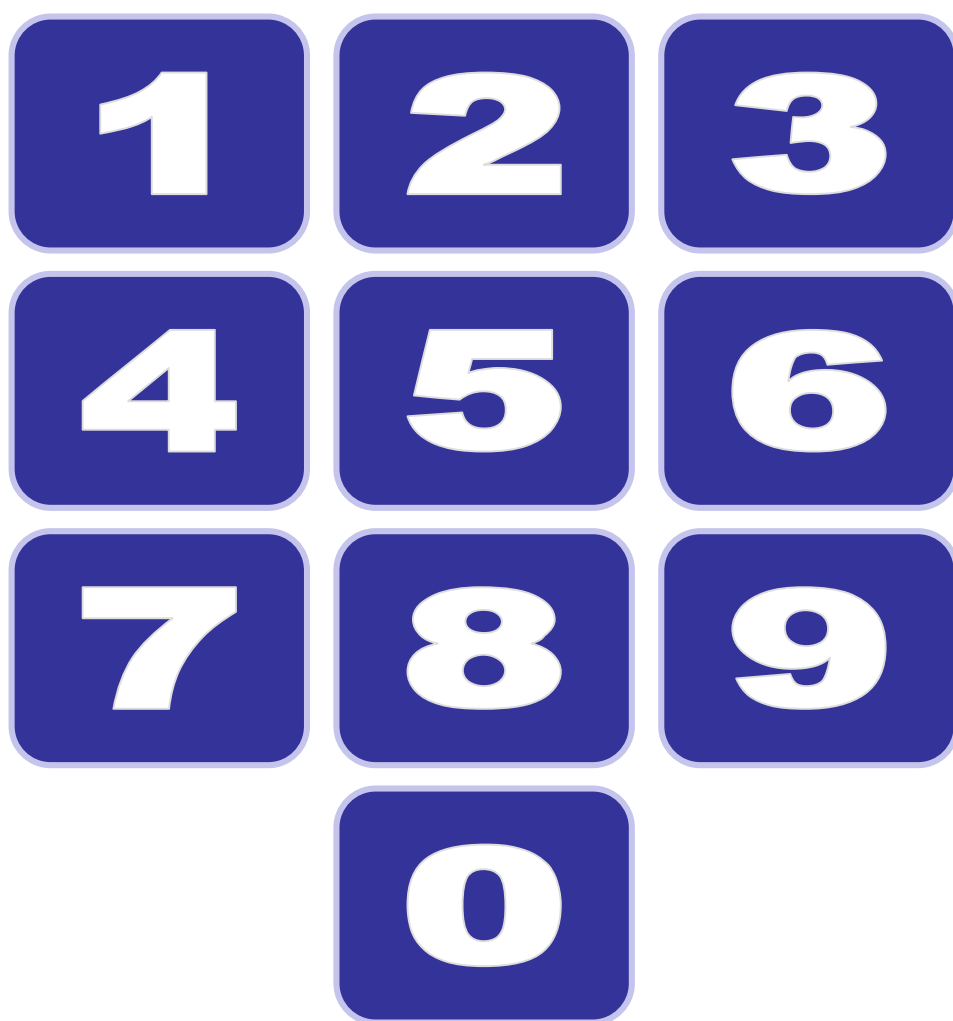


# Guideline for user-friendly payment terminals



Version 01 - May 2007

Dutch National Forum on the Payment System



# Preface

*Early in 2006, Viziris – formerly known as the Netherlands Federation of the Blind and Partially Sighted - and the Dutch National Forum on the Payment System took the initiative to produce a guideline for user-friendly payment terminals. Now you have before you the first version of this guideline.*

*The Dutch organisations who contributed to this guideline would like to see it at some stage formally implemented worldwide. For the time being, though, this guideline is intended for suppliers of payment terminals to embrace it on a voluntary basis.*

*You are invited to send any comments you may have on the contents of the current version to:*

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## CREDITS

### Initiative and co-ordination:

Viziris, The Netherlands organisation for people with a visual impairment  
Dutch National Forum on the Payment System

### Steering Committee:

ANBO	Dutch senior citizens association
CG-Raad	Dutch council for the chronically ill and the disabled
CCV	Supplier of electronic payment systems
Currence	Certifier of electronic payment systems
DNB	De Nederlandsche Bank
FvO	Dutch Organisation of parents with a mentally disabled child
MKB	Dutch organisation of small and medium-sized enterprises
NLB	Dutch organisation of suppliers of payment systems
Pinling	Supplier of electronic payment systems
VNPI	Dutch Petroleum Industry Association

### Financier and Publisher:

Dutch National forum on the Payment System

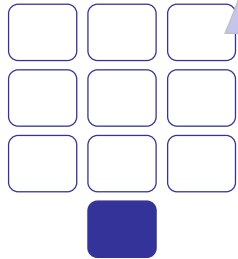
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# 0 Introduction



In today's society payment terminals are a common tool for payment of goods and services. In order to fully rely on the electronic financial transaction, the procedure and its instructions are explicit and uniform, privacy is guaranteed and fraud excluded. This reliability performance is covered by several mandatory requirements for any terminal using PIN-identification anywhere in Europe. However, an adequate transaction by a payment terminal leaves more to be desired.

