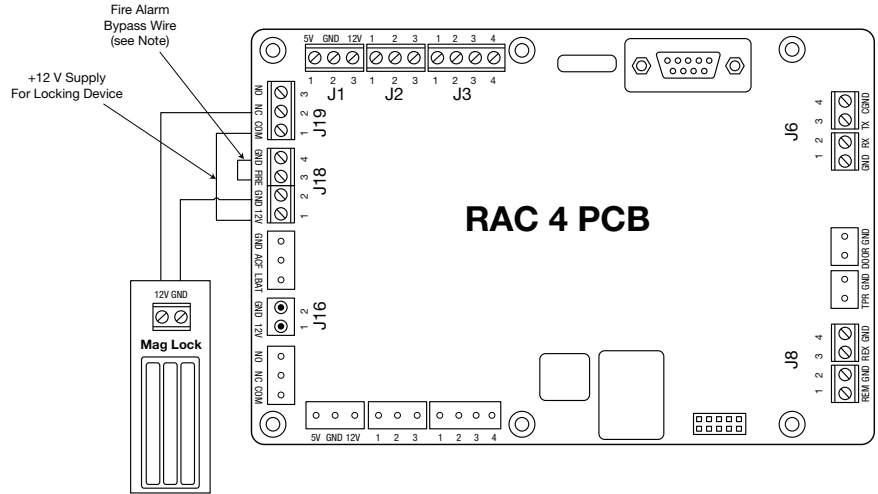


Figure 5: Strike Wiring (Fail Safe)



6.0 Annex B Peripheral Wiring Diagrams

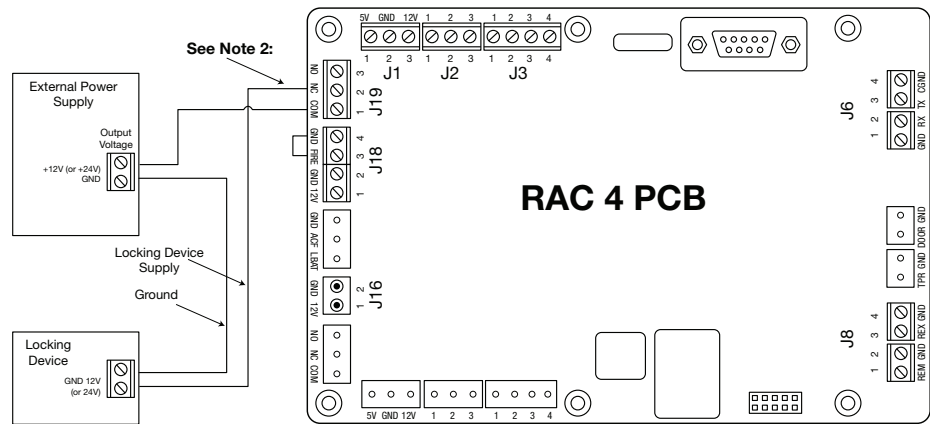
Figure 6: Electromagnetic Lock Wiring



Note: To automatically unlock the door in case of fire, remove the Fire Alarm Bypass wire and connect J18 to the Fire Alarm panel as per Fire Alarm Panel Wiring diagram (see Annex B, Figure 10). In this case the Electromagnetic Lock MUST be powered from the RAC 4's +12V output as shown in this diagram.

Figure 7: Externally Powered Locking Device Wiring (+12 volts or + 24 volts)

IMPORTANT: Kaba does not provide Technical or Field Support on 3rd party locking devices. Please contact the device manufacturer for assistance on installation or functional issues.

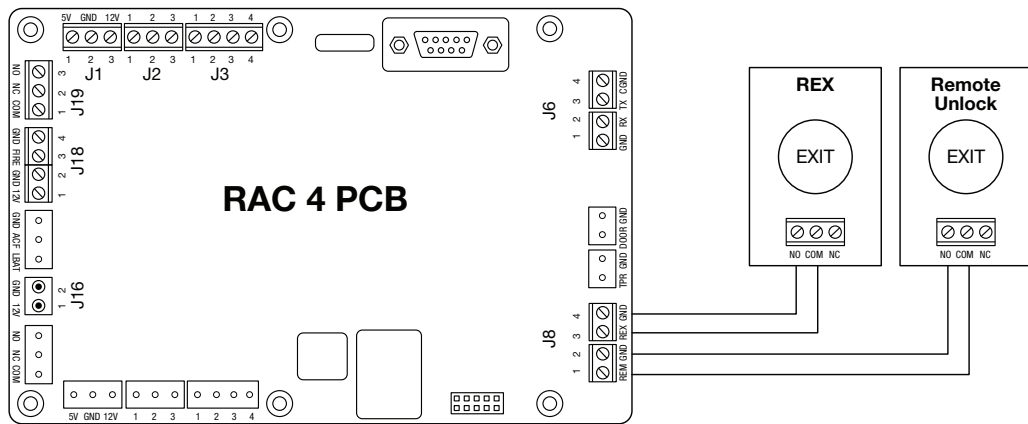


Note 1: If the locking device is inductive (such as a strike) place a diode across the locking device's terminals as shown in the strike wiring diagrams.

