

## Technical Datasheet



### **XMP-TMC28XX-XXX**

## **MULTI-FUNCTION TERMINAL**

The multi-function terminal type XMP-TMC28xx is designed for use in access control, time recording and Time & attendance applications in conjunction with the management system XMP-BABYLON. The terminal read passive proximity badges with the standard RFID-technologies in the frequency range 125 KHz (MIRO, HITAG®1+2) or 13.56 MHz (MIFARE® or LEGIC®). Optionally the terminal can be delivered with a “scramble display” (PIN-Code) or with an integrated fingerprint sensor.

The terminals are connected via RS485 to the access controller units XMP-K12, XMP-K32SX, XMP-K32, XMP-CMM or as second card reader on the stand-alone terminal XMP-TMC3500. The data transmission between reader and controller is secured with a Blowfish or AES256 encryption.

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## 1 Technical data



Description	XMP-TMC28x1	XMP-TMC28x2	XMP-TMC28x3
Processor	M16C (16 Bit, 16 MHz)		
Program memory	20 kB RAM 256 kB Flash		
Power supply	12 to 24 V DC $\pm$ 10%		
Power consumption	210 to 380 mA by 12V DC 105 to 190 mA by 24V DC		
Interface	RS485 (2 wire)		
Baud rate	9600 or 19200		
MIFARE® classic & DESFire® EV1	x	x	x
LEGIC® prime & advant	x	x	x
MIRO / HITAG®1+2	x	x	x
Fluorescence display			2x20 characters
Tamper contact	x	x	x
Buzzer	x	x	x
3 LED status display	x	x	
DIP switch	x	x	x
Multi-function keys		2	8 (4 keys with 8 sub-functions each)
PIN-Code			x
Capacitive keypad		x (biometric only)	x (biometric only)
Biometric	Optical fingerprint sensor	Optical fingerprint sensor	Optical fingerprint sensor


Security System XMP-BABYLON

ABS hosing	x	x	x
Protection class IP54	x	x	x
Environmental conditions	<p>Operation without biometric: -20 to 75°C (-4 to 167°F)</p> <p>Operation with biometric: 0 to 50°C (32 to 122°F)</p> <p>Storage: -20 to 75°C (-4 to 167°F)</p> <p>5 to 90% relative humidity</p>		
Dimensions	see chapter „Order numbers“		
Colors	Silver		


## 2 Order numbers

### 2.1 OEM terminal



Order number	Description	Dimension
 XMP-TMC2801-HIT	<i>MIRO / HITAG®1+2 card reader without display and keyboard for connection to access controller (Color: silver ; Protection class IP54)</i>	195x130x60 mm
XMP-TMC2801-MIF	<i>MIFARE® classic / DESFire® EV1 card reader without display and keyboard for connection to access controller (Color: silver ; Protection class IP54)</i>	195x130x60 mm
XMP-TMC2801-LEG	<i>LEGIC® prime / advant card reader without display and keyboard for connection to access controller (Color: silver ; Protection class IP54)</i>	195x130x60 mm
 XMP-TMC2802-HIT	<i>MIRO / HITAG®1+2 terminal with two function keys without display and keyboard for connection to access controller (Color: silver ; Protection class IP54)</i>	195x130x60 mm
XMP-TMC2802-MIF	<i>MIFARE® classic / DESFire® EV1 terminal with two function keys without display and keyboard for connection to access controller (Color: silver ; Protection class IP54)</i>	195x130x60 mm
XMP-TMC2802-LEG	<i>LEGIC® prime / advant terminal with two function keys without display and keyboard for connection to access controller (Color: silver ; Protection class IP54)</i>	195x130x60 mm

 <p>XMP-TMC2803-HIT</p>	<p><i>MIRO / HITAG®1+2 terminal with eight function keys (four of these have eight sub-functions each) and a two-line display for connection to access controller (Color: silver ; Protection class IP54)</i></p>	<p>195x130x60 mm</p>
<p>XMP-TMC2803-MIF</p>	<p><i>MIFARE® classic / DESFire® EV1 terminal with eight function keys (four of these have eight sub-functions each) and a two-line display for connection to access controller (Color: silver ; Protection class IP54)</i></p>	<p>195x130x60 mm</p>
<p>XMP-TMC2803-LEG</p>	<p><i>LEGIC® prime / advant terminal with eight function keys (four of these have eight sub-functions each) and a two-line display for connection to access controller (Color: silver ; Protection class IP54)</i></p>	<p>195x130x60 mm</p>


