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European Foreword

This document (prEN 12414:2019) has been prepared by Technical Committee CEN/TC 226 “Road equipment”, the secretariat of which is held by AFNOR.

This document is currently submitted to the CEN Enquiry.

This document will supersede EN 12414:1999.

The significant technical changes incorporated in this revision are:

— new requirements depending on the different modes of operation (Pay and Display, Pay and Go, Pay on Departure) which justify the change in the title and the scope of this standard where “pay and display ticket machine” has been replaced by “parking terminal”;

— verification method described for each of the requirements in annex, which justify the change in the title and scope where “test methods” has been added;

— accessibility requirements taking into account new EN 301549:2014;

— requirement for user interface taking into account new technologies (display, keyboards, touch screen...);

— requirements and definition of categories of terminals depending on the level of connectivity with a central system (central system requirement being out of the scope of this standard);

— requirements for minimum information to be exchanged with the central system for connected terminals;

— requirements for payment means taking into account banknotes and new electronic means of payment;

— energy autonomy requirement for terminal powered by mains supply or solar energy or combination of solar energy and non-rechargeable battery, with detailed test procedure in annex;

— protection against theft or burglary with detailed test procedure in annex and introduction of security classes P0 to P4, with a minimum of P0 required;

— update of operation and management requirements;

— update of normative references.
Introduction

This document is a revision of the EN 12414 issued in 1999. This is not a harmonized standard. This document has been written for those called upon to manufacture, operate, maintain and use a parking terminal with the aim of providing requirements and test methods, especially for parking terminals in addition to the applicable European Directives.

This document takes the different modes of operation of parking terminal into account:
- pay and display mode;
- pay and go mode;
- pay on departure mode;

and the different configurations of:
- user interface;
- means of payment;
- power supply;
- connectivity;
- protection against theft or burglary;

in order to provide measurable minimum requirements and associated test methods to standardize and qualify:
- ease of use;
- ease of operation;
- accessibility;
- security;
- energy autonomy;
- resistance to environment;
- protection against theft or burglary.

A terminal conformity to this document is understood as a conformity to all minimum requirements applicable to the mode and configuration of the said terminal. This standard is for the terminal only, it does not cover the central system. Regarding protection against theft or burglary, conformity to the minimum requirement is reached with class P0, but in addition, classes P1-P4 have been defined to allow terminal suppliers to verify the effectiveness of additional measures to increase the protection against theft or burglary above P0.
1 Scope

This document specifies the technical and functional requirements including test methods for parking terminals. It applies to unattended terminals used to obtain the right to park for visual and/or electronic control of multiple road vehicles, with payment where applicable.

This document only covers parking terminals.

For parking terminals connected to centralized system, this document covers the minimum information to be exchanged with a central system. It does not define a standard protocol between parking terminals and central systems. It does not define the centralized system.

This document does not cover pay-on-foot terminals.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.


EN 60068-2-1, Environmental testing - Part 2-1: Tests - Test A: Cold

EN 60068-2-2, Environmental testing - Part 2-2: Tests - Test B: Dry heat

EN 60068-2-30, Environmental testing - Part 2-30: Tests - Test Db: Damp heat, cyclic (12 h + 12 h cycle)

EN 60068-2-61, Environmental testing - Part 2: Test methods - Test Z/ABDM: Climatic sequence

EN 60529, Degrees of protection provided by enclosures (IP Code)

EN 60904-1, Photovoltaic devices - Part 1: Measurement of photovoltaic current-voltage characteristics

EN 61009-1, Residual current operated circuit-breakers with integral overcurrent protection for household and similar uses (RCBOs) - Part 1: General rules

EN 62262, Degrees of protection provided by enclosures for electrical equipment against external mechanical impacts (IK code)

EN 301549:2014, Accessibility requirements suitable for public procurement of ICT products and services in Europe


ISO/IEC 17025, General requirements for the competence of testing and calibration laboratories

ISO/IEC 17065, Conformity assessment — Requirements for bodies certifying products, processes and services
3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.
ISO and IEC maintain terminological databases for use in standardization at the following addresses:
- ISO Online browsing platform: available at http://www.iso.org/obp

3.1 token
medium accepted by a terminal and used as a substitute for currency or for test purposes

3.2 transaction
process followed at the terminal to obtain the right to park

3.3 operator
person who is responsible for the operation of the parking terminal

3.4 supplier
terminal supplier or it's representative

3.5 end-user
individual obtaining the rights to park

3.6 connected terminal
terminal communicating with an external system

3.7 cash
any currently valid coins or notes issued by an official banking system with a set monetary value

3.8 cash box
receptacle for the storage of cash and tokens until collection

3.9 coin validator
terminal component which identifies the validity of the coin/token inserted and accepts or rejects the coin or token

3.10 escrow device
unit to hold coins, tokens or banknotes, before confirmation or cancellation of the transaction
3.11 **embedded software**
dedicated software that provides:

— control of the terminal hardware components;
— control of the terminal behaviour when used;
— ability to set the operating parameters of the terminal

3.12 **out of order**
state of a terminal or a part of a terminal that is not able to operate

3.13 **out of service**
state of a terminal or a part of a terminal that has been voluntarily configured by the operator to no longer operate

3.14 **credit note**
printed media issued by the terminal for refund purposes

3.15 **ePurse**
electronic storage of value, which can be used in a manner similar to cash to pay for goods including the right to park

3.16 **private card**
electronic storage of prepaid value which can only be used to pay for the right to park

3.17 **cash safe compartment**
secure part of the terminal that stores cash

3.18 **service compartment**
secure part of the terminal that contains technical components for operation and maintenance outside of the cash safe compartment

3.19 **return cup**
receptacle that contains coins and tokens rejected or returned after cancellation

3.20 **collection box**
external lockable receptacle used for collection of cash

3.21 **ticket**
printed document for enforcement
4 Functional requirements

4.1 Modes of operation

4.1.1 Introduction

The modes of operation describe how the right to park is provided to end-users, then inspected by enforcement personnel. Three modes of operation are defined in this document:

a) the Pay and Display mode (with ticket);

b) the Pay and Go mode (without ticket);

c) the Pay on Departure (with or without ticket).

Any parking terminal shall comply with one or more modes.

4.1.2 Pay and Display mode (with ticket)

4.1.2.1 General

In this mode, a ticket is printed by the parking terminal and is to be displayed in the vehicle to allow visual inspection by the enforcement agent.

For a cash only offline transaction, a ticket with minimum printed information as detailed in 4.1.2.2, shall be issued within four seconds after confirmation of the transaction.

For pay and display, a printer shall be installed to deliver tickets and shall respect the requirements defined in 4.2.2.

4.1.2.2 Printed information (intended for enforcement)

This ticket shall as a minimum contain the following information on the same side of the ticket:

— amount paid (if applicable);

— parking expiry time and date (at least the month, day, hours and minutes);

— location of the parking terminal (identifier or address).

Where applicable, it shall be possible to add the following information:

— tariff category;

— unique transaction identifier;

— licence plate number;

— space number;

— issuing date and time;

— tax mandatory information;

— parking authority or operator reference.
4.1.3 Pay and Go mode (without ticket)

4.1.3.1 General

In this mode, the end-user does not need to display a ticket in a vehicle. Inspections are based on information that allows for identification either the parking space or the licence plate.

To obtain the right to park this information has to be entered by the end-user into the terminal to be recorded locally or in a centralised system.

The parking terminal shall offer the end-user the capability to correct and confirm the identification data manually entered before payment.

The terminal shall always be able to deliver a receipt:
— by a printer that shall respect the requirements defined in 4.1.3.3 and 4.2.2

or,
— digitally transferred to the end-user if allowed by local legislations, banks standards and card issuers if applicable and shall respect the requirements defined in 4.1.3.3.

4.1.3.2 Storage of transactions data and associated inspection

4.1.3.2.1 General

At least one of the means of storage described in 4.1.3.2.3 and 4.1.3.2.4 shall be used.

4.1.3.2.2 Stored information

Transactions shall be stored with the following information:
— parking expiry time and date (at least the month, day, hours and minutes);
— licence plate number or space number;
— amount paid (if applicable);
— location of the parking terminal (identifier or address);

Where applicable, it shall be possible to add the following information:
— specific category of the user;
— unique transaction identifier;
— date and time of issue.

4.1.3.2.3 Local storage of transaction

For terminals belonging of Category A (as defined in 4.3.2), when the transaction is confirmed by the end-user, the information defined in 4.1.3.2.2 shall be saved in the local memory of the parking terminal for local inspection by enforcement agent. The terminal shall have the capacity to store a minimum of 100 active transactions for enforcement purpose. If the maximum transaction capacity is reached the terminal shall block next transactions.
4.1.3.2.4 Online storage of transaction

For terminals belonging of Category B (as defined in 4.3.3), transactions completed by the end-users shall be transmitted to a centralised system to enable inspection by enforcement agent. If online transmission is not possible the terminal shall offer one of the two following possibilities:

— the transaction shall be blocked, or

— the transactions shall be allowed and stored locally until transmission to the centralised system.

4.1.3.3 Receipt

In case of a ticketless transaction, an offer shall be made to the end-user to obtain a receipt or it shall be automatically issued. An offer made at the end of the transaction shall remain for at least five seconds.

The minimum information contained on the receipt shall be the following:

— amount paid (if applicable);

— parking expiry time and date (at least the month, day, hours and minutes);

— the information that makes it possible to identify the vehicle either the licence plate or parking space number;

— location of the parking terminal (identifier or address).

Where applicable, it shall be possible to add the following information:

— tariff category;

— unique transaction identifier;

— issuing date and time;

— tax mandatory information;

— parking authority or operator reference;

— licence plate number;

— space number;

— date and time of issue.

4.1.4 Pay on departure

4.1.4.1 General

This mode of operation applies only to terminal in category B (as defined in 4.3.3).

To obtain the right to park, the end-user needs to start the parking session at arrival. The parking session is either stopped by the user when departing or automatically by the system when reaching user selected or maximum defined parking end time.

Pay on departure mode can be managed with or without ticket.

The terminal shall always be able to deliver a receipt:

— by a printer that shall respect the requirements defined in 4.1.4.3.2 and 4.2.2,
or
digitally transferred to the end-user if allowed by local legislations, banks standards and card issuers
if applicable and shall respect the requirements defined in 4.1.4.3.2.

4.1.4.2 Transaction data

4.1.4.2.1 Parking session start data

Parking session start data shall contain the following information:
— licence plate number, and/or
— space number, and/or
— unique identifier;
— parking start time (at least the month, day, hours and minutes);
— user selected or maximum defined parking end time.

Where applicable:
— specific category of the user;
— location of the parking terminal (identifier or address).

4.1.4.2.2 Parking session end data

Parking session end data shall contain the following information:
— licence plate number, and/or
— space number, and/or
— unique identifier;
— parking start time (at least the month, day, hours and minutes);
— parking end time (at least the month, day, hours and minutes);
— amount paid.

Where applicable:
— specific category of the user;
— unique transaction identifier;
— location of the parking terminal (identifier or address).

4.1.4.3 Registration of parking transaction data, payment procedure

4.1.4.3.1 Parking session starts

a) Terminals without ticket
When the parking session starts, a terminal shall transmit the data specified in 4.1.4.2.1 to a centralized system to enable online inspection for enforcement.

b) Terminals with ticket

When the parking session starts, a terminal shall print a ticket with the data specified in 4.1.4.2.1 to the end-user to be displayed in the vehicle for online inspection for enforcement.

4.1.4.3.2 Parking session ends

The end-user can end the parking session before the selected or the default maximum parking end time is reached. The data specified in 4.1.4.2.2 shall be transmitted to a centralized system.

An offer to obtain a receipt containing the data in 4.1.4.2.2 shall be made to the end-user or the receipt shall be automatically issued. The offer shall remain for at least five seconds.

The process of ending the parking session can be cancelled by the end-user at any time before the complete payment is exhausted.

4.2 User interface

4.2.1 Screen

To ensure that the information displayed on the main screen are legible, the minimum screen specification shall be as follows:

- size: 5000 mm²;
- definition: 16 ppc (pixels per centimetres), equivalent to 40 ppi (pixels per inch);
- height of the capital letters and numbers = 6 mm (see 5.4);
- luminance contrast ratio \(C_R\) during day and night, from a standing and a seated position shall be equal or greater than \(C_{R_{min}} = 1.5:1\) according to Annex C, 4.2.1.2.

4.2.2 Tickets and receipts

The terminal shall always be able to deliver a ticket/receipt.