Note 2: Dependent on locking device type, may connect to Normally Open (NO) or Normally Closed (NC)

6.0 Annex B Peripheral Wiring Diagrams

Figure 8: Request to Exit (REX) or Remote Unlock Button Wiring



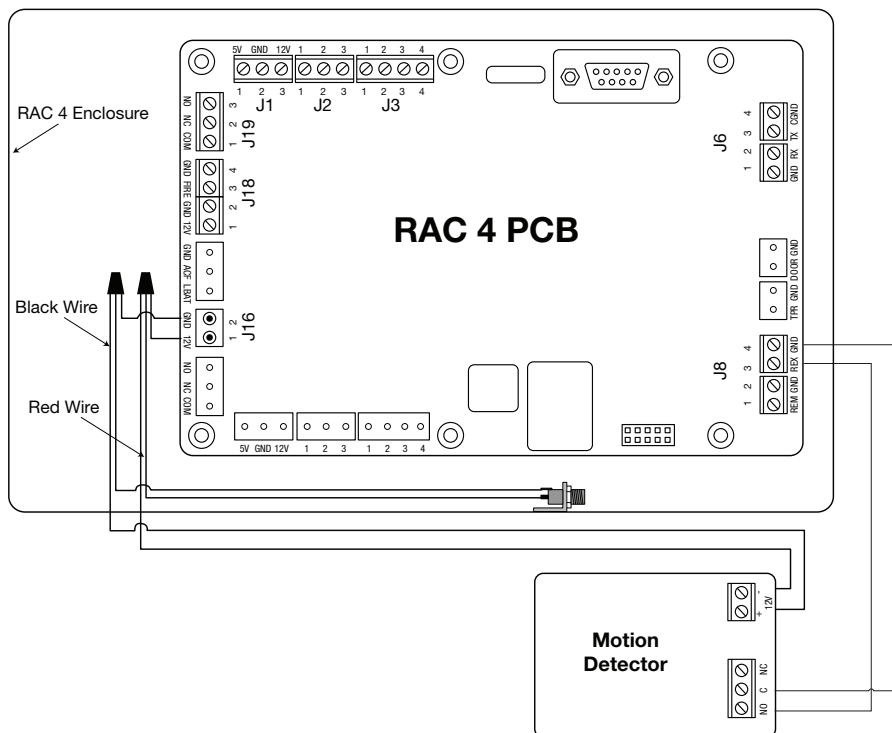
The Remote Unlock input (J8, pins 1 & 2) unlocks the door only for the delay set by the DIP switches, EVEN if the button stays pressed.

The REX input (J8, pins 3 & 4) unlocks the door for as long as the button is pressed PLUS the delay set by the DIP switches.

The Exit Button can be connected to either the Remote Unlock or the REX input, depending on the required functionality. In both cases, the wires should be connected to the Normally Open contact of the Exit button.

In general, a Motion Detector or a manual override should be connected to the REX input (J8, pins 3 & 4).

Figure 9: Motion Detector Wiring



6.0 Annex B Peripheral Wiring Diagrams

Figure 10: Remote Programming Interface (RPI) Wiring

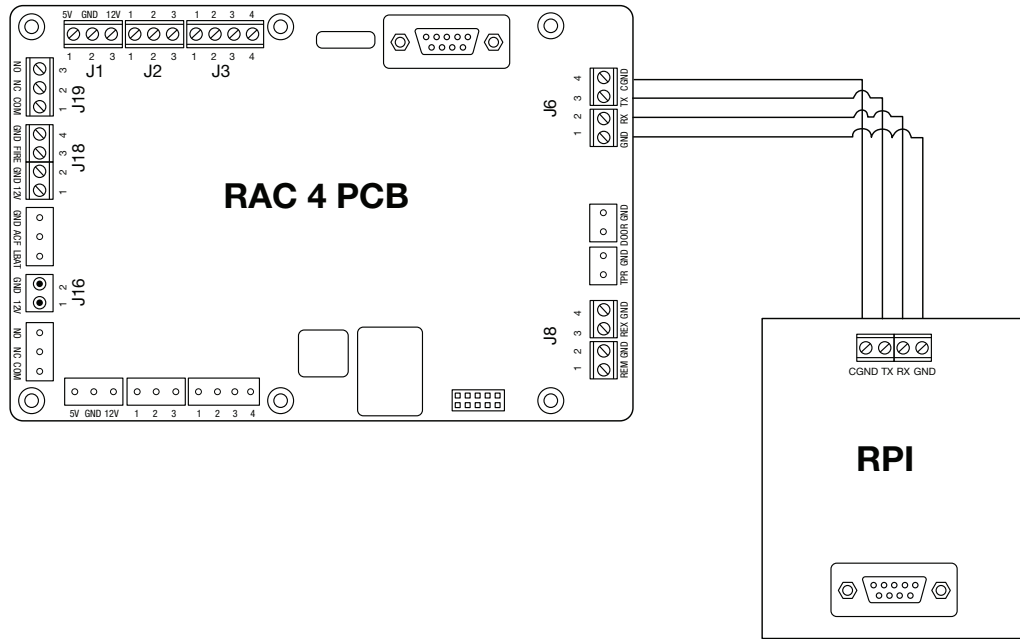
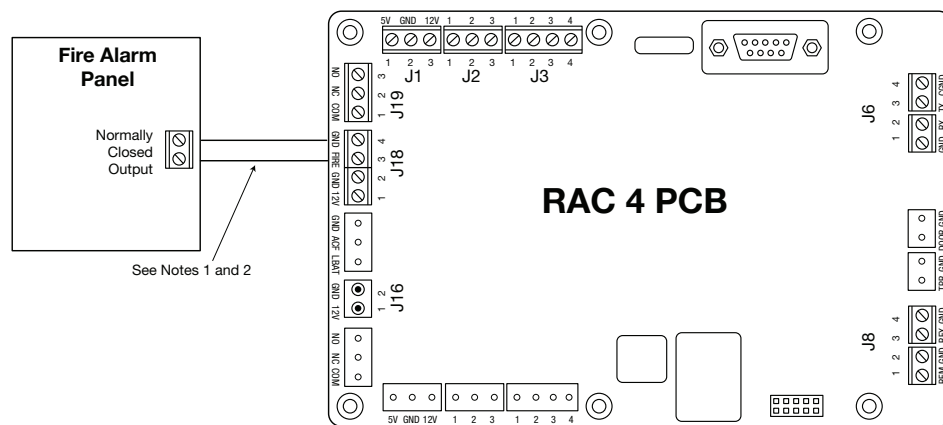


