deister
electronic

PRM 5
Wiring and Installation Instructions

V 1.0   12/00

FCC Compliance Statement

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.

Information to user:

Caution: Any changes or modifications not expressly approved by the party responsible for compliance could
void the user's authority to operate the equipment

Contents

1 Technical Data

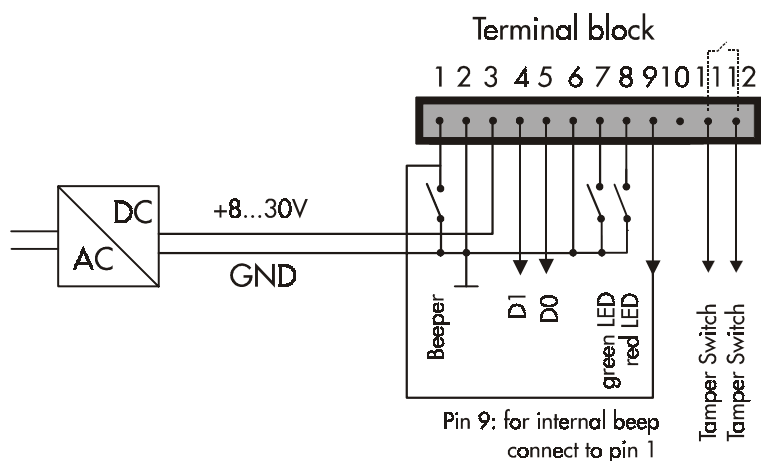|	
Mounting:	1. Flush mounting in non-metallic surfaces
	2. Surface mounting using an AP5 spacer
	3. Mounting on single-gang electrical box using fixing plate FM 5
Material:	ASA plastic housing; polyurethane encapsulated electronics
Housing dimensions:	80 x 80 x 16 mm
Temperature range:	-25...+70 °C
Power supply:	8...30 V DC <100 mA
Electrical protection:	Reverse polarity diode protection on power lines;
	high-speed transient voltage suppressor diodes on data lines
Protection type:	IP 65 (IEC 529)
Frequency:	13.56 MHz
Approvals:	CE, EN 300 330 (European post)
Reading distance:	Up to 3 cm (depending on installation and transponder type)
Data output mode:	1. One transmission per activity
	2. Cyclical transmission
Interface:	1. Wiegand 2-wire (open collector)
	2. Data/Clock (open collector)
	3. Magstripe emulation (open collector)
	4. RS 232
	5. RS 485
	6. F2F Supervised
Electrical connection:	12 position plug-in strip connector with screw terminals
Beeper:	External control
Red LED:	External control
Green LED:	External control
Yellow LED:	Indicates power to the reader