## 2.2 Fingerprint terminal

Order number	Description	Dimension
 <p>XMP-TMC2851-FP-HIT</p>	<p><i>MIRO / HITAG®1+2 card reader with an integrated optical fingerprint sensor without display and keyboard for connection to access controller (Color: silver ; Protection class IP54)</i></p>	<p>195x130x60 mm</p>
<p>XMP-TMC2851-FP-MIF</p>	<p><i>MIFARE® classic / DESFire® EV1 card reader with an integrated optical fingerprint sensor without display and keyboard for connection to access controller (Color: silver ; Protection class IP54)</i></p>	<p>195x130x60 mm</p>
<p>XMP-TMC2851-FP-LEG</p>	<p><i>LEGIC® prime / advant card reader with an integrated optical fingerprint sensor without display and keyboard for connection to access controller (Color: silver ; Protection class IP54)</i></p>	<p>195x130x60 mm</p>

## Security System XMP-BABYLON

 <p>XMP-TMC2852-FP-HIT</p>	<p><i>MIRO / HITAG®1+2 terminal with an integrated optical fingerprint sensor and eight function keys (four of these have eight sub-functions each) without display for connection to access controller (Color: silver ; Protection class IP54)</i></p>	<p>195x130x60 mm</p>
<p>XMP-TMC2852-FP-MIF</p>	<p><i>MIFARE® classic / DESFire® EV1 terminal with an integrated optical fingerprint sensor and eight function keys (four of these have eight sub-functions each) without display for connection to access controller (Color: silver ; Protection class IP54)</i></p>	<p>195x130x60 mm</p>
<p>XMP-TMC2852-FP-LEG</p>	<p><i>LEGIC® prime / advant terminal with an integrated optical fingerprint sensor and eight function keys (four of these have eight sub-functions each) without display for connection to access controller (Color: silver ; Protection class IP54)</i></p>	<p>195x130x60 mm</p>
 <p>XMP-TMC2853-FP-HIT</p>	<p><i>MIRO / HITAG®1+2 terminal with an integrated optical fingerprint sensor, eight function keys (four of these have eight sub-functions each) and a two-line display for connection to access controller (Color: silver ; Protection class IP54)</i></p>	<p>195x130x60 mm</p>
<p>XMP-TMC2853-FP-MIF</p>	<p><i>MIFARE® classic / DESFire® EV1 terminal with an integrated optical fingerprint sensor, eight function keys (four of these have eight sub-functions each) and a two-line display for connection to access controller (Color: silver ; Protection class IP54)</i></p>	<p>195x130x60 mm</p>
<p>XMP-TMC2853-FP-LEG</p>	<p><i>LEGIC® prime / advant terminal with an integrated optical fingerprint sensor, eight function keys (four of these have eight sub-functions each) and a two-line display for connection to access controller (Color: silver ; Protection class IP54)</i></p>	<p>195x130x60 mm</p>

### 2.3 Scramble terminal

Order number	Description	Dimension
 <p>XMP-TMC2803-MIF-SCR</p>	<p><i>MIFARE® classic / DESFire® EV1 Scramble keyboard card reader for connection to access controller (Color: silver ; Protection class IP54)</i></p>	<p>195x130x60 mm</p>