Figure 11: Fire Alarm Panel Wiring



See Notes 1 and 2

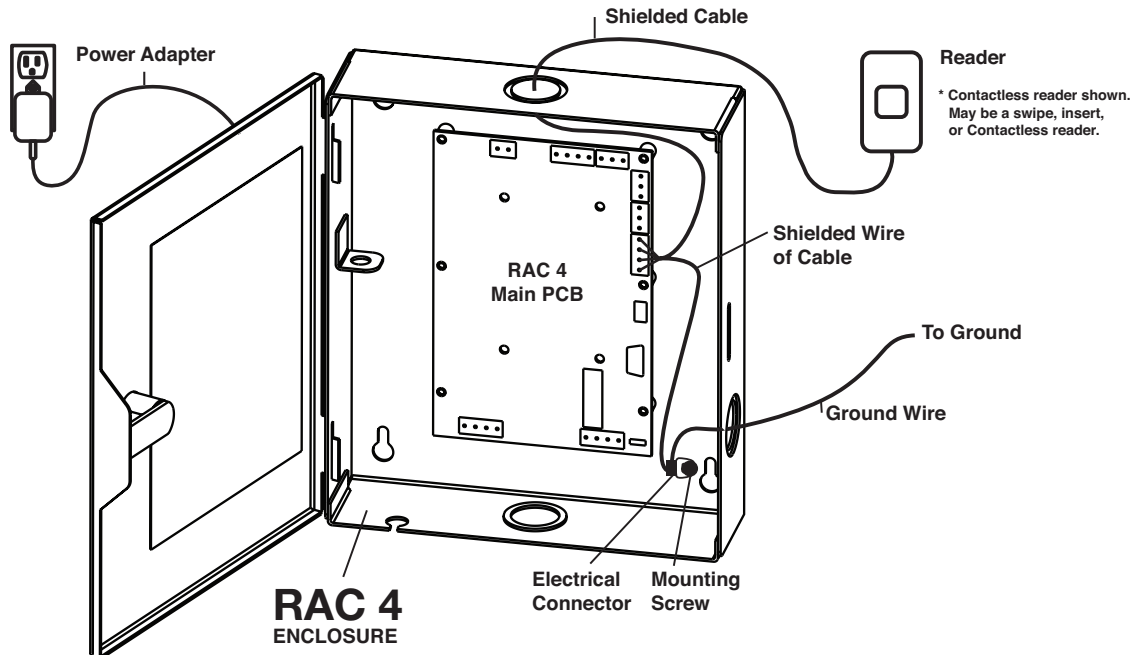
Note 1: When the RAC 4/4XT is connected to a Fire Alarm Panel, it must be connected to a Normally Closed dry contact output.

Note 2: If the Fire Alarm Panel connection is not required, place a jumper wire between pin 3 and 4 of J18.

6.0 Annex C Protection from Electromagnetic Interference

As per any other electronic equipment, the RAC 4 can be affected by electromagnetic interference caused by industrial electrical equipment such as elevator motors.

To prevent the unit from operational instability such as "freezing" or losing programming, shielded cables should be used and connections made as per the diagram below.



- 1- Use shielded cables for the reader
- 2- Connect the shield wire of the reader cable to the Ground wire
- 3- Connect the wires to the Mounting screw of the RAC.
(Remove the paint under the mounting screw of good electrical contact.)

