

# RAC5 MFC



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EN



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# 1 Introduction and Disclaimers

**Please read and follow all directions carefully.**

These instructions are designed for use by qualified installers or individuals with knowledge of common safety practices and the competence to perform the steps described herein.

## IMPORTANT

dormakaba Canada Inc. is not responsible for damage or malfunction due to incorrect installation. The dormakaba RAC5 MFC is intended for guest pass level elevator floor control only and is not designed to provide any Emergency/Fire Recall operations or control. Emergency/Fire Recall operations and control are managed by separate elevator control systems and outside of the dormakaba RAC5 MFC system.

## ⚠ CAUTION

Carefully inspect windows, doorframes, doors, etc. to ensure that the installation not cover damages caused by installation.

## ⚠ WARNING

Installation of card readers or other peripherals within elevators must only be done with prior consultation of the elevator manufacturer. A technician from the elevator manufacturer should always be present for installation. Do not connect to a receptacle controlled by a switch.

If installing the RAC5 MFC 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.

The Table below outlines Access Control Levels as they pertain to certain Features.

| Feature                                    | Level |
|--------------------------------------------|-------|
| Destructive Attack Level                   | I     |
| Line Security                              | I     |
| Endurance Level                            | IV    |
| Standby Power                              | I     |
| Single Point Locking Device with Key Locks | I     |

RAC5 MFC Model #: T53-XXXXX

Firmware #: FW-516334

**For indoor use only.**

# 1.1 Safety Procedures

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

**⚠ CAUTION** Wear safety glasses when using any tools.

**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
- 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

**Adhere to UL STD 294**

**Adhere to the National Electrical Code ANSI/NFPA 70**

**Statement according to FCC part 15**

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 Product Description

## 2.1 Features

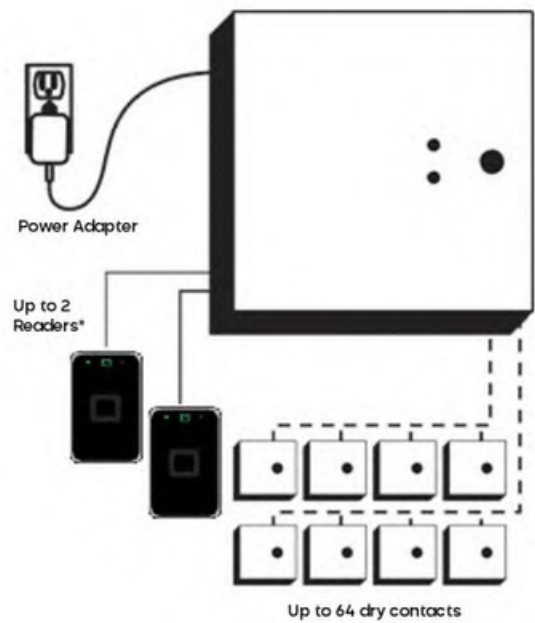
The RAC5MFC is designed to operate either online or stand-alone elevator control units (ECUs). It provides access control and secure stops for multiple floors and functions with RAC5 NFC wall readers and AMBIANCE features. The system can control the RAC5 NFC wall readers up to 1,000 feet (300m) away.

\*Recommended cable is 22AWG CMP cable (Belden 8723 or equivalent).

**NOTE:** For installation of the contactless reader of distances greater than 1,000 feet (300m) please contact dormakaba Canada Inc. Technical Support.

The Contactless Card Reader can be mounted directly on the inside of the elevator car, typically on the elevator call button panel. For surface mount, the surface area required for the contactless reader is 2 7/8" L (73mm) x 1 7/8" W (47.7mm) x 2" D (50.8mm), 2" depth behind panel required. The RAC5 MFC is an access control solution that can operate 2 individual card readers, provides multiple relays, and much more as per the feature list below. See Figure 1 for a typical configuration.

Figure 1 – RAC5 MFC System



### Features

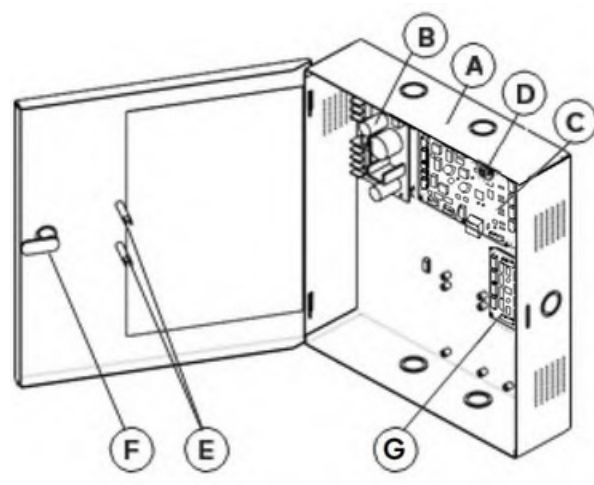
- |                                                                                                                                                                                                                      |                                                                                                                                                                             |                                                                                                                                                                 |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"><li>• Relay Expansion Board (up to 8) with 8 relays each</li><li>• Power failure 3-way auto-recovery; real time clock (RTC)</li><li>• Relay bypassing (passing function)</li></ul> | <ul style="list-style-type: none"><li>• Control up to two card readers</li><li>• Variable access delay programmable via an M-Unit</li><li>• Access Override Input</li></ul> | <ul style="list-style-type: none"><li>• Tamper Alarm Input</li><li>• Power Status LEDs feedback</li><li>• Configurable fail safe or fail secure modes</li></ul> |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|

## 2.2 Components

Refer to Annex D for RAC5 MFC component breakdown.

### 2.2.1 Controller Box

Figure 2 – RAC5 MFC Controller Box



- (A) RAC5 MFC Enclosure & Access Door: Holds the controller board (PCB), power supply and relay expansion board. Knockouts are available on 3 sides for routing of peripheral cables
- (B) Power Supply: Provides the DC power required for operation of the controller PCB and all peripherals
- (C) Controller Board: Controls all the features of the RAC5 MFC system
- (D) Tamper Switch: Attached to the RAC5 MFC enclosure to generate an alarm if the box is opened during operation
- (E) Power & Battery Status LEDs: Provides visual indication of the operational status of the RAC5 MFC system. Battery status LED is only used on battery back-up equipped systems
- (F) Cam-lock with Key: To provide secure locking and to control access to the RAC5 MFC enclosure
- (G) Relay Expansion Board: Interface board providing 8 relay outputs that can be used to control relay-equipped equipment. For example, it can be used with an elevator to call the elevator or to provide access only to specific floors for certain guests and staff. Up to 8 expansion boards of 8 relays each giving up to 64 individual control relays can be added

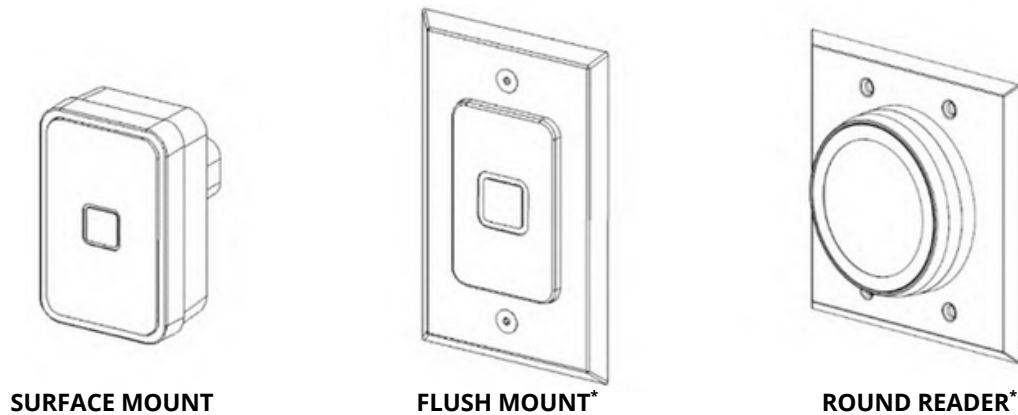
#### Not Shown:

- (H) Cables: Cables required for connections of the LEDs, power supply and controller PCB. If equipped, will also include cable for connection of relay expansion board

## 2.2.2 Contactless Card Reader

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

Figure 3 – Contactless Card Reader



\*NOTE: The included trim plate can be removed for direct mounting of the reader to the elevator panel.

# 3 Checklist and Exploded Views

## 3.1 Parts and Tools List

NOTE: Some items are dependent on the options or configuration purchased. Please ensure all parts ordered and required for installation are available before starting. Parts are subject to change without notice. For letter designations, refer to Figures 3 and 4.

### 3.1.1 RAC5 MFC Enclosure

NOTE: All items below come factory installed.

- (A) RAC5 MFC enclosure with access door
- (B) Power Supply: 24 VAC / 24 VDC input, 12 VDC output
- (C) Controller PCB
- (D) Tamper switch
- (E) 2-panel mounted LEDs (green) for power and battery status
- (F) Cam-lock

### 3.1.2 Relay Expansion Board

- (G) Up to 8 Relay expansion PCB boards, including 4 x 6-connection cable (not shown)

### 3.1.3 Cables (not shown)

NOTE: All items come factory installed.

- (H) System cables: Power supply to LEDs, controller PCB and controller PCB jumpers

### 3.1.4 Card Reader(s)

- (I) Contactless Reader Options (see Figure 3)

## 3.1.5 Power Adapter

**NOTE:** Dependent

(J) 1x International 24 VDC output Adapter with integrated 6-foot (1.8m) power cable and interchangeable AC outlet prongs. Input power requirements of 100-240 VAC, 50 – 60 Hz, 1.0A

**Or**

(K) 1x North America 24 VAC output power adapter with 2 separate 10-foot (3m) power cable assembly (2x 18 AWG cables terminated on one end with fork terminals). Input power requirements of 110-120 VAC, 60 Hz.

## 3.1.6 Installation Hardware Bag

(L) 4x Philips wood screw, #8x1- 1/4"

(M) 4x Nylon anchor, #6-10

(N) 4x Concrete anchor, #7-9

(O) 2x Strain relief connector with locking nut

(P) Ring terminal connector

(Q) 5x Steel flat washer, #8

(R) 2x Crimp fork terminals, 18-22AWG

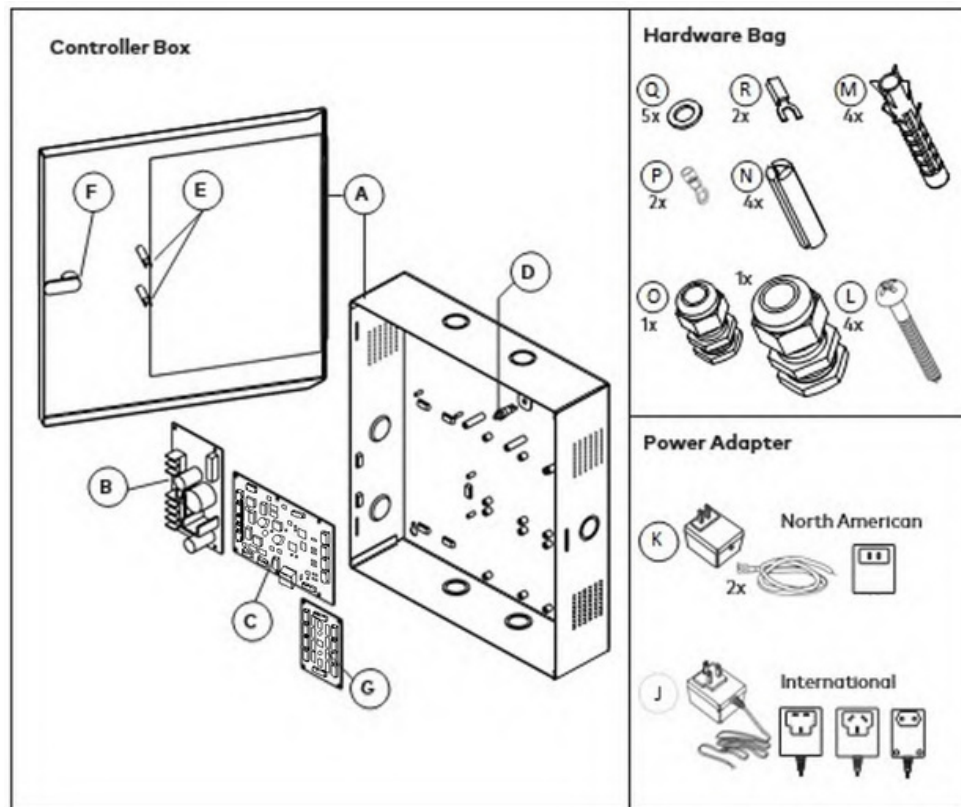
## 3.1.7 Tools Required (not supplied)

Additional tools may be required dependent on the peripherals being installed. The list below covers the installation of the RAC5 MFC enclosure only.