2 Wiring Diagram
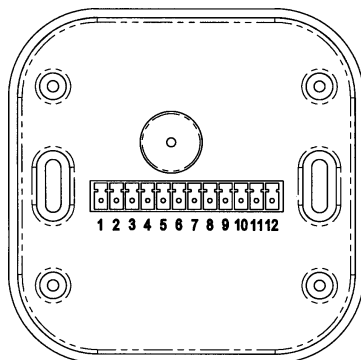
Rear view of the reader

2.1 PRM 5 Wiegand 2-wire

Terminal block

Pin 9: for internal beep
connect to pin 1

2.2 PRM 5 Magstripe Emulation

Terminal block

Pin 9: for internal beep
connect to pin 1

2.3   PRM 5 RS 232

Terminal block

Pin 9: for internal beep connect to pin 1
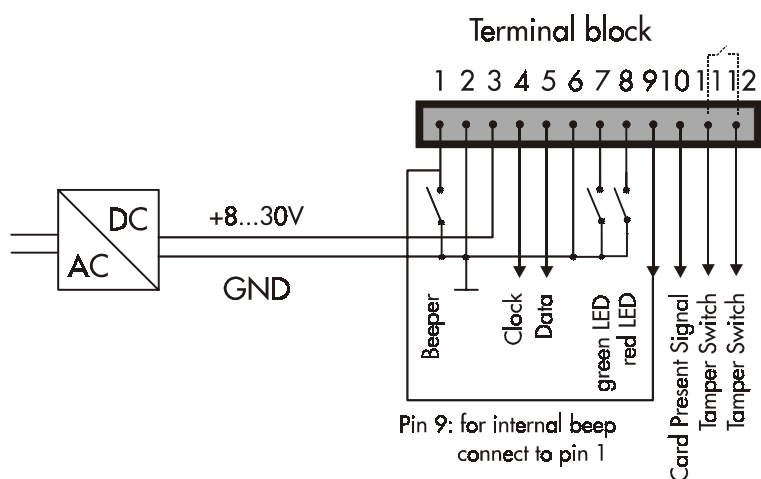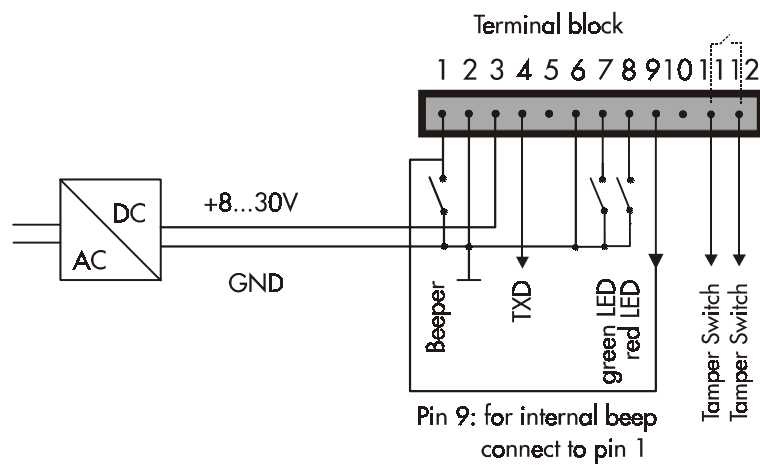
RXD can be connected to Pin 5, but without any function.