6.0 Annex D Quick Troubleshooting Guide

The following sections show basic troubleshooting for some common problems that may occur during installation. Each section relates to a specific type of problem, namely:

- Power Troubleshooting
- Card Reading Troubleshooting
- External Inputs Troubleshooting
- Locking Device Troubleshooting
- Relay Expansion Board Troubleshooting
- Programming and Auditing Troubleshooting

For detailed assistance, please contact Technical Support as indicated at the start of this manual.

1. Power Troubleshooting

Symptom	Action
All controller board (B) LEDs are OFF	<ul style="list-style-type: none">- Verify that the RAC 4 controller is connected properly to the power adaptor as per Annex A, Table 1.- Verify that AC power is active for the wall mount power adaptor.- If qualified, with a multi-meter verify that 12VDC is present across J16-1 and J16-2 with the power adaptor connected and AC power turned on.

2. Card Reading Troubleshooting

Symptom	Action
Swipe reader green Arrow LED is OFF	<ul style="list-style-type: none">- Verify that the RAC 4 is powered.- Verify the wiring to the card reader.
Initialization card not accepted	<ul style="list-style-type: none">- If the Initialization LED (D41) on the RAC 4 controller is ON:<ul style="list-style-type: none">• The RAC 4 has already been initialized. To re-initialize the reader, follow the procedure described in section 5.3 “Hotel ID Re-initialization”.- If the Initialization LED (D41) on the RAC 4 controller is OFF:<ul style="list-style-type: none">• As per section 5.2 “Hotel ID Initialization”, create a new Initialization card with the FDU or ATLAS and swipe it in the card reader. The Initialization LED (D41) should now be on.

6.0 Annex D Quick Troubleshooting Guide

2. Card Reading Troubleshooting Continued

Symptom	Action
No feedback on swipe reader when using a programmed card.	<ul style="list-style-type: none">- Verify that the RAC 4 controller is active: the Functionality 1 (D45) and Functionality 2 (D46) LEDs should blink. If not, reset the RAC 4 Controller: press the Reset switch (SW1) or disconnect and reconnect the power.- Verify the wiring to the reader.- As a card is being used with the reader, verify that the data present LED (D34) illuminates during swiping.- Verify that the card is encoded properly.- Verify that the time is correct, both on the RAC 4 and the FDU (or Atlas). If not, do a Reset Lock Time.- Re-program the RAC 4.
No response to valid contactless keycard LED stays solid green.	<ul style="list-style-type: none">- Verify that the contactless reader is wired properly, including the 2 required jumper wires as per Annex A, Table 5.

3. External Inputs Troubleshooting

Symptom	Action
Request to Exit does not work	<ul style="list-style-type: none">- Verify that the REX LED (D33) on the RAC 4 controller turns on when the button is pressed. If not, verify the wiring to the Request to Exit button.
Remote Unlock does not work	<ul style="list-style-type: none">- Verify that the Remote Unlock LED (D36) on the RAC 4 controller turns on when the button is pressed. If not, verify the wiring to the Remote Unlock button.