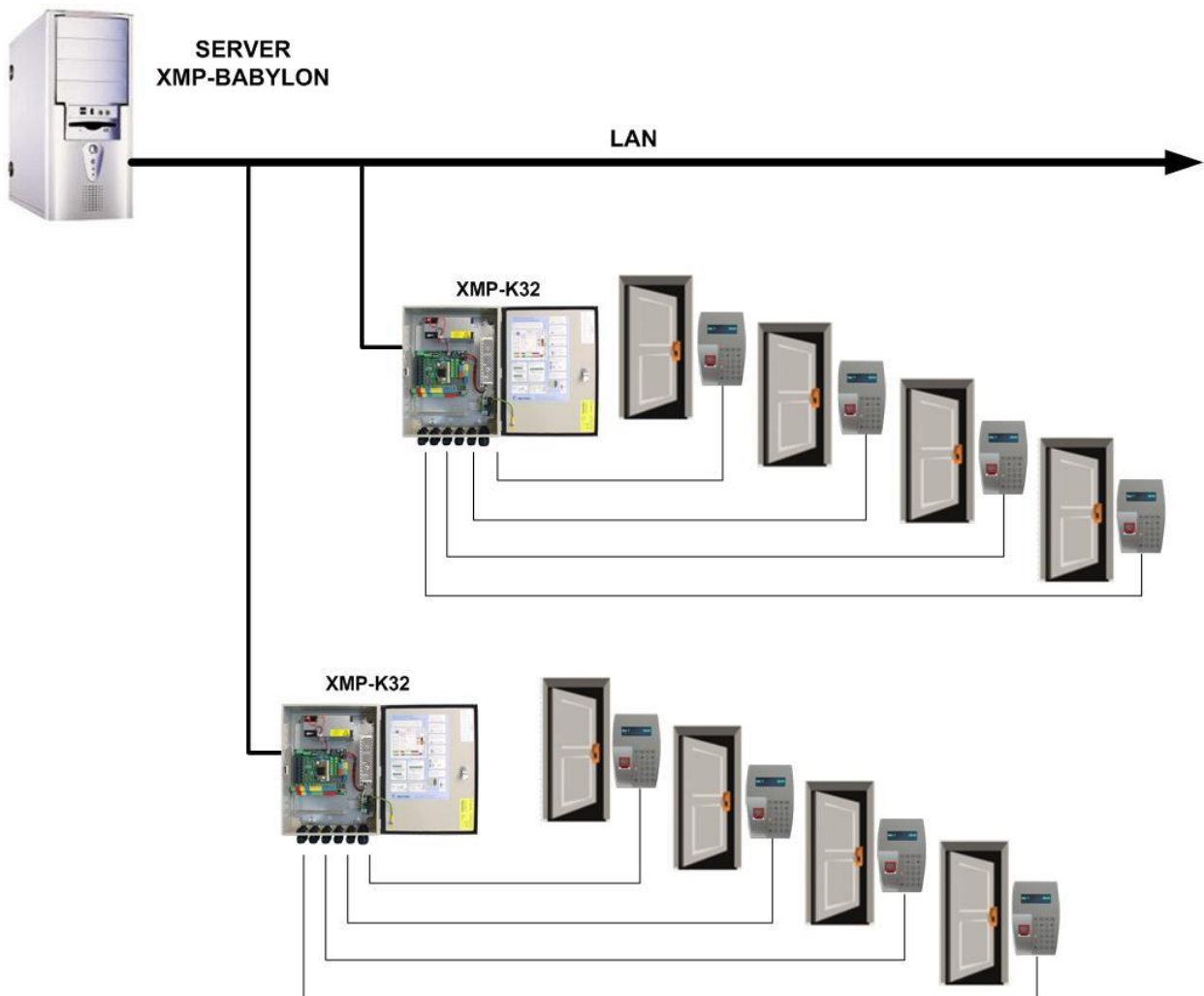
### 2.4 Accessory

Order number	Description	Dimension
XMP-TMC2500-HZ	<i>Heater for XMP-TMC2800 terminal / card reader</i>	80x50x5 mm
XMP-TMC2500-WSD	<i>Weather protection top for XMP-TMC2800 terminals</i>	230x150x95 mm



### 3 System Overview

Up to 2048 controllers with 2, 4 or 8 readers can be connected to one server.