- Safety glasses
- Ink marker
- Electric drill
- 
- 
- 
- 
- Philips screwdriver - #2
- Slotted screwdriver –
- Adjustable wrenches
- Crimp tool – 18-22 AWG
- Pliers
- Wire cutter/stripper
- Hammer or rubber mallet
- Awl or center punch

## 3.2 Exploded View

Figure 4– Exploded View



## 4 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 and wiring of RAC5 MFC enclosure & peripherals must comply with all applicable local building codes and regulations and National Electric Code, ANSI/NFPA 70.

#### CAUTION

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

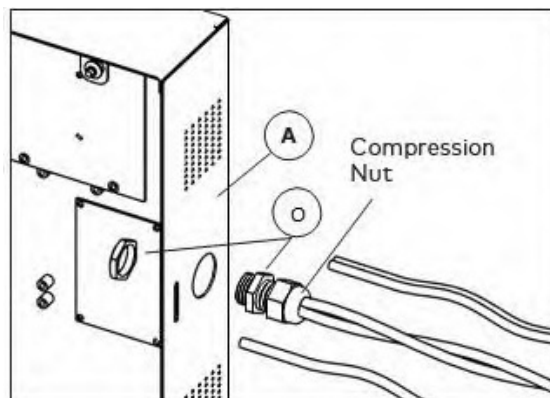
## 4.1 Pre-installation Procedures

1. Identify a secure location for the RAC5 MFC enclosure.

### IMPORTANT

- Access to the RAC5 MFC enclosure must be restricted to authorized personnel
  - AC power must be available within distance specified in section 3.1.5.
  - The location temperature must be from 0 to 49 °C (32 to 120 °F) and sheltered against weather hazards and dripping water with relative humidity conditions less than 85% at 32 °C (90 °F)
  - The enclosure must be installed using the hardware supplied
  - The 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
2. Identify location(s) for contactless readers.
    - Card readers must be placed within 1,000 feet (300 m) from the RAC5 MFC enclosure
    - Readers should be installed in an obvious location at an ergonomic height near the access door or elevator being controlled
    - The space to use the contactless reader must be large enough to allow for adequate clearance for the card being presented to the reader
  3. Install strain relief.
    - Strain reliefs are provided in the hardware bag to secure the wires leading into the enclosure and to help prevent the possibility of wire tampering
      - a) Determine the routing needed for all wiring of the RAC5 MFC card readers and peripherals and select the enclosure knock-out(s) to be removed for installation of the strain relief(s)
      - b) Remove the selected knock-out(s) using a hammer and screwdriver / awl, and from the inner side of the enclosure, tap out the small metal disc
      - c) Based on the amount of wires to be routed, attach the appropriate strain relief to the enclosure as shown in Figure 5. Do not attempt to route an excessive amount of wires. If extra strain reliefs are required, please contact dormakaba Canada Inc

Figure 5 – Strain Relief



4. Ensure that Dip Switch SW2 has Test Mode switch setting (SW2-4) set to OFF.

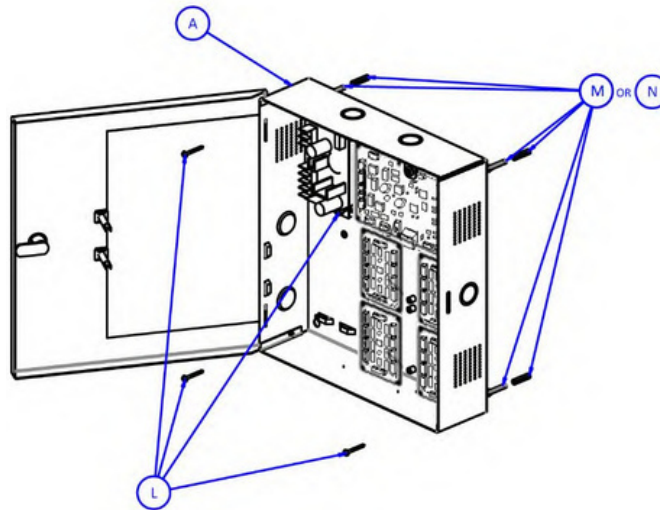
## 4.2 Installation and Wiring Procedures

### 1. Mount the RAC5 MFC enclosure

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

**NOTE:** For easier access, we recommend removing the access door prior to installation.

Figure 6– Enclosure



### 2. Mount the contactless card reader.

a) Prepare the panel according to the drilling template in Annex I.

b) Install the contactless card reader as indicated in Annex G.

### 3. 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 the controller PCB must be of the proper gauge and type as specified by the manufacturer.

#### **IMPORTANT**

Every wire must pass through a strain relief as connected in the pre-installation procedures. dormakaba Canada Inc. does not provide technical or field support for third party locking devices. Please consult the device manufacturer for support.

**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.

a) **Access Override Panel:** Refer to Annex H, Figure 21 for detailed wiring

- i. Remove the jumper wire connected between pins 3 and 4 of connector J18 on the controller PCB and complete the access override installation as per

b) **Tamper Switch to Premise Alarm System**

- i. To wire the tamper switch to the premise alarm system, disconnect the wires on controller PCB connected J7 pins 1 & 2 and run a 2-conductor cable from the switch to the premise alarm system

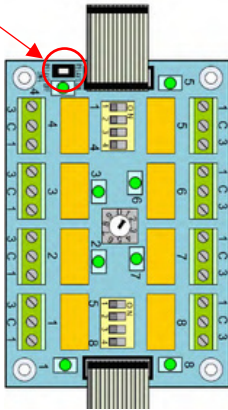
#### **IMPORTANT**

is closed, the switch itself is also in a closed state. Ensure that the wiring to the premise alarm system is done accordingly to prevent false alarms.

#### 4. Relay Expansion Board Configuration

##### IMPORTANT

Relay State Switch [SW4]  
(switch sets idle state of  
relays after power-up  
per board – allboards  
must have SW4  
configured identically)



##### Configure Relay Output SW4

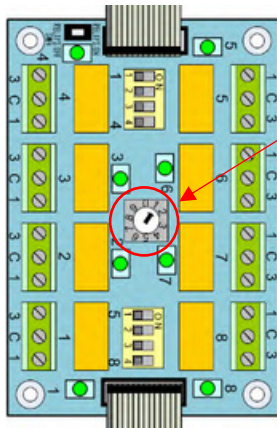
The relay expansion boards are factory configured to a fail secure mode by default. In the fail secure mode, Switch 4, on each relay expansion board, is set to Relays OFF. In this mode the relays are normally OFF in the idle state after power up. When the proper credential is presented to the reader the coordinating relay will turn ON and activate accordingly. If the system loses power or the Access Override (J18) is activated, the relays will remain OFF. In this situation, the elevator buttons will no longer be available to the user unless the master elevator controller grants access outside of the dormakaba system.

To reconfigure the system to a fail safe mode, power off system and set Switch 4 on all relay expansion boards to Relays ON.

In the fail safe mode, Switch 4, on each relay expansion board is set to Relays ON. At the next power up, all relays will be normally ON in the idle state at power up. When the proper credential is presented the coordinating relay will turn OFF accordingly. If the system loses power or the Access Override (J18) is activated, the relays will switch states and turn OFF. In this situation, all buttons in the elevator car will be available to the user without the requirement of presenting a credential to the reader.

**NOTE:** All relay expansion boards must be configured the same. If the relay expansion boards are configured differently (one set to Relays ON, another set to Relays OFF) the system will not function properly. The system must be power cycled for the configuration change to take effect.

#### 5. Relay Expansion Board Switch Selection



Relay Board ID Selector  
[SW2]  
(switch sets the unique  
board ID)

Each REB is factory configured to have a unique ID. If service to a REB is ever required, ensure to set the switch to the same ID of the PCB you are replacing.

#### 6. Wire relay expansion board outputs. Refer to Annex B for sample wiring diagram.

The relay expansion board provides 8 relay contacts for wiring and control of relay-enabled elevator. The board only provides normally open or normally closed dry contacts, so no power is provided by the board.

Up to 8 expansion boards can be used for total control of 64 floors (secure stops). The relay outputs are at the wiring input of each three-terminal connector (1, C, 3) on the expansion PCB as well as being

indicated on the label on the inside of the door. Several floors can be controlled by one relay (one secure stop).

The relays in the RAC5 MFC are UL rated and are capable of a maximum switching of 30 VDC @ 1A. For time duration of relay state see Ambiance System Settings, under Security and Lock Access.

As wiring of relay-controller equipment may vary between products, please refer to the product

**NOTE:** Refer to Annex B, Figure 8 for specific relay expansion board bypass switches.

- If relay output configuration Switch 4 is set to RELAYS OFF and bypass switches are ON, the relays are bypassed, and the green LED associated with that relay is turned ON
- If relay output configuration Switch 4 is set to RELAYS ON and bypass switches are ON, the relays are bypassed, and the green LED associated with that relay is turned OFF
- If relay output configuration Switch 4 is set to RELAYS OFF and bypass switches are OFF, the controller PCB can activate the relays. The associated LEDs turn ON during relay activation
- If relay output configuration Switch 4 is set to RELAYS ON and bypass switches are OFF, the controller can activate the relays. The associated LEDs turn OFF during relay activation
- When the power of the RAC5 MFC is too low (power failure), the controller PCB stops functioning and the relays will be powered down. Any peripheral connected to the relays will then be either in fail safe or fail secure mode, depending on the wiring

## 7. Connect the power adapter.

**NOTE:** Dependent

power adapter required. Refer to Annex B, Figure 8 for detailed wiring.