6.0 Annex D Quick Troubleshooting Guide

4. Locking Device Troubleshooting

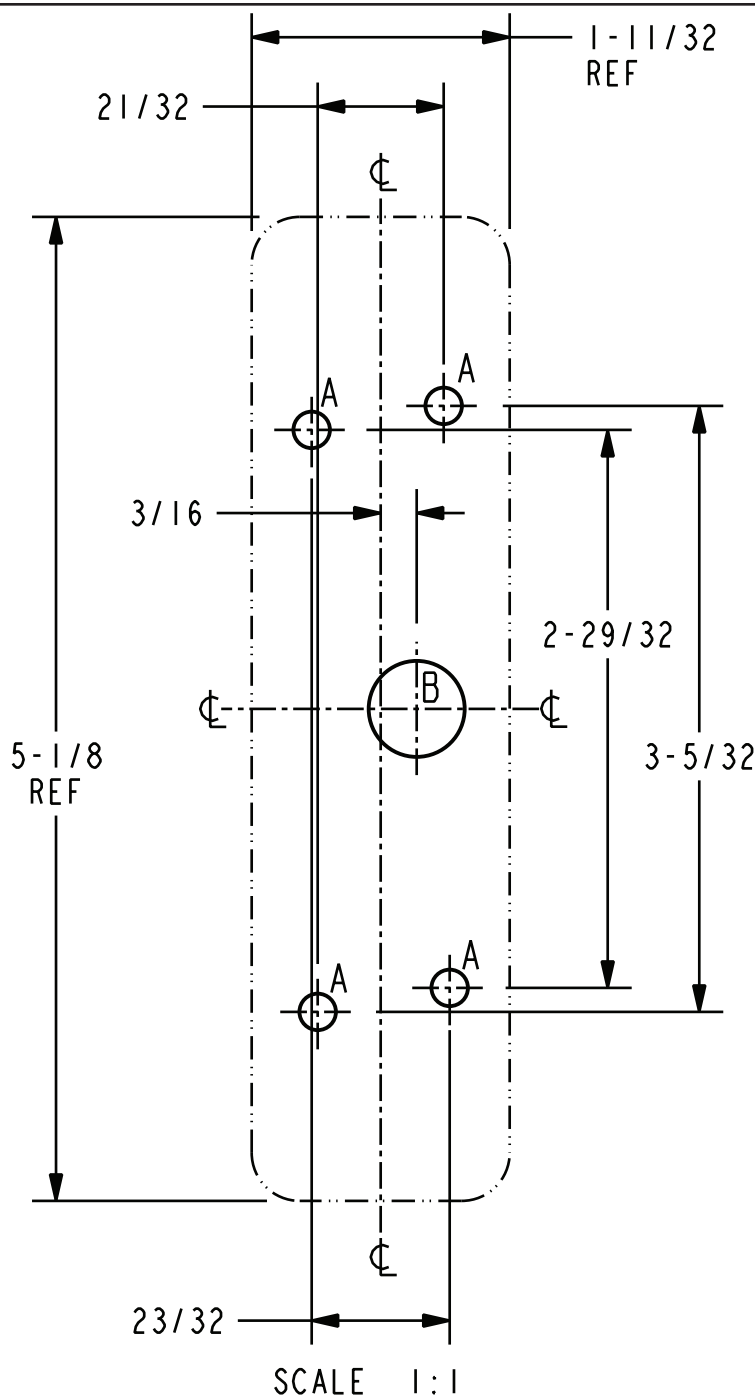
Symptom	Action
Locking Device always unlocked	<ul style="list-style-type: none">- If the Locking Device Relay LED (D31) on the RAC 4 controller is ON:<ul style="list-style-type: none">• Verify that the delay setting of the DIP switch (SW2) is correct.• Verify that the lock is in not Passage Mode.- If the Locking Device Relay LED (D31) on the RAC 4 controller is OFF:<ul style="list-style-type: none">• Verify that the Bypass switch is not active (Bypass LED, D21, is OFF).• Verify that the Fire Alarm input not active (Input contact closed, Fire Alarm LED, D47, is ON).• Verify the wiring to the locking device.
Locking device does not unlock	<ul style="list-style-type: none">- If the Locking Device Relay LED (D31) turns on:<ul style="list-style-type: none">• Verify that the Fire Alarm input is not active (Input contact closed, Fire Alarm LED, D47, is on).• Verify the wiring to the locking device.- If a diode is installed on the locking device, verify the polarity.- If the locking device Relay LED (D31) does not turn on:<ul style="list-style-type: none">• Verify that the Request to Exit or Remote Unlock activation unlocks the door.• Verify that the card is encoded properly.• Verify that the RAC 4 is not in Lockout mode.• Verify that the RAC 4 is programmed properly.
Fire Alarm does not Unlock door	<ul style="list-style-type: none">- Verify that the Fire Alarm input is connected to a Normally Closed contact.- Verify that the Fire Alarm LED (D47) is normally on and turns off when the Fire Alarm is present.- Verify that the 12V_Lock output of the RAC 4 controller is connected to the COMMON of the locking device relay.
RAC 4 Controller PCB resets when relay is activated	<ul style="list-style-type: none">- Verify that there is no short-circuit on the locking device wiring.- If a diode is installed on the locking device, verify the polarity.

6.0 Annex D Quick Troubleshooting Guide

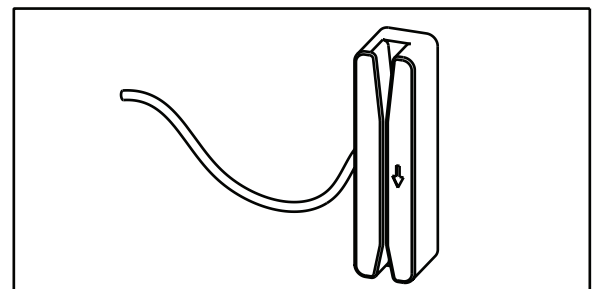
5. Programming and Auditing Troubleshooting

Symptom	Action
Cannot program or audit the RAC 4	<ul style="list-style-type: none">- Verify that the RAC 4 controller is active: the Functionality 1 (D45) and Functionality 2 (D46) LEDs should blink. If not, reset the RAC 4 Controller: press the Reset switch (SW1) or disconnect and reconnect the power.- Verify that the cable between the RAC 4 and the FDU or IPM is connected properly.- If the RAC 4 is not initialized (Initialization LED, D41, is OFF)<ul style="list-style-type: none">• Create an Initialization card with the FDU or Atlas and swipe it to initialize the RAC 4. The Initialization LED (D41) should turn on.- If the RAC 4 was already initialized, it may need to be re-initialized:<ul style="list-style-type: none">• Follow the instructions in section 5.3 “Hotel ID Re-Initialization”.

