# Proximity Card Reader SmartID

Ref. V2-112005

INTEGRATED
ENGINEERING
Smart Technology!

Smart ID

| | |
|---|---|
| 1 | 2 |
| 3 | 4 |
| 5 | 6 |
| 7 | 8 |
| 9 | 0 |
| * | # |
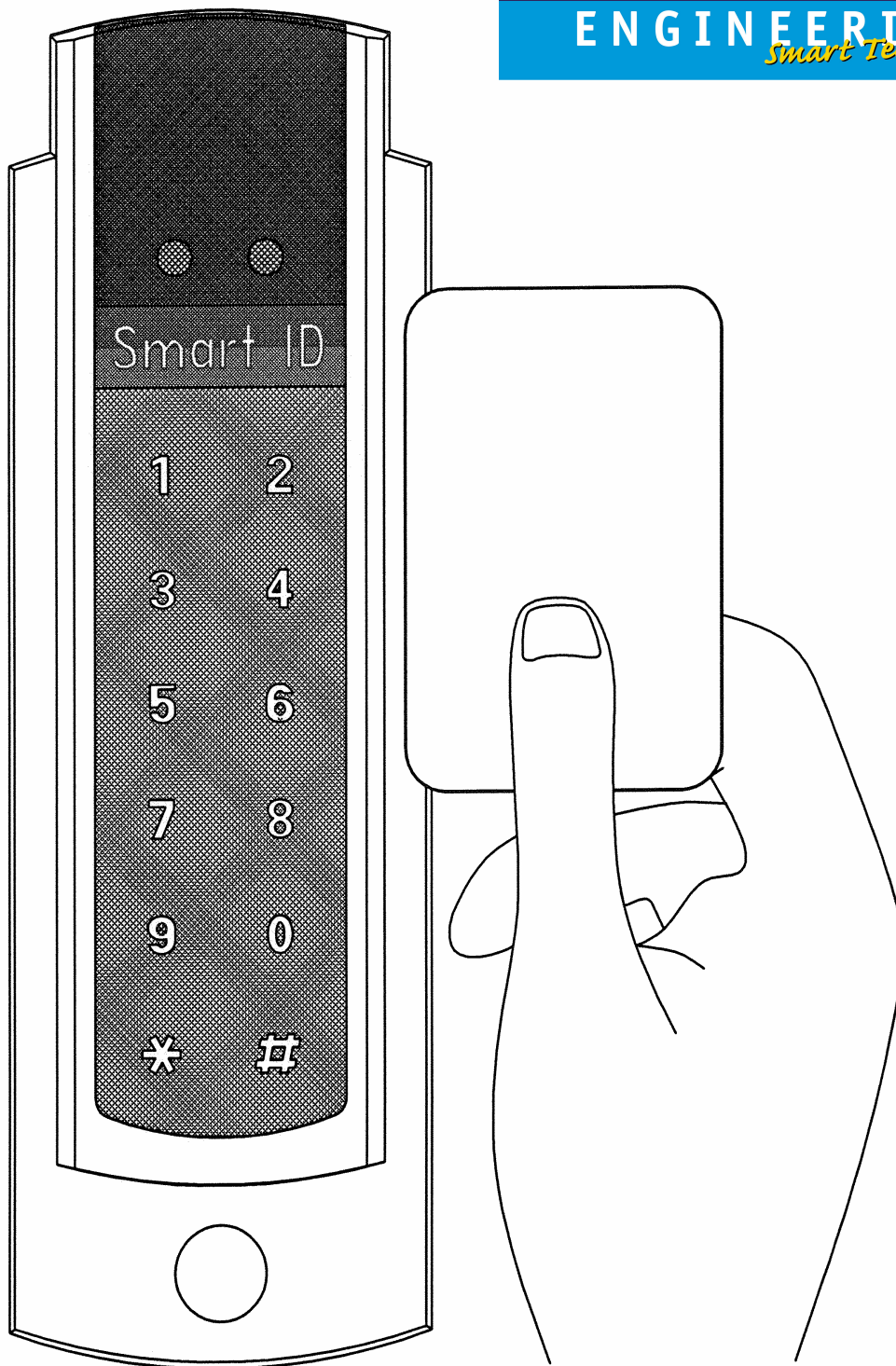
This manual is applicable for the following SmartID products:

- 800-8000    SmartID/EM4102
- 800-8001    SmartID/EM4102/pin
- 800-8015    SmartID/Hitag1&2
- 800-8016    SmartID/Hitag1&2/RW
- 800-8025    Mifare Serial number Reader/Rs232
- 800-8030    ISO14443-3 Mifare Sector reader
- 800-8045    ISO14443-3 Mifare Sector reader and pinpad
- 800-8062    SmartID/ISO14443-3/MifareDual/RO
- 800-8077    SmartID/ISO14443-3/PIN/MifareDual
- 800-8060    ISO14443-4 DESFire     reader (PIV  II)
- 800-8061    ISO14443-4 DESFire     reader
- 800-8076    ISO14443-4DESFire PINpad reader
- 800-8075    ISO14443-4DESFire PINpad reader (PIV II)
- 800-8063    ISO14443-4 DESFire and Mifare reader
- 800-8078    ISO14443-4 DESFire and Mifare PINpad reader
- 800-8080    ISO14443-4 reader (ISO7816-4, PIV II)
- 800-8085    ISO14443-4 PINpad reader (ISO7816-4, PIV II)
- 800-8081    ISO14443-4 PINpad reader (ISO7816-4 and Mifare, PIV II)
- 800-8086    ISO14443-4 PINpad reader (ISO7816-4 and Mifare, PIV II)

Extra options for these readers, which are included in this manual, are:

- 500-0300    Reader Tamper switch
- 500-9287    SmartID/Mountingplate/Grey (Spacer)
- 500-8090    SmartID/SPMD (Switch Box Mounting Device)

# Table of content:

## Features

The Smart ID Reader has a slim door style mountable design to match any decor. The sunk LED's and buzzer allow the Smart ID Readers to be mounted indoors and outdoors.

The Smart ID Reader accepts 4 to 16 Volts DC. The reader output formats like clock-and-data magstripe (ABA / ISO7811), Wiegand and a number of other formats are determined by the personalization of the card or configuration of the reader. The 5 Volt DC capability allows the replacement of older reader systems without rewiring or pulling new cables. The Smart ID Reader offers high reliability, consistent read characteristics and low power consumption.

Within the Smart ID Proximity Reader Family also models with a RS232/RS422/RS485 interface are available for read-only and read/write operations.

The Smart ID Reader Family supports both the 125KHz and 13.56MHz technologies. Different models are available for EM4002, HiTAG1 and 2, Mifare, DESFire and I·Code technology. Standard capabilities include Host system controlled red and green LED's and a buzzer.

The Smart ID Reader can be mounted on any surface without relevant performance degradation. For mounting on a metal surface a spacer is advised.

Our commitment is to bring non-propriety, open Radio Frequent Identification (RFID) systems to the market demonstrated with the Smart ID Reader Family.

## Mullion Mounting

The Smart ID Readers can be mounted on a door mullion.

Optional there is a mounting kit available in case the small Smart ID reader will be mounted over a wall box (mounting US back box, vertical 84 milimeter (3.31 inch), mounting European back box, horizontal 60 millimeter (2.36 inch)).

## Indications

When a proximity card is decoded successfully the with the card associated code is send to the Host system and the buzzer sounds a short 3KHz beep. Both LED's and the buzzer are also controllable by the Host system.

## Connections

The Smart ID Reader Family has a flexible and reliable connector interface. The space for the cable and the connector within the Smart ID housing can be sealed with silicone to withstand harsh environmental conditions.

## Output protocols

The Smart ID Reader Family can operate with any facility, system or card coding scheme. The output format, contents and length are determined by the personalization of the card or configuration of the reader. Output formats like magstripe, Wiegand and several others are available.

## Security

Depending on the model and the RF technology used the Smart ID Reader Family offers high security challenge response schemes to protect the RFID air interface against various attacks schemes like record & playback attacks.

## Specifications

**Typical read range with an ISO Card**
EM4102       up to 7.5 cm (2.95 inch)
Hitag1&2     up to 8 cm (3.15 inch)
ISO14443     up to 3 cm (1.8 inch)
ISO15693     up to 15 cm (5.91 inch)
DESFire      up to 2 cm (0.79 inch)

**Power Supply**
4.5 – 16 Volt DC

**Current requirements**
Average Power Consumption   1.25 Watt
Peak Power Consumption      1.68 Watt

**Interface**
Inputs   EMC Prot. 10K ohm pull-ups
Outputs EMC Prot. open drain 0.5 A/max

**Dimensions**
142 x 46.2 x 25 mm (5.59 x 1.81 x 0.98 inch)

**Material**
SB housing with polyurethane potting

**Operating temperature**
-20° to 60° C (-4 to 140 Fahrenheit)

## Certifications
CE, FCC

## FCC ID's are:
- Hitag1&2: Smart ID/Hitag1&2
  P4E-SMARTPIN-2
- ISO14443: Smart ID/ ISO14443/SNR/RS232
  P4E-SMARTPIN-1
- ISO 14443-3: Smart ID/ISO14443-3/Sect
  P4E-SMARTPIN-1
- DESFire: Smart ID/DESFire
  P4E-SMARTPIN-1

Consult your National Authority if any authorization is needed for this product.
This device complies with Part 15 of the FCC Rules.
Operation is subject to the following two conditions:
1) that this device does not cause harmful interference, and
2) that this device must accept any interference received, including interference that may cause undesired operation.