2.4   PRM 5 RS 485

Terminal block

Pin 9: for internal beep connect to pin 1

2.5 Supervised F2F

INTERN

ST2

1 2 3 4 5 6 7 8 9 10 11 12

FOR FURTHER USE

FOR FURTHER USE

FOR FURTHER USE

FOR FURTHER USE

FOR FURTHER USE

CONTROLLER

GND

+8...30V

R
470/0,5W

W1 F2F DATA

TAMPER SWITCH

TAMPER SWITCH

DOOR CONTACT
S1
SWITCH NC

EXIT REQUEST
S1
SWITCH NO
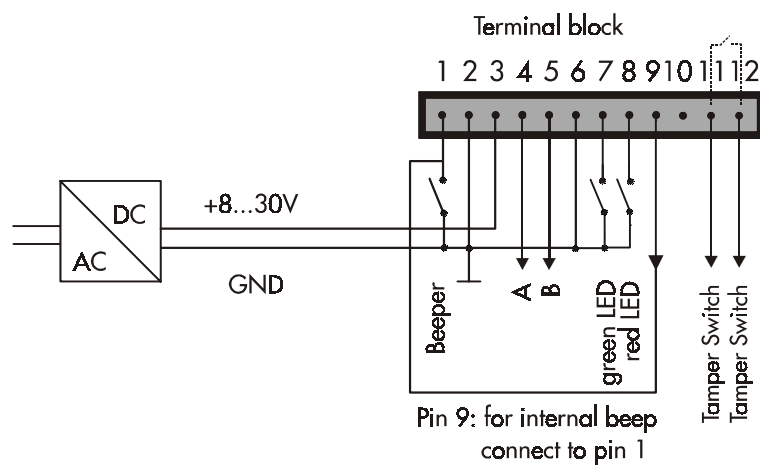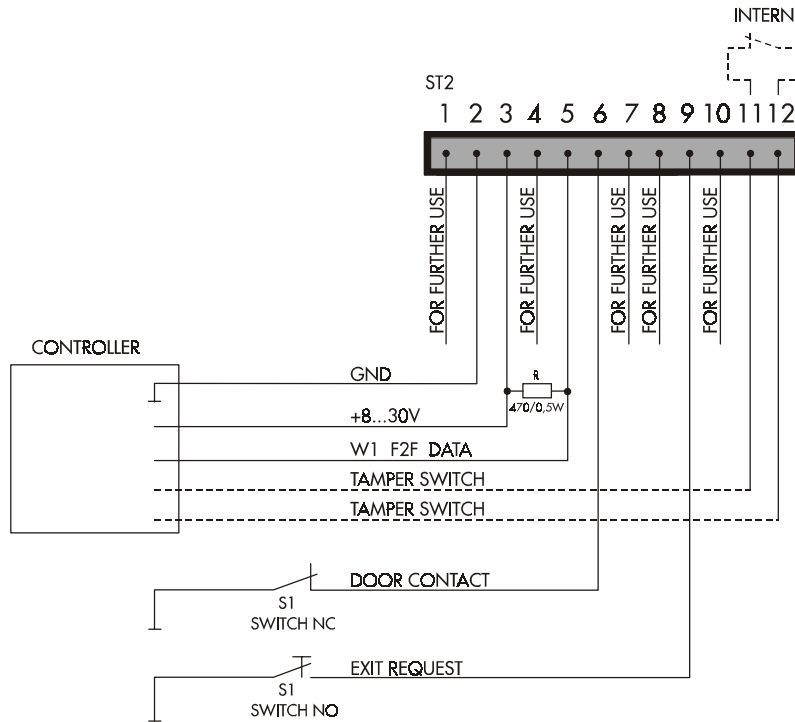
3 Mechanical Dimensions