## Objective

Apart from being reliable, a payment terminal should be easy to use. This is what the *Guideline for user-friendly payment terminals* stands for. The guideline provides insight into the requirements from the point of view of those who operate payment terminals: customers. Every one of us is or will be a customer.

Although customers might find the terminals quite practical in general, operating them is not always that simple. What may be sufficient and trivial to some, may be unsuitable and complex for others, simply because customers all differ in their physical and mental skills. This universal phenomenon serves as the leading principle of this guideline.

## Status

To a certain extent the mandatory requirements for reliability restrict the scope for taking the implications of human diversity fully into account. Therefore, the guideline is not an absolute criterion, but simply a guide to making terminals as user-friendly as possible. It is specifically aimed at the suppliers of payment terminals and their buyers, who will select a terminal in general for their stores and install it at their counters. Both suppliers and buyers are warmly recommended to make use of the guideline and strive for the best. There are reasons to do so. On the one hand, a user-friendly terminal will prove itself economically profitable: it reduces the transaction time at the counter. On the other hand, user-friendly terminals form just one of the many tools towards creating society in which we all - as diverse as we are - can participate as equally and independently as possible. In short: a user-friendly payment terminal serves us all.

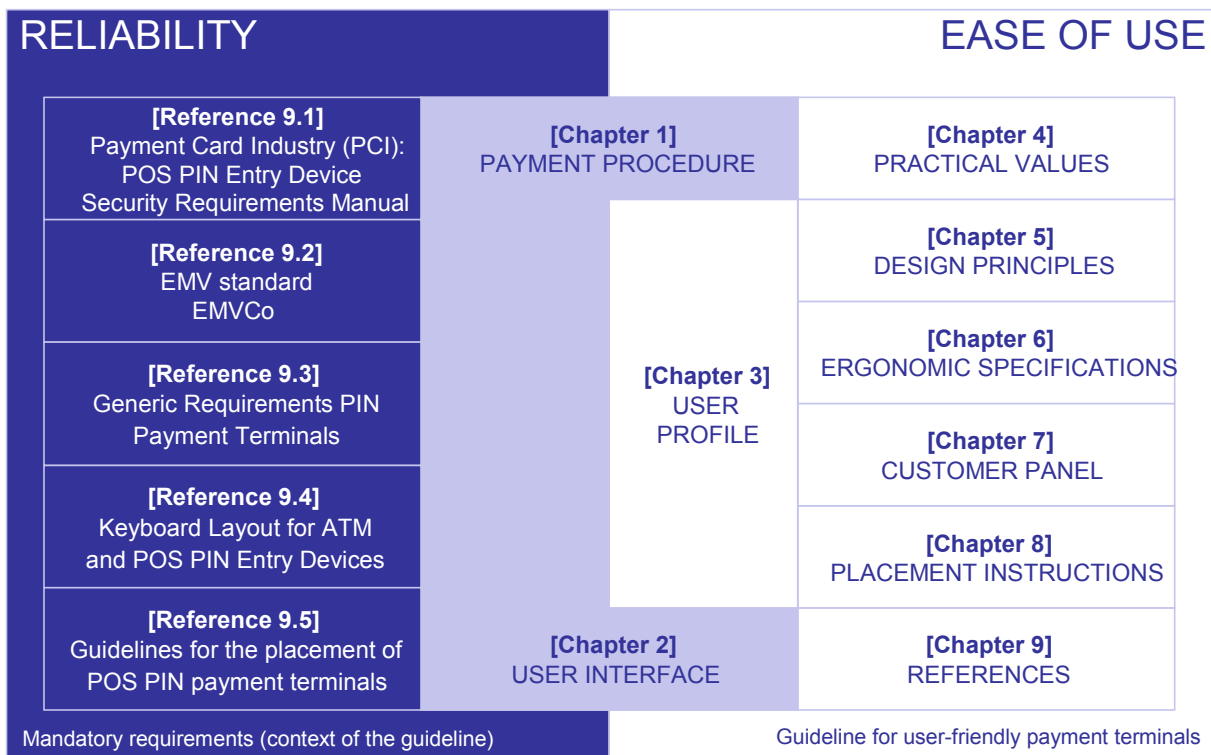
## Outline

Diagram 0 shows the coherence between the mandatory requirements for reliability and the contents of this *Guideline for user-friendly payment terminals*. The Guideline consists of:

1. Chapter 1, which describes the mandatory standardised PIN code payment procedure;
2. Chapter 2, which describes the standardised elements of the user interface;
3. Chapter 3, which focuses on the most significant starting point for operating payment terminals: the user profile;
4. Chapter 4, which provides practical values of a user-friendly interface based on the user profile;
5. Chapter 5, which provides design principles;
6. Chapter 6, which presents the ergonomic specifications, which will be relatively easy to meet if Chapter 5 is taken into account at an early stage of the product development;
7. Chapter 7, which describes the use of customer panels;
8. Chapter 8, which provides instructions on how to place the terminal on site with the user profile in mind;
9. Chapter 9, which consists of references used in the guideline.

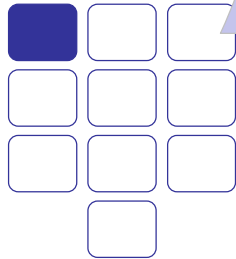
Diagram 0:

Coherence between the mandatory reliability requirements and the Guideline for user-friendly payment terminals, which is fully in line with the mandatory requirements.



# 1

## Payment procedure



In each European country suppliers of PIN payment terminals must meet the (national) Brand requirements [see 9.3], which describe in detail the payment procedure. Although these generic requirements may differ from one country to another, in general they all come down to the same kind of standardised instructions which a customer has to follow during the payment procedure.

The first step in the design of a user-friendly terminal is to transform the payment instructions into the actual operations a customer has to perform. In general, the user of the terminal will be required to go through the following three consecutive steps:

- p perceiving the instructions (see them, hear them, feel them);
- c comprehending the instructions (recognize them and understand them);
- a performing an action (swipe the card, press a key, etc.).

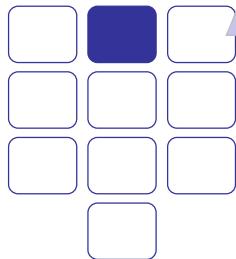
Diagram 1 shows an example of how the instructions are transformed into these three ergonomic tasks.

Diagram 1:  
Example of the transformation of a payment procedure into ergonomic tasks.

PROCEDURE	ERGONOMIC TASKS (interactions)	
INSERT CARD [and take out card]	p	perceive (standardised) instruction [1] use audio mode
	c	understand instruction (know the language) [2] switch language
	p	perceive card insert
	c	comprehend how to insert card
	a	insert card [take out card] a repeat card insert
	p	perceive acceptance card p perceive rejection
INSERT PIN CODE	p	perceive (standardised) instruction
	p	perceive (standardised) PIN keypad
	a	press key [4x] a correct wrong input
	p	perceive response a repeat code insert
	p	perceive acceptance of PIN code p perceive rejection
CONFIRM PAYMENT	p	perceive (standardised) instruction
	a	press confirmation key a press non-confirmation
	p	perceive response p perceive response
EXTRA ACTIONS credit balance information language switch [2]	c	recognize key in question
	a	press key
	p	perceive response a press return key
	p	perceive announcement c recognize return key
AUDIO MODE [1]	c	recognize plug-in
	a	plug in (personal) hearing aid
	p	hear instructions

# 2) User interface

The user interface concerns the payment terminal parts that facilitate the actual interaction between the customer and the terminal, namely:



- C the card reader, which may be a swipe card reader for magnetic cards or a dip-insert card reader for chip cards, each with its own specific way of insertion;
- K the keyboard, which is standardised as far as the functions of the keys and their mutual positions are concerned. The mandatory requirements also specify that the width of the numeric PIN pad may not exceed 70 mm (the hand should be able cover the keyboard, so that the PIN code cannot be seen by others);
- D the display, showing the (standardised) instructions;
- R the receipt, providing a hard copy of the transaction;
- A the audio mode for an audio response to the customers card reader and keyboard actions. While it is optional under the mandatory reliability requirements, the audio mode is nevertheless recommended in this guideline for its practical value.

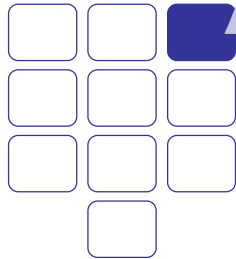
However, for privacy reasons it is mandatory that the audio response provides nothing but the actual information on the display and a neutral 'bleep' for pressed keys.