## Cable Distance
Up to 150 meter (492 foot), depending on output protocol and cable type. Recommended cable type: stranded conductor with overall stranded shield or equivalent

SIA recommended cable type for Wiegand signals

| Cable Length | Cable | Diameter inch | Diameter mm |
|---|---|---|---|
| Up to 61m (200.1 ft) | AWG22 | 0.025 | 0.64 |
| Up to 91m (301.8 ft) | AWG20 | 0.03 | 0.82 |
| Up to 153m (502 ft) | AWG18 | 0.04 | 1.02 |

Recommended cable for clock and data ABA track 2 emulation: Up to 25 meter (82 foot), AWG22.

**Wiegand Signal Levels**
Voh = Output Voltage idle high
Vol = Output Voltage active low

**SmartID output interface and pull-up resistors**
The SmartID readers provided true open collector outputs for Wiegand/Clock&Data ABA track 2 emulation. This means the data output is
not voltage driven.

External pull-up resistors are required when the controller does not provide internal pull-up resistors. The typical value for the pull-up resistors is 1 kOhm. The recommend position to place the pull-up resistors is at the controller side.

The pull-up resistor #1 connects form Data/D1 (reader connector pin 3) to a 5 Volt reference.
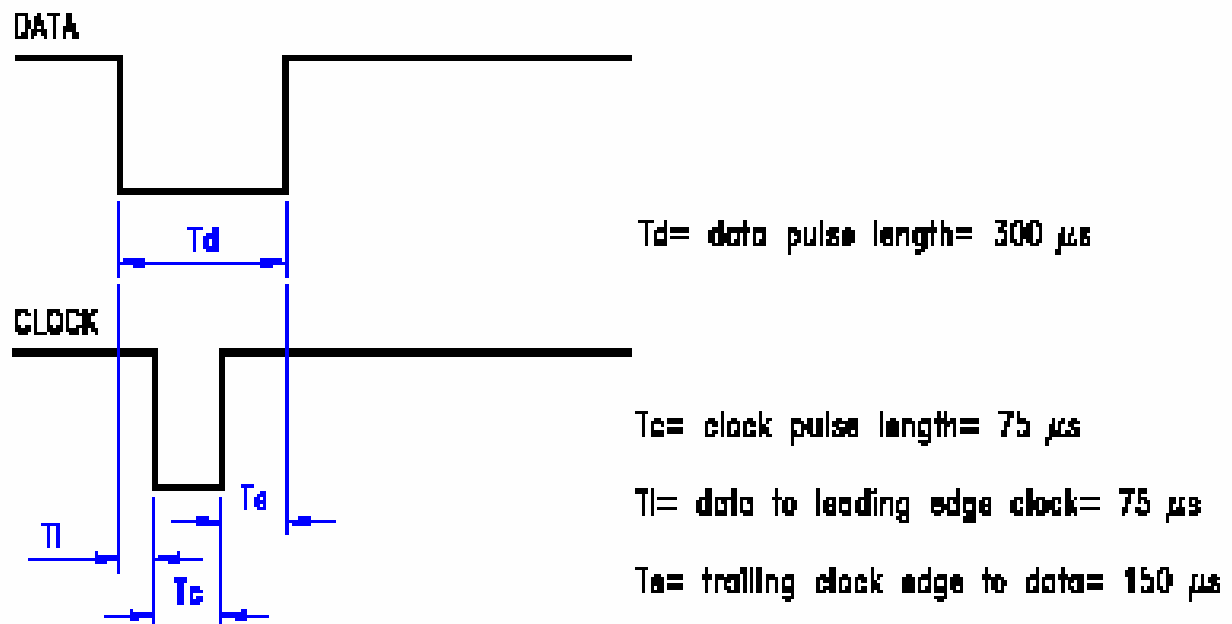The pull-up resistor #2 connects form Clock/D0 (reader connector pin 4) to a 5 Volt reference.