6.0 Annex E Drilling Templates for Swipe Card Reader



HOLE ID	DIM INCH	DIM mm	COMMENTS
A	INSTALLATION WITH DRYWALL INSERT		
	Ø 7/32	Ø 5,5	▽ 1-1/2 (38,1mm) INSTALL 2 SCREWS
	INSTALLATION WITH METAL SCREW		
	Ø 9/64	Ø 3,5	▽ 1/2 (12,7mm) INSTALL 2 SCREWS
B	Ø 1/2	Ø 12,7	-



DRILLING TEMPLATE

SWIPE READER R71-6XX

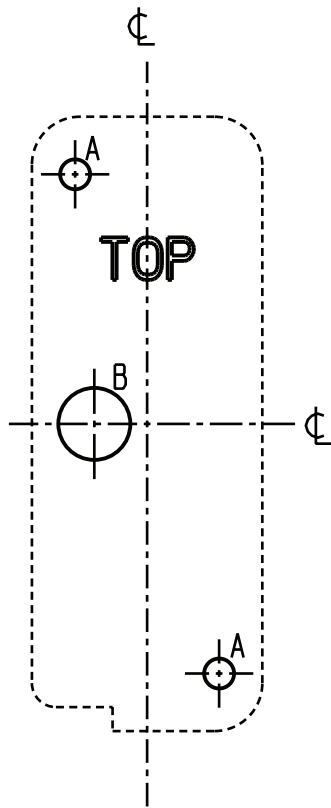
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CONTACT CUSTOMER SUPPORT
1-800-906-4526

6.0 Annex E Drilling Templates for Swipe Card Reader

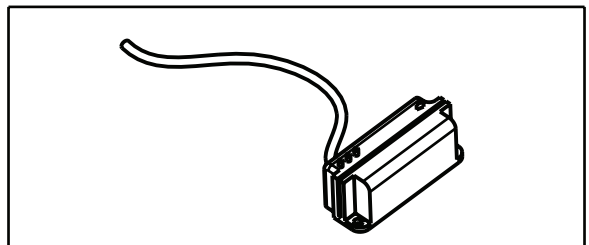


Not to scale

DO NOT REPRODUCE
CONTACT CUSTOMER SUPPORT
1-800-906-4526

HOLE ID	DIM INCH	DIM mm	COMMENTS
A	INSTALLATION WITH DRYWALL INSERT		
	Ø 7/32	Ø 5,5	▽ 1-1/2 (38,1mm)
A	INSTALLATION WITH METAL SCREWS		
	Ø 9/64	Ø 3,5	▽ 1-1/2 (38,1mm)
B	Ø 3/8	Ø 9,5	-

UNLESS OTHERWISE NOTED:
PART IS SYMETRICAL ABOUT C .