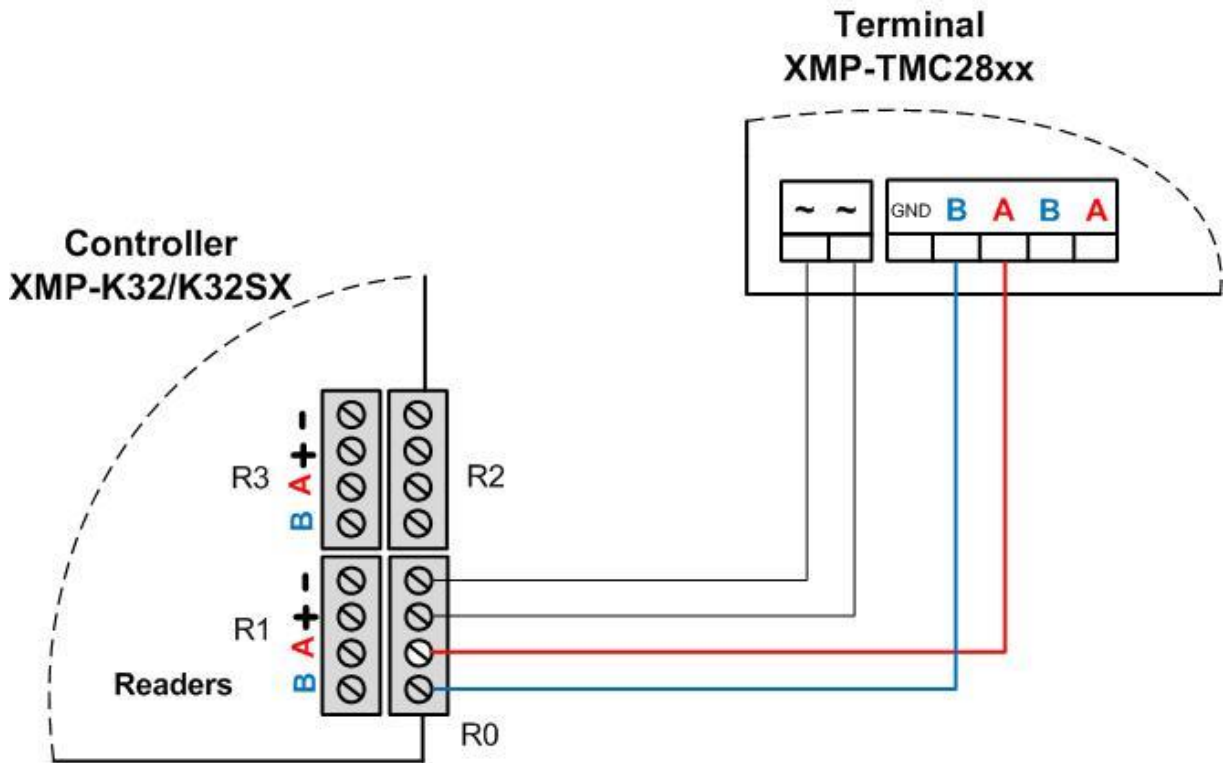



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Defective circuit boards must be disposed in competent manner. Old batteries and accumulators are hazardous waste. The package can be used again or can be disposed. The green filling material can be disposed as bio waste.

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### 3.1 Connection terminal to controller



The power supply can be provided by the XMP-K12 / XMP-K32 (recommendation).

Following distances should be observed:



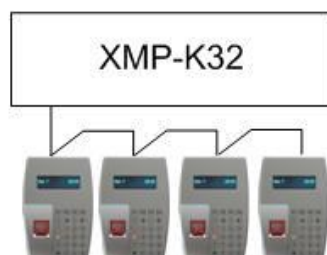
- Maximum distance between controller and reader 100 m with 12VDC and 200m with 24VDC.
- Cable type: 2x2x0.8mm (shielded)

Additional information's please see the access controller documentations.

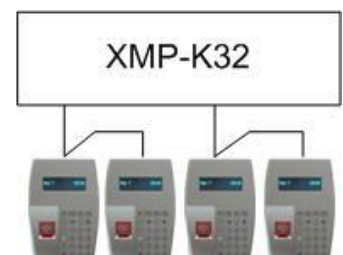
The connection can be realized star- or bus-shaped (Note fuse values!).