### a) International Power Adapter

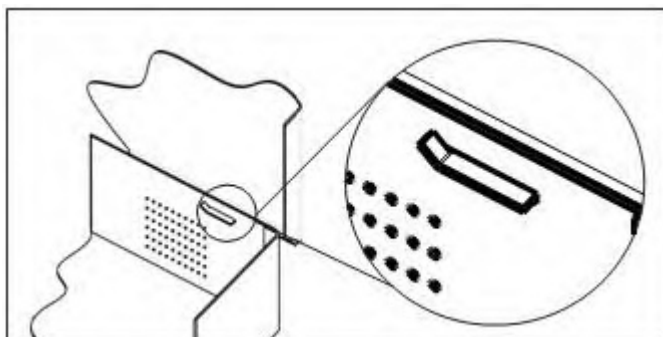
- i. Attach the appropriate AC outlet prong to the power adapter
- ii. Route the power adaptor wires into the enclosure and secure the wire (recommended with tie wraps)
- iii. From the inside of the enclosure, crimp the fork terminals supplied in the hardware bag to the end of each wire
- iv. Connect the fork-terminated wires to the power supply input as shown in Annex B, Figure 8

### b) North America Power Adapter

- i. From the inside of the enclosure, connect one end of the fork-terminated wires to the power supply inputs as shown in Annex B, Figure 8
- ii. Route the wires out of the enclosure to the AC power source and secure the wires (recommended with tie wraps)
- iii. Crimp the fork terminals supplied in the hardware bag to the end of the wires and connect them to the power adapter screw terminals

8. Complete the installation.
  - a) If the access door was removed, reinstall the door to the RAC5 MFC enclosure
  - b) Bend the two tabs on the door to a maximum of 30 degrees as shown in Figure 7**

Figure 7– Door Tabs



- c) Connect the LED wire harness from the power supply to the access door LEDs as indicated below and in Annex B, Figure 8

**NOTE:** The wires must be connected with the proper polarity. Once the terminals are installed, they are designed to have a tight fit so removal may damage the LEDs.

| LED Description | Location on Door | +   | -      |
|-----------------|------------------|-----|--------|
| Power Status    | Top              | Red | Orange |
| Battery Status  | Bottom           | Red | Yellow |

**IMPORTANT** Ensure that the proper connections are made (e.g. red to red, black to black).

- d) Plug the power adapter into the AC power source and/or turn on the main AC power to the system

# 5 Annex A: Quick Troubleshooting Guide

The following sections show basic troubleshooting for some common problems that may occur during installation. Each section related to a specific type of problem. For detailed assistance, please contact Technical Support.

## 5.1 Power Troubleshooting

| Symptom                             | Action                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|-------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Power adapter LED is OFF            | <ul style="list-style-type: none"><li>• Verify that the AC supply is not turned off</li><li>• Verify that the Adapter output is not shorted</li></ul>                                                                                                                                                                                                                                                                                                                                                                             |
| Power supply AC ON green LED is OFF | <ul style="list-style-type: none"><li>• Verify that the wiring to the power wall-mount adapter is correct</li><li>• If using the 24 VDC International Adapter, verify that the polarity is correct</li></ul>                                                                                                                                                                                                                                                                                                                      |
| Power supply DC ON red LED is OFF   | <ul style="list-style-type: none"><li>• Verify the wiring between the power supply and the RAC5 MFC controller</li><li>• Verify that the power supply output is not shorted</li></ul>                                                                                                                                                                                                                                                                                                                                             |
|                                     | <ul style="list-style-type: none"><li>• Verify that the power supply is powered (both AC ON and DC ON LEDs are on)</li><li>• Verify the LED wiring to the power supply</li></ul>                                                                                                                                                                                                                                                                                                                                                  |
| All RAC5 MFC LEDs are OFF           | <ul style="list-style-type: none"><li>• Verify that the DC ON LED on the power supply is on</li><li>• Verify that the AC power is active for the wall-mount adapter</li><li>• Verify that the RAC5 MFC controller is connected properly to the power supply as per Annex B, Figure 8</li><li>• If qualified, with a multi-meter, verify that 24 VAC (North American Power Adapter) or 24 VDC (International Power Adapter) is present across the power supply terminal block XFMR_1 and XFMR_2 as per Annex B, Figure 8</li></ul> |

## 5.2 Card Reading Troubleshooting

| Symptom                                 | Action                                                                                                                                                                                                                                                                                                                                                                                     |
|-----------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| No feedback on Reader when using a card | <ul style="list-style-type: none"><li>• Verify that the RAC5 MFC controller is active. If not, restart the RAC5 MFC controller: Press the Reset Switch (SW1) or disconnect and reconnect the power</li><li>• Check that the Reader LED (D48 for Reader 1 or D37 for Reader 2) is steady ON. If not, verify the reading wiring</li><li>• Verify that the card is encoded properly</li></ul> |

## 5.3 External Inputs Troubleshooting

| Symptom                                          | Action                                                                                                                                                                                                  |
|--------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Tamper Alarm is not activating the premise alarm | <ul style="list-style-type: none"> <li>Verify that the Tamper Alarm LED (D53) on the RAC5 MFC controller turns on when the button is pressed. If not, verify the wiring on the Tamper Switch</li> </ul> |

## 5.4 Relay Expansion Board Troubleshooting

### ⚠ CAUTION

The power for the RAC5 MFC must be turned off before reconnecting or disconnecting the Relay Expansion Board or if changing the relay output state using Switch 4.

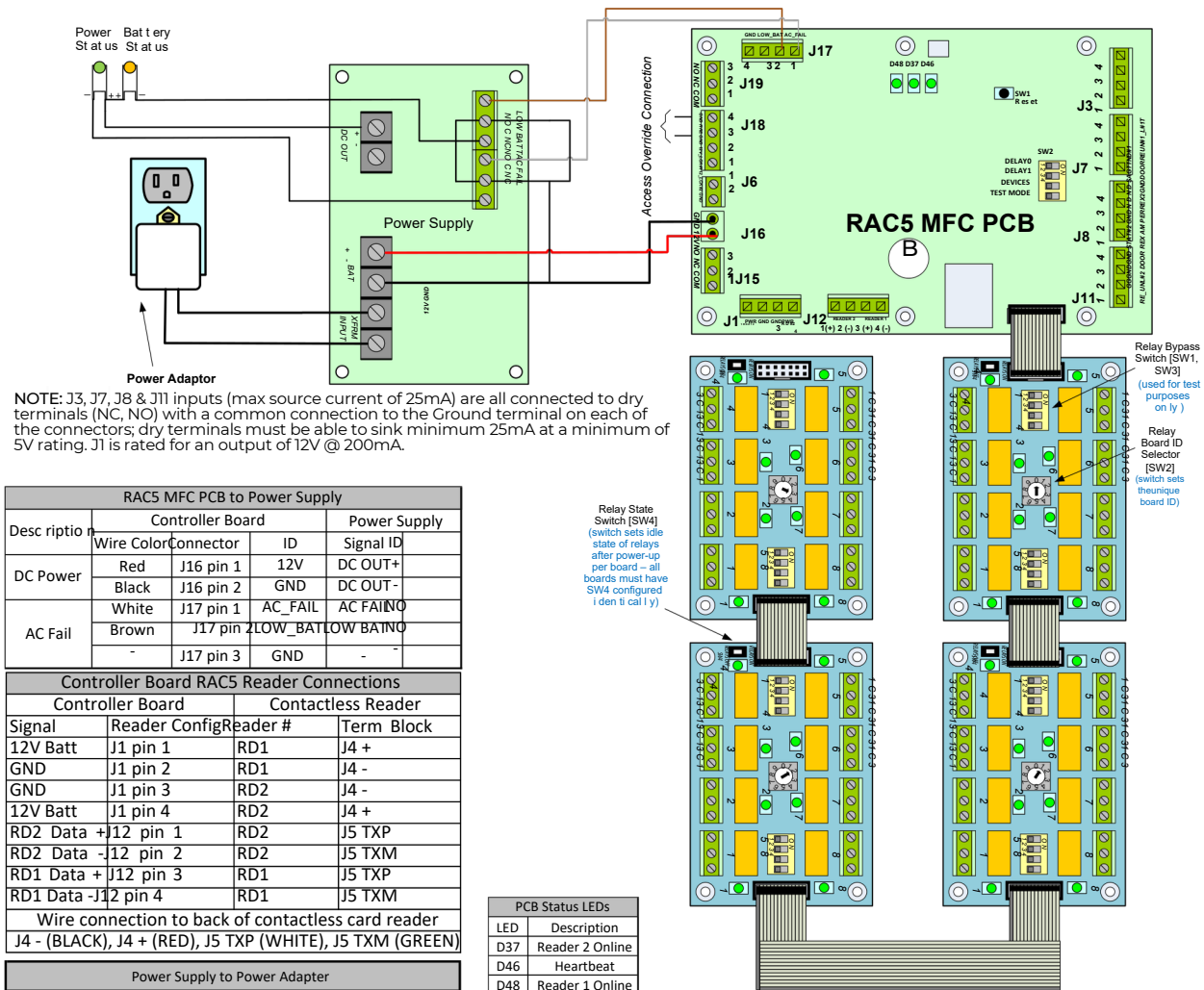
If Switch 4 is set to RELAYS OFF, LEDs on the Relay Expansion board should be normally OFF in idle state.

If Switch 4 is set to RELAYS ON, LEDs on the Relay Expansion board should be normally ON in idle state.

| Symptom                                                                                   | Action                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|-------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| LEDs on the Relay Expansion Board are ON in idle state when Switch 4 is set to RELAYS OFF | <ul style="list-style-type: none"> <li>Verify that the ribbon cable between the RAC5 MFC controller and the Relay Expansion Board is connected properly. If it is not connected, turn the power off, connect the cable, and turn the power back on</li> <li>Verify that the relays are not bypassed (the bypass switches SW1 and SW3 on the Relay Expansion Board should be off)</li> <li>Verify that the RAC5 MFC is not in Passage Mode</li> </ul>                                                                                                                                                                                                                                   |
| Relay Expansion Board relays do not change states                                         | <ul style="list-style-type: none"> <li>Activate the manual bypass switches SW1 and SW3 on the Relay Expansion Board and verify that the relays are activated and the corresponding LEDs turn ON or OFF depending on the setting of the SW4 switch. De-activate the manual bypass</li> <li>Verify that the RAC5 MFC controller is active: Heartbeat LED D46 should be blinking, and the Reader LEDs (D48 and D37) are respectively ON. If not, reset the RAC5 MFC Controller by pressing the reset switch (SW1) or disconnect and reconnect the power.</li> <li>Verify that the RAC5 MFC controller is programmed properly</li> <li>Verify that the card is encoded properly</li> </ul> |
| Access Override not functioning                                                           | <ul style="list-style-type: none"> <li>Verify that the Access Override input is connected to a Normally Closed contact</li> <li>Verify that the Access Override LED (D47) is normally on and turns off when the Access Override is present</li> <li><b>NOTE:</b> Access Override, when enabled, will remove power from the relays and they will fail safe or secure depending on the configuration of the SW4 switch</li> </ul>                                                                                                                                                                                                                                                        |
| RAC5 MFC Controller PCB resets when relay is activated or deactivated                     | <ul style="list-style-type: none"> <li>Verify that there is no short-circuit on the locking device wiring</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |

# 6 Annex B: Multi-Floor Controller RAC5 MFC

Figure 8– RAC5 MFC



| PCB Status LEDs |                 |
|-----------------|-----------------|
| LED             | Description     |
| D37             | Reader 2 Online |
| D46             | Heartbeat       |
| D48             | Reader 1 Online |

| SW4 CONFIGURATION         |                     |                    |
|---------------------------|---------------------|--------------------|
|                           | RELAYS OFF          | RELAYS ON          |
| Idle state after power up | Relays normally OFF | Relays normally ON |
| Valid keycard state       | Relays turn ON      | Relays turn OFF    |