When equipped with a printer the terminal shall be able to deliver a ticket to the following specification:

a) Ticket and receipt dimensions;

The minimum area of the ticket or receipt shall be 3 500 mm². The smallest dimension shall be minimum of 50 mm;

b) Ticket legibility for Pay and Display mode;

To be legible in daylight with normal or corrected vision:

1) the minimum size of text:

- for parking expiry date and time height of capital letters and numbers = 6 mm;
- for other information required for enforcement height of capital letters and numbers = 4 mm;
2) for short term tickets: the color contrast ratio of the information printed shall remain above 4,5:1 for a minimum of 2 days behind the windscreen;

3) for long term tickets: the color contrast ratio of the information printed shall remain above 4,5:1 for a minimum of 30 days behind the windscreen;

c) Paper characteristics for ticket and receipt;

The terminal supplier shall provide references for short term and long term tickets compliant to above and the following specification:

1) minimum thickness of 60 μm;

2) minimum width of 50 mm.

4.2.3 Transaction confirmation function

The parking terminal shall include a mechanism to confirm the transaction:

— by the end-user, with a button as described in 4.2.13,

— or, as an option, automatically when the maximum amount is reached.

4.2.4 Transaction cancellation function

The parking terminal shall include a mechanism to cancel the transaction:

— by the end-user, with a button as described in 4.2.13. In this case, the cash inserted shall be refunded to the end-user,

— or automatically after a time-delay. In this case the cash inserted shall be refunded.

The information that the transaction is cancelled shall be displayed to the end-user for at least three seconds.

The refund process for cash payment is specified in 4.4.2.2 and 4.4.2.3.

4.2.5 Tariff selection

If applicable, the parking terminal shall include the capability to select tariffs activated by the end-user, which indicates, by display and before any transaction, the specific tariff (e.g. resident tariff).

4.2.6 Physical keyboard

All following requirements do not apply to keyboards dedicated to pin entry for electronic means of payments.

If a physical alphanumeric keyboard is present for data entry or for terminals supplied in pay by plate / space mode the keypad shall maintain a luminance contrast ratio (\(C_R\)) during day and night, from a standing and a seated position shall be equal or greater than \(C_{R_{\text{min}}} = 1,5:1\).

When the terminal is waiting for a user input, any valid action taken by the end-user with the buttons and keypads, the end-user shall receive a response within one second. The response shall take the form of a mechanical, sound and/or visual form.
4.2.7 Screen standby mode

If the terminal has a standby mode (to save power) which results in the screen being switched off (completely or in part) after an idle period, the screen shall be reactivated within one second by a coin or token insertion, when the terminal accepts coins or tokens, and by at least one of the following actions:

— pressing the wake-up button;
— pressing the confirmation button;
— pressing the touchscreen;
— an automatic detection of the user.

A permanent instruction shall explain this wake-up process.

When a parking terminal is in standby mode, this shall be shown to the user:

— either by displaying the time;
— or by a dynamic visual indicator which is not a red-coloured lamp.

NOTE A red-coloured lamp confirms the status “Out of Service”, see 4.2.9.

4.2.8 Parking terminal visibility

The parking terminal height, including any attached extensions, shall be a minimum 1,40 m.

The height shall allow integration of two or more P-signs, with a minimum height of 130 mm, on opposite sides.

4.2.9 Out of service and out of order

When a parking terminal is out of service or out of order this shall be shown to the end-user on the parking terminal’s interface(s) at a minimum by a red-coloured lamp confirming the status.

In both situations, the parking terminal shall not accept payment or deliver any rights to park.

The terminal shall accept payments and/or deliver right to park only if service and cash safe compartments are closed.

4.2.10 Languages

At the start of the transaction, the user interface shall begin with the default language and if applicable the end-user shall be able to select a language out of those available on the terminal.

At the end of the transaction the terminal shall switch back to default language.

4.2.11 Displayed information during the transaction

4.2.11.1 Current time display

At the start of the transaction, the terminal shall display the current time.

The current time displayed shall be rounded down to the nearest minute on the internal clock of the device.

Hours and minutes shall be displayed.
4.2.11.2 Amount

a) Pay and Display and Pay and Go modes

The parking terminal shall display the value of the incrementing payments or the value of the selected parking end time until the transaction is confirmed;

b) Pay on departure

When the user starts parking session, the parking terminal shall display the value for the selected parking end time or the value for the maximum allowed parking end time.

When the user ends parking session, the parking terminal shall display the value of the parking session.

4.2.11.3 End parking time

The parking terminal shall display the parking expiry time and date either by direct selection or as payment reaches each time or payment step, until the transaction is confirmed.

The parking expiry time and date displayed on the screen when the end-user confirms the transaction shall be identical to the expiry time and date printed on the ticket or saved in the centralised system.

4.2.12 Parking time calculation

The calculation of the duration of the parking period starts at the beginning of the transaction.

4.2.13 Labels, legends and button colours

The means of payment shall be represented by coins, tokens, banknotes, electronic means of payment, icons or legends as appropriate.

The button legends and colours presented in the Table 1 shall be used (if corresponding features are available).

When buttons are displayed on colour screen, colour contrast is specified in 4.2.1.

When buttons are displayed on monochrome screen, at least the button legend shall be used.

Minimum height of legends 6 mm.

<table>
<thead>
<tr>
<th>Table 1 — Functional description of command buttons</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
</tr>
<tr>
<td>-----------</td>
</tr>
<tr>
<td>Confirm</td>
</tr>
<tr>
<td>Cancel</td>
</tr>
<tr>
<td>Back space</td>
</tr>
</tbody>
</table>
Wake-up | Wake-up with a dedicated button | Any

NOTE This Table is based on EN 1332-3:2008, Table 1 and EN 60417-1:1999.

For optional function keys that could be present, EN 1332-3:2008, Annex A shall be used when relevant.

4.3 Connectivity of the parking terminal

4.3.1 General

The connectivity of a parking terminal defines if and how a terminal is connected to a centralised system. Depending on this connectivity additional requirements apply.

Different categories and sub-categories of services are defined. Any configuration of parking terminal that complies with this document shall be attributable to one of the following categories: A, B1, B2, or B3.

4.3.2 Category A – Not connected parking terminal

A parking terminal of this category delivers the rights to park without any connection with a centralised system.

A parking terminal of this category being not connected, the data is stored in the parking terminal.

NOTE It could be possible to exchange data through a portable device or media.

4.3.3 Category B – Connected parking terminal

4.3.3.1 General

A parking terminal of this category is connected to a centralised system to permit remote management of technical, operational and financial functions, and allow the exchange of data between the terminal and the centralised system.

The parking terminal of this category shall connect, as a minimum, to a central system provided by the terminal supplier.

It is equipped with a device that provides the connectivity with a centralised system, through wired or wireless network.

NOTE Requirements from category B apply to any parking terminal from sub-categories B1, B2 and B3.

4.3.3.2 Sub-category B1 – Offline parking rights

(Requirements from category B also applied.)

A parking terminal of this category shall deliver the rights to park without any connection with a centralised system.

A parking terminal of this category is connected to a central system for remote management of technical, operational and financial functions only.

4.3.3.3 Sub-category B2 – Online parking rights

(Requirements from category B also applied.)

A parking terminal of this category shall be connected to check on a central system which parking rights can be issued to the end-user and/or to send to the central system the parking rights issued.

The end-user shall be informed about the progress on the screen while the rights are being verified online.
4.3.3.4 Sub-category B3 – Fully remote controlled sequence

(Requirements from category B also applied.)

A parking terminal belongs in this category if its design is based on fully remote controlled behaviour, that is if the entire sequence (instructions displayed on the screen and/or use of devices such as keypad, printer, payment methods etc.) is provided in real time by the centralised system.

4.4 Payment means

4.4.1 General

The requirements defined in 4.4 only apply to parking terminals accepting one or more of the following types of payment:

— coins and /or banknotes;

— tokens;

— electronic means of payment.

It shall be possible to accept overpayment only for cash payments.

Note The terminal is not required to provide change giving.

4.4.2 Various payment means

4.4.2.1 Token transactions

Tokens, recognised by the coin validator, shall be accepted to the configured value (in time or amount). The terminal shall not accept further tokens when maximum amount defined by selected tariff is already reached.

The terminal shall not accept token if:

— the removable coin cashbox is not inserted when applicable;

— the cash safe compartment is not closed and locked.

4.4.2.2 Coin transactions

The terminal shall accept coins according to the configuration. A terminal with coin acceptance shall have an escrow device.

The coins inserted shall be returned upon cancellation.

The coins inserted shall be transferred immediately to the cashbox upon transaction confirmation.

The terminal shall not accept further coins when maximum amount defined by selected tariff is already reached.

The terminal shall not accept coin payment if:

— the removable coin cashbox is not inserted, when applicable;

— the cash safe compartment is not closed and locked.

4.4.2.3 Banknote transactions

The terminal shall accept banknotes according to the configuration.
Banknote acceptance can be provided with or without an escrow function.

— With an escrow: returns the original banknotes to the end-user when a cancellation request has been made.

— Without an escrow:

    When a cancellation request is made, a terminal without an escrow function shall issue a credit note for the value of the banknote(s) that cannot be returned.

The minimum information contained on the credit note shall be the following:

— value of the notes inserted and not returned by the terminal;
— date and time;
— location of the parking terminal (identifier or address);
— redemption procedure.

The terminal shall not accept further banknotes when maximum amount defined by selected tariff is already reached.

The terminal shall not accept banknote payment if:

— the banknote cashbox is not inserted;
— the cash safe compartment is not closed and locked.

4.4.2.4 Electronic means of payment

If an ePurse and/or private card is accepted, the card issuers requirements shall be adhered to.

If a debit or credit card based payment is accepted, national / regional card issuers and financial and / or industry standards shall be adhered to.

4.4.3 Confirmation and acceptance of payment

During the period between confirmation of the transaction and delivery of parking rights:

— any additional cash or token inserted shall be returned directly to the user or insertion shall be prevented;

— any additional charge against an electronic means of payment shall not be possible.

4.4.4 Collection systems

4.4.4.1 Collection of physical payments (coins, banknotes and/or tokens)

The parking terminal shall be able to provide a detailed information of revenue per means of payment collected, on a printed ticket and / or sent to central system. Each means of payment collected shall be accounted for separately:

— the number of tokens;
— the number of each type of coins;
— the total value of coins per currency;
— the number of each type of banknotes;
— the total value of banknotes per currency;
— the total value of credit notes issued.

The collection agent shall not have access to the content of the cashboxes or collection boxes. The stored means of payments shall not be accessible only by a single tool, key or manoeuvre.

The terminal shall allow for a revenue collection by one of the following methods:

a) direct collection of cash and/or tokens stored in a built-in cashbox with transfer into a collection box. After collection of the cash, the cashbox shall be automatically closed and locked. The collection box itself shall be locked;

b) collection of a removable cashbox. Upon removal, the cashbox shall be automatically closed and locked.

4.4.4.2 Collection of electronic means of payment

Electronic means of payments issuer standards shall be complied with.

4.5 Upgrade capability

4.5.1 Software configuration

The software of the terminal shall be configurable to adjust at least the following features:
— means of payment acceptance;
— cash and currency acceptance;
— value (in time or amount) of tokens;
— tariff;
— tickets or receipts layout;
— languages;
— instructional messages.

4.5.2 Software updates

It shall be possible to identify the running software version. The embedded software of the mainboard of the terminal shall be capable of being updated locally at the terminal and/or remotely if the terminal is connected (category B according to 4.3.3).

4.6 Management at the terminal

4.6.1 Display of warnings (impending out of order situation)

When an event is impending or an incident is liable to cause a terminal failure after a given time period, this information, intended for the operator, shall be shown to authorized personnel. This behaviour is only required for a standalone terminal (category A according to 4.3.2).
NOTE  On a connected terminal (category B according to 4.3.3), this status is available on the centralised system.

4.6.2 Ease of maintenance

The different consumables (e.g. battery, lamps, tickets) and sub-assemblies (e.g. electronic boards, printers, coin validator) shall be easy to reach and exchanged on site without the use of proprietary tools and without possibility of incorrect fitting.

The supplier shall provide maintenance and operation manuals and a preventive maintenance schedule (as described in 4.8).

4.6.3 Secured access to maintenance actions

The terminal shall be secured to prevent unauthorised access to software and hardware maintenance actions.

4.6.4 Storage of operating and management data

If not sent or managed by a centralised system (as explained in 4.3), the following management and operating data shall be stored within the terminal and shall be printed or displayed or exported to external media:

— cumulative revenue;
— last collection;
— revenue held in the terminal;
— terminal identification;
— terminal configuration or functional parameters;
— operational and maintenance events that have occurred on the terminal.

In the case of a terminal which accepts several means of payment, the cumulative revenue shall be available for each of these means.

4.6.5 Verification of revenue held

The terminal shall include a function whereby the operator can check the amount of physical payments held in the terminal (cash and/or tokens). If not sent or managed by the central system, the electronic revenue collected (and the accumulative total since the last collection) shall be available from the terminal.

Record of transactions made by electronic means of payment shall be capable of reconciliation separately.

4.7 Remote management and reporting

4.7.1 General

The requirements defined in 4.7 apply only to terminals belonging to category B according to 4.3.3.