# Timing

## Typical timing for Wiegand

DO

D1

$T_p$ = pulse time = 75 μs

$T_i$ = pulse interval = 1050 μs
(time in between pulses)
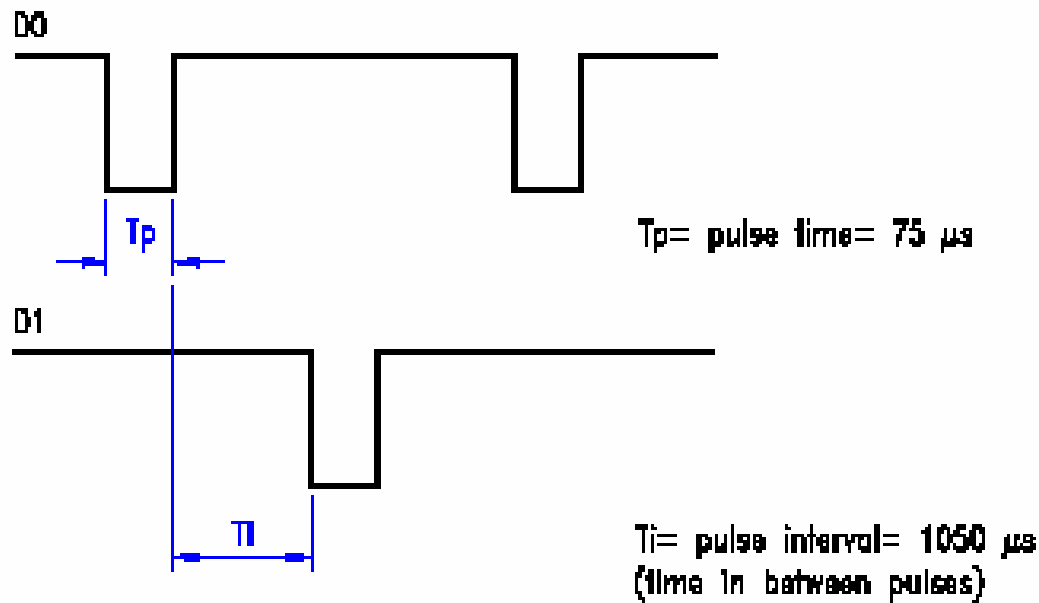
## Typical timing for ABA track 2 emulation

DATA

CLOCK

$T_d$ = data pulse length = 300 μs

$T_c$ = clock pulse length = 75 μs

$T_l$ = data to leading edge clock = 75 μs

$T_a$ = trailing clock edge to data = 150 μs

10

# Installation instruction

**1)** Determine an appropriate position for the Reader and drill two holes for mounting the reader to the surface (see mullion mounting drawing on 13). Do not mount the readers less than 20 cm (7.87 inch) from each other. Make sure that enough room to connect the cable is allowed. Protect the cable against sharp edges and any damage from chaffing.

**2)** Remove the Terminal Connector 8 pins from the back of the Reader. Use a small flat head screwdriver to loosen off all of the terminals. The end of the cable should be prepared by cutting it back to expose the wires and each end should be twisted to eliminate any loose or frayed wires.

**3)** The wires should then be connected to the Reader inline with the Connector Assignments. Wire ends outside the shielding and optional permanent LED links should be kept as short as possible. Twist the connector a few times to twine the wire ends to avoid differential mode interference on the data lines.

Note: wires at the connector must be kept as short as possible: long, unshielded connections will reduce the sensitivity of the reader.

**4)** After wiring the reader and the Host system the Reader is ready to be tested. Apply power and present a Card to the Reader. The green LED should flash and the buzzer should beep indicating a read. If the Host system is connected to the red and green LED inputs these should follow the functionality of the Host system.

**5)** The Reader can now be secured to the surface using the appropriate screws. Mount the black cover (sticker) and mount the cap over the mounting hole.