NOTE: Boards are shipped with SW4 in the OFF position with tape seal

| RELAY EXPANSION BOARD |       |               |          |       |               |                 |       |               |          |       |
|-----------------------|-------|---------------|----------|-------|---------------|-----------------|-------|---------------|----------|-------|
| SW4 - RELAYS OFF      |       |               |          |       |               | SW4 - RELAYS ON |       |               |          |       |
| Terminal              | State | Bypass Switch | Terminal | State | Bypass Switch | Terminal        | State | Bypass Switch | Terminal | State |
| J1-1                  | NO    | SW1-1         | J5-1     | NO    | SW3-1         | J1-1            | NC    | SW1-1         | J5-1     | NC    |
| J1-3                  | COMM  |               | J5-3     | COMM  |               | J1-3            | COMM  |               | J5-3     | COMM  |
| J1-2                  | NC    |               | J5-2     | NC    |               | J1-2            | NO    |               | J5-2     | NO    |
| J2-1                  | NO    | SW1-2         | J6-1     | NO    | SW3-2         | J2-1            | NC    | SW1-2         | J6-1     | NC    |
| J2-3                  | COMM  |               | J6-3     | COMM  |               | J2-3            | COMM  |               | J6-3     | COMM  |
| J2-2                  | NC    |               | J6-2     | NC    |               | J2-2            | NO    |               | J6-2     | NO    |
| J3-1                  | NO    | SW1-3         | J7-1     | NO    | SW3-3         | J3-1            | NC    | SW1-3         | J7-1     | NC    |
| J3-3                  | COMM  |               | J7-3     | COMM  |               | J3-3            | COMM  |               | J7-3     | COMM  |
| J3-2                  | NC    |               | J7-2     | NC    |               | J3-2            | NO    |               | J7-2     | NO    |
| J4-1                  | NO    | SW1-4         | J8-1     | NO    | SW3-4         | J4-1            | NC    | SW1-4         | J8-1     | NC    |
| J4-3                  | COMM  |               | J8-3     | COMM  |               | J4-3            | COMM  |               | J8-3     | COMM  |
| J4-2                  | NC    |               | J8-2     | NC    |               | J4-2            | NO    |               | J8-2     | NO    |

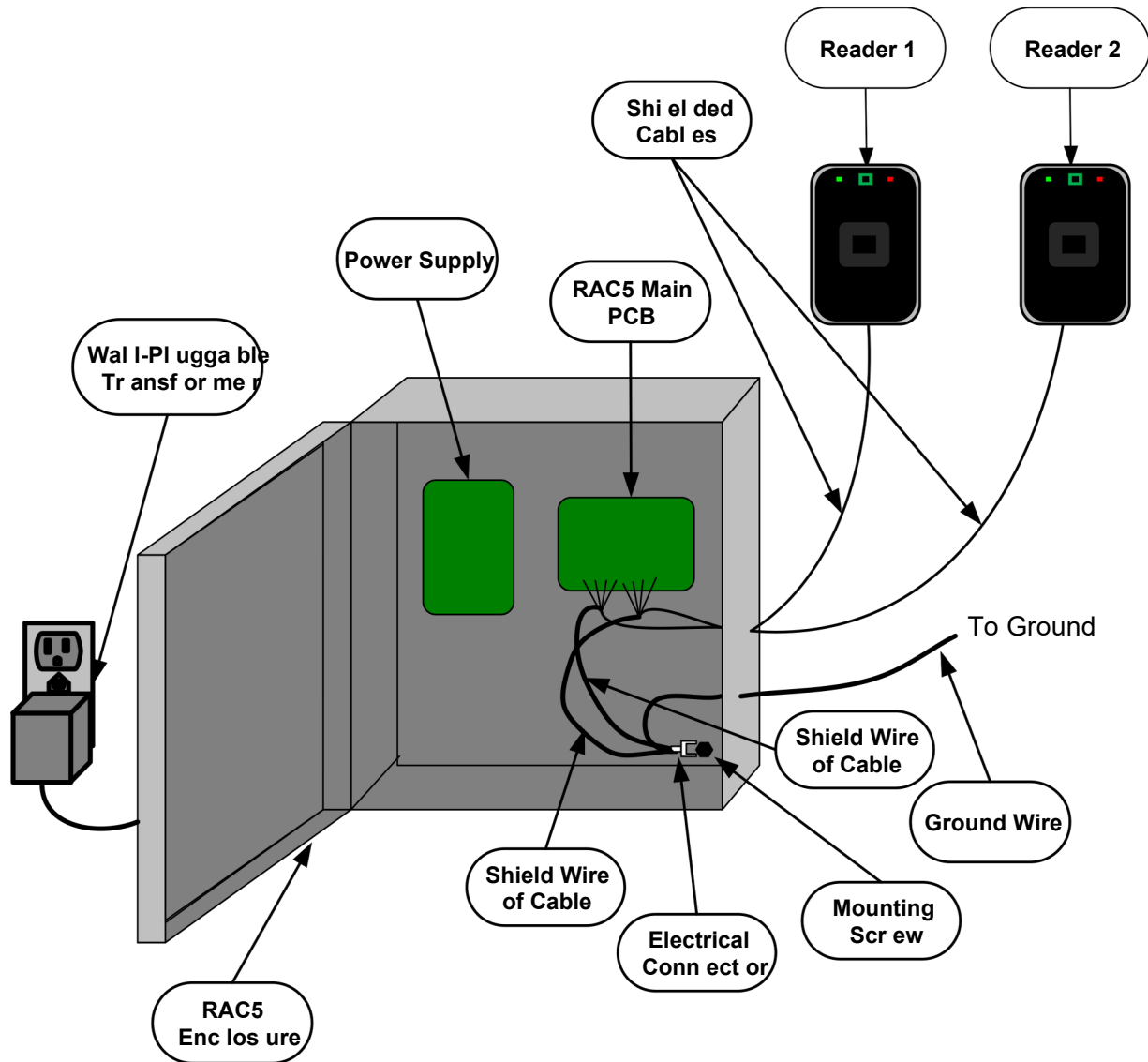
## Caution:

If SW4 is in the OFF position when the bypass switches (SW1 and SW3) are "ON", then relays are bypassed & GREEN LEDs are "ON"  
If SW4 is in the OFF position when the bypass switches (SW1 and SW3) are "OFF", then GREEN LEDs are "OFF" & Controller Board can activate the relays  
If SW4 is in the ON position when the bypass switches (SW1 and SW3) are "ON", then relays are bypassed & GREEN LEDs are "OFF"  
If SW4 is in the ON position when the bypass switches (SW1 and SW3) are "OFF", then GREEN LEDs are "ON" & Controller Board can activate the relays

# 7 Annex C: Electromagnetic Interference

As per any other electronic equipment, the RAC5 MFC can be affected by electromagnetic interference because of industrial electrical equipment such as elevator motors. To prevent the unit from operational instability, shielded cables should be used and connections made as per the diagram below.

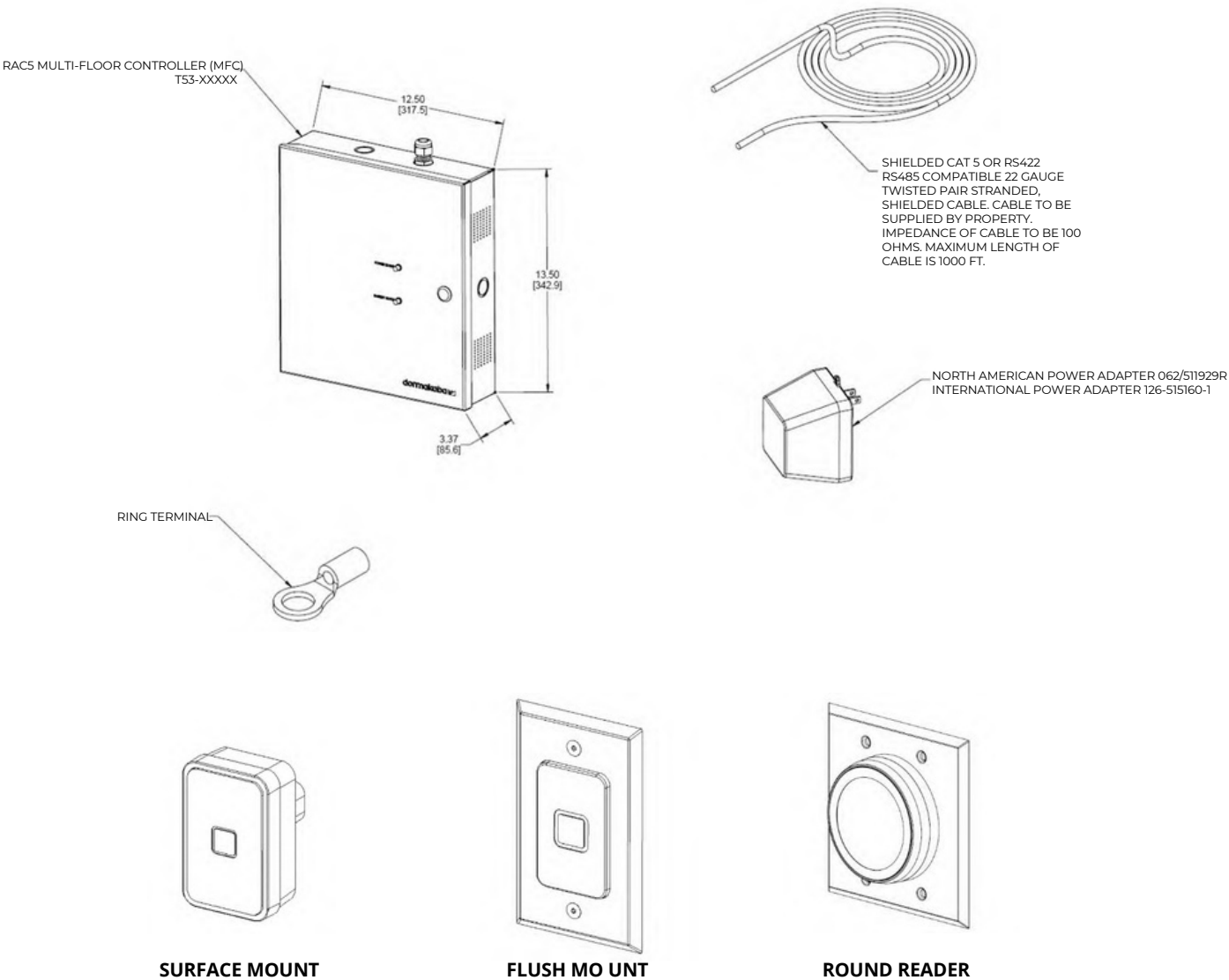
Figure 9 – Shielded Cable



- 1-Use shielded cables for the readers
- 2-Connect the shield wire of the reader cables to the Ground wire
- 3-Connect the wires to the Mounting screw of the RAC5.  
(Remove the paint under the mounting screw for good electrical contact.)