4.7.2 Online status and events monitoring

The terminal shall communicate their status to a centralised system. In the event of a status change the centralised system shall be notified. Status information shall provide as a minimum:

— the date and time of the status;
— information to identify the status.

In case of communication failure, the status alert shall be sent within thirty minutes after the communication has been restored.

These status alerts are, but not limited to:

— out of paper;
— paper stock low;
— cash-box full;
— cash-box level warning;
— terminal out of order;
— power supply battery level low;
— payment type out of order (one alert for each payment type).

The terminal shall be capable of sending relevant maintenance events.

These events are, but not limited to:

— opening / closing of the door(s);
— Cash and/or token collection.

4.7.3 Data for statistics

The terminal shall be capable of sending data to the centralised system.

In case of communication failure, the data shall be sent within thirty minutes after the communication has been restored.

The data used for statistics shall be transmitted once per day as a minimum:

— battery level;
— transaction data:
  — amount paid per currency (if an amount has been paid);
  — payment method;
  — start and expiry time and date (at least the month, day, hours and minutes);
  — identifier of the parking terminal;
  — specific category of the user (if applicable);
  — unique transaction identifier;
  — licence plate number (if applicable);
  — space number (if applicable);
4.7.4 Remote configuration

A connected terminal shall permit remote configuration of the following:
- disable / Enable out of service of the complete terminal;
- disable / Enable out of service of the payment means (by each one) included in the terminal;
- applicable tariff.

4.8 Manuals

The manuals shall contain information and, when applicable, illustrations on:
- ticket replenishment process;
- test procedures for standalone terminals;
- process for local inspection by enforcement agent if Category A with Pay & Go mode (local storage of transaction);
- instructions to configure all the software features provided in 4.5.1;
- how the collection of cash/or token shall be undertaken as required by 4.4.4.1;
- instructions to access to maintenance areas of the terminal as required by 4.6.2;
- preventive maintenance schedule;
- instructions to perform preventive and corrective actions in case of terminal failure or vandalism;
- electrical safety instructions for mains machines;
- installation instructions.

5 Technical requirements

5.1 Safety

5.1.1 Electrical safety

If the terminal is powered by mains electricity, it shall be protected by a residual current operated circuit breaker compliant with the EN 61009-1 type A as a minimum.

The terminal shall provide a protection index IK09 according to EN 62262 (pendulum hammer).

5.1.2 Ingress Protection (dust, water, and foreign objects)

All the equipment shall provide a protection index IP24D according to the EN 60529.

The mains supply part shall be in a compartment providing a protection index IP54.

IP2xD is required to allow the insertion of large coins (UK £2 coin,...) while also protecting against access to hazardous parts (with wires, screws, ...). IPx4 is required to protect from the rain or the cleaning tools splashing from any direction. IP5x on main supply is required to ensure a complete protection against contact on this highly hazardous part.
5.2 Operating capacity

5.2.1 Ticket stock

The minimum ticket capacity of the terminal shall be 3000 tickets as defined in 4.1.2.2 and 4.1.3.3. When the ticket stock is depleted, the terminal shall be out of service (see 4.2.9). This requirement does not apply for a Pay and Go terminal (as described in 4.1.3) and for Pay on departure without ticket (as described in 4.1.4).

5.2.2 Capacity of the escrow for coins and tokens

The escrow unit shall have a minimum volume to hold at least 20 coins of 2 euros. When the escrow unit exceeds its maximum capacity, all coins and tokens inserted shall be returned or their insertion shall not be possible. An appropriate message shall be displayed to the end-user. This requirement does not apply for a cashless terminal.

5.2.3 Capacity of the cashbox for coins and tokens

The cashbox shall have a minimum usable volume of 3.5 l. When the cashbox exceeds its maximum capacity, all coins and tokens inserted shall be returned or their insertion shall not be possible. An appropriate message shall be displayed to the end-user. This requirement does not apply for a cashless terminal.

5.2.4 Storage relating to transactions by electronic means of payment

If an ePurse and/or private card is accepted, the card issuers requirements shall be adhered to. If a debit or credit card based payment is accepted, national / regional card issuers and financial and / or industry standards shall be adhered to.

5.2.5 Energy autonomy

Any terminal shall be able to operate continuously more than a year without changing the internal battery. This operation shall be verified in accordance with Annex A, energy autonomy test procedure by comparing the average energy consumption to the input energy. The following energy autonomy requirements are based on a calculation in laboratory conditions as defined in Annex A.

The energy autonomy shall apply in three power modes:

— when the terminal is powered by mains supply;
— when the terminal is powered by solar energy;
— when the terminal is powered by a combination of solar energy and a non-rechargeable battery.

For a terminal powered by mains supply, the terminal shall be fully autonomous during 5 days at 75 transactions per day when no power is received according to A.3. It ensures the operation of the terminal in case of failure of the power supply.

For a terminal powered by solar only, the terminal shall be fully autonomous during 45 days when no power is received according to A.3. It ensures the operation of the terminal during the winter. The terminal shall ensure a minimum number of 75 transactions per day, according to A.4.

For a terminal powered by a combination of solar energy and a non-rechargeable battery, the terminal shall ensure a minimum of 2 years at 75 transactions per day.
5.3 Resistance to environmental conditions

5.3.1 Minimum conditions

5.3.1.1 Terminal Storage Temperature Resistance

The terminal shall be able to fully operate, according to 5.3.1.2 after each of the following conditions:
- a 16 h storage in +70 °C according to EN 60068-2-2;
- a 16 h storage in -20 °C according to EN 60068-2-1.

5.3.1.2 Terminal Operation Temperature Resistance

The terminal shall be able to fully operate during at least 24 h in each of the following conditions:
- +55 °C according to EN 60068-2-2;
- +55 °C and 95 % humidity according to EN 60068-2-30;
- -20 °C according to the phase 2 of EN 60068-2-1, with controlled recovery at 25 °C 95% HR during 1h.

NOTE This humidity conditions while decreasing temperature gives freezing effects.

5.3.2 Terminal water flooding resistance

Any part that can be damaged by water shall not be present below 10 cm from the ground according to the installation instructions in the terminal.

5.4 Accessibility for end-user

A parking terminal shall comply with the requirements listed in EN 301549:2014, Table B.2:
- applicable to a parking terminal as defined in the current document, and
- having primary relationship with accessibility needs expressed in EN 301549:2014, subclauses 4.2.2 to 4.2.11 (functional performance statement).

The following definitions given in the EN 301549:2014 shall be used:
- the minimal height of the capital letters and numbers = 6 mm reference EN 301549:2014, subclause 5.1.4 where the viewing distance is D= 500 mm;
- in EN 301549:2014, subclause 8.3.3, the 'essential controls' shall include the input commands (buttons, keyboards: mechanical or touchscreen), the payments means interface, the coin return cup and the ticket output;
- in EN 301549:2014, subclause 8.3.4, the button colour and button legend defined in 4.2.3.6, buttons colour and legend and the instructions and display necessary for the end-user to operate the parking terminal shall be included.

NOTE 1 "Usage without vision" (4.2.1) and "operation without keyboard interface" (5.1.6.1) are not mandatory requirements for parking terminals.


5.5 Protection against theft or burglary

The anchoring of the machine shall not be accessible by unauthorised persons.
If the terminal accepts coin as a payment method, the terminal shall fulfil at least the following security requirements:

— access to the cash safe compartment(s) and service compartment(s) have to be separated, i.e. with different access authorisations;

— the resistance of the terminal shall reach the P0 resistance class in accordance with the requirements and the test procedure defined in Annex B. Resistance time and tool sets shall be in accordance with Table B.1;

— the terminal shall not accept cash payment if the cashbox is not in place.

If the terminal accepts coin as a payment method, the terminal suppliers can verify the effectiveness of additional measures to increase the protection against theft or burglary above P0.

The classification P0-P4 provides a measure of resistance to successful attack in accordance with Table B.1. The security test procedure is described in Annex B and shall be performed for terminal accepting coins by a test laboratory following ISO/IEC 17025 and certified by certification body according to ISO/IEC 17065.

5.6 Data security requirements for a parking terminal

The terminal shall meet the following requirements:

— access to operating and management data as described in 4.6.4 shall be restricted to authorised personnel only;

— the operating and management data as defined in 4.6.4 shall be stored for a minimum of 30 days in case of power failure;

— when electronic payment is accepted, the requirements from national/regional card issuers, banks and payment service providers shall be adhered to;

— when personal data is processed, the terminal shall meet the national/regional legislation and standards.

5.7 Internal clock

The internal clock of the parking terminal shall be sufficiently accurate to not drift by more than one minute within a 28 days period. It shall be possible to correct the internal clock, at the terminal or by a remote action.

That level of accuracy is sufficient for issuing the right to park and for the enforcement process. The parking terminal does not therefore need to be subject to metrology verification.

6 Verification of the functional and technical requirements

6.1 Tests conditions

If not specified otherwise, the tests are performed in a laboratory environment at 20°C ±2°C and a relative humidity from 25 % to 60 %.

All tests requiring a connection to central system shall be made using the centralised system provided by the terminal supplier and assume that the communication quality is above 80 %.

6.2 Test methods

The details of the verification methods are given in Annexes A, B and C.
Annex A
(normative)

Energy autonomy test procedure

A.1 Calculation of daily consumption

The energy consumption of a terminal is determined by an appropriate 24 h test procedure.

The terminal shall be tested with all the components that will be provided to the customer. All components shall be as good as new and shall be the standard components.

For direct measurement of the power consumption of the terminal, a power measuring device with at least the following specification shall be used:

— measuring accuracy of 10%;
— sampling rate of 20 kHz.

The device shall be placed between rechargeable battery and terminal power input.

The test shall be done at room temperature and a relative air humidity of 30 % - 60 %. The terminal shall be installed under this environmental conditions 2 h before the test begin. During the test run, the terminal shall operate solely on the rechargeable battery. The rechargeable battery shall be fully charged at test start. The rechargeable battery shall not be recharged by any power supply during the test.

The measurement of the power consumption runs for 24 h. During this period the following actions shall be done in order to simulate the average energy consumption of the terminal within 24 h:

— 70% payments in daylight conditions;
— 30% payments in nightly conditions (as described in 4.2.1 and 4.2.6);
— payments shall be done either with 3 different coins, or with an offline electronic mean of payment (private card), or with an online electronic mean of payment (bank card), according to connectivity level criteria;
— on each payment, a ticket or a receipt shall be issued (as described in 4.1.2.2 or 4.1.3.3 or 4.1.4.3.2).

This test procedure shall be completed with the conditions specific to the connectivity level of the terminal (as described in 4.3):

— for a terminal from category A: 50% of payments with coins, 10% with banknotes, 40% with offline card (ePurse or private card);
— For a terminal from sub-category B1:
  — 30% of payments with coins, 10% with banknotes, 30% with offline card ePurse or private card (ePurse or private card), 30% with online card (bank/financial card);
  — 2 transmissions of error messages;
  — 1 transmission of the transaction data realized during the test;
— For a terminal from sub-category B2:
— 30% of payments with coins, 10% with banknotes, 30% with offline card (ePurse or private card), 30% with online card (bank/financial card);
— a communication with the server at each transaction;
— 2 transmissions of error messages;
— 1 transmission of the transaction data realized during the test;

— For a terminal from sub-category B3:
— 30% of payments with coins, 10% with banknotes, 30% with offline card (ePurse or private card), 30% with online card (bank/financial card);
— a communication with the server at each modification of the information displayed on the screen;
— 2 transmissions of error messages;
— 1 transmission of the transaction data realized during the test.

If a terminal doesn’t accept one or more of the payment types, the total number of transaction (N) should be the same. The transactions that could not be done using the missing payment type shall be equally distributed across the others payment types.

The consumption during 24 h based on N transactions is noted Consumption(24h, N).

A.2 Calculation of annual energy available

A.2.1 Solar powered terminal

Based on the peak power of the solar panel (P_k) and the yearly average of daily global irradiation on the horizontal surface in Berlin (H_h), the potential electricity generation of the solar module over a year (E_year) and the potential electricity generation of the solar module during the winter months (E_winter, from November to February) are calculated as follow:

\[
E_{\text{year}} = \frac{365 \cdot H_h \cdot P_k}{IR_{\text{ref}}} \quad \text{(A.1)}
\]

With:

\[
H_h = 2930 \text{ Wh/m}^2/\text{day (average for Berlin over the whole year)}
\]

\[
E_{\text{winter}} = \frac{120 \cdot H_{hw} \cdot P_k}{IR_{\text{ref}}} \quad \text{(A.2)}
\]

With:

\[
H_{hw} = 812 \text{ Wh/m}^2/\text{day for Berlin from November to February} \quad \text{(A.3)}
\]

Where:

\[P_k\] is expressed in W,
The peak power of the solar panel (P_k) is defined according to the EN 60904-1.