## Mullion Mounting
The size in the drawing is in mm. 1 mm is 0.039 inch.

Cover

Cap

25

12

142

120

Connector

Removable

25 ±5

ø5.5
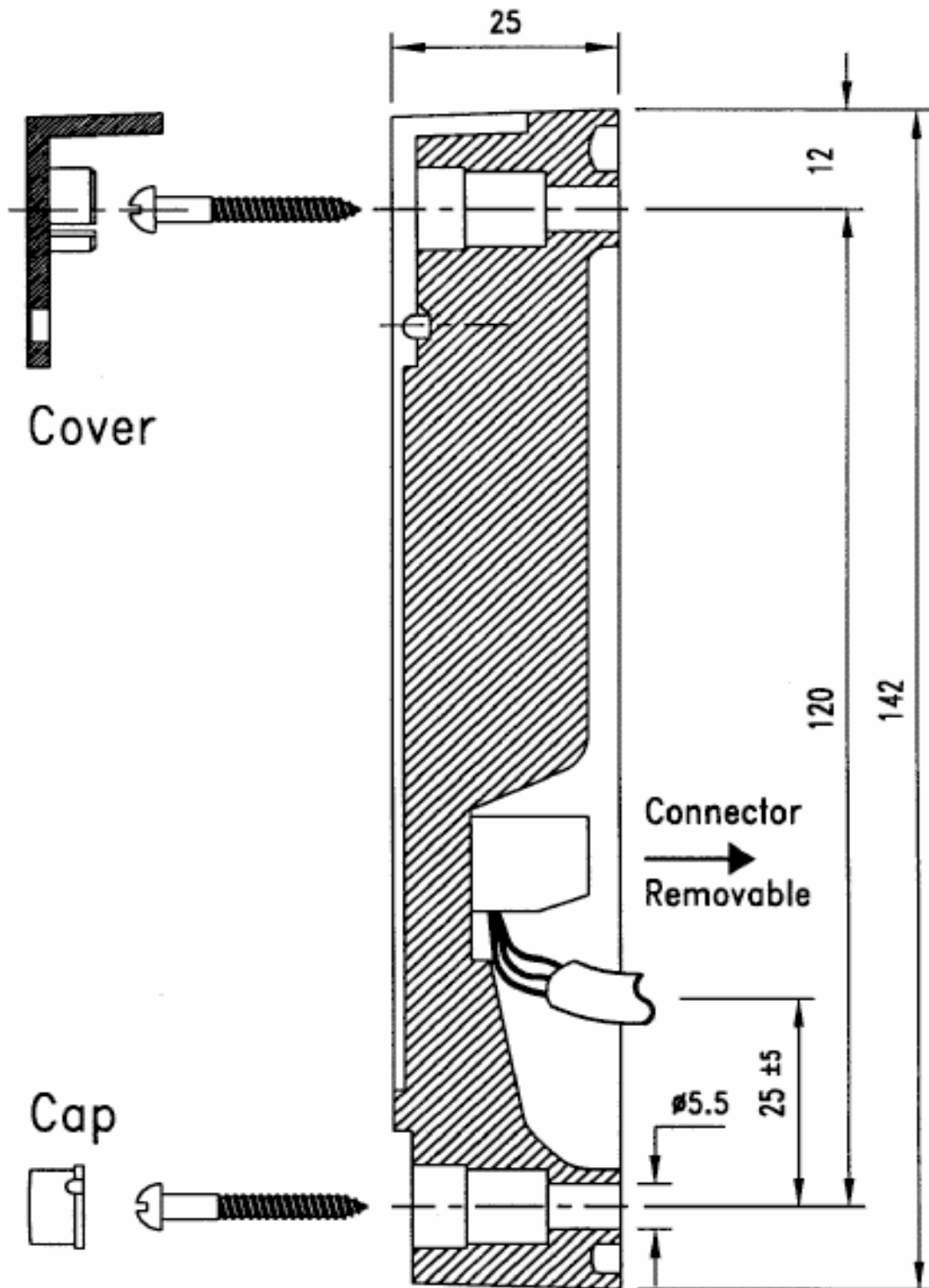
## Connector Assignments

| | Clock/Data (ABA) | Wiegand | RS232 | RS422 |
|---|---|---|---|---|
| 1 | Green LED input | Green LED input | Green LED input)** | Green LED input)** |
| 2 | Led LED input | Led LED input | Led LED input)** | Led LED input)** |
| 3 | Data | D1 | Do not connect | TXA |
| 4 | Clock | D0 | TXD | TXA |
| 5 | Buzzer input | Buzzer input | Do not connect | RXA |
| 6 | Do not Connect | Do not Connect | RXD | RXB |
| 7 | Ground | Ground | Ground | Ground |
| 8 | Power 4.5 to 16.00 VDC | Power 4.5 to 16.00 VDC | Power 4.5 to 16.00 VDC | Power 4.5 to 16.00 VDC |

**Attention:** 4.5 Volt DC is MINIMUM VOLTAGE AT READER CONNECTOR PINS

)** LED input only valid in read-only applications

*Optional*
# Tamper Switch
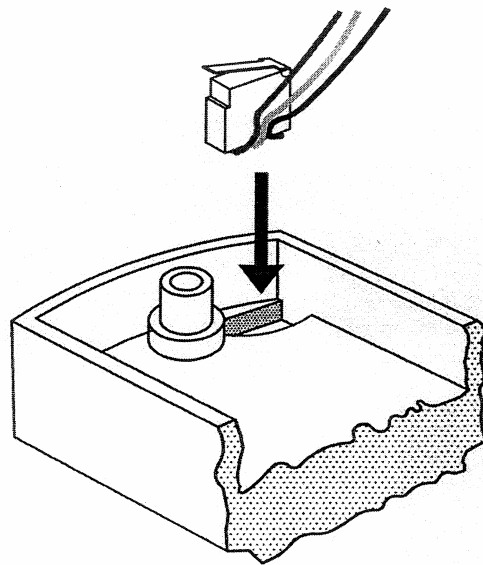
MOUNTING:
Push switch in opening
with cables in showed direction
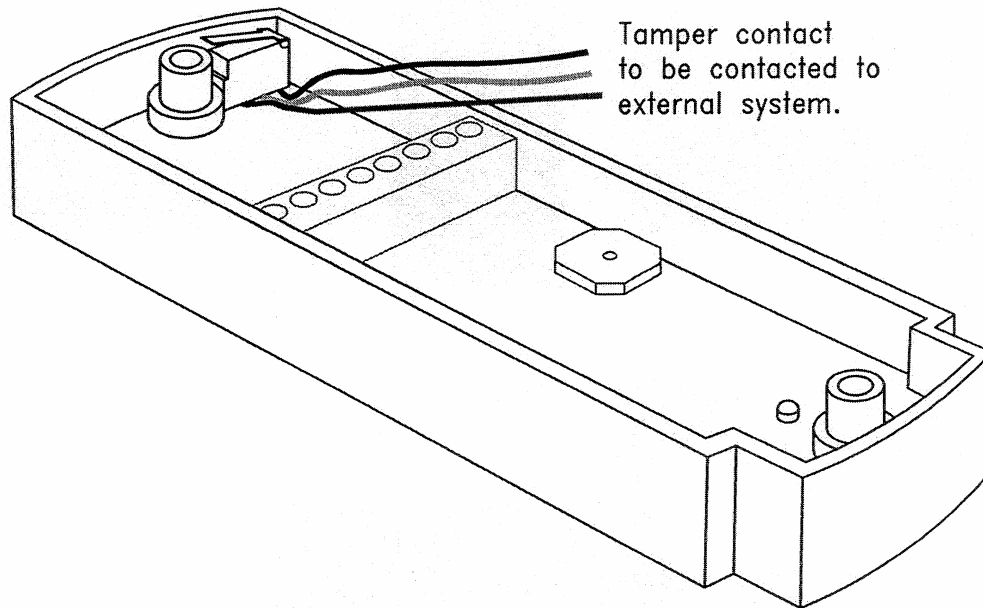
Tamper contact
to be contacted to
external system.