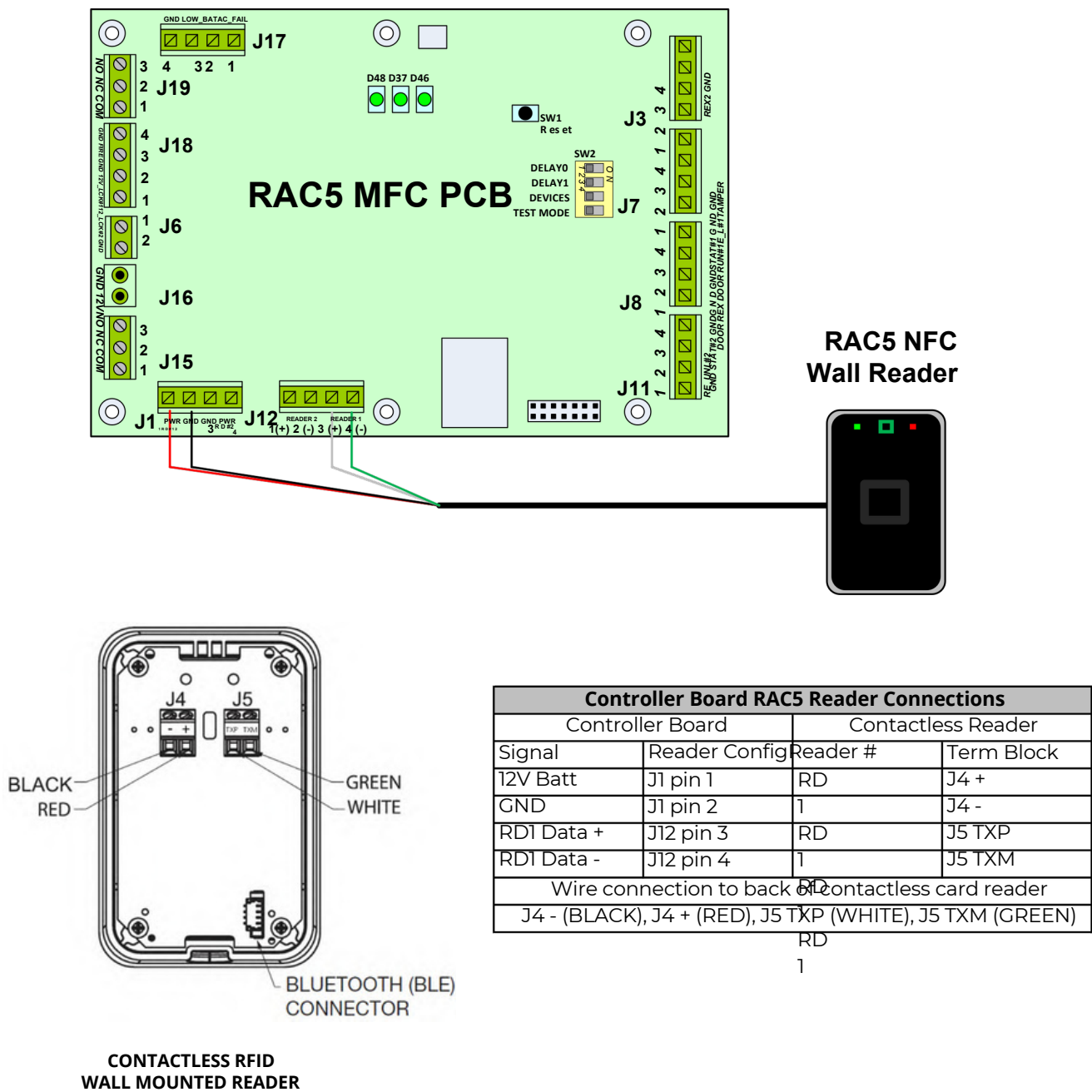
# 8 Annex D: RAC5 MFC Components

Figure 10 – RAC5 MFC Components



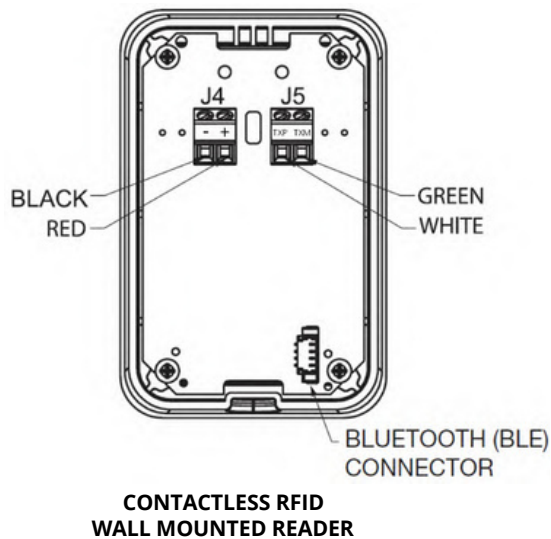
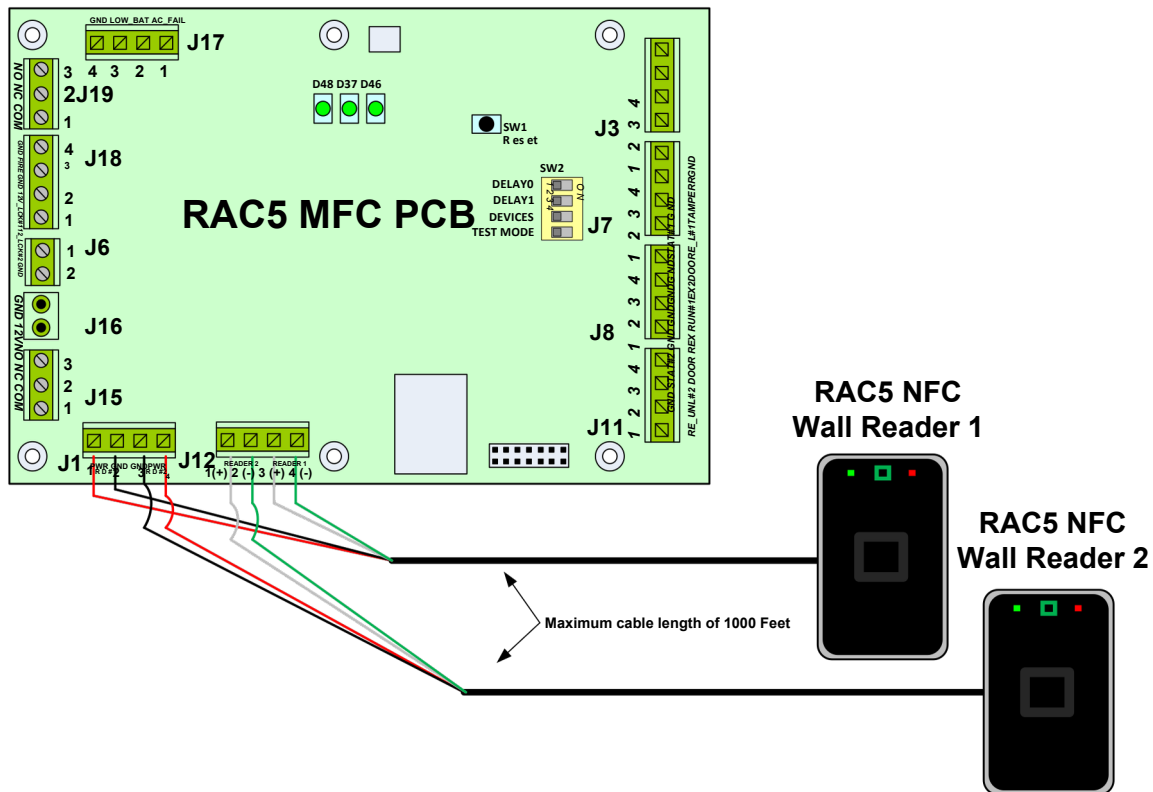
# 9 Annex E: Single Reader Wiring

Figure 11 – Single Reader Wiring



# 10 Annex F: Dual Reader Wiring

Figure 12 – Dual Reader Wiring



| Controller Board RAC5 Reader Connections                 |               |                    |            |
|----------------------------------------------------------|---------------|--------------------|------------|
| Controller Board                                         |               | Contactless Reader |            |
| Signal                                                   | Reader Config | Reader #           | Term Block |
| 12V Batt                                                 | J1 pin 1      | RD1                | J4 +       |
| GND                                                      | J1 pin 2      | RD1                | J4 -       |
| GND                                                      | J1 pin 3      | RD2                | J4 -       |
| 12V Batt                                                 | J1 pin 4      | RD2                | J4 +       |
| RD2 Data +                                               | J12 pin 1     | RD2                | J5 TXP     |
| RD2 Data -                                               | J12 pin 2     | RD2                | J5 TXM     |
| RD1 Data +                                               | J12 pin 3     | RD1                | J5 TXP     |
| RD1 Data -                                               | J12 pin 4     | RD1                | J5 TXM     |
| Wire connection to back of contactless card reader       |               |                    |            |
| J4 - (BLACK), J4 + (RED), J5 TXP (WHITE), J5 TXM (GREEN) |               |                    |            |

# 11 Annex G: RAC5 MFC Wall Reader

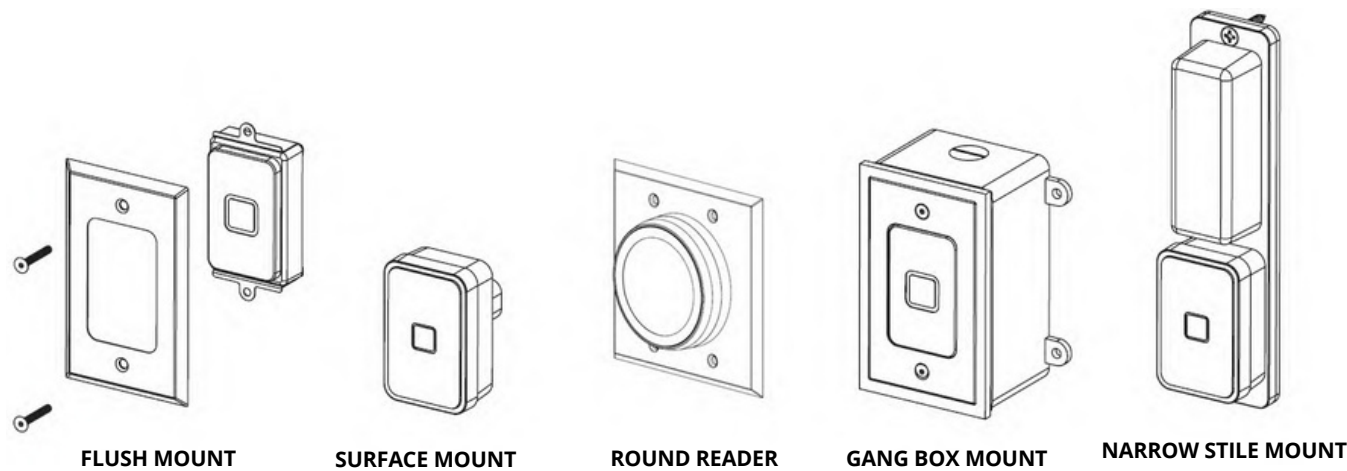
## Mounting Instructions

**CAUTION** Wear Safety glasses while preparing wall.

### Introduction

The RFID wall mounted reader provided by dormakaba is compact, lightweight, rugged and water resistant, able to withstand temperatures from -30°F to 150°F (-35°C to 66°C). It is made from durable materials and comes with at least 15 feet (4.6 m) of cable. The reader is capable of functioning up to distances of 1000 feet (304.8 m) when powered from the RAC5 MFC controller board.

The reader has a green LED that indicates that the unit is powered. The reader also provides visual feedback when access is granted.



### Regulatory Compliance:

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.

Any ch  
operate the equipment.