A.2.2 Terminal powered by a combination of solar energy and a non-rechargeable battery

The energy available from the non-rechargeable power source over a year (NRE_{year}) is calculated as follow:

\[
NRE_{year} = \frac{NRE_{tot}}{LC}
\]  

(A.4)

Where:

- \(NRE_{tot}\) is the total capacity of the non-rechargeable power source, expressed in Wh
- \(LC\) is the life cycle of the non-rechargeable power source as advertised by the terminal supplier.

EXAMPLE If the non-rechargeable power source should be changed every 2 year \(LC = 2\). Terminal with \(LC\) lower than 2 years are not considered as autonomous. Thus \(LC\) should be at least 2 years.

A.3 Autonomy during ‘no energy’ days

For solar-operated terminals it is assumed (arbitrarily) that within the period of one year there is a total of 45 winter days without considerable solar power input so that the terminal shall work solely on the internal rechargeable battery.

This is an intermediate value between the two theoretical extremes: sunshine maintained daily for a terminal located in a north-south axis, and sunshine away up to 180 consecutive days (night or permanent shade) for a terminal located at the north side of an east-west axis.

It is also assumed that a risk of 5 days of mains supply failure has to be managed where the terminal shall operate solely on battery power.

To ensure these criteria simply, the energy consumption during 45 days or 5 days shall be balanced by the power income during the other days of the year, and the battery shall be fully recharged by these days of energy income. An average transaction number of 75 is taken into account.

Both formulas shall thus be respected:

\[
Consumption_{(24\,h,N=75)} \cdot No\,Power\,Days < Battery\,Capacity
\]  

(A.5)

and

\[
E_{year} > Battery\,Capacity + Consumption_{(24\,h,N=75)} \cdot 365
\]  

(A.6)

where

\(No\,Power\,Days = 5\,days\,or\,45\,days\,according\,to\,the\,energy\,system\)  

(A.7)
For a terminal powered by a combination of solar energy and a non-rechargeable battery an average transaction number of 75 is taken into account. The following formulas shall thus be respected instead of those above.

\[
\text{Consumption}_{(24h, N=75)} \cdot \text{No Power Days} < \text{Battery Capacity} + \text{NRE}_{\text{year}}
\]  

(A.8)

and

\[
\text{E}_{\text{year}} + \text{NRE}_{\text{year}} > \text{Battery Capacity} + \text{Consumption}_{(24h, N=75)} \cdot 365
\]

(A.9)

**A.4 Energy autonomy of a terminal**

The energy autonomy of the terminal means that the following formula is respected:

\[
\text{E}_{\text{W,inter}} \geq \text{Consumption}_{(24h, N=75)} \cdot 120
\]

(A.10)

For a terminal powered by a combination of solar energy and a non-rechargeable battery the following formula is used instead of the one above.

\[
\text{E}_{\text{W,inter}} + \text{NRE}_{\text{year}} \geq \text{Consumption}_{(24h, N=75)} \cdot 120
\]

(A.11)
Annex B
(normative)

Security test procedure

B.1 Requirements for verification of protection against burglary

B.1.1 Documentation to be provided before the test

B.1.1.1 General

In order for this test to be carried out on a parking terminal, the applicant is required to provide to the test laboratory / test house the following documentation on the terminal.

B.1.1.2 General requirements on the documentation

The documentation contains the following indications:

— date of issue and name of terminal supplier;
— for written form: indication of these data on each page of the documentation;
— declaration on type of product as well as the model number.

B.1.1.3 Necessary documents

The documentation contains the following records:

— installation instruction of the product turned in for testing;
— operators instruction for the product turned in for testing including the functions which may be performed via the user interface;
— data on products or components which already have been tested and approved (e.g. profile cylinders or the locking mechanism of a profile cylinder);
— detailed drawing of the cash safe compartment;
— detailed drawing of the cashbox if given;
— detailed drawing of the assembly unit;
— detailed description of functions taking into consideration possible mechanical, electromechanical and/or electronic measures which could inhibit the trapping of payment.

B.1.1.4 Requirements for drawings

The technical documentation (drawings as well as other documents) shall show the following information:

— cross and longitudinal sections;
— number, arrangement and features of locks, bolt work, etc.;
— number, distances and arrangement of door latches, their dimensions (e.g. cross section), direction of latches/bolts and range of which the bold overlaps the locking plate as well as type of the bolts (e.g. movable or fix);

— position and construction of areas with special protection materials;

— purpose, arrangement and dimensions of each opening with detailed illustration of protected zones;

— specification of the used materials.

B.1.1.5 Declaration of dangerous materials

Details on materials which generate gas, smoke, soot etc. and equipment which could generate dangerous materials during testing in case of attack shall be detailed.

B.1.2 Resistance classes

B.1.2.1 General

Table B.1 defines the resistance times as well as the burglar tools/break-open tools which are stated for use during testing and assigned to the classes of parking terminals.

<table>
<thead>
<tr>
<th>Class of parking terminal</th>
<th>Resistance time(^a)</th>
<th>Set of tools(^b)</th>
</tr>
</thead>
<tbody>
<tr>
<td>P0</td>
<td>1 min</td>
<td>Basic set of tools, A, B.</td>
</tr>
<tr>
<td>P1</td>
<td>3 min</td>
<td>Basic set of tools, A, B</td>
</tr>
<tr>
<td>P2</td>
<td>3 min</td>
<td>Basic set of tools, A, B, C</td>
</tr>
<tr>
<td>P3</td>
<td>5 min</td>
<td>Basic set of tools, A, B, C</td>
</tr>
<tr>
<td>P4</td>
<td>5 min</td>
<td>Basic set of tools, A, B, C, D</td>
</tr>
</tbody>
</table>

\(^a\) The time during which a tool has contact with the equipment under test (according to B.3.2)

\(^b\) The set of tools are described in B.4.

B.1.2.2 Access to the cash safe compartment

An attack on the locking mechanism of the cash safe compartment door is part of the test according to Table B.1.

B.2 Preparation of tests

B.2.1 Test Team

The test team comprises:

— the test team leader who is responsible for planning, guidance and surveillance of the test;

— the time keeper who is responsible for taking the times and issuing the test record;

— the test engineers who perform the necessary works on the equipment under test according to instructions of the test team leader.

NOTE 1 If necessary, the service of several time keepers is admitted.
The test team leader may himself operate as test engineer or time keeper.

**B.2.2 Time measurement**

A chronograph is used, the measurement inaccuracy of which does not exceed 0,05 min (referred to 10 min) and allows a graduation of at least 0,01 min. If necessary, several chronographs are used.

**B.2.3 Report**

The main test is recorded in accordance with B.3. The record provides information on kind of tools and duration of their application.

**B.2.4 Pre-testing actions**

**B.2.4.1 General**

Prior to the main test the steps indicated in the following paragraphs shall be performed.

**B.2.4.2 Check of documentation**

The following tests shall be performed only if all required documents in accordance with B.1.1 are available and fulfil the criteria mentioned there.

**B.2.4.3 Preliminary inspection**

Prior to performing the attack test with tools as well as issuing the test schedule the test team may perform preliminary inspections in order to become conversant with the construction of the equipment under test and – if given – detect possible weak points.

A documentation of preliminary inspection in the test report is not necessary.

Times for performing preliminary inspections are not added to the resistance time.

**B.2.4.4 Test schedule**

The compilation of the individual test schedule is made such that the shortest resistance time (referred to the seek resistance class for the parking terminal and the set of tools to be used for this class) can be anticipated after evaluation of the test team leader and the test.

A documentation of the test schedule in the test report is not necessary.

**NOTE** Depending on the construction of the presented equipment under test, several tests (if appropriate also on several equipment under test) could be required.

**B.2.4.5 Choice of tools**

The test tools to be used for the test comprises exclusively of tools as indicated in Table B.1 and described in Table B.2 for the resistance class of the parking terminal.

For P4 test using hydraulic tools (specification according to B.5) the following applies: the point at which the hydraulic tool is applied, shall not be changed during the test. Multiple test on the same point shall not be performed.

The time to make any adapters which might be required to be made for the purpose of the hydraulic test shall not be part of the resistance time.
B.3 Main test

B.3.1 General

The equipment under test is mounted according to the terminal supplier’s installation instructions.

The purpose of the main test is to determine:

— if requirements on the product marking as well as constructional requirement of the equipment under test which influence its resistance against unauthorized access, are fulfilled,

and

— if the cash safe compartment or the available cashbox can not be removed,

— or if a possibility of removal of the potential content of the cash safe compartment or the available cashbox.

B.3.2 Time keeping

The times for reaching access to the cash safe compartments in accordance with B.3.3 are taken with chronographs as described in B.2.2 and recorded. The times to be recorded begin with physical contact with the equipment under test and end when the physical contact is stopped. If the test is divided into several timed limited sections, the resistance time is the total of all individually measured contact times.

The contact times of the single tools are measured and recorded in the test report. The results of the single attacks shall be recorded. The final result of the test (after reaching the indicated resistance time) shall be recorded.

B.3.3 Access on cash safe compartments

By using the tools chosen in accordance with Table B.1 check if:

— the removal of the cash safe compartment or the available cash box is not possible,

or

— no possibility is given to remove the cash box or its content from the cash safe compartment or the available cash box.

The use of operational openings which are in the equipment under test in the frame of the test, e.g., in order to gain access to payments, is admitted without restrictions.

The access on the cash safe compartment or the available cash box is deemed to be possible according to these guidelines, if an opening with a diameter of ≥ 42 mm for the hole has been reached.

NOTE The time which is necessary for the removal of payments from the cash safe compartment or the cash box is not added to the resistance time. If during testing it is ascertained that, for the removal of the large part of the payment deposited, more than five times of the resistance time required for parking terminal than indicated in Table B.1 is necessary, the requirement is also deemed to be fulfilled.

The result of the test is recorded.

B.4 Specification of tool sets

The Table B.2 specifies the set of tools to be used as required in Table B.1.
<table>
<thead>
<tr>
<th>Description</th>
<th>Type/specification</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Basic set of tools</strong></td>
<td></td>
</tr>
<tr>
<td>Screw driver</td>
<td>Width of blade 6 mm</td>
</tr>
<tr>
<td>Long-nose pliers</td>
<td>Length at maximum 200 mm</td>
</tr>
<tr>
<td>Combination pliers</td>
<td>Length at maximum 200 mm</td>
</tr>
<tr>
<td>Drift punch</td>
<td>FL 25 x 6 Length at maximum 250 mm</td>
</tr>
<tr>
<td>Drift punch</td>
<td>Rd Ø 15 Length at maximum 250 mm</td>
</tr>
<tr>
<td>Locksmith’s hammer</td>
<td>200 g</td>
</tr>
<tr>
<td>Allen key</td>
<td>Maximum length 120 mm</td>
</tr>
<tr>
<td>Screw wrench</td>
<td>Maximum length 180 mm</td>
</tr>
<tr>
<td>Tweezers</td>
<td>AM 160 mm</td>
</tr>
<tr>
<td>Tightrope</td>
<td>Hemp trope</td>
</tr>
<tr>
<td>Steel wire</td>
<td>Tie wire</td>
</tr>
<tr>
<td>Hook</td>
<td>Welding rod curved</td>
</tr>
<tr>
<td>Torch light</td>
<td>Variable</td>
</tr>
<tr>
<td>Adhesive foil</td>
<td>Fabric tape</td>
</tr>
<tr>
<td>Knife</td>
<td>Blade at maximum 120 mm</td>
</tr>
<tr>
<td>Industrial vacuum cleaner</td>
<td>Rated input 2000 W including optional suction adapter</td>
</tr>
<tr>
<td><strong>Set of tools A</strong></td>
<td></td>
</tr>
<tr>
<td>Screw driver</td>
<td>Width of blade 10 mm</td>
</tr>
<tr>
<td>Screw driver</td>
<td>Width of blade 14 mm</td>
</tr>
<tr>
<td>Timber wedges</td>
<td>L/B/H 200/80/40 mm (max.)</td>
</tr>
<tr>
<td>Plastic wedges</td>
<td>L/B/H 200/80/40 mm (max.)</td>
</tr>
<tr>
<td>Multigrip pliers</td>
<td>Length 240 mm</td>
</tr>
<tr>
<td>Gas pipe pliers</td>
<td>Length 240 mm</td>
</tr>
<tr>
<td><strong>Set of tools B</strong></td>
<td></td>
</tr>
<tr>
<td>Nail puller</td>
<td>Length 710 mm</td>
</tr>
<tr>
<td>Hammer</td>
<td>500 g</td>
</tr>
<tr>
<td><strong>Set of tools C</strong></td>
<td></td>
</tr>
<tr>
<td>Club hammer</td>
<td>1,5 kg; length of shaft 400 mm</td>
</tr>
<tr>
<td>Axe/hatchet</td>
<td>Length 350 mm</td>
</tr>
<tr>
<td>Chisel</td>
<td>Variable dimensions</td>
</tr>
<tr>
<td>Hack saw</td>
<td>Variable dimensions and blades</td>
</tr>
<tr>
<td>Description</td>
<td>Type/specification</td>
</tr>
<tr>
<td>---------------------------</td>
<td>----------------------------------------</td>
</tr>
<tr>
<td>Metal shears</td>
<td>Right; Length 260 mm</td>
</tr>
<tr>
<td>Gas pipe pliers</td>
<td>Length 410 mm</td>
</tr>
<tr>
<td>Bolt cutter</td>
<td>Length 750 mm</td>
</tr>
<tr>
<td>Drift punch</td>
<td>Variable dimensions</td>
</tr>
<tr>
<td>Screw driver</td>
<td>Variable dimensions</td>
</tr>
<tr>
<td>Steel wedges</td>
<td>Variable dimensions</td>
</tr>
<tr>
<td>Electrical power source</td>
<td>Variable</td>
</tr>
<tr>
<td>Set of tools D</td>
<td></td>
</tr>
<tr>
<td>Drill machine</td>
<td>Rated input 600 W</td>
</tr>
<tr>
<td>Impact drilling machine</td>
<td>Rated input 600 W</td>
</tr>
<tr>
<td>Hydraulic tools (as defined in B.5)</td>
<td>Rated at 50 kN at maximum, optional adapter</td>
</tr>
<tr>
<td>Drilling HSS</td>
<td>Variable</td>
</tr>
<tr>
<td>Carbide drill</td>
<td>Variable</td>
</tr>
<tr>
<td>Solid carbide drill (jet drill)</td>
<td>Variable</td>
</tr>
<tr>
<td>Hole saw</td>
<td>Variable</td>
</tr>
<tr>
<td>Hole cutter</td>
<td>Variable</td>
</tr>
</tbody>
</table>