TAMPER SWITCH

BLACK (COMMON)
WHITE (NC: HINGE DOWN, READER MOUNTED ON WALL)
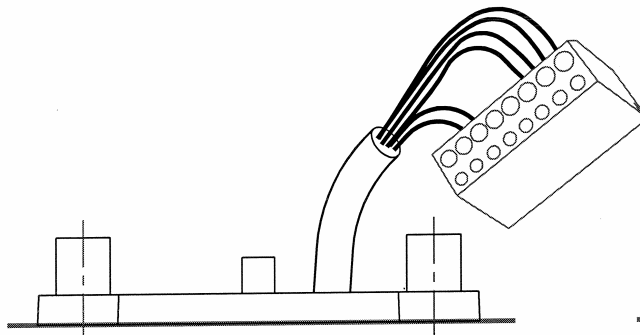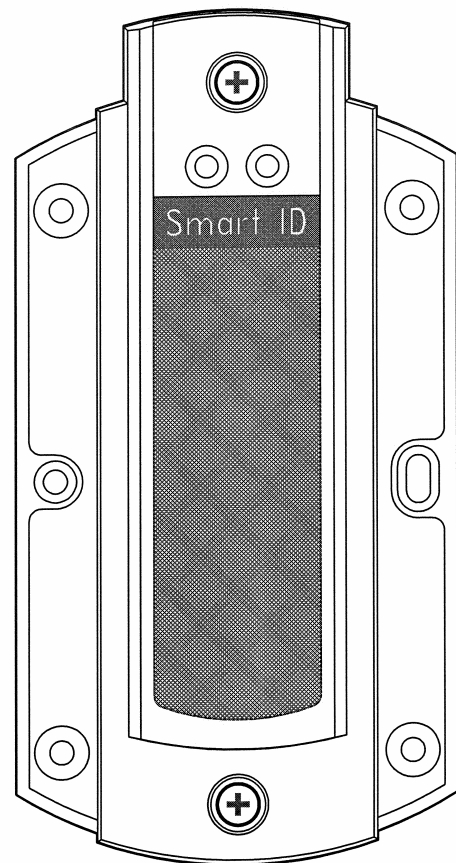RED   (NO: HINGE DOWN, READER MOUNTED ON WALL)