DRILLING TEMPLATE
SWIPE READER

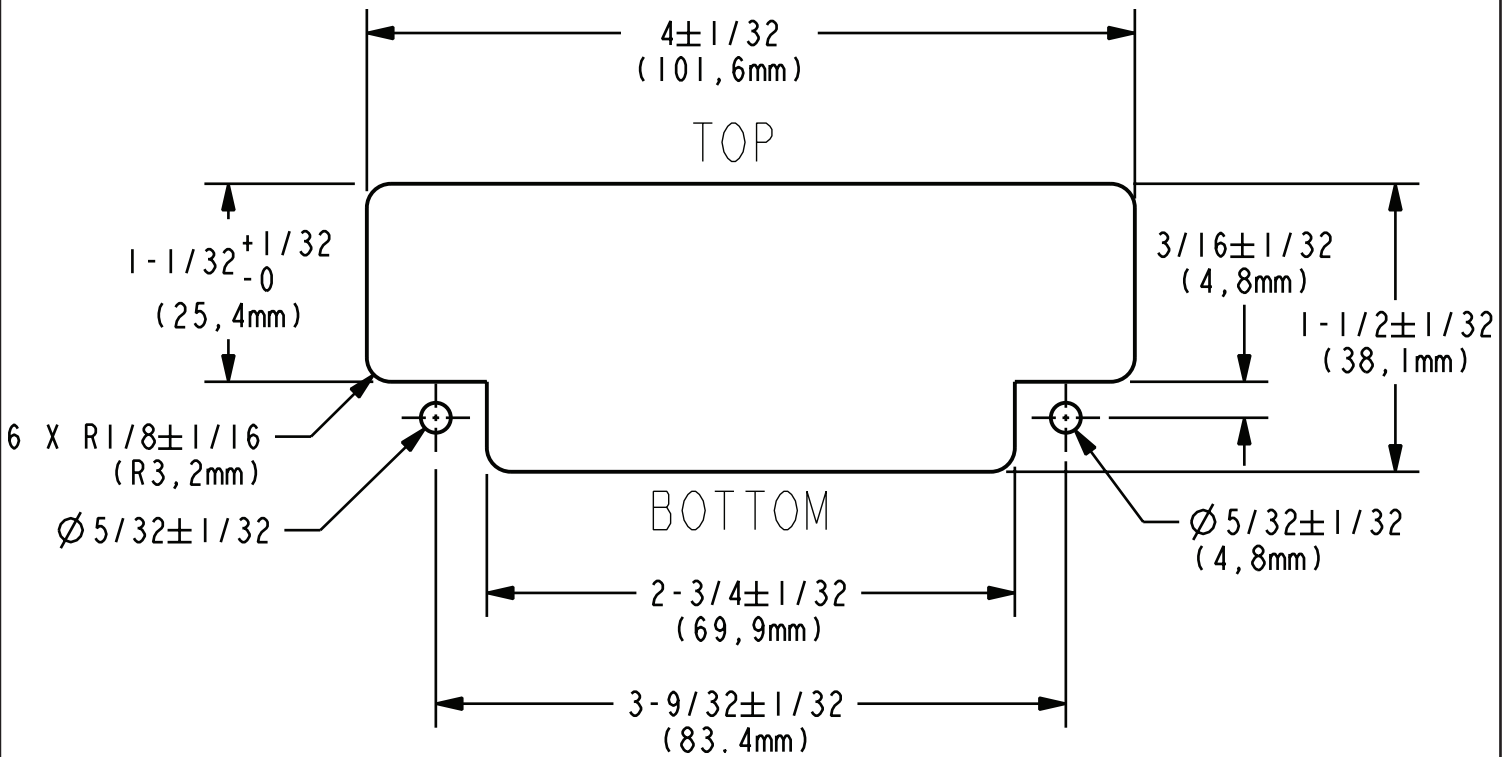
2 HOLES PATTERN

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H4P 2G7
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SHEET 1 OF 1	ECN 12070	DT-511968	REV-1
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6.0 Annex F Drilling Template for Insert Card Reader

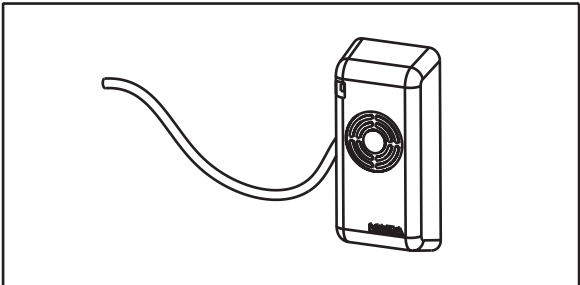
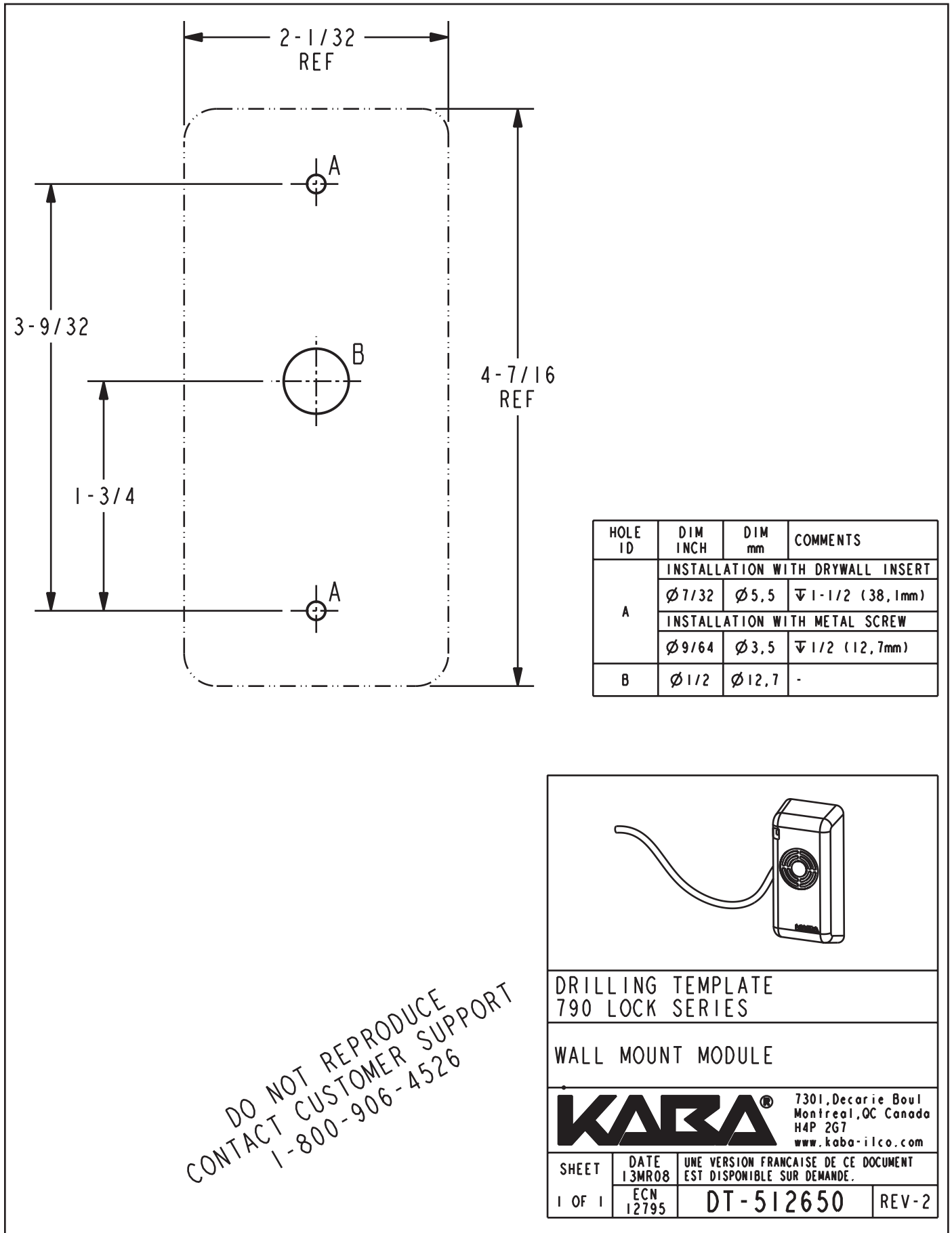
NOTES:
 - SYMBOLS: - ∇ DEEP
 - CL CENTER LINE OF DOOR
 - \varnothing DIAMETER
 - \leftarrow NOT TO SCALE