**B.5 Specification of hydraulic tool**

The hydraulic tool used shall be suitable for a load of 50 kN.
The tolerance of force measuring shall not exceed ± 5 % of the acting force.
The maximum rate of force increase shall not exceed 150 mm/minute.
Any adapters used to connect the hydraulic tool to the equipment under test shall not increase the force that acts on the equipment under test.
Annex C
(normative)

Verification methods

The verification methods for the functional requirements described in 4 and the technical requirements described in 5 are given in Table C.1.
## Table C.1 — Verification methods

<table>
<thead>
<tr>
<th>Clause / subclause</th>
<th>Requirement</th>
<th>Verification method</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>Functional requirements</td>
<td></td>
</tr>
<tr>
<td>4.1</td>
<td>Modes of operation</td>
<td></td>
</tr>
<tr>
<td>4.1.2</td>
<td>Pay and display mode (with ticket)</td>
<td></td>
</tr>
<tr>
<td>4.1.2.1</td>
<td>General</td>
<td></td>
</tr>
<tr>
<td>4.1.2.2</td>
<td>Printed information (intended for enforcement)</td>
<td></td>
</tr>
<tr>
<td>4.1.3</td>
<td>Pay and Go mode (without ticket)</td>
<td></td>
</tr>
<tr>
<td>4.1.3.1</td>
<td>General</td>
<td></td>
</tr>
</tbody>
</table>

### 4.1.2.1 General

For a cash only offline transaction, a ticket with minimum printed information as detailed in 4.1.2.2, shall be issued within four seconds after confirmation of the transaction.

For pay and display, a printer shall be installed to deliver tickets and shall respect the requirements defined in 4.2.1.3.

**Functional test**

In a cash only transaction, measure time between transaction confirmation and ticket presented.

For Pay and Display mode: Visual verification of the presence of a printer

See 4.2.1.3 for test of General requirements for printer, printed tickets and receipts.

### 4.1.2.2 Printed information (intended for enforcement)

This ticket shall as a minimum contain the following information on the same side of the ticket:

- amount paid (if applicable);
- parking expiry time and date (at least the month, day, hours and minutes);
- location of the parking terminal (identifier or address).

**Visual verification**

Required information is printed on the issued ticket

### 4.1.2.2 Printed information (intended for enforcement)

Where applicable, it shall be possible to add the following information:

- tariff category;
- unique transaction identifier;
- licence plate number;
- space number;
- issuing date and time;
- tax mandatory information;
- parking authority or operator reference.

**Visual verification**

Required information is printed on ticket issued in a specific configuration.

(Configure the terminal with appropriate parameters, and print tickets with the listed information. Several different configurations might be required)
### Clause / subclause

<table>
<thead>
<tr>
<th>Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>The parking terminal shall offer the end-user the capability to correct and confirm the identification data manually entered before payment.</td>
</tr>
<tr>
<td>The terminal shall always be able to deliver a receipt:</td>
</tr>
<tr>
<td>— by a printer that shall respect the requirements defined in 4.1.3.3 and 4.2.1.3,</td>
</tr>
<tr>
<td>or</td>
</tr>
<tr>
<td>— digitally transferred to the end-user if allowed by local legislations, banks standards and card issuers if applicable and shall respect the requirements defined in 4.1.3.3.</td>
</tr>
</tbody>
</table>

#### Verification method

<table>
<thead>
<tr>
<th>Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>— correct it and;</td>
</tr>
<tr>
<td>— validate it on the terminal.</td>
</tr>
</tbody>
</table>

### Functional test

Perform a transaction and verify that you can get a receipt.

If the terminal deliver:

<table>
<thead>
<tr>
<th>Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>— printed receipt: see tests methods 4.1.3.3 and 4.2.1.3;</td>
</tr>
<tr>
<td>— digital receipt: see test method 4.1.3.3.</td>
</tr>
</tbody>
</table>

### 4.1.3.2 Storage transactions data and associated inspection

#### 4.1.3.2.2 Stored information

Transactions shall be stored with the following information:

<table>
<thead>
<tr>
<th>Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>— parking expiry time and date (at least the month, day, hours and minutes);</td>
</tr>
<tr>
<td>— licence plate number or space number;</td>
</tr>
<tr>
<td>— amount paid (if applicable);</td>
</tr>
<tr>
<td>— location of the parking terminal (identifier or address).</td>
</tr>
</tbody>
</table>

#### Functional test

Check that the required information can be accessed locally or remotely.

### Where applicable, it shall be possible to add the following information:

<table>
<thead>
<tr>
<th>Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>— specific category of the user;</td>
</tr>
<tr>
<td>— unique transaction identifier;</td>
</tr>
<tr>
<td>— date and time of issue.</td>
</tr>
</tbody>
</table>

#### Functional test

Check that the required information can be access locally or remotely.

(Configure the terminal with appropriate parameters and perform the test. Several different configurations might be required)

### 4.1.3.2.3 Local storage of transaction

For terminals belonging of Category A (as defined in 4.3.2), when the transaction is confirmed by the end-user, the information defined in 4.1.3.2.2 shall be saved in the local memory of the parking terminal for local inspection by enforcement agent.

#### Functional test

Perform a transaction and check that the enforcement agent can get access to the stored information (as defined in 4.1.3.2.2) on the parking terminal by a method described in the manuals (4.8).

The terminal shall have the capacity to store a minimum of 100 active transactions for enforcement purpose. If the maximum transaction capacity is reached the terminal shall block next transactions.

#### Functional test

Perform transactions, check that 100 transactions can be viewed locally by the inspection staff. Perform transactions until the transactions memory is full then check that next transactions are blocked.

### 4.1.3.2.4 Online storage of transaction

#### Functional test
### Clause / subclause

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Verification method</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>4.1.3.3</strong> Receipt&lt;br&gt;In case of a ticketless transaction, an offer shall be made to the end-user to obtain a receipt or it shall be automatically issued. An offer made at the end of the transaction shall remain for at least five seconds.</td>
<td><strong>Functional test</strong>: At the end of a ticketless transaction, check that a receipt function is available for at least five seconds and that a receipt can be issued with the minimum required information.</td>
</tr>
<tr>
<td>The minimum information contained on the receipt shall be the following:&lt;br&gt;— amount paid (if applicable);&lt;br&gt;— parking expiry time and date (at least the month, day, hours and minutes);&lt;br&gt;— the information that makes it possible to identify the vehicle either the licence plate or parking space number;&lt;br&gt;— location of the parking terminal (identifier or address).</td>
<td>Check that a receipt can be issued with the minimum required information.</td>
</tr>
<tr>
<td>Where applicable, it shall be possible to add the following information:&lt;br&gt;— tariff category;&lt;br&gt;— unique transaction identifier;&lt;br&gt;— issuing date and time;&lt;br&gt;— tax mandatory information;&lt;br&gt;— parking authority or operator reference;&lt;br&gt;— licence plate number;&lt;br&gt;— space number;&lt;br&gt;— date and time of issue.</td>
<td>Configure the terminal with appropriate parameters to check that additional information can also be issued.</td>
</tr>
</tbody>
</table>

---

**Clause / subclause**

**Requirement**

For terminals belonging of Category B (as defined in 4.3.3), transactions completed by the end-users shall be transmitted to a centralised system to enable inspection by enforcement agent.

If online transmission is not possible the terminal shall offer one of the two following possibilities:

— the transaction shall be blocked, or
— the transactions shall be allowed and stored locally until transmission to the centralised system.

**Verification method**

After a transaction, check that this transaction can be viewed on the centralised system.

**Functional test**:<br>— disable the transmission;<br>— perform a transaction;<br>— check that the transaction has been blocked or has been registered locally;<br>— if transaction has been registered locally, re-enable connectivity and then check that this transaction can be viewed on the centralised system.
<table>
<thead>
<tr>
<th>Clause / subclause</th>
<th>Requirement</th>
<th>Verification method</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>4.1.4.3</strong></td>
<td><strong>Registration of parking transaction data, payment procedure</strong></td>
<td></td>
</tr>
<tr>
<td>4.1.4.3.1</td>
<td><strong>Parking session starts</strong></td>
<td></td>
</tr>
</tbody>
</table>
| a) Terminals without ticket | *When the parking session starts, a terminal shall transmit the data specified in 4.1.4.2.1 to a centralized system to enable online inspection for enforcement.* | Start a parking session and verify that:  
— licence plate number, and/or  
— space number, and/or  
— unique identifier;  
— parking start time (at least the month, day, hours and minutes);  
— user selected or maximum defined parking end time.  
Where applicable:  
— specific category of the user;  
— location of the parking terminal (identifier or address).  
Are stored in a centralized system. |
| b) Terminals with ticket | *When the parking session starts, a terminal shall print a ticket with the data specified in 4.1.4.2.1 to the end-user to be displayed in the vehicle for online inspection for enforcement.* | Start a parking session and verify that:  
— licence plate number, and/or  
— space number, and/or  
— unique identifier;  
— parking start time (at least the month, day, hours and minutes);  
— user selected or maximum defined parking end time.  
Where applicable:  
— specific category of the user;  
— location of the parking terminal (identifier or address).  
Are printed on a ticket to be displayed in the vehicle |
| 4.1.4.3.2 | **Parking session ends** | End a parking session, that already have been started, and verify:  
— licence plate number, and/or  
— space number, and/or  
— unique identifier;  
— parking start time (at least the month, day, hours and minutes);  
— user selected or maximum defined parking end time.  
Where applicable:  
— specific category of the user;  
— location of the parking terminal (identifier or address).  
Are transmitted to a centralized system. |
**4.1.4.2.2**

An offer to obtain a receipt containing the data in 4.1.4.2.2 shall be made to the end-user or the receipt shall be automatically issued. The offer shall remain for at least five seconds.

The offer shall contain:

- parking start time (at least the month, day, hours and minutes);
- parking end time (at least the month, day, hours and minutes);
- amount paid.

Where applicable:

- specific category of the user;
- unique transaction identifier;
- location of the parking terminal (identifier or address).

Are stored in a centralized system.

End a parking session that already have been started, and verify that an offer is made to the end-user or the receipt is automatically issued.

Verify that:

- licence plate number, and/or
- space number, and/or
- unique identifier;
- parking start time (at least the month, day, hours and minutes);
- parking end time (at least the month, day, hours and minutes);
- amount paid.

Where applicable:

- specific category of the user,
- unique transaction identifier and
- location of the parking terminal (identifier or address)

are contained in the receipt to the end-user.

When an offer is made verify that the offer remains for at least five seconds.

### 4.2 User interface

#### 4.2.1 Screen

To ensure that the information displayed on the main screen are legible, the minimum screen specification shall be as follows:

- **minimum size**: 5000 mm²;

- **minimum definition**: 16 ppc (pixels per centimetres), equivalent to 40 ppi (pixels per inch);

**Measurement**

Verify that the height (H) of the screen multiplied with the width (W) is at least 5000 mm² (H x W ≥ 5000 mm²).