-exempt RSS standard(s). Operation is subject to the  
following two conditions: (1) this device may not cause interference, and (2) this device must accept any

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FCC # Q8SR79KSR  
IC# 4652A-R79KSR

Figure 13 – RFID Wall Reader (Surface Mount)

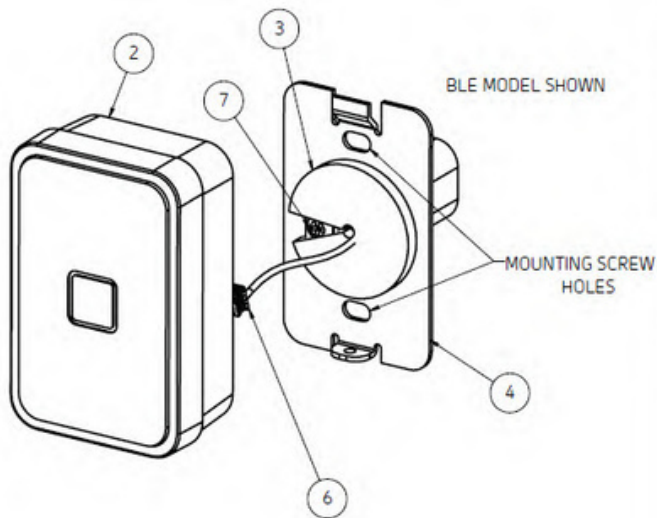


Figure 13 (A)

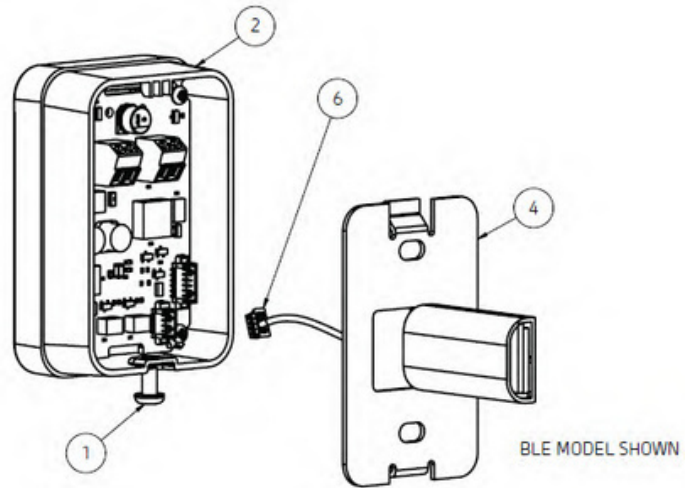


Figure 13 (B)

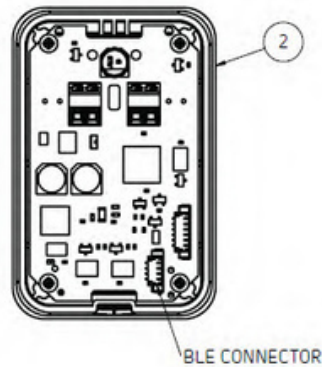
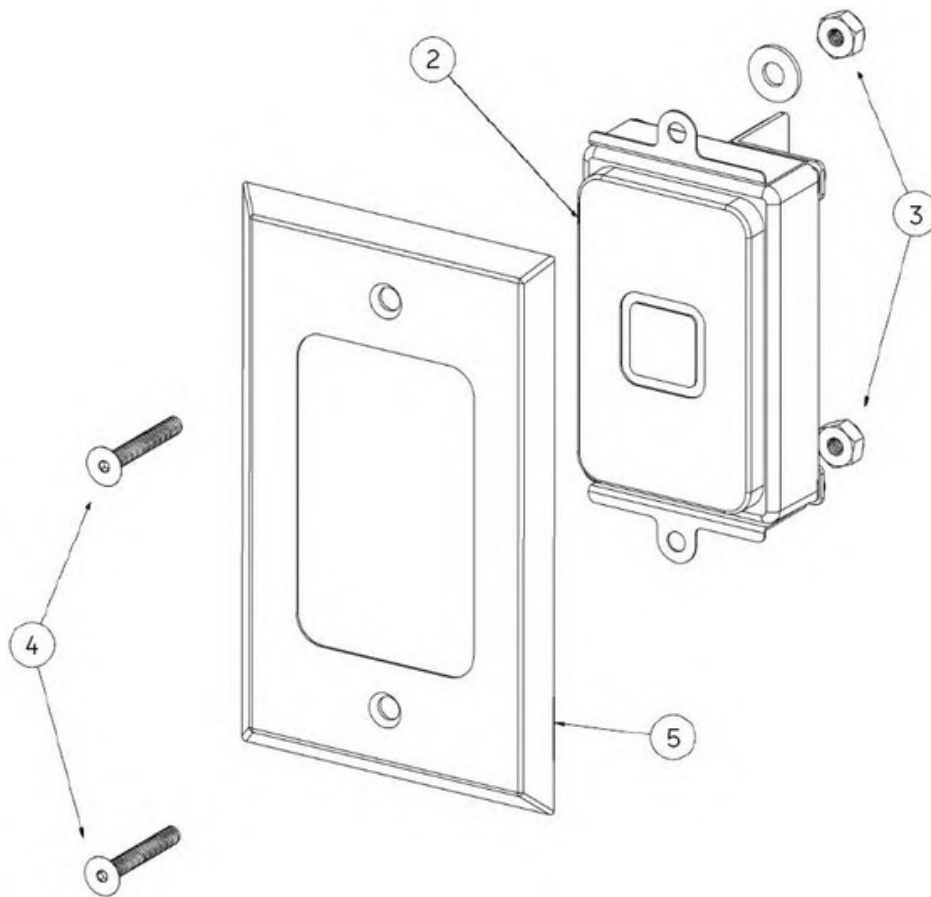


Figure 13 (C)

## RFID Wall Reader Instructions– Surface Mount

1. Pull cable(s) for RAC through hole in the back plate and, if applicable, through the gasket then screw the mounting plate of the reader to the panel machine screws
2. Adhere the round gasket (in hardware bag) to the back plate (item #4) with the cutout located so the gasket does not cover the screw (item #7) as shown in Figure 13 A, if not installed
3. Connect cables for RAC5 as per Annex E or F
4. Connect BLE cable to BLE connector (Figure 13 C)
5. Hook the top of the reader enclosure (item #2) onto the top of the mounting plate (item #4) and secure together with the included screw (item #1), tightened at the bottom of the reader

Figure 14 – RFID Wall Reader (Flush Mount)



## RFID Wall Reader Instructions– Flush Mount

1. Remove screws (item #4) and nuts (item #3) to prepare reader for mounting
2. Install reader (item #2) then faceplate (item #5) into the panel using the screws (item #4) and nuts (item #3)
3. Connect cables for RAC5 as per Annex E and F

Figure 15 – RFID Wall Reader Gang Box Installation

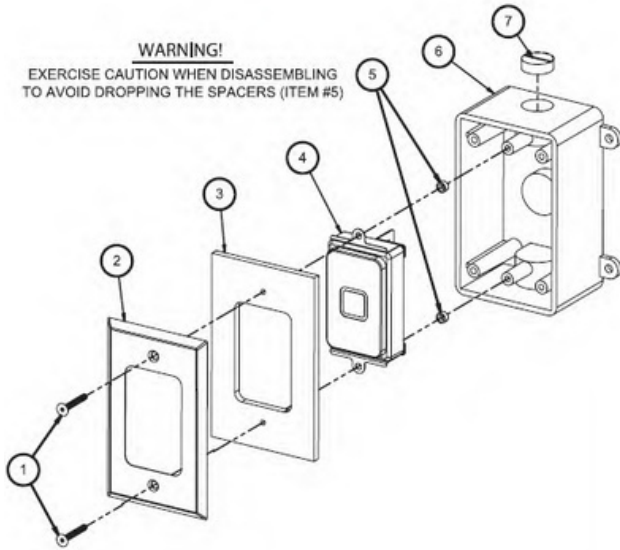


Figure 15 (A)

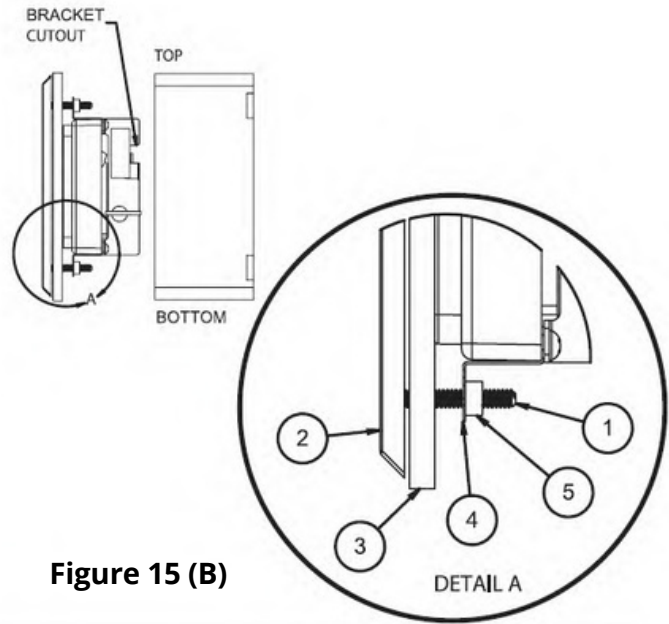


Figure 15 (B)

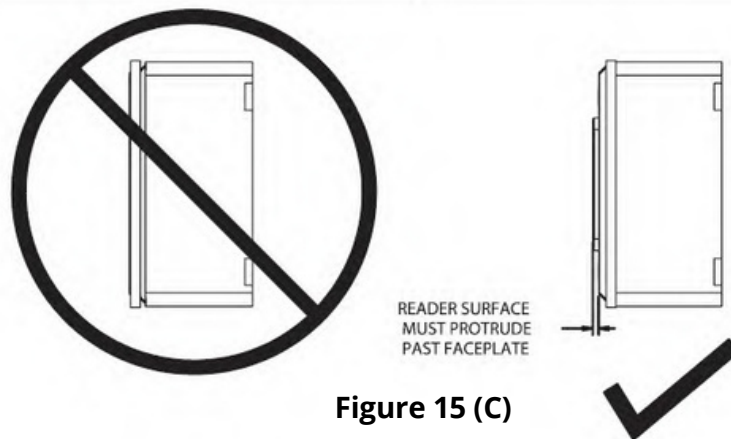


Figure 15 (C)

## RFID Wall Reader Gang Box Instructions

1. Remove screws (item #1) to gain access to reader assembly (item #4)
2. Carefully remove reader assembly (item #4) (see warning above) remove protective film from reader face
3. Install the gang box with proper screws, not provided
4. Connect cables for RAC5 as per Annex E and F
5. Reader assembly orientation to be as shown in Figure 15 B with bracket cutout at the top when installing BLE.
6. Re-assemble items #1 through #5 in order as shown in Figure 15B "Detail A", then assemble to gang box (item #6) and tighten screws making sure the reader face protrudes past the faceplate as shown in Figure 15 C