Star-shaped

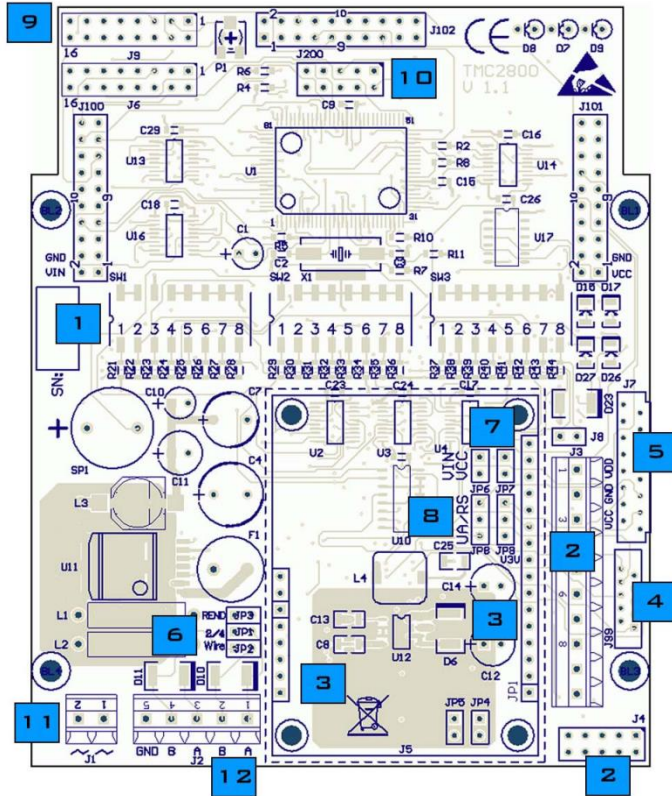


Bus-shaped




Mix star- and bus-shaped

## 4 Overview XMP-TMC2800 board




Component	Description
1	Dip switch SW1 to SW3
2	Interface read head
3	Connection fingerprint sensor
4	Connection foil keyboard
5	Connection sensor keyboard / read head
6	Jumper JP1 to JP3
7	Jumper for power supply (read head)
8	Jumper for RS485 / UART (read head)
9	Connection fluorescence display
10	Interface for firmware update
11	Power supply terminal
12	RS485 interface


## 5 Meaning of dip switch SW1 to SW3

Dip switch SW1	Description
	
SW1-1	Bit 1, 2 and 3 for reader hardware address (0 to 7)
SW1-2	
SW1-3	
SW1-4	Reserved
SW1-5	BPA/9 plus (OFF) or SecuCrypt® (ON)
SW1-6	Foil keyboard (OFF), Sensor keyboard (ON)
SW1-7	Third-Party read head via Wiegand or Clock/Data (OFF), Barcode scanner (ON)
SW1-8	Boot loader-Mode active (Service only)

The reader address is set on the micro-switches 1-3 in binary form as follows:

Switch 1	Switch 2	Switch 3	Address
Off	Off	Off	0
<b>On</b>	Off	Off	1
Off	<b>On</b>	Off	2
<b>On</b>	<b>On</b>	Off	3
Off	Off	<b>On</b>	4
<b>On</b>	Off	<b>On</b>	5
Off	<b>On</b>	<b>On</b>	6
<b>On</b>	<b>On</b>	<b>On</b>	7

<p style="text-align: center;"><b>Dip switch SW2</b></p> 	<p style="text-align: center;"><b>Description</b></p>
SW2-1	Fingerprint On Card aktive (ON)
SW2-2	Reserved
SW2-3	Reserved
SW2-4	Reserved
SW2-5	Reserved
SW2-6	Baud rate between access controller and terminal: 9600 (OFF) or 19200 (ON)
SW2-7	Baud rate between read head and terminal: 9600 (OFF) or 19200 (ON)
SW2-8	Reserved





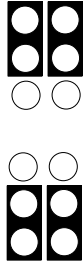
<p style="text-align: center;"><b>Dip switch SW3</b></p>  <p>ON</p> <p>OFF</p>	Description
SW3-1	If SW1-7 OFF → Third-Party read head via Wiegand (OFF) Third-Party read head via Clock/Data (ON)
SW3-2	Reserved
SW3-3	Fingerprint identification (ON)
SW3-4	Fingerprint verification (OFF)
SW3-5	Reserved
SW3-6	If SW1-7 OFF → 8 Bit (ON) or 7 Bit (OFF)
SW3-7	Reserved
SW3-8	Boot loader mode active (Service only)

## 6 Meaning of the LEDs

The reader status is displayed with 3 color LEDs and 4 status LEDs on the man board:

Yellow on	Normal operation
Yellow flashing in 0.5 second cycle	No communication to the door control unit
Red on for time x	Access not allowed
Green on for time x	Access allowed
Yellow and red flashing in 0.5 second cycle	Boot loading program activated
Yellow, red and green on	Reader blocked
D15:	Communication TXD to access controller
D17	Communication RXD to access controller
D27	Communication TXD to read head
D28	Communication RXD to read head