Diagram 2:  
The standardised parts of the user interface

HARDWARE PARTS <small>In accordance with Generic Requirements PIN [7.3]</small>	USER INTERFACE	
CARD READER	C1 swipe reader C2 dip (insert) reader	
SECURITY MODE	no user interface	
CUSTOMERS KEYBOARD	K0 keys in general K1 PIN pad [1..9] K2 command keys [X, <, O] K3 function keys	
CUSTOMERS DISPLAY	D display	
ENTREPRENEURS KEYBOARD	in accordance with K1, K2 en K3	
ENTREPRENEURS DISPLAY	in accordance with D	
RECEIPT PRINTER	R receipt	
JOURNAL PRINTER	in accordance with R	
CLOCK	no user interface	
ACOUSTIC ELEMENT	A1 audio response A2 audio mode	
DATA INTERFACE	no user interface	



# 3) User profile



The guiding principle for a user-friendly product is to anticipate the skills of customers who have to operate it. Since payment terminals are used by anyone and people all differ in their abilities to perceive (see, hear and feel), comprehend (recognize and understand) and act (move around and operate), the interface should be designed for human diversity.

In this guideline human diversity is represented by a user profile, showing the extent of diversity in each of the ergonomic tasks. As such, the profile serves as the general criterion for the practical values (Chapter 4), the design principles (Chapter 5), the ergonomic specifications (Chapter 6), the set-up of customer panels (Chapter 7) and the placement instructions (Chapter 8).

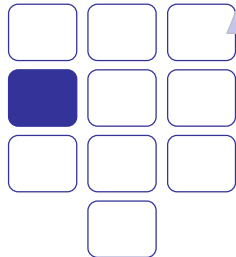
Diagram 3:  
A user profile, being a composition of human diversity in conducting relevant ergonomic tasks.

ERGONOMIC TASKS		DIVERSITY (human characteristics)
PERCEIVE	see	sees all
		partially sighted: no sharp vision
		partially sighted: cannot see all at once
		partially sighted: cannot distinguish (all) colours
		cannot see anything
	hear	hears all
		partially hearing: has problems with background noise
		partially hearing: has problems with pitch/volume
	feel	cannot hear anything
feels all		
COMPREHEND	recognize	partially feeling
		recognizes all
		cannot recognize all
	understand	cannot recognize anything
understands all		
ACT	move around	cannot understand all
		moves around without problems
		moves around with problems: carrying children, shopping etc.
	position	moves around with problems: uses mobility aids
		has no problems finding the right position
		has problems finding the right position: force/grip
	operate	has problems finding the right position: trembles
		is right-handed and has no problems to operate
		is left-handed and has no problems to operate
		has problems to operate: force/grip
		has problems to operate: trembles

# 4

## Practical values

Practical values concern every aspect which determines what customers may expect of a user-friendly interface. The values form the input for the interface design, and entrepreneurs can use the values to distinguish between terminals.



To find out the practical values, each part of the interface should be considered from the customer's point of view, bearing the user profile and ergonomic tasks in mind. So the question is, what parts of the interface the customer should be able to see, hear, feel, recognize, understand, and operate while conducting the payment procedure? Diagram 4 shows an example of this inventory of practical values.

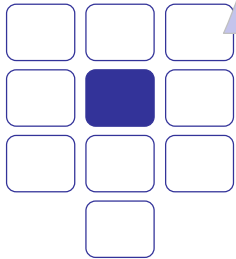
Diagram 4:  
Practical values for each part of the user interface

USER INTERFACE	PRACTICAL VALUES	
C1 SWIPE READER	p	swipe section is visually and tangibly perceptible
		swipe motion is visually and tangibly perceptible
	c	swipe section is recognizable as such
		swipe motion is understandable
	a	swiping is a fluent movement requiring little effort
		swiping requires minimal skill
C2 DIP READER	p	the swiping is tangible (acting response)
		insert section is visually and tangibly perceptible
	c	insert method is visually and tangibly perceptible
		insert section is recognizable as such
	a	insert method is understandable
		inserting (and removing) requires little effort
K KEYBOARD	p	inserting (and removing) requires minimal skill
		the insertion is tangible (acting response)
	c	keys (and key combinations) are visually and tangibly perceptible
		characters and pictograms are visually and tangibly perceptible
	a	different key functions can be distinguished
		symbols for functions are unambiguous and self-evident
p	pressing a key requires little effort	
	keys are large enough for effective (error-free) pressing	
D DISPLAY	p	the effect of pressing a key is tangibly perceptible (acting response)
R RECEIPT	p	characters are visually perceptible
A1 AUDIO RESPONSE	p	characters are visually perceptible
A2 AUDIO MODE	p	pressing of keys is audible (even with background noise)
		plug-in for personal hearing aid is visually and tangibly perceptible
	c	output signal is audible
		plug-in for personal hearing aid is recognizable as such
a	plug-in in accordance with standard personal hearing aids (mini-jack)	

# 5

## Design principles

The practical values lead to a couple of general design principles. If these are taken into account at the very start of the product design, it will be relatively easy to meet the specifications presented in Chapter 6. If a part of the interface is considered to be innovative, it is useful to have it tested by a consumer panel before implementing it in the terminal (see Chapter 7).