**Measurement**

Refer to the technical data sheet of the supplier.
<table>
<thead>
<tr>
<th>Clause / subclause</th>
<th>Requirement</th>
<th>Verification method</th>
</tr>
</thead>
<tbody>
<tr>
<td>—</td>
<td>height of the capital letters and numbers = 6 mm (see 5.4, Accessibility for end-user);</td>
<td>Measurement See verification method 5.4.</td>
</tr>
</tbody>
</table>
| —                  | luminance contrast ratio \( (C_R) \) during day and night, from a standing and a seated position shall be equal or greater than \( C_{Rmin} = 1.5:1 \) according to Annex C, 4.2.1.2. | a) Day condition test method The day condition test shall be carried out according to procedure ISO 9241-305:2008, 6.7.3. \( C_R \) shall be calculated with the following formula with the value of vertical illuminance at the terminal of \( E = 500, 1000, 5000 \) and 10 000 lux. \[
C_R = \frac{L_H + \rho_{HD} E}{L_L + \rho_{LD} E} \quad (C1)
\]
<p>|                    |                | With: |
|                    |                | ( L_H ) is luminance at high level (white pattern) ((cd/m^2)) |
|                    |                | ( L_L ) is luminance at low level (black pattern) ((cd/m^2)) |
|                    |                | ( \rho_{HD} ) is reflection coefficient (diffuse) at high level |
|                    |                | ( \rho_{LD} ) is reflection coefficient (diffuse) at low level |
|                    |                | ( E ) is illuminance (diffuse) ((lux)) |
|                    |                | Calculate contrast ratio ((C_R)) for all luminance values and check that all results are greater or equal to 1,5:1. |
|                    |                | The observation angles used for luminance and reflection coefficient measurement shall be calculated for the following position: |
|                    |                | — Position P1 (average people): 1750 mm from the ground; |
|                    |                | — Position P2 (disabled people in a wheelchair): 1015 mm from the ground. |
|                    |                | NOTE P2 height of 1015 mm come from EN 301549: 2014, subclause 8.3.4. |
|                    |                | For both positions the horizontal distance is 500 mm between the front of the terminal and the front of the measurement tool |
|                    |                | b) Night condition test method The night condition test shall be carried out according to procedure ISO 9241-305:2008, 6.7.1. This is equivalent to day condition test method with ( E = 0 ) lux. |
|                    |                | c) Dimming For terminal equipped with a dynamic backlight adjustment mechanism (dimming) the measurement shall be performed with the backlight adjusted to the level it would have for illuminance level for each ( E ) value. It's the responsibility of the terminal manufacturer to provide |</p>
<table>
<thead>
<tr>
<th>Clause / subclause</th>
<th>Requirement</th>
<th>Verification method</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>4.2.2</strong></td>
<td><strong>Tickets and receipts</strong>&lt;br&gt;The terminal shall always be able to deliver a ticket/receipt.</td>
<td><strong>Visual inspection</strong>&lt;br&gt;Check that a printer is installed, or that the terminal has the capability to digitally transfer a receipt.</td>
</tr>
</tbody>
</table>
| **4.2.2** | When equipped with a printer, the terminal shall be able to deliver a ticket to the following specification:<br><br>d) **Ticket and receipt dimensions**<br>The minimum area of the ticket or receipt shall be 3 500 mm². The smallest dimension shall be minimum of 50 mm;<br><br>e) **Ticket legibility for Pay and Display mode**<br>To be legible in daylight with normal or corrected vision:<br>1) the minimum size of text:<br>— for parking expiry date and time height of capital letters and numbers = 6 mm;<br>— for other information required for enforcement height of capital letters and numbers = 4 mm;<br>2) for short term tickets: the color contrast ratio of the information printed shall remain above 4,5:1 for a minimum of 2 days behind the windscreen;<br>3) for long term tickets: the color contrast ratio of the information printed shall remain above 4,5:1 for a minimum of 30 days behind the windscreen;<br><br>f) **Paper characteristics for ticket and receipt**<br>The terminal supplier shall provide references for short term and long term tickets compliant to above and the following specification:<br>1) minimum thickness of 60 μm;<br>2) minimum width of 50 mm. | **Functional test**<br>a) Check that the paper referenced by the terminal supplier complies with the minimum thickness and width.<br>b) Print one ticket on this paper and check the minimum length and area.<br>c) Verify legibility.<br>Compare the ticket text and background colour with a Separation Grayscale card with 20 steps in 0,10 density increments between 0,0 [white] and a practical printing black of 1,90 density. Found the nearest density for both text and background.<br>Convert background and text grey level number to relative luminance (same as WCAG 2.0 Contrast):

\[
sRGB = \frac{19-Gn}{19},
\]

where

\[
Gn = \text{Grayscale card number (between 0 and 19)}
\]

if \( sRGB \leq 0.03928 \) then

\[
L = sRGB/12.92
\]

else

\[
L = \frac{(sRGB+0.055)/1.055)}{2.4}
\]

Compute colour contrast ratio using the following formula (same as WCAG 2.0 Contrast):

\[
(L1 + 0.05) / (L2 + 0.05),
\]

where

\[
L1 = \text{the relative luminance of the lighter of the colours,}
\]

\[
L2 = \text{the relative luminance of the darker of the colours.}
\]

Check that colour contrast ratio is greater than 4,5:1 |
| **4.2.3** | **Transaction confirmation function** | |
### Clause / subclause

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Verification method</th>
</tr>
</thead>
<tbody>
<tr>
<td>The parking terminal shall include a mechanism to confirm the transaction:</td>
<td><strong>Functional test</strong></td>
</tr>
<tr>
<td>— by the end-user, with a button as described in 4.2.3.6, Labels, legends and button colours,</td>
<td>a) Perform necessary actions to obtain the right to park without reaching the maximum amount or confirming the transaction.</td>
</tr>
<tr>
<td>— or as an option, automatically when the maximum amount is reached.</td>
<td>b) Verify that the option to confirm the actual transaction is represented by a green button with a symbol according to 4.2.3.6.</td>
</tr>
<tr>
<td></td>
<td>c) Verify that the transaction is confirmed when pressing the confirmation button.</td>
</tr>
<tr>
<td><strong>4.2.4</strong> Transaction cancellation function</td>
<td><strong>Functional test (cancellation by user)</strong></td>
</tr>
<tr>
<td>The parking terminal shall include a mechanism to cancel the transaction:</td>
<td>a) Perform necessary actions to obtain the right to park without reaching the maximum amount or confirming the transaction.</td>
</tr>
<tr>
<td>— by the end-user, with a red button, also identified with legend and symbol described in 4.2.3.6. In this case, the amount paid shall be refunded to the end-user;</td>
<td>b) Verify that the option to cancel the transaction is represented by a red button with a symbol according to 4.2.3.5.</td>
</tr>
<tr>
<td>— or automatically after a time-delay. In this case the amount paid shall be refunded.</td>
<td>c) Verify that the transaction is cancelled when pressing the cancellation button.</td>
</tr>
<tr>
<td>The information that the transaction is cancelled shall be displayed to the end-user for at least three seconds.</td>
<td>d) Verify that the information that the transaction is cancelled is displayed for at least three seconds after pressing the cancellation button.</td>
</tr>
<tr>
<td>The refund process is specified for each payment mean in the corresponding section.</td>
<td><strong>Functional test (automatic cancellation)</strong></td>
</tr>
<tr>
<td></td>
<td>a) Perform necessary actions to obtain a right to park from the terminal, without reaching the maximum amount or confirming the transaction.</td>
</tr>
<tr>
<td></td>
<td>b) When reaching the step for confirmation or cancelation, verify that an automatic cancelation of the transaction is performed after the programmed time-delay.</td>
</tr>
<tr>
<td></td>
<td>c) Verify that the information “transaction cancelled” is displayed for at least three seconds after pressing the cancelation button.</td>
</tr>
<tr>
<td><strong>4.2.5</strong> Tariff selection</td>
<td><strong>Functional test</strong></td>
</tr>
<tr>
<td>If applicable, the parking terminal shall include the capability to select tariffs activated by the end-user, which indicates, by display and before any transaction, the specific tariff (e.g. resident tariff).</td>
<td>a) If the terminal is provided with the capability to select tariffs:</td>
</tr>
<tr>
<td></td>
<td>1) perform necessary actions according to the supplier to activate tariff selection for end-users;</td>
</tr>
<tr>
<td></td>
<td>2) verify that a transaction is possible to perform using each of the available tariffs.</td>
</tr>
<tr>
<td>Clause / subclause</td>
<td>Requirement</td>
</tr>
<tr>
<td>-------------------</td>
<td>-------------</td>
</tr>
<tr>
<td>4.2.6</td>
<td><strong>Physical keyboard</strong></td>
</tr>
<tr>
<td></td>
<td><em>All following requirements do not apply to keyboards dedicated to pin entry for electronic means of payments. If a physical alphanumeric keyboard is present for data entry or for terminals supplied in pay by plate / space mode the keypad shall maintain a luminance contrast ratio ((C_R)) during day and night, from a standing and a seated position shall be equal or greater than (C_{Rmin} = 1.5:1).</em>&lt;br&gt;When the terminal is waiting for a user input, any valid action taken by the end-user with the buttons and keypads, the end-user shall receive a response within one second. The response shall take the form of a mechanical, sound and/or visual form.</td>
</tr>
<tr>
<td>4.2.7</td>
<td><strong>Screen standby mode</strong></td>
</tr>
<tr>
<td></td>
<td><em>If the terminal has a standby mode (to save power) which results in the screen being switched off (completely or in part) after an idle period, the screen shall be reactivated within one second by a coin or token insertion, when the terminal accepts coins or tokens, and by at least one of the following actions:</em>&lt;br&gt;— pressing the wake-up button;&lt;br&gt;— pressing the confirmation button;&lt;br&gt;— pressing the touchscreen;&lt;br&gt;— an automatic detection of the user.&lt;br&gt;A permanent instruction shall explain this wake-up process.</td>
</tr>
<tr>
<td></td>
<td><em>When a parking terminal is in standby mode, this shall be shown to the user:</em>&lt;br&gt;— either by displaying the time&lt;br&gt;— or by a dynamic visual indicator which is not a red-coloured lamp.</td>
</tr>
<tr>
<td>Clause / subclause</td>
<td>Requirement</td>
</tr>
<tr>
<td>-------------------</td>
<td>-------------</td>
</tr>
</tbody>
</table>
| **4.2.8** Parking terminal visibility | *The parking terminal height shall be a minimum 1,40 m.*  
*The height shall allow integration of two or more P-signs, with a minimum height of 130 mm, on opposite sides.* | **Measurement**  
Verify that the terminal including any attached extensions:  
a) is at least 1,40 m high;  
b) can integrate two P-signs, with a minimum height of 130 mm, on two opposite sides. |
| **4.2.9** Out of service and out of order | *When a parking terminal is out of service or out of order this shall be shown to the end-user on the parking terminal's interface(s) at a minimum by a red-coloured lamp confirming the status.  
In both situations, the parking terminal shall not accept payment or deliver any rights to park.* | **Functional test/Visual inspection**  
**Out of order**  
a) Perform necessary actions to set the terminal in out of order mode.  
b) Verify that the out of order mode is indicated as a minimum by a red-coloured lamp confirming the status.  
c) Verify that:  
   — Coins nor tokens cannot be inserted or are returned when inserted;  
   — Banknotes cannot be inserted or are returned when inserted;  
   — No purchase is possible to perform.  
**Out of service**  
a) Perform necessary actions to set the terminal in out of service mode.  
b) Verify that the out of service mode is indicated as a minimum by a red-coloured lamp confirming the status.  
c) Verify that:  
   — Coins nor tokens cannot be inserted or are returned when inserted;  
   — Banknotes cannot be inserted or are returned when inserted;  
   — No purchase is possible to perform.  
Open service compartment and check that payment is impossible and delivery of right to park is not possible.  
Open cash safe compartment and check that payment is impossible and delivery of right to park is not possible. |
| **4.2.10** Languages | *At the start of the transaction, the user interface shall begin with the default language and if applicable the end-user shall be able to select a language out of those available on the terminal.* | **Functional test**  
If multiple languages are provided:  
a) verify that it is possible to change language at the beginning of a transaction; |
<table>
<thead>
<tr>
<th>Clause / subclause</th>
<th>Requirement</th>
<th>Verification method</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.2.11.1</td>
<td>Current time display&lt;br&gt;At the start of the transaction, the terminal shall display the current time.&lt;br&gt;The current time displayed shall be rounded down to the nearest minute on the internal clock of the device.&lt;br&gt;Hours and minutes shall be displayed.</td>
<td>Visual inspection:&lt;br&gt;Verify that the terminal is displaying the current time with at least hours and minutes at the beginning of a transaction</td>
</tr>
<tr>
<td>4.2.11.2</td>
<td>Amount&lt;br&gt;a) Pay and Display and Pay and Go modes&lt;br&gt;The parking terminal shall display the value of the incrementing payments or the value of the selected parking end time until the transaction is confirmed.</td>
<td>Functional test&lt;br&gt;a) Start a transaction.&lt;br&gt;b) Increase the expiry time once by payment means or tariff selection.&lt;br&gt;c) Verify that the value of the incrementing payment is displayed.&lt;br&gt;d) Increase the expiry time once more by payment means or tariff selection.&lt;br&gt;e) Verify that the total value of the incrementing payments is displayed.&lt;br&gt;f) Perform necessary actions to confirm the transaction.&lt;br&gt;g) Verify that the total value of the incrementing payments or product value is displayed until the transaction is confirmed.&lt;br&gt;b) Pay on departure&lt;br&gt;When the user starts parking session, the parking terminal shall display the value for the selected parking end time or the value for the maximum allowed parking end time.&lt;br&gt;When the user ends parking session, the parking terminal shall display the value of the parking session.</td>
</tr>
<tr>
<td>4.2.11.3</td>
<td>End parking time&lt;br&gt;The parking terminal shall display the parking expiry time and date either by direct selection or as payment reaches each time or payment step, until the transaction is confirmed.&lt;br&gt;That parking expiry time and date displayed on the screen when the end-user confirms the transaction shall be identical to the expiry</td>
<td>Functional test&lt;br&gt;a) Start a transaction.&lt;br&gt;b) Increase the expiry time once.&lt;br&gt;c) Verify that the expiry time of the incrementing payment is displayed.&lt;br&gt;d) Increase the expiry time once more.&lt;br&gt;e) Verify that the expiry time of the incrementing payments is displayed.</td>
</tr>
<tr>
<td>Clause / subclause</td>
<td>Requirement</td>
<td>Verification method</td>
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</table>
|                   | time and date printed on the ticket or saved in the centralised system. | f) Perform necessary actions to confirm the transaction.  
g) Verify that the expiry time of the incrementing payments is displayed until the transaction is confirmed.  
h) If applicable, verify that the expiry time and date on the ticket are identical to the displayed details.  
i) If applicable, verify that the expiry time and date in the centralised system are identical to the displayed details. |
| 4.2.12            | Parking time calculation  
The calculation of the duration of the parking period starts at the beginning of the transaction. | Functional test:  
a) Start a transaction.  
Note the time displayed at the terminal and current tariff when beginning the transaction.  
b) Carry out a process to remain in the transaction.  
c) Complete the transaction (and a receipt if Pay & Go terminal).  
d) Verify that the expiry time printed on the ticket/receipt is calculated from the time displayed at the terminal in the beginning of the transaction, according to the amount paid, based on the current tariff when beginning the transaction. |
| 4.2.13            | Labels, legends and button colours  
The means of payment shall be represented by coins, tokens, banknotes, electronic means of payment, icons or legends as appropriate.  
The buttons legend and colour presented in the Table 1 shall be used (if corresponding features are available). | Visual inspection  
Verify that all means of payment available are identified / provided.  