## 7 Meaning of the jumpers

Jumper	Description	Position
JP1 + JP3	Open = 4 wire Close = 2 wire	
JP3	Open = No terminal resistance Close = Terminal resistance active	
JP6	Open = VIN not active Close = VIN active (VIN = Power supply of the terminal, e.g. access controller)	
JP7	Open = VCC (5V) not active Close = VCC (5V) active	
JP8 + JP9	Read head via RS485  Read head via UART	



## 8 Details of reading technology

### 8.1 125 KHz - MIRO / HITAG® 1 & 2

The XMP-TMC2800 reads the serial number (UID) of MIRO, HITAG® 1 and HITAG® 2 badges. The card reader sends a 14-digit information. Digit 14 represents the technology:

0 = MIRO

1 = HITAG® 1

2 = HITAG® 2

If different reader types are used it can be necessary to replace digit 14 by a blank in the access control parameters.

As communication protocol the SecuCrypt® is recommended.



Recommended card type: ISO cards

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### 8.2 13,56 MHz - MIFARE® classic® & DESFire EV1

The XMP-TMC2800 reads the serial number or memory information's of MIFARE® DESFire EV1 and classic badges. In case of MIFARE® classic® badges the serial number (UID) will be transmitted as decimal value (e.g. *40004403886360 by 4 byte UID*) or hexadecimal (e.g. *800A345CB1986A by 7 byte UID*) and MIFARE® DESFire EV1 badges as 7 byte hexadecimal (e.g. *801B76A1726F04*) in 14 digits. The factory settings read the serial number. The special parameter settings will be downloaded via the utility program **W3TM24P**.

As communication protocol the SecuCrypt® is recommended.



Recommended card type: ISO cards

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### 8.3 13,56 MHz - LEGIC® prime & advant

The XMP-TMC2800 reads the serial number (UID) or segments information's of LEGIC® advant and/or LEGIC® prime badges. Project specific settings like CRC check, segment number, search-string and so on must be defined by the installer. Maybe the need of SAM cards is required.

As communication protocol the SecuCrypt® is recommended.



Recommended card type: ISO cards

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## 8.4 Reading distances

	MIRO / HITAG®1+2	MIFARE® classic®	MIFARE® DESFire EV1	LEGIC® prime	LEGIC® advant
UID	Up to 7 cm	Up to 6 cm	Up to 6 cm	Up to 6 cm	Up to 6 cm
Memory / Segment		Up to 3 cm	Up to 3 cm	Up to 3 cm	Up to 3 cm



Metal parts in a distance of 120 mm can reduce the reading distance

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The distance between two installed card readers should be minimum 20 cm, because of the fact, that the electro-magnetic fields of the readers - concerning the reading distances - affect each other in disadvantageous way.

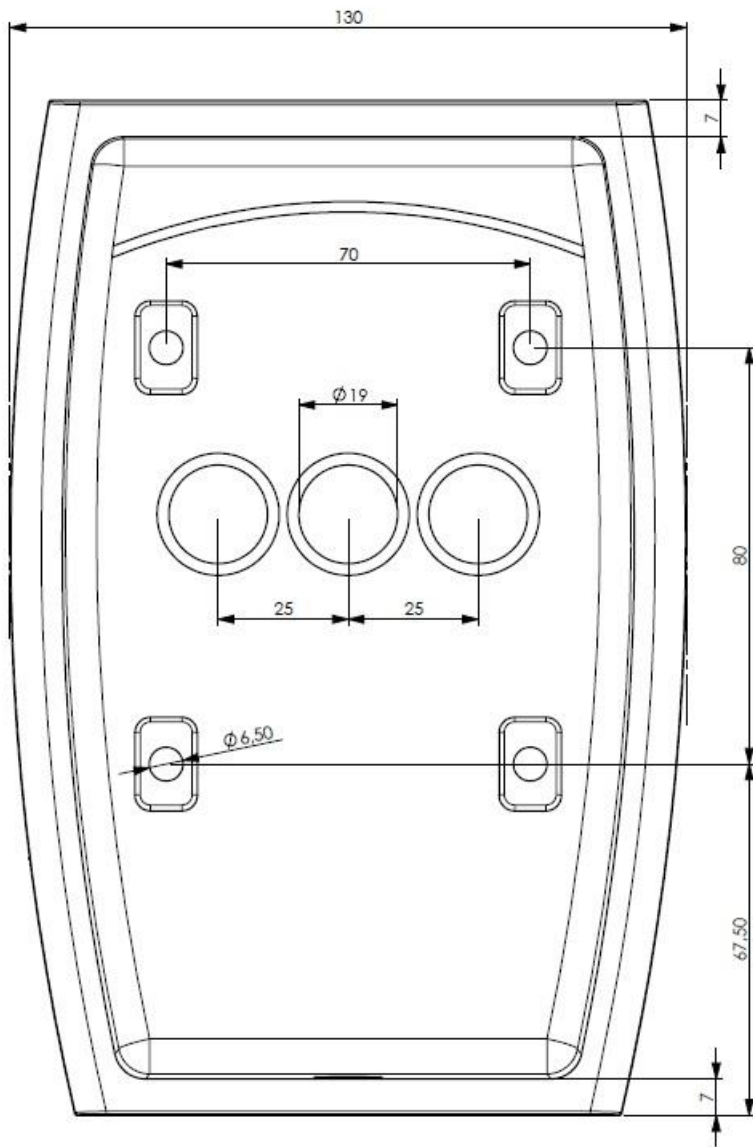
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## 9 Details of fingerprint sensor