### Perceiving

[5.1] Make all interface instructions both visible and tactile, and if possible, audible, by means of differences in contrast and luminance, explicit use of colour, the use of relief and an audio-output.

### Comprehending

[5.2] Limit the amount of functions of the terminal to what is strictly required for the payment procedure. The more functions and keys, the more complex using the terminal will become. Less is more!

[5.3] Provide an understandable, self-evident operating response, for example by means of a clear sound effect and slight resistance felt on pushing a key and inserting the card. In general touch-screens are not satisfactory in this respect. Be aware that unmanned terminals demand extra attention in this respect.

### Acting

[5.4] Make the keys, the key characters and the display characters as large as possible within the mandatory restrictions for privacy.

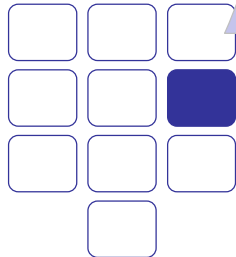
[5.5] For several payment brands a privacy shield is mandatory. If so, verify whether this shield does not interfere with the customer's field of vision or obstruct the operating space of the keyboard.

[5.6] Anticipate both right handed and left handed use of the card insert. An adequate position of the insert would be straight under or above the keyboard and not on either the right or left hand side.

[5.7] Be aware that handling a handheld payment terminal is different from handling a fixed model. A fixed model is steady, while a handheld terminal may move when being operated. In general, this requires more skills and strength. On the other hand, a fixed model requires extra attention for finding a suitable location (see Chapter 8).

# 6) Ergonomic specifications

In the preceding chapters the payment procedure was described, as well as the standardised parts of the user interface. The user profile mentioned in Chapter 3 shows for whom the interface is intended and the practical values describe what performance may be expected.



The diagrams of this chapter show the ergonomic specifications. There are two kinds of specifications, namely, those that are absolute and measurable and those that should be tested by a customer panel. The measurable requirements refer to a reference presented in Chapter 9.

The set-up of a customer panel is covered by Chapter 7.

Diagram 6a:  
Ergonomic specifications for the card insert

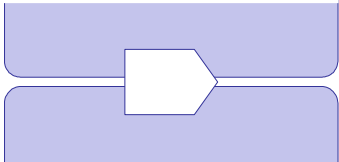
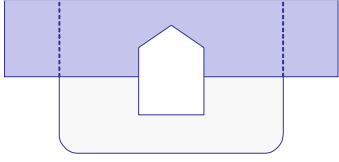
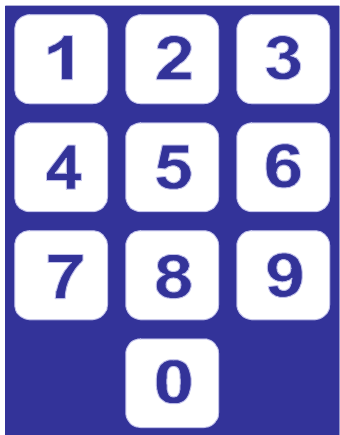
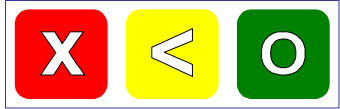

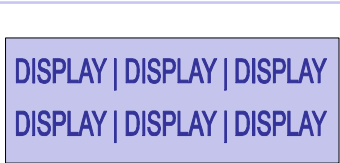
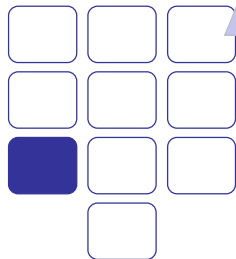
	<b>C1 SWIPE READER</b>			
	p	01	element is recognizable by touch	[see 7]
		02	brightness between swipe zone and environment $\geq 3:1$	[see 9.7]
		03	pictogram in raised relief	[see 7]
		04	brightness between pictogram and environment $\geq 3:1$	[see 9.7]
		05	some swipe resistance	[see 7]
	c	06	instruction pictogram	[see 9.2]
		07	understandable, recognizable pictogram	[see 7]
	a	08	swipe resistance $\leq 15$ N	[see 9.7]
		09	free grip zone on card during swipe $\geq 25$ mm	[see 9.8]
10		swipe speed between 0.1 and 1.0 m/s	[see 7]	
	<b>C2 DIP READER</b>			
	p	01	element is recognizable by touch	[see 7]
		02	brightness between insert zone and environment $\geq 3:1$	[see 9.7]
		03	pictogram in raised relief	[see 7]
		04	brightness between pictogram and environment $\geq 3:1$	[see 9.7]
		05	some insert resistance	[see 7]
	c	06	instruction pictogram	[see 9.2]
		07	understandable, recognizable pictogram	[see 7]
	a	08	insert resistance $\leq 15$ N	[see 9.7]
09		free grip zone on card when inserted $\geq 25$ mm	[see 9.8]	

Diagram 6b:  
Ergonomic specifications for the keyboard, keys, display, receipt and audio-output.