**Functional test/Visual inspection**  
a) If the terminal is provided with a “back space” button, verify that it has the colour and legend according to Table 1.  
b) If the terminal is provided with an alphanumeric keyboard:  
1) perform necessary actions to reach a situation where the keyboard is required or possible to use, according to the supplier;  
2) verify that any available “back space” button has the colour and legend according to Table 1.  
c) If the terminal is provided with a ”Wake-up“ button, verify that it has the colour and legend according to Table 1.  
See 4.2.3 for verification of “Confirm” and 4.2.4 for verification of “Cancel” |
|                   | When buttons are displayed on colour screen, colour contrast is specified in 4.2.1.  
When buttons are displayed on monochrome screen, at least the button legend shall be used.  
Minimum height of legends 6 mm. | According to 4.2.1.  
Check that the button legend are used.  
Measure minimum height of each legend is 6 mm. |
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<thead>
<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>4.3</td>
<td>Connectivity of the parking terminal</td>
<td>Check which category the terminal has been attributed, to determine which following tests to apply.</td>
</tr>
<tr>
<td>4.3.1</td>
<td>General</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Any configuration of parking terminal that complies with this document shall be attributable to one of the following categories: A, B1, B2, or B3.</td>
<td></td>
</tr>
<tr>
<td>4.3.2</td>
<td>Category A – not connected parking terminal</td>
<td>[Only if the terminal is attributed to category A]&lt;br&gt;&lt;br&gt;<strong>Functional test</strong>&lt;br&gt;Check that no communication device is installed or that any pre-installed device is not operable. Check that a transaction using cash, tokens or private card can be performed successfully.</td>
</tr>
<tr>
<td>4.3.3</td>
<td>Category B – Connected parking terminal</td>
<td>[Only if the terminal is attributed to sub-category B1, B2, or B3]&lt;br&gt;&lt;br&gt;<strong>Functional test</strong>&lt;br&gt;Check that a communication device is installed.&lt;br&gt;For the following tests, connection to the central system provided by the terminal supplier is used.</td>
</tr>
<tr>
<td>4.3.3.1</td>
<td>General</td>
<td>[Only if the terminal is attributed to sub-category B1]&lt;br&gt;&lt;br&gt;<strong>Functional test</strong>&lt;br&gt;One of the 2 following tests shall be successfully completed:&lt;br&gt;a) Configure the centralised system to obtain the right to park.&lt;br&gt;b) Perform a transaction at the terminal.&lt;br&gt;c) Check the right to park can be obtained.</td>
</tr>
<tr>
<td>4.3.3.2</td>
<td>Sub-category B1 – Offline parking rights</td>
<td>[Only if the terminal is attributed to sub-category B1]&lt;br&gt;&lt;br&gt;<strong>Functional test</strong>&lt;br&gt;Render the communication device inactive.&lt;br&gt;Check that the transaction using cash, tokens or private card can be done successfully without any communication attempt.&lt;br&gt;Note The tests for 4.5.2, 4.6.4, and 4.7 test specifically the requirements linked to connectivity.</td>
</tr>
<tr>
<td>4.3.3.3</td>
<td>Sub-category B2 – Online parking rights</td>
<td>[Only if the terminal is attributed to sub-category B2]&lt;br&gt;&lt;br&gt;<strong>Functional test</strong>&lt;br&gt;One of the 2 following tests shall be successfully completed:&lt;br&gt;Test 1&lt;br&gt;a) Configure the centralised system to obtain the right to park.&lt;br&gt;b) Perform a transaction at the terminal.&lt;br&gt;c) Check the right to park can be obtained.</td>
</tr>
<tr>
<td>Clause / subclause</td>
<td>Requirement</td>
<td>Verification method</td>
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<td></td>
<td></td>
<td>d) Configure the centralised system to prevent the right to park.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>e) Perform a transaction at the terminal.</td>
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<td></td>
<td></td>
<td>f) Check that the right to park cannot be obtained.</td>
</tr>
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<td></td>
<td></td>
<td>Test 2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>a) Perform a transaction at the terminal.</td>
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<tr>
<td></td>
<td></td>
<td>b) In the centralised system, check that the performed transaction is stored.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>NOTE The tests for 4.5.2, 4.6.4, and 4.7 test specifically the requirements linked to connectivity.</td>
</tr>
<tr>
<td>4.3.3.4</td>
<td>Sub-category B3 – Fully remote controlled sequence</td>
<td></td>
</tr>
<tr>
<td></td>
<td>The terminal's design is based on fully remote controlled behaviour.</td>
<td>[Only if the terminal is attributed to sub-category B3]</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Functional test</td>
</tr>
<tr>
<td></td>
<td></td>
<td>When online verification is required as part of the transaction, check that an indication that the transaction is in progress is displayed to the end-user on the screen.</td>
</tr>
<tr>
<td>4.4</td>
<td>Payment means</td>
<td></td>
</tr>
<tr>
<td>4.4.1</td>
<td>General</td>
<td></td>
</tr>
<tr>
<td></td>
<td>The requirements defined in 4.4 only apply to parking terminals accepting one or more of the following types of payment:</td>
<td></td>
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<tr>
<td></td>
<td>— coins and/or banknotes;</td>
<td></td>
</tr>
<tr>
<td></td>
<td>— tokens.</td>
<td></td>
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<tr>
<td></td>
<td>— electronic means of payment</td>
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<tr>
<td></td>
<td>It shall be possible to accept overpayment only for cash payments.</td>
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<tr>
<td></td>
<td></td>
<td>The following test procedures apply only to terminals with payments.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>If the terminal is configured to accept cash: coins and/or banknotes</td>
</tr>
<tr>
<td></td>
<td></td>
<td>a) perform necessary actions to set overpayment allowance;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>b) insert cash greater than maximum tariff;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>c) verify transaction is completed;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>d) verify total payment value is registered and/or printed on ticket.</td>
</tr>
<tr>
<td>4.4.2</td>
<td>Various payment means</td>
<td></td>
</tr>
<tr>
<td>4.4.2.1</td>
<td>Token transactions</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Tokens, recognised by the coin validator, shall be accepted to the configured value (in time or amount).</td>
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<tr>
<td></td>
<td></td>
<td>Perform a transaction by inserting a token into the coin entry point.</td>
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<td></td>
<td></td>
<td>Check on the display and ticket or receipt that the value is as configured.</td>
</tr>
<tr>
<td>Clause / subclause</td>
<td>Requirement</td>
<td>Verification method</td>
</tr>
<tr>
<td>-------------------</td>
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</tr>
<tr>
<td></td>
<td>The terminal shall not accept further tokens when maximum amount defined by selected tariff is already reached.</td>
<td>Insert the maximum amount defined by the selected tariff and check that you cannot insert a new token or that it is directly returned.</td>
</tr>
<tr>
<td></td>
<td>The terminal shall not accept token if: — the coin cashbox is not correctly inserted when applicable — the cash safe compartment is not closed and locked.</td>
<td>— Remove the coin cashbox when applicable and check that you cannot insert a token or that it is directly returned. — Open or unlock the cash safe compartment and check that you cannot insert a token or that it is directly returned.</td>
</tr>
<tr>
<td>4.4.2.2 Coin transactions</td>
<td>The terminal shall accept coins according to the configuration. A terminal with coin acceptance shall have an escrow device. The coins inserted shall be returned upon cancellation. The coins inserted shall be transferred immediately to the cash box upon transaction confirmation.</td>
<td>— Insert each type of coin (valid according to the configuration) and check the acceptance to the corresponding incremented value on the display is correct. — Cancel the transaction and check that all inserted coins are returned to the end-user by escrow device. — Perform a new transaction with coins, validate the transaction. Perform a cashbox collection and check that the inserted coins are inside.</td>
</tr>
<tr>
<td></td>
<td>The terminal shall not accept further coins when maximum amount defined by selected tariff is already reached.</td>
<td>Insert the maximum amount defined by the selected tariff and check that you cannot insert a new coin or that it is directly returned.</td>
</tr>
<tr>
<td></td>
<td>The terminal shall not accept coin payment if: — the removable coin cashbox is not correctly inserted, when applicable — the cash safe compartment is not closed and locked.</td>
<td>— Remove the coin cashbox when applicable and check that you cannot insert a coin or that it is directly returned. — Open or unlock the cash safe compartment and check that you cannot insert a coin or that it is directly returned.</td>
</tr>
<tr>
<td>4.4.2.3 Banknote transactions</td>
<td>The terminal shall accept banknotes according to the configuration. Banknote acceptance can be provided with or without an escrow function. — With an escrow: returns the original banknotes to the end-user when a cancellation request has been made. — Without an escrow: When a cancellation request is made, a terminal without an escrow function shall issue a credit note for the value of the banknote(s) that cannot be returned. The minimum information contained on the credit note shall be the following: — value of the notes inserted and not returned by the terminal; — date and time; — location of the parking terminal (identifier or address); — redemption procedure.</td>
<td>Insert each type of banknote (valid according to the configuration) and check the acceptance to the corresponding incremented value on the display is correct. Cancel the transaction and check that one of the following is met: — all inserted banknotes are returned to the end-user by escrow device; — a credit note is printed containing the minimum information. Check the presence of the minimum information on the credit note issued.</td>
</tr>
<tr>
<td>Clause / subclause</td>
<td>Requirement</td>
<td>Verification method</td>
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</tr>
<tr>
<td>Clause / subclause</td>
<td>Requirement</td>
<td>Verification method</td>
</tr>
<tr>
<td></td>
<td>The terminal shall not accept further banknotes when maximum amount defined by selected tariff is already reached.</td>
<td>Insert the maximum amount defined by the selected tariff and check that you cannot insert a new banknote or that it is directly returned.</td>
</tr>
<tr>
<td></td>
<td>The terminal shall not accept banknote payment if:</td>
<td>— Remove the banknote cashbox and check that you cannot insert a banknote or that it is directly returned.</td>
</tr>
<tr>
<td></td>
<td>— the banknote cashbox is not correctly inserted;</td>
<td>— Open or unlock the cash safe compartment and check that you cannot insert a banknote or that it is directly returned.</td>
</tr>
<tr>
<td></td>
<td>— the cash safe compartment is not closed and locked.</td>
<td></td>
</tr>
<tr>
<td>4.4.2.4</td>
<td>Electronic means of payment</td>
<td></td>
</tr>
<tr>
<td>If an ePurse and/or private card is accepted, the card issuers requirements shall be adhered to.</td>
<td>Check the validity of the certificate of conformity delivered by the issuers of all accepted ePurses or private card.</td>
<td></td>
</tr>
<tr>
<td>If a debit or credit card based payment is accepted, national / regional card issuers and financial and / or industry standards shall be adhered to.</td>
<td>Check the validity of the certificate of conformity delivered by the national / regional card issuers and financial and / or industry standards.</td>
<td></td>
</tr>
<tr>
<td>4.4.3</td>
<td>Confirmation and acceptance of payment</td>
<td>Functional test</td>
</tr>
<tr>
<td>During the period between confirmation of the transaction and delivery of parking rights:</td>
<td>a) Perform necessary actions to pay.</td>
<td></td>
</tr>
<tr>
<td>— any additional cash or token inserted shall be returned directly to the user or insertion shall be prevented.</td>
<td>b) Confirm the transaction.</td>
<td></td>
</tr>
<tr>
<td>c) Between the time of the confirmation and the issuing of the right to park, confirmed to the end-user on the display, try to insert cash or token.</td>
<td>d) Verify that the cash or token cannot be inserted or is directly returned.</td>
<td></td>
</tr>
<tr>
<td>During the period between confirmation of the transaction and delivery of parking rights:</td>
<td>Functional test</td>
<td></td>
</tr>
<tr>
<td>— any additional charge against an electronic means of payment shall not be possible.</td>
<td>a) Perform necessary actions to pay with an electronic means of payment.</td>
<td></td>
</tr>
<tr>
<td>b) Confirm the transaction.</td>
<td>c) Between the time of the confirmation and the issuing of the right to park, any additional charge against an electronic means of payment shall not be possible.</td>
<td></td>
</tr>
<tr>
<td>4.4.4</td>
<td>Collection systems</td>
<td>Functional test</td>
</tr>
<tr>
<td>4.4.4.1</td>
<td>Collection of physical payments (coins, banknotes and/or tokens)</td>
<td>a) Perform necessary actions to change settings for the terminal so that the operator receives an option to obtain detailed information of revenue per means of payment.</td>
</tr>
<tr>
<td>The parking terminal shall be able to provide a detailed information of revenue per means of payment collected, on a printed ticket and / or sent to central system. Each means of payment collected shall be accounted for separately:</td>
<td>b) For each group of physical payment means possible to collect separately:</td>
<td></td>
</tr>
<tr>
<td>— the number of tokens;</td>
<td>1) Perform necessary actions to start a collection of the selected group of physical payment means;</td>
<td></td>
</tr>
</tbody>
</table>
### Clause / subclause | Requirement | Verification method
--- | --- | ---
 | — the number of each type of coins; — the total value of coins per currency; — the number of each type of banknotes; — the total value of banknotes per currency; — the total value of credit notes issued. | 2) Verify that the detailed information of revenue contains minimum information required for the selected group of physical payment means; 3) Verify that the detailed information of revenue is printed on a ticket and/or sent to central system. |
 | The collection agent shall not have direct access to the content of the cash boxes or collection boxes. | Functional/Technical test  
For each group of physical payment means possible to collect separately: Perform a collection and verify that the collection agent does not have access to the collected payments in the cashboxes or collection boxes |
 | The stored means of payments shall not be accessible only by a single tool, key or manoeuvre. | Technical test  
For each group of physical payment means stored in separate cashboxes: Perform a collection and verify that the collection agent does not have access to the collected payments with the provided tool, key or manoeuvre |
 | The terminal shall allow for a revenue collection by one of the following methods:  
a) direct collection of cash and/or tokens stored in a built-in cashbox with transfer into a collection box. After collection of the cash, the cashbox shall be automatically closed and locked. The collection box itself shall be locked;  
b) collection of a removable cashbox. Upon removal, the cashbox shall be automatically closed and locked. | Perform a collection and check that, at any time during this process, and by using only the provided tool, key or manoeuvre it is not possible to remove any coin or any banknote by hand, from either the cashbox or the collection box. |