<b>CPU</b>	533 MHz DSP
<b>Flash Memory</b>	1 MB
<b>FRR</b> False Rejection Rate	< 0,1 %
<b>FAR</b> False Acceptance Rate	< 0,0001 %
<b>Verification time</b>	< 600 ms
<b>Template options</b>	Suprema ISO19794-2 ANSI-378
<b>Template size</b>	256 to 386 Byte
<b>Fingerprint Data Encryption</b>	256-bit AES
<b>Image size (Pixel)</b>	271 x 320
<b>Image resolution</b>	500 dpi
<b>Sensor surface</b>	16 mm x 19 mm
<b>Sensor type</b>	Optisch

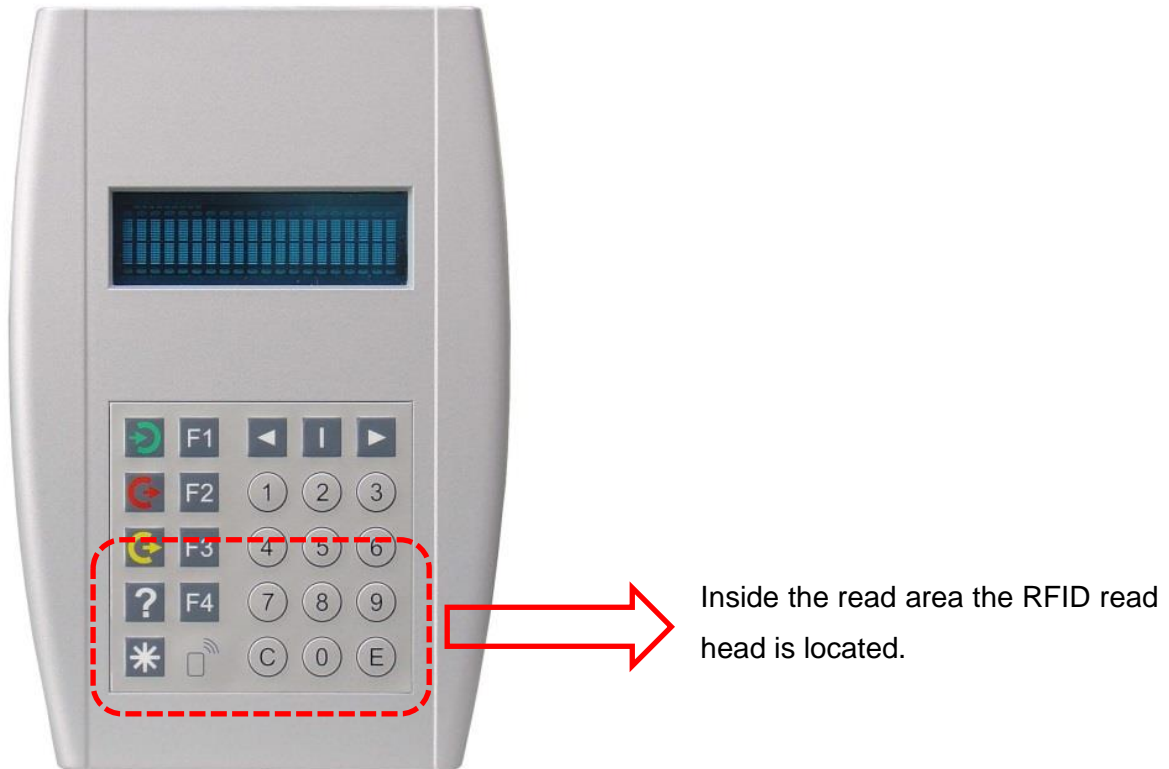
## 10 Dimensions

### 10.1 Mounting drawing



Size in mm

## 10.2 OEM terminal

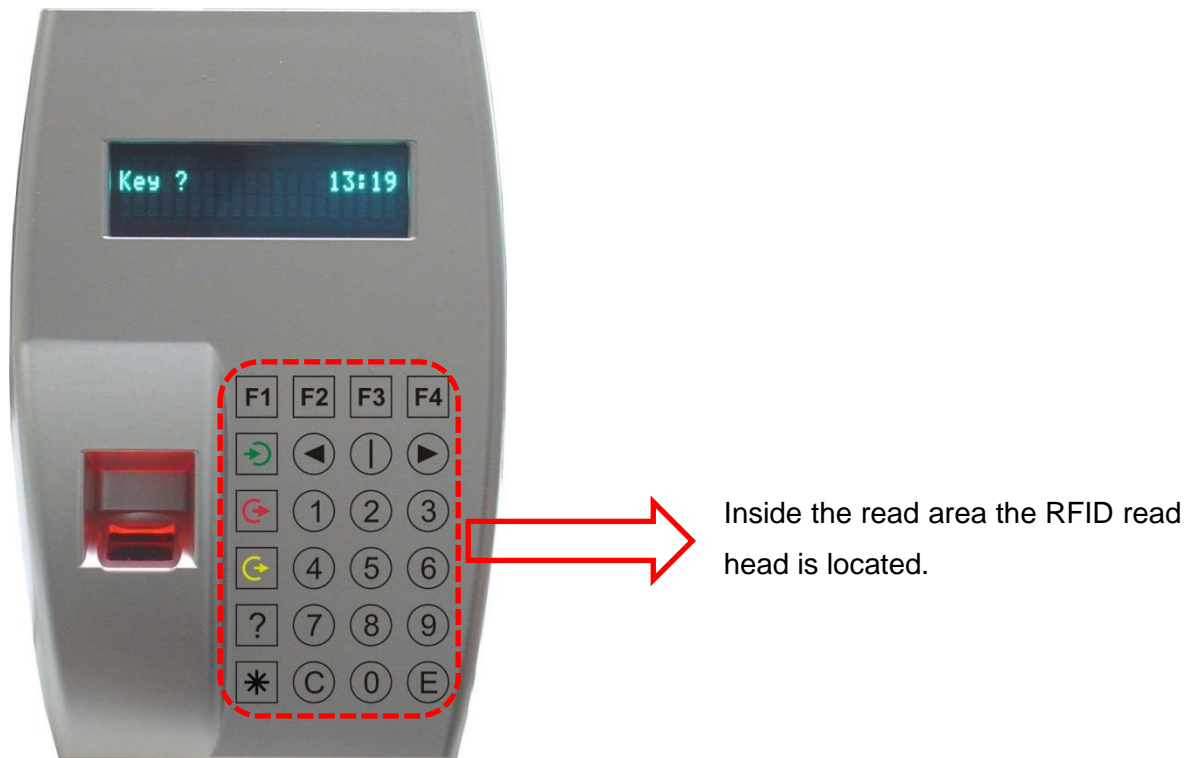


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The picture shows the maximum expansion level of the XMP-TMC2803 without Scramble keyboard

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### 10.3 Fingerprint terminal



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The picture shows the maximum expansion level of the XMP-TMC2853-FP

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## 10.4 Scramble terminal



Inside the read area the RFID read head is located.



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The picture shows the maximum expansion level of the XMP-TMC2803-SCR

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## 11 Document History

Version	Date	Description
V1.0	01.08.2016	New structure of the datasheet



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