	<table border="1"> <tr> <td colspan="3"><b>K0 KEYS IN GENERAL</b></td> </tr> <tr> <td rowspan="6">p</td> <td>01</td> <td>keys raised <math>\geq 2</math> mm</td> <td>[see 9.7]</td> </tr> <tr> <td>02</td> <td>brightness between keys and environment <math>\geq 3:1</math></td> <td>[see 9.7]</td> </tr> <tr> <td>03</td> <td>characters and symbols in raised relief</td> <td>[see 7]</td> </tr> <tr> <td>04</td> <td>brightness between characters and environment <math>\geq 3:1</math></td> <td>[see 9.7]</td> </tr> <tr> <td>05</td> <td>character size <math>\geq 9</math> mm (16pt)</td> <td>[see 9.8]</td> </tr> <tr> <td>06</td> <td>minimal press resistance 0,75 N</td> <td>[see 9.7]</td> </tr> <tr> <td rowspan="2">c</td> <td>07</td> <td>distinction between PIN, command and function keys</td> <td>[see 7]</td> </tr> <tr> <td>08</td> <td>maximum press resistance 3 N</td> <td>[see 9.7]</td> </tr> <tr> <td rowspan="2">a</td> <td>09</td> <td>key surface <math>\geq 70</math> mm<sup>2</sup></td> <td>[see 9.8]</td> </tr> <tr> <td>10</td> <td>free space between keys <math>\geq 2.5</math> mm</td> <td>[see 9.8]</td> </tr> <tr> <td colspan="3"><b>K1 PIN PAD</b></td> </tr> <tr> <td rowspan="2">p</td> <td>11</td> <td>raised relief on key #5</td> <td>[see 7]</td> </tr> <tr> <td>12</td> <td>distinction between pin, command and function keys</td> <td>[see 7]</td> </tr> <tr> <td colspan="3"><b>K2 COMMAND KEYS</b></td> </tr> <tr> <td rowspan="4">p</td> <td>21</td> <td>specific use of colour: <b>X</b> = red, <b>&lt;</b> = yellow, <b>O</b> = green</td> <td>[see 9.7]</td> </tr> <tr> <td>22</td> <td>symbol for cancel: <b>X</b></td> <td>[see 9.7]</td> </tr> <tr> <td>23</td> <td>symbol for clear/correction preferably <b>&lt;</b> (else <b>I</b>)</td> <td>[see 9.7]</td> </tr> <tr> <td>24</td> <td>symbol for ok/enter/confirm: <b>O</b></td> <td>[see 9.7]</td> </tr> <tr> <td colspan="3"><b>K3 FUNCTION KEYS</b></td> </tr> <tr> <td>p</td> <td>31</td> <td>colour distinctive from PIN and command keys</td> <td>[see 7]</td> </tr> <tr> <td>c</td> <td>32</td> <td>understandable symbol / pictogram</td> <td>[see 7]</td> </tr> </table>	<b>K0 KEYS IN GENERAL</b>			p	01	keys raised $\geq 2$ mm	[see 9.7]	02	brightness between keys and environment $\geq 3:1$	[see 9.7]	03	characters and symbols in raised relief	[see 7]	04	brightness between characters and environment $\geq 3:1$	[see 9.7]	05	character size $\geq 9$ mm (16pt)	[see 9.8]	06	minimal press resistance 0,75 N	[see 9.7]	c	07	distinction between PIN, command and function keys	[see 7]	08	maximum press resistance 3 N	[see 9.7]	a	09	key surface $\geq 70$ mm <sup>2</sup>	[see 9.8]	10	free space between keys $\geq 2.5$ mm	[see 9.8]	<b>K1 PIN PAD</b>			p	11	raised relief on key #5	[see 7]	12	distinction between pin, command and function keys	[see 7]	<b>K2 COMMAND KEYS</b>			p	21	specific use of colour: <b>X</b> = red, <b>&lt;</b> = yellow, <b>O</b> = green	[see 9.7]	22	symbol for cancel: <b>X</b>	[see 9.7]	23	symbol for clear/correction preferably <b>&lt;</b> (else <b>I</b> )	[see 9.7]	24	symbol for ok/enter/confirm: <b>O</b>	[see 9.7]	<b>K3 FUNCTION KEYS</b>			p	31	colour distinctive from PIN and command keys	[see 7]	c	32	understandable symbol / pictogram	[see 7]
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	02	luminance contrast (character):(background) $\geq 30:1$	[see 9.7]																																																																							
	03	height of character $\geq 9$ mm	[see 9.8]																																																																							
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	05	proportion character (height):(width) = 5:3	[see 9.7]																																																																							
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# 7 Customer panel