3.1 PRM 5 Reader

All dimensions in mm

3.2 Surface Spacer AP5
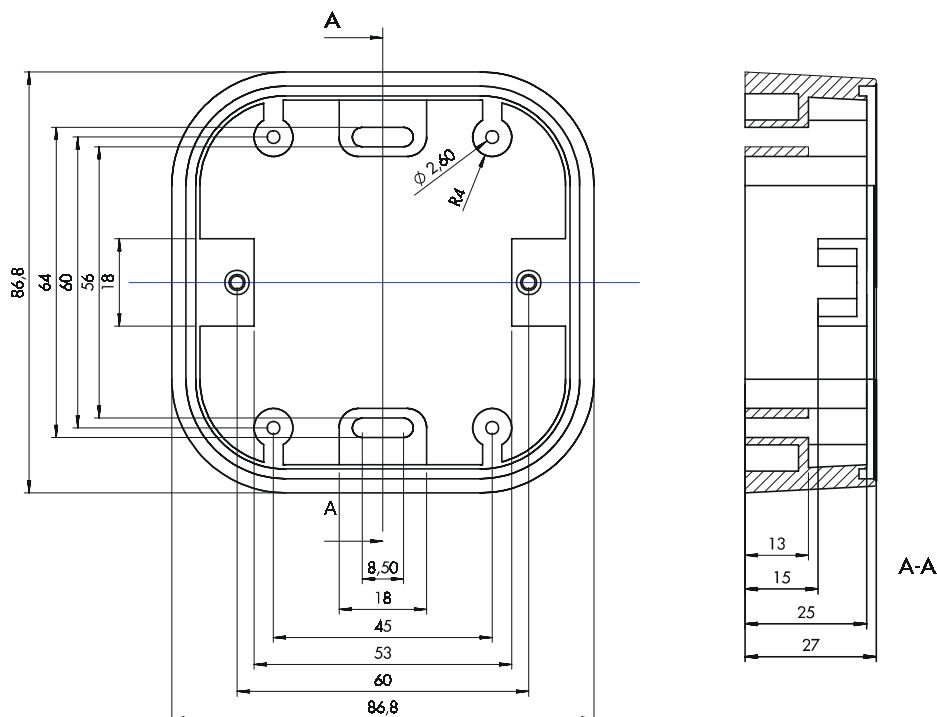
All dimensions in mm

3.3 Flush Mounting Bezel FM5
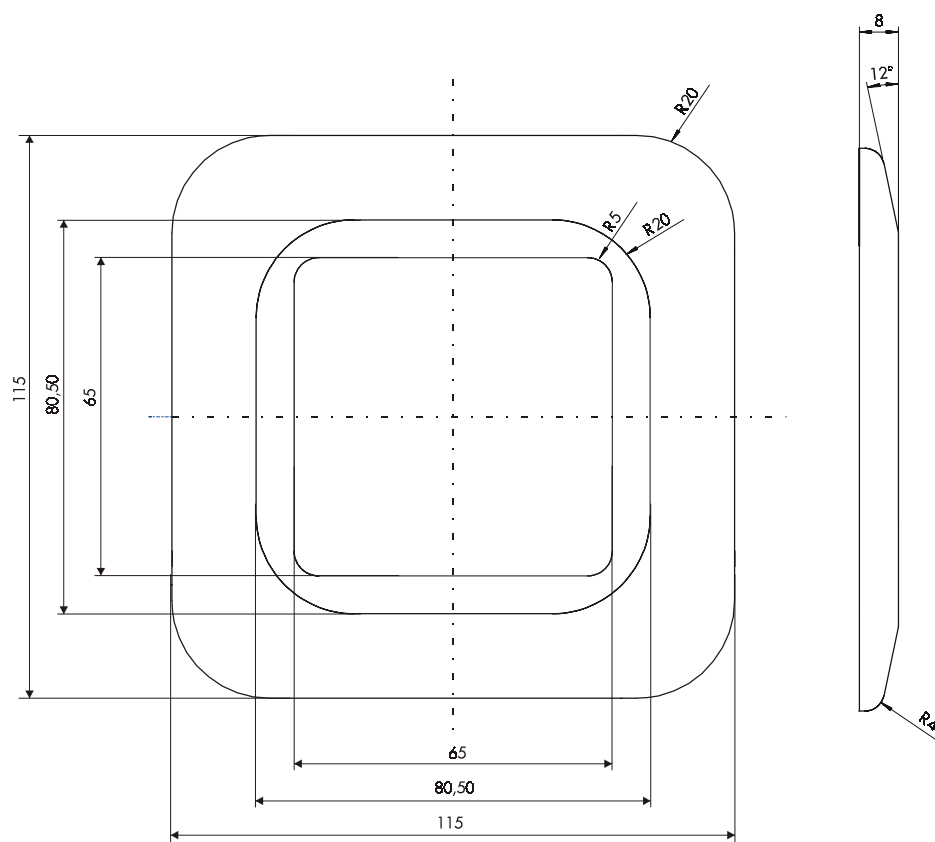
All dimensions in mm

4   Communications Protocol

4.1   Wiegand Standard

Message   1   1   0   0   0   0   0   1

Data "0"

Data "1"