DO NOT REPRODUCE
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	DRILLING TEMPLATE R71-4 INSERT READER		
DT-512152	SHEET 1 OF 1	REV-2	ECN 12449

6.0 Annex G Drilling Template for Contactless Card Reader



DRILLING TEMPLATE
790 LOCK SERIES

WALL MOUNT MODULE

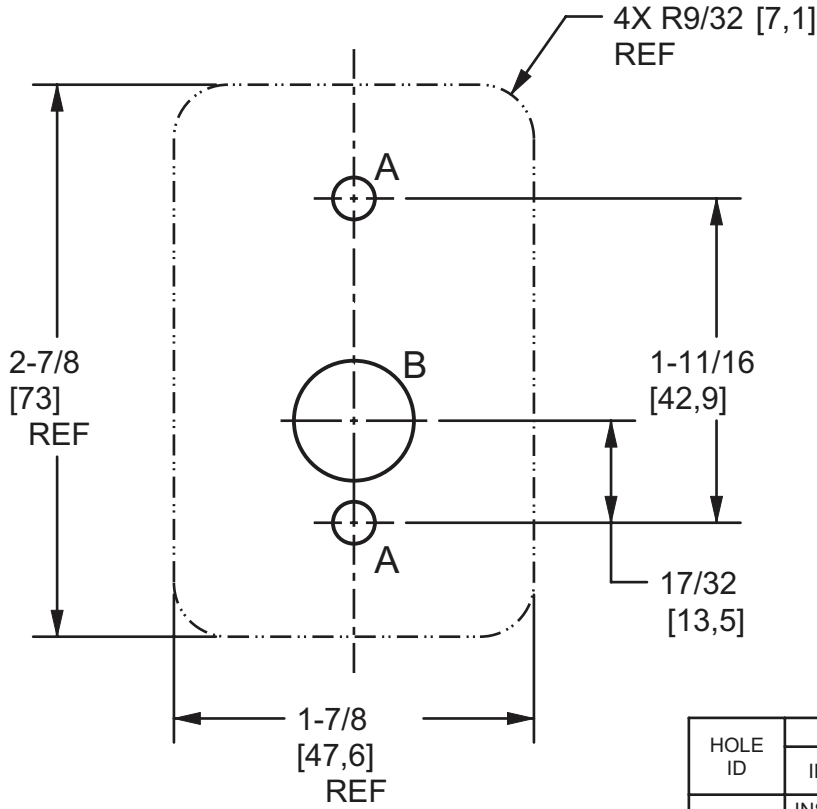


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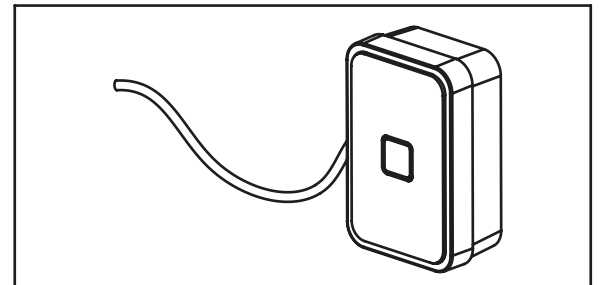
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6.0 Annex H Drilling Template for Contactless Card Reader



HOLE ID	DIM		COMMENTS INCH[mm]
	INCH	[mm]	
A	INSTALLATION WITH DRYWALL INSERT		
	Ø 7/32	Ø 5,6	▽ 1-1/2 [38,1]
	INSTALLATION WITH METAL SCREW		
	Ø 9/64	Ø 3,6	▽ 1/2 [12,7]
B	Ø 5/8	Ø 15,9	-

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DRILLING TEMPLATE
RFID WALL READER R79K

SURFACE MOUNT MODULE



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BEYOND SECURITY



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