Most ergonomic specifications mentioned in Chapter 6 are covered by commonly accepted criteria. However, some are not. This is why prototypes of a payment terminal should be tested by a customer panel. The test provides insight into what wants improving from a user point of view. Buyers of terminals can also make use of a consumer panel to select the most user-friendly terminal available. In both cases the members of the panel are asked to conduct the payment tasks during the test. Candidates for the panel can be selected according to the characteristics of the user profile and demographic variables, like age, gender and education. Local or national consumer organisations can help to find adequate candidates, and so can specialised consultants.

Diagram 7:  
Example of the composition of a balanced customer panel. For a reliable test each of the human characteristics should be covered – say – five times. In practice, this will be the case when the panel consists of at least 25 persons.

ERGONOMIC TASKS		DIVERSITY (human characteristics)	members:	01	02	03	04	...	25
PERCEIVE	see	sees all						...	■
		partially sighted: no sharp vision	■					...	
		partially sighted: cannot see all at once		■				...	
		partially sighted: cannot distinguish (all) colours			■			...	
	cannot see anything				■		...		
	hear	hears all			■	■	...	■	
		partially hearing: has problems with background noise		■			...		
		partially hearing: has problems with pitch/volume		■			...		
	cannot hear anything	■				...			
	feel	feels all	■		■	■	...	■	
partially feeling			■			...			
COMPREHEND	recognise	recognizes all			■		...	■	
		cannot recognize all		■		■	...		
		cannot recognize anything	■				...		
	understand	understands all	■		■	■	...	■	
cannot understand all			■			...			
ACT	move around	moves around without problems	■				...		
		moves around with problems: carrying children, shopping etc.			■		...		
		moves around with problems: uses mobility aids		■			...	■	
	position	has no problems finding the right position	■			■	...		
		has problems finding the right position: force/grip			■		...	■	
		has problems finding the right position: trembles		■			...		
	operate	is right-handed and has no problems to operate	■	■		■	...	■	
		is left-handed and has no problems to operate			■		...		
		has problems to operate: force/grip			■		...	■	
		has problems to operate: trembles		■			...		

[01] woman aged 51, just recently got a pincard, deaf, has no a sharp vision without her reading glasses  
 [02] man aged 82, hearing is becoming worse, cannot see all at once due to spots on his field of vision, uses a rollator  
 [03] man aged 35, left-handed, colour-blind and 2.05 m tall  
 [04] man aged 18, blind from birth, experienced computer user and frequent user of payment terminals  
 [25] woman aged 27, suffering from rheumatism, uses an electric scooter when shopping

## Preparation

Although the use of a customer panel applies to the design of new payment terminals, it may also be very useful to have existing terminals be tested by a panel and implement the experiences in new products. Either way, a test with a customer panel should be prepared carefully. The following instructions may be of use.

[7.1] Make an inventory of what aspects have to be tested by the panel according to the list of specifications (see Chapter 6).

[7.2] Lay down which tasks will be conducted, which questions have to be answered, how the test will be monitored and how the test results will be documented.

[7.3] Pay attention when using a prototype. A prototype must meet all measurable ergonomic specifications. Make sure that the placement of the prototype is similar to the eventual application. For example, handheld terminals should be tested as such.

[7.4] See to it that the payment tasks are the same as in reality, including error proceedings.

[7.5] In order not to disturb the test unnecessarily, make sure the prototype is solid or easy to repair.

## Execution

When the prototype, including its settings, is installed and the panel is invited, the test can be executed. Make sure the following conditions are observed:

[7.6] The supervisor must be prepared to communicate with a variety of people. Questionnaires should be suitable for all kinds of panel members.

[7.7] Always conduct a pilot test, for the test may take longer than expected, some tasks may be impossible to conduct after all, questions may be misinterpreted, etc.

[7.8] It is wise to invite test customers individually. Make them feel comfortable. Explain them that they are the experts and the test is not an examination. If something goes wrong, it is the product that is to blame, not the tester!

[7.9] Let the customer conduct the complete transaction, from the moment he or she approaches the terminal until when he or she puts away his/her card again.

[7.10] Register all interactions, preferably by video and observation lists.



## Analysis

After all test results are collected it is time to analyse. During the analysis it is important to stay objective and not to jump to conclusions too soon. Let the panel members speak. The analysis should provide answers to the following questions.