Figure 16 – RFID Wall Reader BLE Narrow Stile

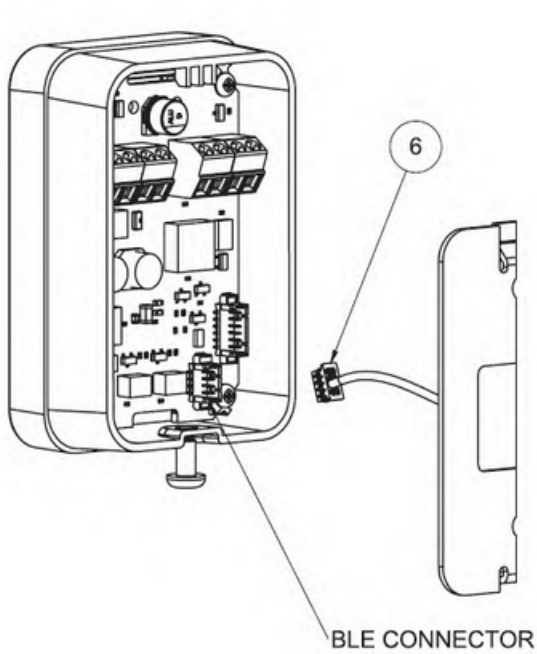


Figure 16 (A)

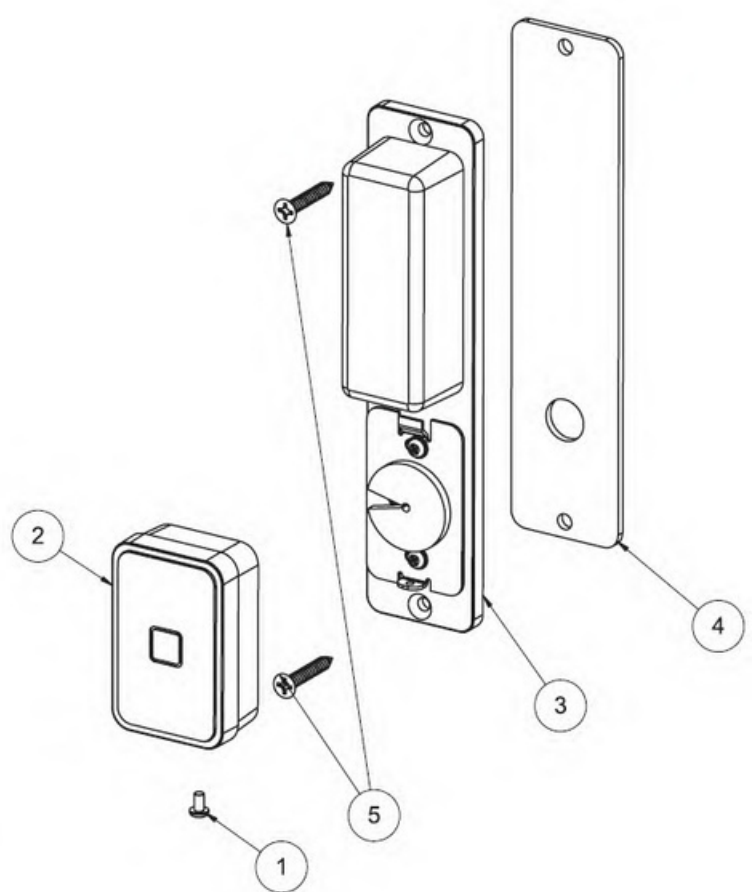


Figure 16 (B)

## RFID Wall Reader BLE Narrow Stile Instructions

1. Remove screw (item #1) to gain access to reader assembly (item #2)
2. Disconnect BLE cable (item #6), if necessary
3. Remove protective film from reader face (item #2)
4. Pull cable(s) for RAC through hole in the back plate and, if applicable, through the gasket then attach plate (item #3) to surface using gasket (item #4) and screws (item #5) that are included in the hardware bag
5. Connect cables for RAC5 as per Annex E and F
6. Re-connect BLE cable (item #6)
7. Re-assemble reader (item #2) to assembly and secure with screw (item #1)

Figure 17 – RFID Wall Reader Round Mount

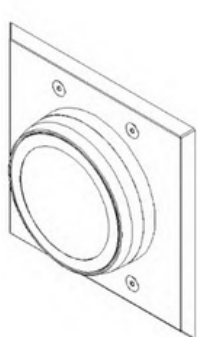


Figure 17 (A)

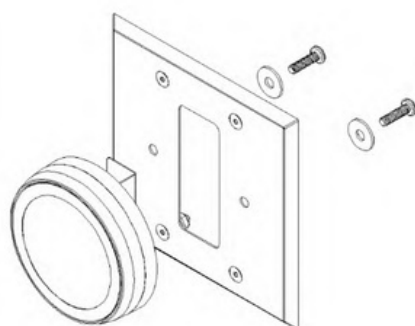


Figure 17 (B)

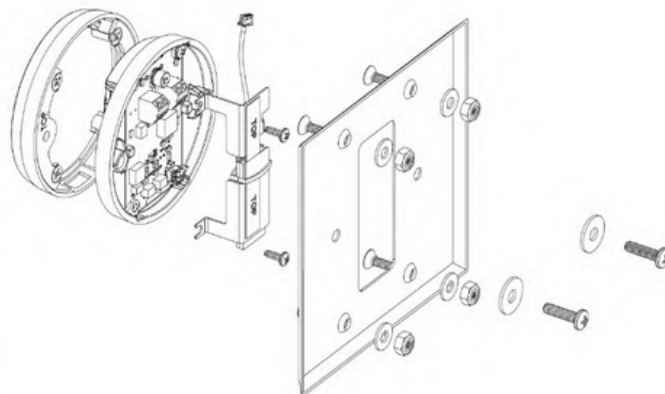


Figure 17 (C)

## RFID Wall Reader Instructions– Round Mount (no Double Gang Plate)

1. Remove 2 8-32 Pan Head screws and washers from assembly.  
NOTE: At this point, reader electronics and reader housing can be separated.
2. Remove double gang plate and discard.
3. If applicable, remove BLE bracket to access wiring terminals by loosening 2 mounting screws.
4. Connect cables for RAC5 as per Annex E and F
5. If applicable, re-install BLE bracket.
6. Align reader assembly with elevator panel.
7. Assemble to panel using previously removed 8-32 pan head screws and washers.

## RFID Wall Reader Instructions– Round Mount (with Double Gang Plate)

1. Remove washers from #8 screws on reader assembly. These will not be used in this configuration.
2. If applicable, remove BLE bracket to access wiring terminals by loosening 2 mounting screws.
3. Connect cables for RAC5 as per Annex E and F.
4. If applicable, re-install BLE bracket.
5. Align reader assembly with panel.
6. Assemble to panel using provided 6-32 hex screws, lock nuts, and washers. Ensure there is no washer under 2 8-32 reader assembly screws when using double gang plate

Figure 18 – RFID Wall Reader Surface Mount

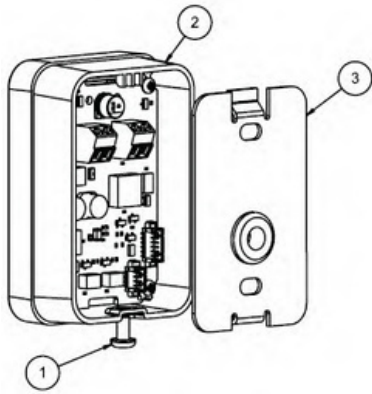


Figure 18 (A)

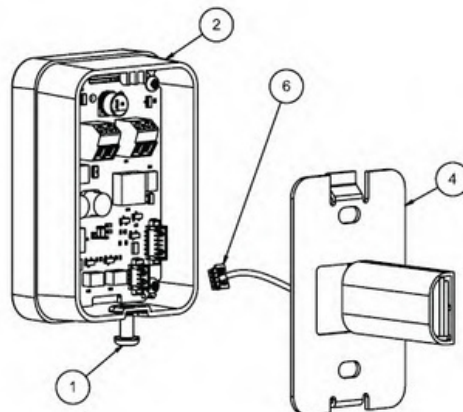


Figure 18 (B)

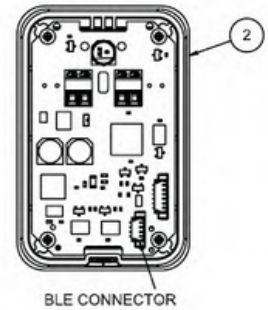


Figure 18 (C)

## RFID Wall Reader Surface Mount – Adding BLE Instructions

1. Remove screw (item #1) to remove reader assembly (item #2)
2. Disconnect cables and remove mounting plate (item #3) from wall
3. Install BLE mounting plate (item #4) using existing screws, refer to appropriate drilling template
4. Connect cables for RAC5 as per Annex E and F
5. Connect BLE cable (item #6) to BLE connector (Figure 18 C)
6. Re-assemble reader (item #2) assuring that the screw (item #1) is at the bottom

Figure 19 – RFID Wall Reader Flush Mount

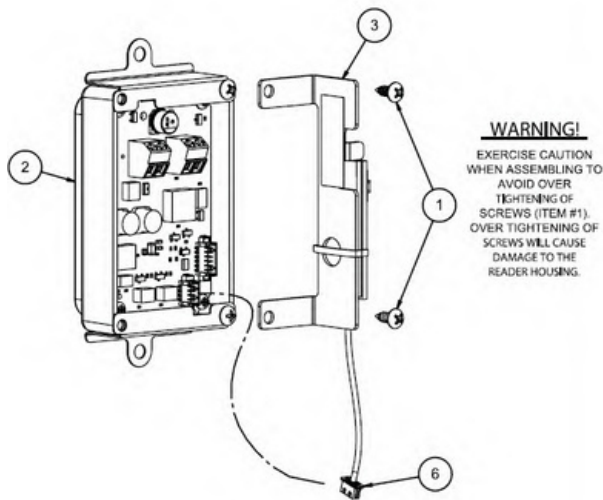


Figure 19 (A)

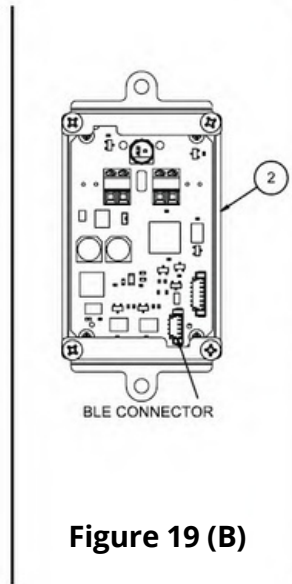


Figure 19 (B)

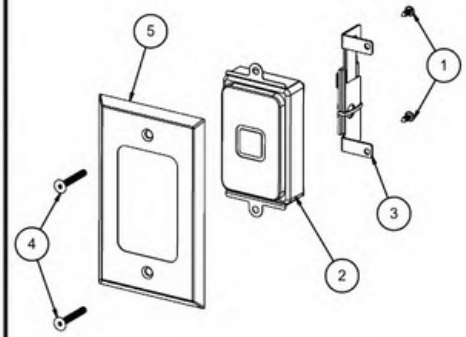


Figure 19 (C)

## RFID Wall Reader Flush Mount– Adding BLE Instructions

1. Remove screws (item #4) and faceplate (item #5) to gain access to reader (Figure 19 C)
2. Disconnect cables
3. Remove screws (item #1)
4. Install BLE assembly (item #3) using screws (item #1) oriented as shown with the cutout at the top and cable facing downward. Refer to warning above
5. Connect cables for RAC5 as per Annex E and F
6. Connect BLE cable (item #6) to BLE connector (Figure 19 B)
7. Re-assemble reader (item #2) assuring that the BLE connector is at the bottom