HINGE
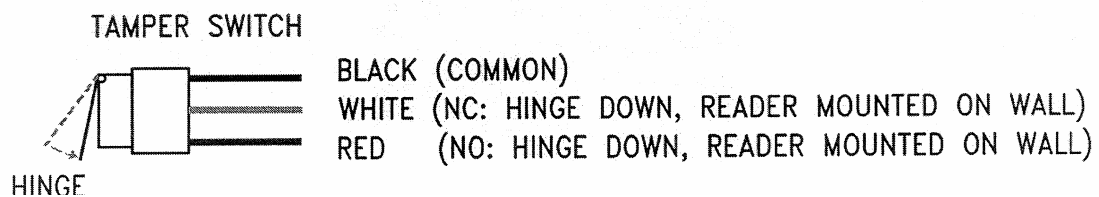
*Optional*

# Mounting tool

The sizes in the drawing is in mm. 1 mm is 0.039 inch.
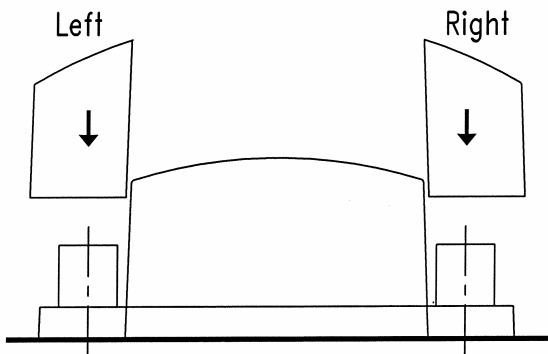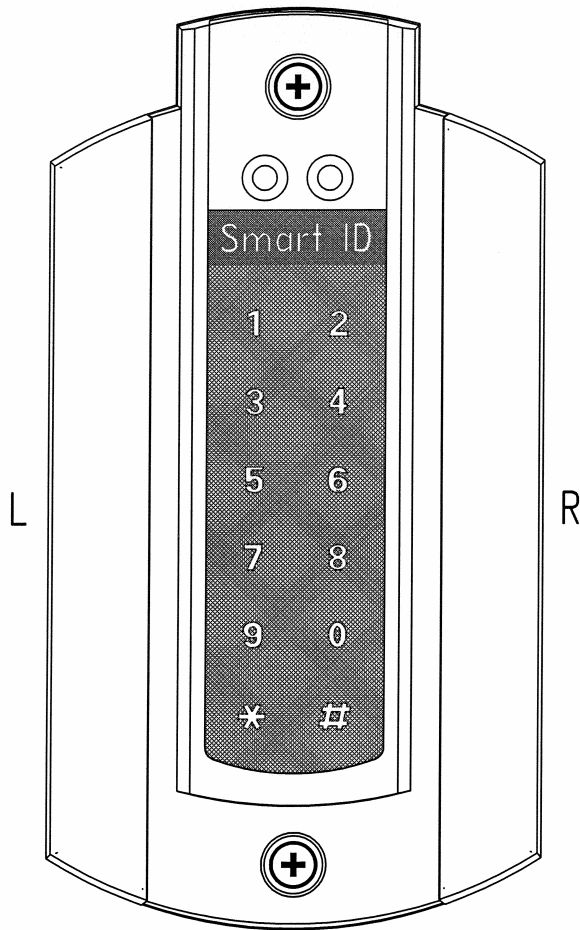
① Mount Backplate
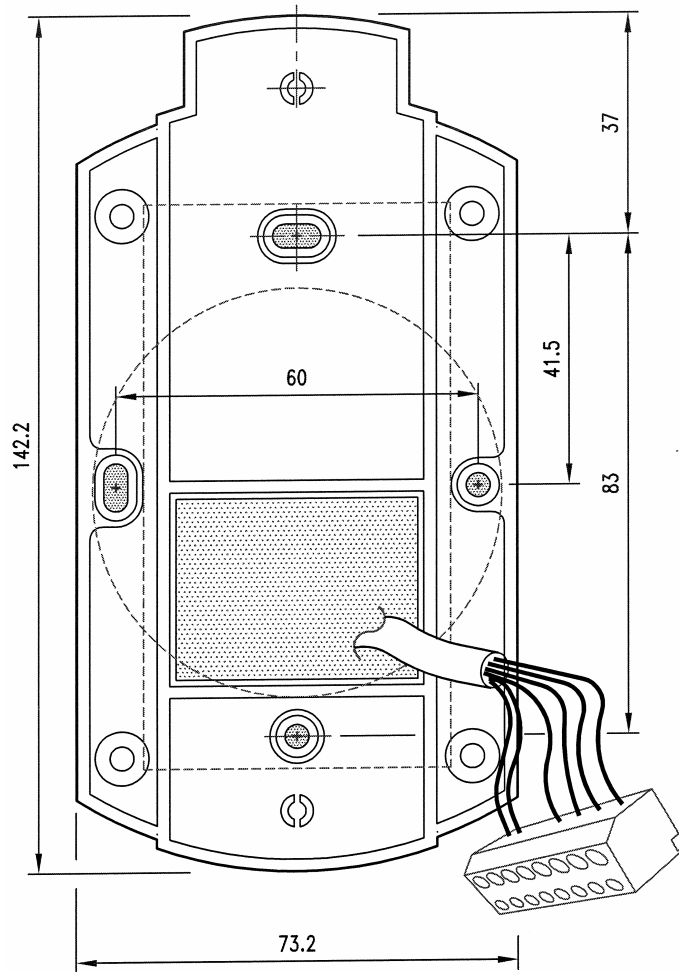
② Mount Reader
(connect cable and test
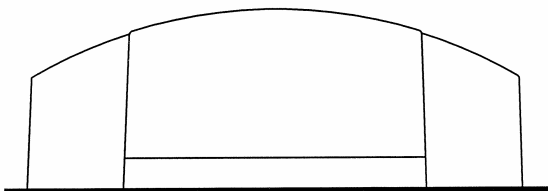conform reader
installation instruction)