[7.11] Is the prototype effective: can all test users conduct the payment tasks? If no, what are the bottlenecks?

[7.12] Is the prototype efficient: can all users conduct the tasks within a given time? If no, what is the problem?

[7.13] Are the panel members satisfied about the use? What improvements do they suggest?

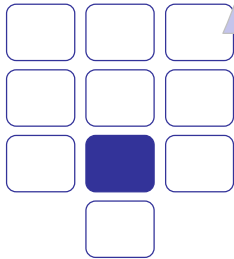
## Continuation

The test with a customer panel may give cause to change the prototype at certain points. A new customer test can provide insight into whether these changes were indeed improvements.

# 8

## Placement instructions

Having a user-friendly payment terminal only makes sense if it is installed in an accessible location. Such is the case if customers, without any hindrance, can:



- move towards the terminal (and leave again);
- position themselves in front of the terminal;
- reach for the card reader and keyboard;
- have a look at the keyboard and display.

If the user profile (Chapter 3) is taken into account, it is obvious that the accessibility requirements should accommodate the needs of all kinds of customer, i.e. the blind and poor-sighted, the motorically handicapped, and those pushing prams or carrying large shopping bags. To encourage entrepreneurs - like shopkeepers - to install their terminals in an accessible location, the payment terminal should be provided with placement instructions, for example as shown in Diagram 8.

Diagram 8:  
Placement instructions for the entrepreneur [based on reference 9.5]

### 1) ROUTE TOWARDS THE PAYMENT TERMINAL

All customers should be able to approach the payment terminal, incl. people in wheelchairs, people carrying shopping bags etc.

lightning at the walking surface should be over 50 lux

free passage way should be wider than 0,90 meter

differences in height over 20 mm should be avoided or bridged by ramp

the walking surface should be non-slippery, flat and firm

### 2) POSITIONING SPACE IN FRONT OF THE TERMINAL

customers should be able to position themselves in front of the terminal, be able to take a good look at the terminal and hear its audio response

lightning near the terminal should be over 100 lux (avoid reflections in the display)

lightning at the keyboard should be over 200 lux

background noise should not exceed 30dB

positioning space should be over 0,90 x 1,40 meter

turning space near the terminal should be over 2,00 x 2,00 meter

### 3) POSITION OF THE TERMINAL

customers of all sizes should be able to reach for the terminal and take a good look at the display (a terminal on a revolving plate may be a solution for high counters)

keyboard and card reader should be placed at least 0,50 meter from an inner corner

keyboard and card reader should be between 0,85 and 1,10 meter above the floor

the display should be between 1,00 and 1,40 meter above the floor

### 4) SERVICE

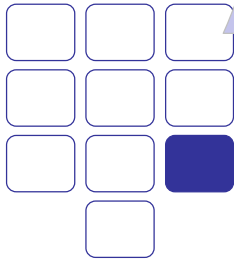
entrepreneurs should provide a helping hand to any customer having difficulty using the terminal, without infringing on the customer's privacy.

# 9

## References

The specifications in Chapter 6 are based on several publications. It is recommended to consult these references.

### Mandatory requirements



#### [9.1] *PCI*

International guideline for the hardware security of the PIN-code during the payment transaction.

#### [9.2] *EMV standard*

Requirements concerning the security of the electronic interaction between card and payment terminal, composed by EMVCo.

#### [9.3] *Generic Requirements PIN Payment Terminals*

Generic Requirements from the Dutch payment brand PIN which specify user interface for the standardisation of the payment procedure, procedure instructions and hardware parts.

#### [9.4] *Keyboard layout for ATM an POS PIN entry devices EBS100 V3*

European guideline for the standardisation of the keyboard layout.

#### [9.5] *Guidelines for the positioning of the PED (Pin Entry Device)*

Requirements from the Dutch payment brand PIN which specifies guidelines for securing the privacy at the location of the terminal.

### Sources of measurable specifications

#### [9.5] *European Concept for Accessibility*

Criteria for the design of buildings and outdoor spaces, formulated by an European network of experts. Info Handicap, Luxemburg

#### [9.6] EN 1332-1/2/3/4

European standard concerning the use of identification cards in combination with keyboards.

#### [9.7] *Guidelines for accessible automated teller machines*

[NVB Amsterdam STROV, 2004, Amsterdam]

Criteria for the design and placement of ATM's.

#### [9.8] *Industry Standard Electronic Funds Transfer at Point of Sale*

Australian Bankers' Association.

Guideline for user-friendly PIN POS entry devices in Australia

#### [9.9] [www.tirisiias.org](http://www.tirisiias.org)

URL consisting of all kinds of relevant ergonomic references.