Figure 20– RFID Wall Reader Round Mount

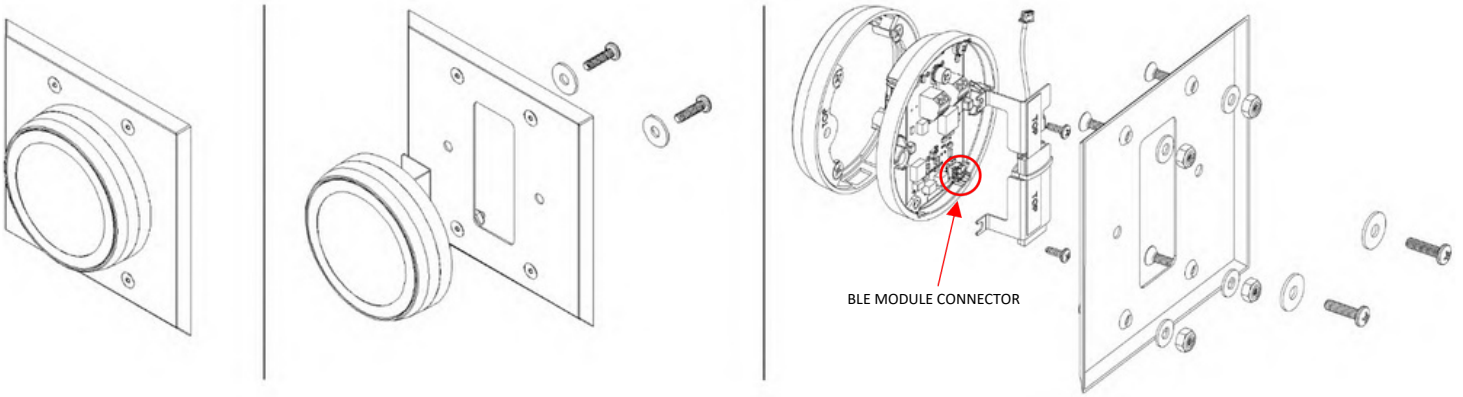


Figure 20 (A)

Figure 20 (B)

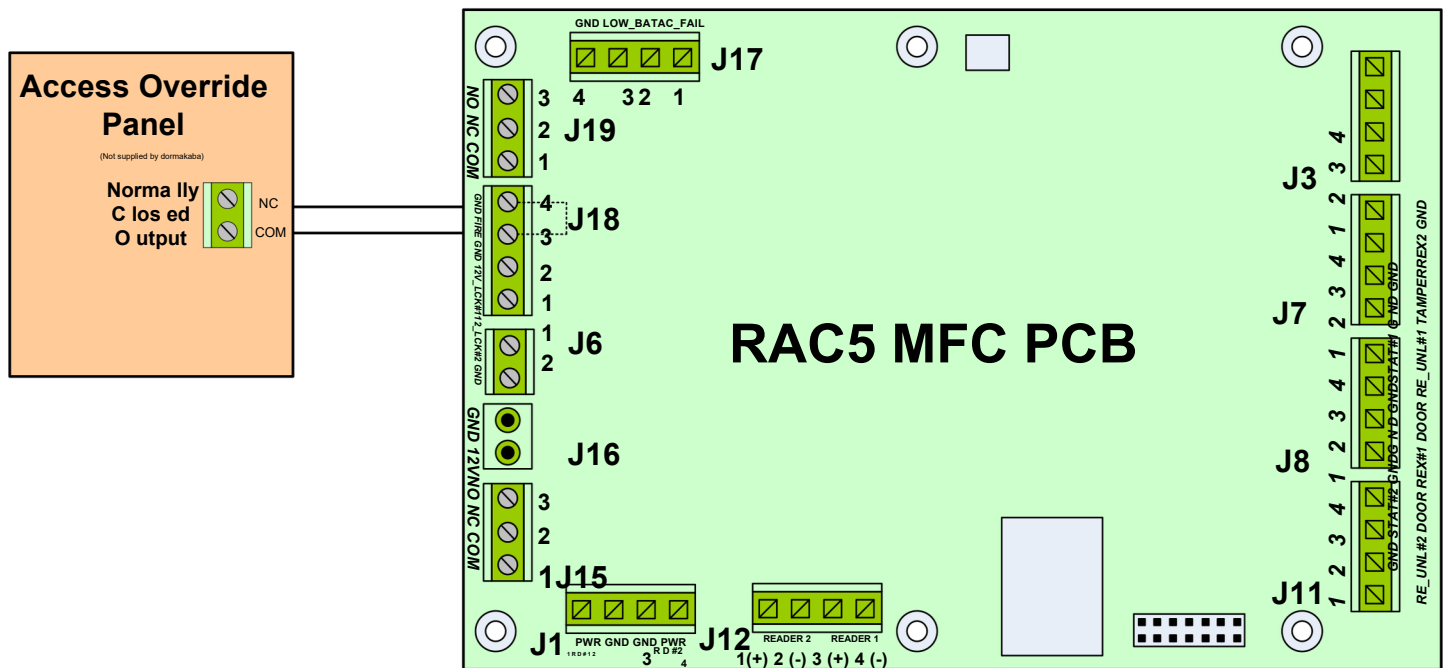
Figure 20 (C)

## RFID Wall Reader Round Mount– Adding BLE Instructions

1. Remove mounting screws securing reader to panel
2. Loosen 2 #4 screws on left side of reader assembly as shown to mount BLE bracket.
3. Connect BLE module to the reader connector as shown
4. Install BLE bracket under 2 #4 screws
5. Tighten #4 screws
6. Re-install reader to panel using previously removed hardware

# 11 Annex H: Access Override Panel Wiring

Figure 21 – Access Override Panel Wiring

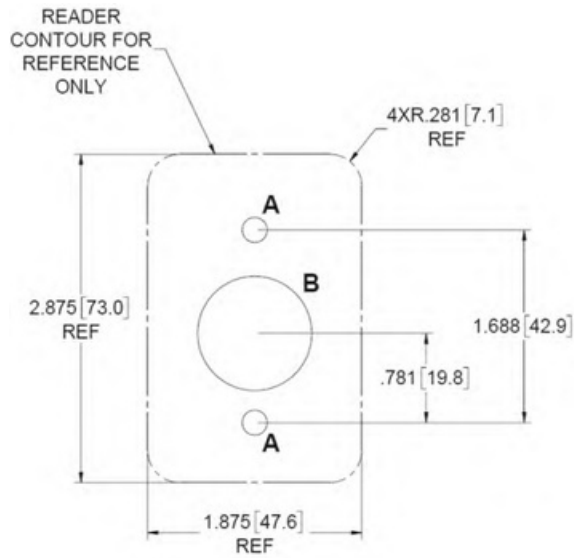


**Note 1:** The input from the Access Override Panel must be connected to a Normally Closed Dry contact. When the RAC5 MFC Access Override is activated, power to all relays will be removed. Ensure you have configured Switch 4 of the Relay Expansion Board appropriately for your desired controller behavior. See Switch 4 configuration details referenced on page 12.

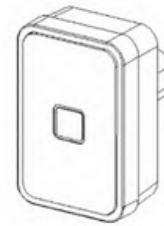
**Note 2:** If the Access Override Panel connection is not required, place a jumper wire between pin 3 and 4 of J18.

# 12 Annex I: Reader Drilling Templates

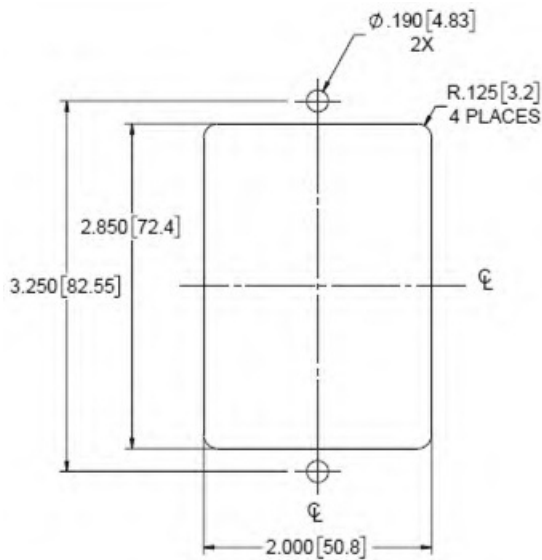
Reader Drilling Templates (not to scale)



**SURFACE MOUNT PREP**



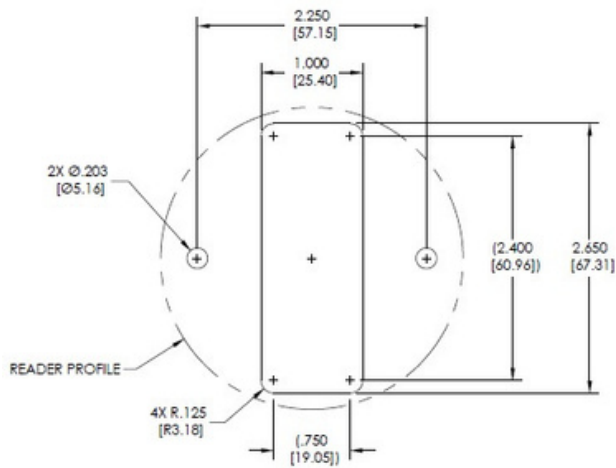
**SURFACE MOUNT READER**



**FLUSH MOUNT PREP**



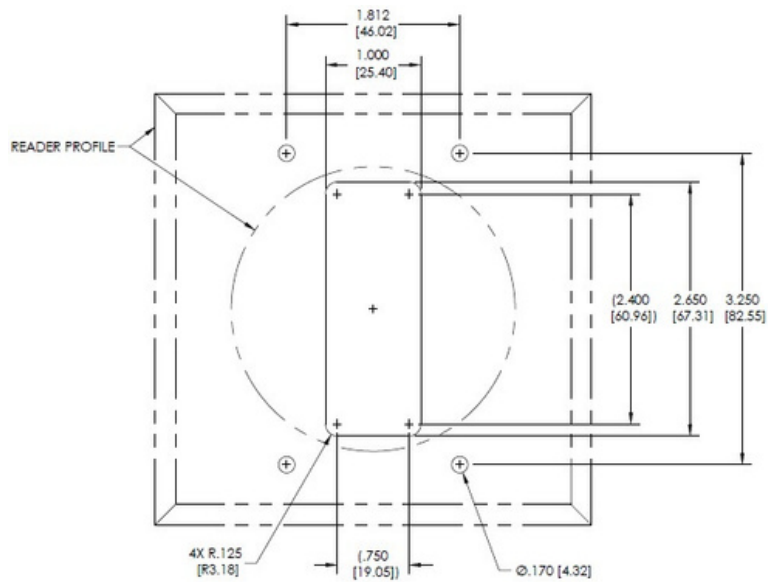
**FLUSH MOUNT READER WITH TRIM PLATE**



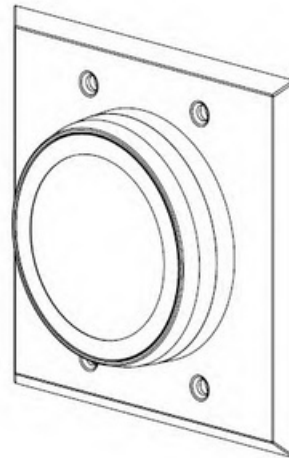
**ROUND READER FOR DIRECT PANEL MOUNT PREP**



**ROUND READER WITH TRIM PLATE REMOVED**



**ROUND READER WITH TRIM PLATE PREP**



**ROUND READER WITH TRIM PLATE**



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