Smart ID

142.2

73.2
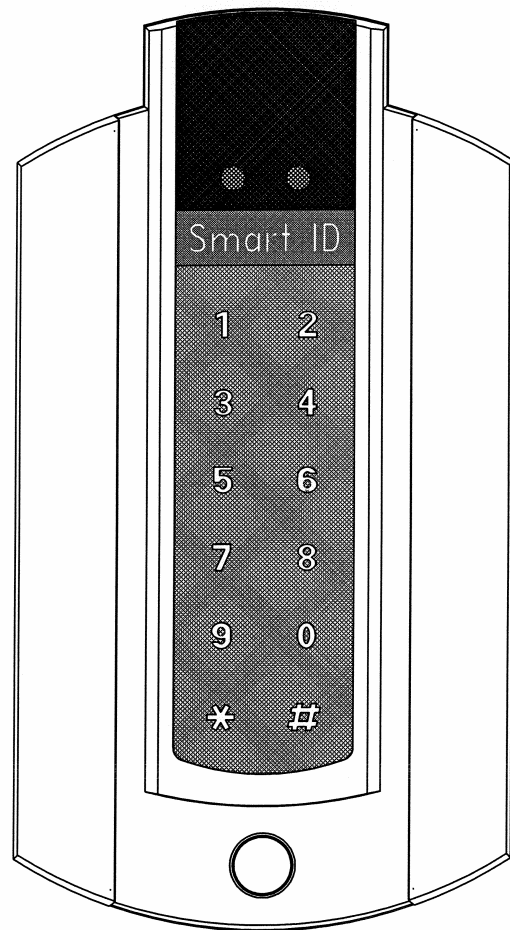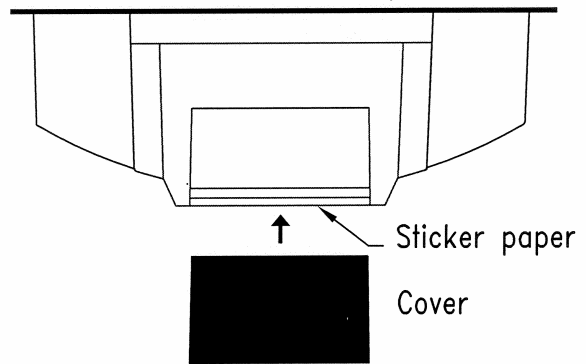
37

41.5

83

60

Screw (2x)
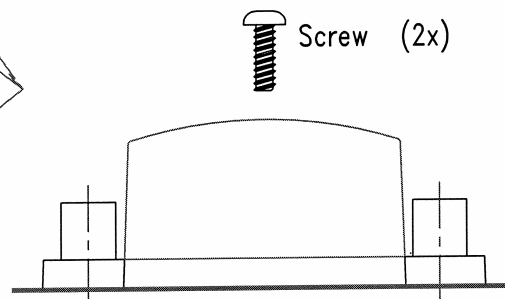
Smart ID MOUNTING KIT

③ Mount Side Caps
   Left and right

Smart ID

1    2
3    4
5    6

L                    R

7    8
9    0
*    #

Left                    Right

↓                        ↓

(After mounting: Side Caps
     can't be removed!)
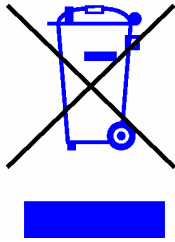
④ Mount Cover
   (take off sticker paper)
   and mount Cap

Sticker paper

Cover

Smart ID

1    2
3    4
5    6
7    8
9    0
*    #

Cap

↓
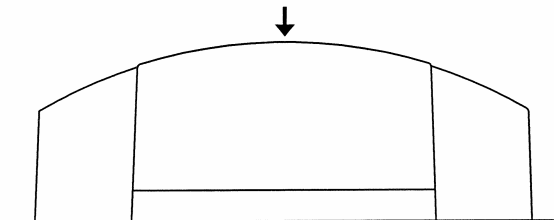
(If needed, reader can be removed
 without removing the Side Caps)

*Optional*
# Mounting Plate (Spacer)
The sizes in the drawing is in mm. 1 mm is 0.039 inch.

Cover

Cap

Spacer

Spacer

Wall

25

10

143

120

30 ±5

10.5

Smart ID

Cable

47

Cable conduit (Attema K25)

SPACER FOR SmartID-READER

Mounting in case:

A.  cable can not be connected through the wall
    and must be on the wall.
    Cable is led through spacer. For this purpose
    open one of the cable entries by removing
    the plastic.

B.  The reader is too close to a metal wall.
    The spacer creates some more distance between
    reader and wall resulting in a better RF-signal.

# Notes

The crossed-out wheeled bin means that within the European Union the product must be taken to separate collection at the product end-of life. This applies to your device but also to any enhancements marked with this symbol. Do not dispose of these products as unsorted.

**Approval**
If used according to the instructions, this radio system meets the basic requirements of article 3 and the remaining applicable conditions of the R&TTE directive (1999/5/E6) of March 1999.