100 µs   900 µs

4.2   Data/Clock

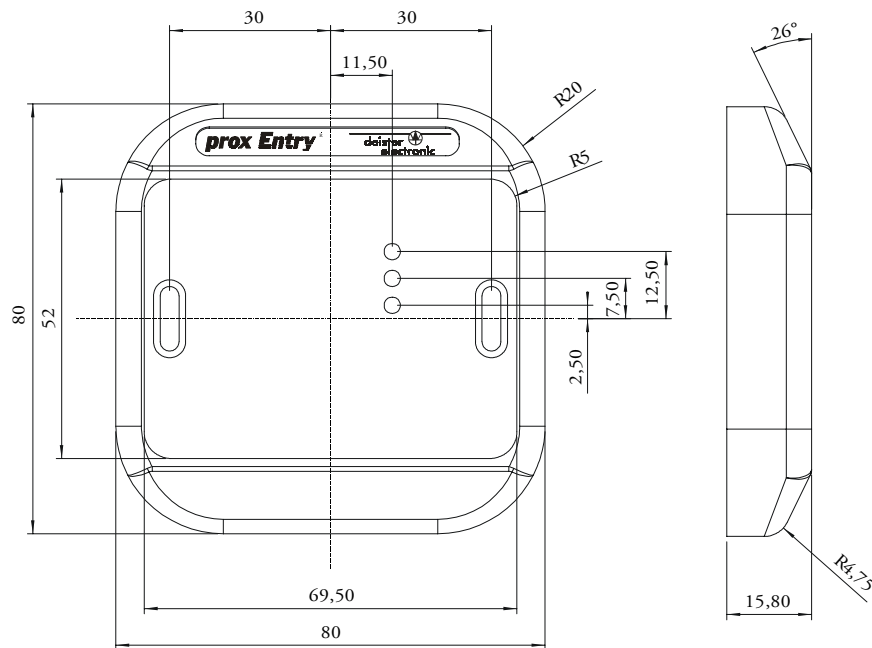Message   1   1   0   0

Data

Clock

330 µs
330 µs
330 µs
Data Hold Time

4.3   Magstripe Emulation

Message   1   1   0   0

Data

Clock

330 µs
330 µs
330 µs
Data Hold Time

Card
Present
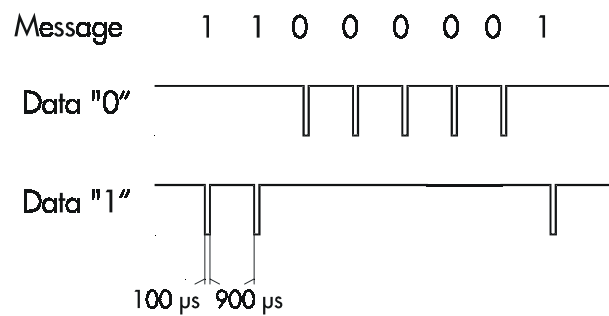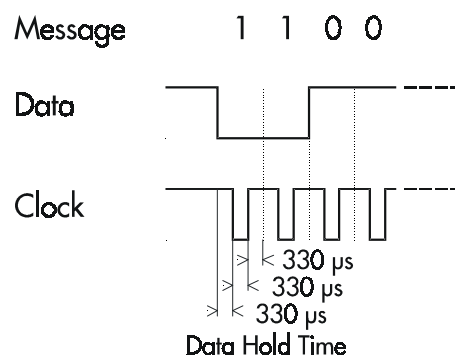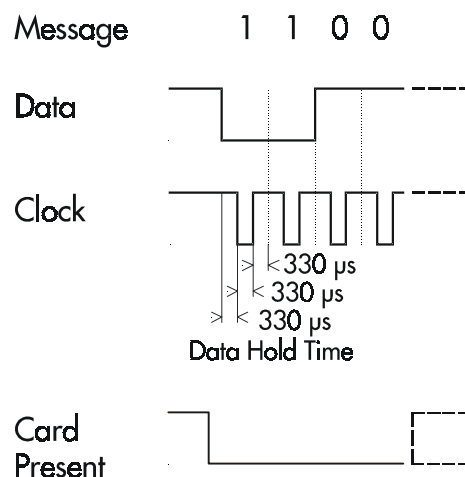
4.3.1   Magstripe Interface according to ISO 7811/2-1995 - Track 2

Data Encoding Table

Value	Bitpattern	Meaning
0	0 0 0 0-1	"0"
1	1 0 0 0-0	"1"
2	0 1 0 0-0	"2"
3	1 1 0 0-1	"3"
4	0 0 1 0-0	"4"
5	1 0 1 0-1	"5"
6	0 1 1 0-1	"6"
7	1 1 1 0-0	"7"
8	0 0 0 1-0	"8"
9	1 0 0 1-1	"9"
10 (Ahex)	0 1 0 1-1	unused character
11 (Bhex)	1 1 0 1-0	start sentinel (start character)
12 (Chex)	0 0 1 1-1	unused character
13 (Dhex)	1 0 1 1-0	field separator
14 (Ehex)	0 1 1 1-0	unused character
15 (Fhex)	1 1 1 1-1	end sentinel (stop character)

The least significant bit of every digit is sent first; the fifth bit is an odd parity bit for each group of 4 data bits.

The complete message always looks as follows:
left edge - start - data characters - end - LRC - right edge

The LRC is calculated by the following procedure:
Each of the 4 bits in the LRC character is an even parity bit of the equivalent bits in the telegram including start and stop sentinel; i. e. the first LRC bit is an even parity bit for all the least significant bits in the telegram and the 4th bit of the LRC is the even parity of all the most significant bits.

The fifth bit is the odd parity of the 4 LRC bits (it is not calculated over all the parity bits).

On magstripe cards the space left and right of the information (edge) is filled with an unknown number of zero bits (this is not a valid character as the parity is invalid). As most terminals need some of the zero bits (known as "clocking bits" too) and do not care about additional zero bits, deister decided to send 16 zero bits at the left edge as well as to the right edge.

The parity bits, the start and end characters, the LRC and the zero bits at the edge are generated automatically by the reader.
On the one hand, they do not require space in the transponders (therefore we can encode 16 digits for the user), on the other hand this means that there will be a problem if one of the fields is missing.

Example:
The short information "86" would be transmitted as follows:
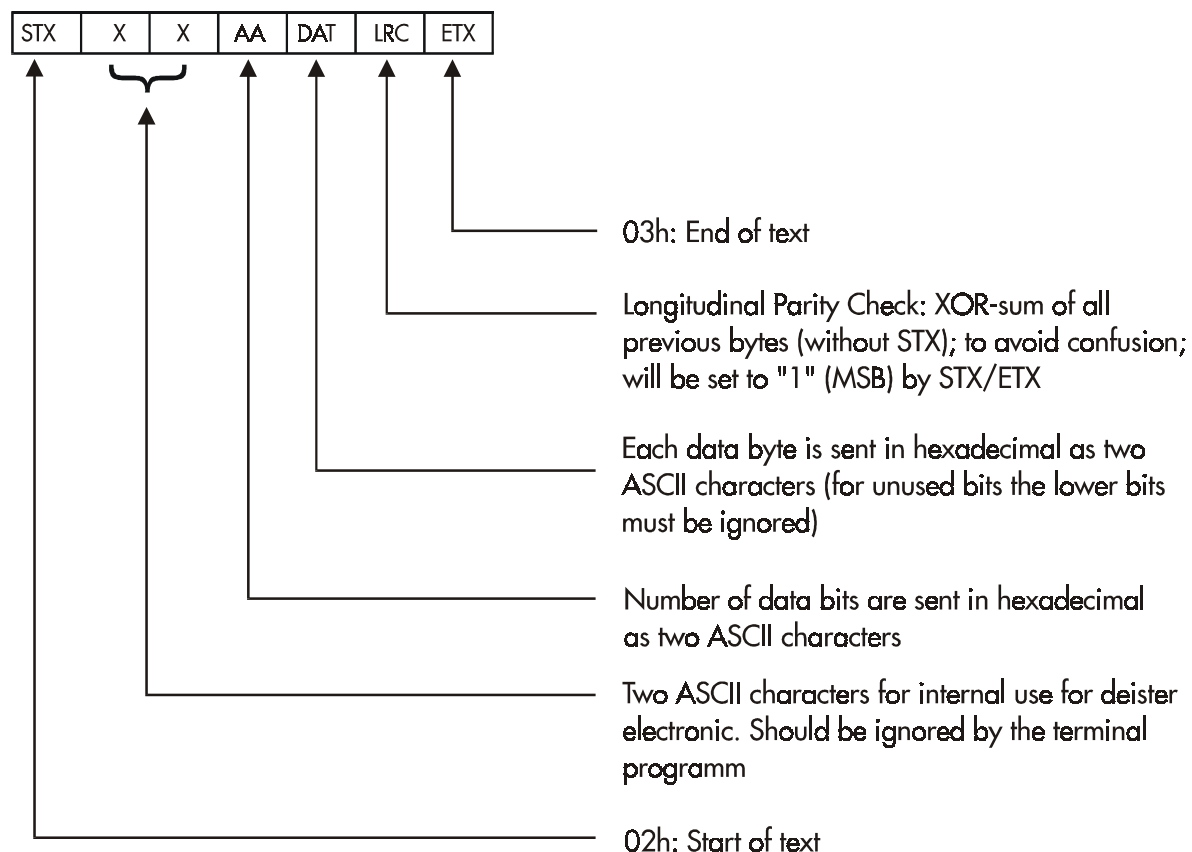0000000000000000-11010-00010-01101-11111-01011-0000000000000000
        edge   start   "8"   "6"   stop   LRC edge

A "1"-bit is transmitted as a logic low level; the falling as well as the rising edge of the clock pulse may be used to clock in data.

4.4 Protocol for PRM 5 with RS 232/RS 485 Interface (no Partyline protocol)

The interface is operated using 9600 baud, 8 data bits, 2 stop bits and no parity bit.

Message Format: Example

STX	X	X	AA	DAT	LRC	ETX

03h: End of text

Longitudinal Parity Check: XOR-sum of all previous bytes (without STX); to avoid confusion; will be set to "1" (MSB) by STX/ETX

Each data byte is sent in hexadecimal as two ASCII characters (for unused bits the lower bits must be ignored)

Number of data bits are sent in hexadecimal as two ASCII characters

Two ASCII characters for internal use for deister electronic. Should be ignored by the terminal programm

02h: Start of text

Transponder data:					0101	0101	0111			
Data transmitted from reader:										
02h	"R"	"E"	"0"	"C"	"5"	"5"	"7"	"0"	E3h	03h

↓ first character Tx

↓ undefined,
bits to fill incomplete byte
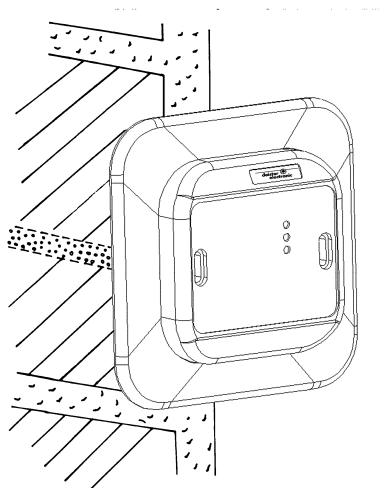
Calculation of the parity:

LRC = 80h OR [52h Å 45h Å 30h Å 43h Å 35h Å 35h Å 37h Å 30h] = E3h

("Å" means Exlusive-OR)
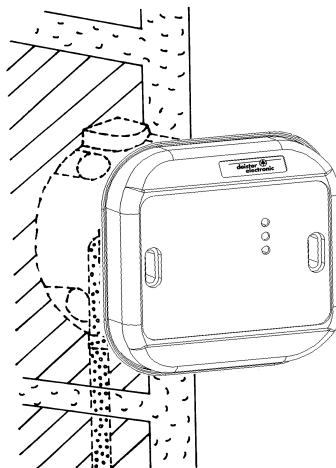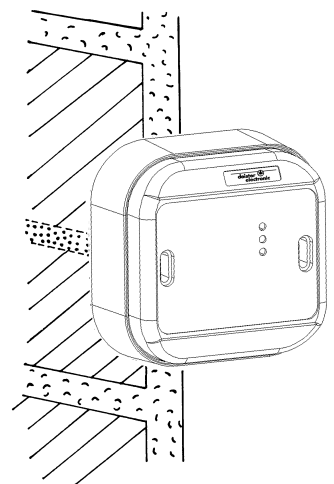
5 Installation

5.1 PRM 5 Reader

The PRM 5 reader can be surface mounted using an AP 5 spacer, or flush mounted direct to an European round style back box.
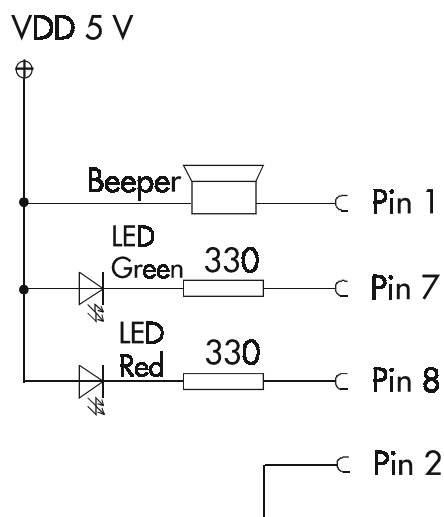

Flush mounted with FM5 bezel

Flush mounted directly with a European round back box

Surface mounted with AP5 spacer

6   Installation
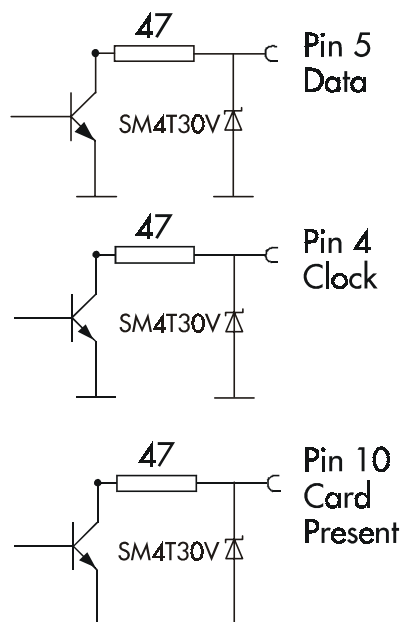
6.1   Indicators

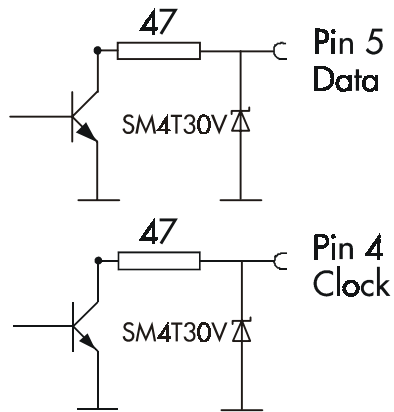Function of LED's and beeper (except Supervised F2F protocol):

Yellow LED:
Reader is operational. Momentarily flashes
during the reading of a card.

Green LED, red LED, beeper:
The function of these indicators is dependant on how
they are connected to the controller.

6.2   Magstripe Emulation

6.3 Wiegand/Data/Clock

☞ **Note:**

For all interfaces except RS 232/485 the pull-ups must be connected to the clock and data lines.

7 Appendix

7.1 Supervised F2F

It is possible to switch between native and compatible mode using special programming cards.