### 4.4.4.2 Collection of electronic means of payment
Electronic means of payments issuer standards shall be complied with.

Perform a collection and check that, at any time during this process, and by using only the provided tool, key or manoeuvre it is not possible to remove any coin or any banknote by hand, from either the cashbox or the collection box.

Check the validity of the certificate of conformity delivered by the issuer of the electronic means of payment.

### 4.5 Upgrade capability

#### 4.5.1 Software configuration

The software of the terminal shall be configurable to adjust at least the following features:
— means of payment acceptance;
— cash and currency acceptance;
— value (in time or amount) of tokens;
— tariff;
— tickets or receipts layout;

- Configure the terminal to accept each means of payment available. Check that these means of payment are accepted.
- Perform a transaction with the current configuration.
- Change the configuration. Check that the terminal reacts according to the newly configured features.
- Change configuration of tariff.
- Perform a transaction and check that the tariff has changed.
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<tr>
<th>Clause / subclause</th>
<th>Requirement</th>
<th>Verification method</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.5.2</td>
<td>Software updates</td>
<td>It shall be possible to identify the running software version. The embedded software of the mainboard of the terminal shall be capable of being updated locally at the terminal and/or remotely if the terminal is connected (category B according to 4.3.3).</td>
</tr>
<tr>
<td></td>
<td></td>
<td>f) Change configuration of tickets or receipts layout</td>
</tr>
<tr>
<td></td>
<td></td>
<td>g) Perform a transaction and check that ticket or receipts layout has changed.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>h) Change an instructional messages</td>
</tr>
<tr>
<td></td>
<td></td>
<td>i) Perform a transaction and check that the instructional message has changed.</td>
</tr>
<tr>
<td>4.6</td>
<td>Management at the terminal</td>
<td>4.6.1 Display of warnings (impending out of order situation)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>When an event is impending or an incident is liable to cause a terminal failure after a given time period, this information, intended for the operator, shall be shown to authorized personnel. This behaviour is only required for a standalone terminal (category A according to 4.3.2).</td>
</tr>
<tr>
<td></td>
<td></td>
<td>— For a standalone terminal (category A) generate an impending out of service situation (i.e. paper capacity warning).</td>
</tr>
<tr>
<td></td>
<td></td>
<td>— Access to the terminal using the authorized personnel procedure. Check that the terminal shows the warnings to the authorized personnel.</td>
</tr>
<tr>
<td>4.6.2</td>
<td>Ease of maintenance</td>
<td>The different consumables (e.g. battery, lamps, tickets) and sub-assemblies (e.g. electronic boards, printers, coin validator) shall be easy to reach and exchanged on site without the use of proprietary tools and without possibility of incorrect fitting. The supplier shall provide maintenance and operation manuals and a preventive maintenance schedule (as described in 4.8).</td>
</tr>
<tr>
<td></td>
<td></td>
<td>With the sub-assemblies in place, verify that there is only one mechanical position to connect each accessible built-in cable or that they are clearly marked.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Verify that no proprietary tools are needed to exchange consumables and sub-assemblies. Manuals are tested according to Table C.2, 4.8.</td>
</tr>
<tr>
<td>4.6.3</td>
<td>Secured access to maintenance actions</td>
<td>The terminal shall be secured to prevent unauthorised access to software and hardware maintenance actions.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Check that the access to software and hardware maintenance action require security element and process (key, access code...) as described in the maintenance manual provided (4.8).</td>
</tr>
<tr>
<td>4.6.4</td>
<td>Storage of operating and management data</td>
<td>If not sent or managed by a centralised system (as explained in 4.3), the following management and operating data shall be stored within the terminal and shall be printed or displayed or exported to external media:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>— cumulative revenue;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>If not send or managed by a central system, check that the terminal is able to print or display or export to external media a report of cumulative revenue, last collection, revenue held, terminal identification and terminal configuration and events occurred in the terminal.</td>
</tr>
<tr>
<td>Clause / subclause</td>
<td>Requirement</td>
<td>Verification method</td>
</tr>
<tr>
<td>--------------------</td>
<td>-----------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td></td>
<td>— last collection;</td>
<td>a) Initialize the machine to a zero collection status.</td>
</tr>
<tr>
<td></td>
<td>— revenue held in the terminal;</td>
<td>b) Perform a minimum of one transaction with coins and one for electronic means.</td>
</tr>
<tr>
<td></td>
<td>— terminal identification;</td>
<td>c) Check the revenue amount. The status shall reflect the previously performed transactions.</td>
</tr>
<tr>
<td></td>
<td>— terminal configuration or functional parameters;</td>
<td>d) Perform a collection for all means of payments and check that the collections reflect the performed transactions.</td>
</tr>
<tr>
<td></td>
<td>— operational and maintenance events that have occurred on the terminal.</td>
<td>e) Check that the records of transactions made by electronic means of payment allows reconciliation with information provided by the electronic means of payment issuer.</td>
</tr>
<tr>
<td></td>
<td>In the case of a terminal which accepts several means of payment, the cumulative revenue shall be available for each of these means.</td>
<td></td>
</tr>
<tr>
<td>4.6.5</td>
<td><strong>Verification of revenue held</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>The terminal shall include a function whereby the operator can check the amount of physical payments held in the terminal (cash and/or tokens).</td>
<td>a) Initialize the machine to a zero collection status.</td>
</tr>
<tr>
<td></td>
<td>If not sent or managed by the central system, the electronic revenue collected (and the accumulative total since the last collection) shall be available from the terminal.</td>
<td>b) Perform a minimum of one transaction with coins and one for electronic means.</td>
</tr>
<tr>
<td></td>
<td>Record of transactions made by electronic means of payment shall be capable of reconciliation separately.</td>
<td>c) Check the revenue amount. The status shall reflect the previously performed transactions.</td>
</tr>
<tr>
<td>4.7</td>
<td><strong>Remote management and reporting</strong></td>
<td>d) Perform a collection for all means of payments and check that the collections reflect the performed transactions.</td>
</tr>
<tr>
<td>4.7.2</td>
<td><strong>On line status and events monitoring</strong></td>
<td>e) Check that the records of transactions made by electronic means of payment allows reconciliation with information provided by the electronic means of payment issuer.</td>
</tr>
<tr>
<td></td>
<td>The terminal shall communicate their status to a centralised system. In the event of a status change the centralised system shall be notified.</td>
<td>Voluntarily instigate each defect or event listed and check on the centralised system the beginning and end of alarm.</td>
</tr>
<tr>
<td></td>
<td>Status information shall provide as a minimum:</td>
<td>Check also that alarms contain the right information about the event and the correct date and time.</td>
</tr>
<tr>
<td></td>
<td>— the date and time of the status:</td>
<td>Each event shall be instigated one at a time and not combined.</td>
</tr>
<tr>
<td></td>
<td>— information to identify the status.</td>
<td>Disconnect the network, instigate one of the event and restore communication capability.</td>
</tr>
<tr>
<td></td>
<td>In case of communication failure, the status alert shall be sent within thirty minutes after the communication has been restored.</td>
<td>Check on the centralised system the alarms (using same criteria as before).</td>
</tr>
<tr>
<td></td>
<td>These status alerts are, but not limited to:</td>
<td>The maximum allowed delay between the return of communication capability and the alarm received on the centralised system shall not exceed 30 minutes.</td>
</tr>
<tr>
<td></td>
<td>— out of paper;</td>
<td></td>
</tr>
<tr>
<td></td>
<td>— paper stock low;</td>
<td></td>
</tr>
<tr>
<td></td>
<td>— cash-box full;</td>
<td></td>
</tr>
<tr>
<td></td>
<td>— cash-box level warning;</td>
<td></td>
</tr>
<tr>
<td></td>
<td>— terminal out of order;</td>
<td></td>
</tr>
<tr>
<td></td>
<td>— power supply battery level low;</td>
<td></td>
</tr>
<tr>
<td></td>
<td>— payment type out of order (one alert for each payment type).</td>
<td></td>
</tr>
<tr>
<td>Clause / subclause</td>
<td>Requirement</td>
<td>Verification method</td>
</tr>
<tr>
<td>--------------------</td>
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</tr>
</tbody>
</table>
| **4.7.3 Data for statistics** | The terminal shall be capable of sending relevant maintenance events. These events are, but not limited to:  
— opening / closing of the door(s).  
— cash and/or token collection. | Do at least one transaction of each type supported by the terminal and then do a collect. After the transmission of the statistics and reconciliation data check in the centralised system that all the relevant information, as specified, are available and correct. |
| **4.7.4 Remote configuration** | A connected terminal shall permit remote configuration of the following:  
— Disable/Enable out of service of the complete terminal  
— Disable/Enable out of service of the payment means (by each one) included in the terminal  
— Applicable tariff. | a) Change the tariff configuration.  
b) Configure and out of service of the terminal and check that the terminal is out of service, purchase of new right to park is not possible.  
c) Re-configure the terminal to be on-service, and check that a purchase of new right to park is possible.  
d) After transmitting the data make sufficient transactions to ensure that the tariff is the correct one.  
e) Disable one payment type. |
<table>
<thead>
<tr>
<th>Clause / subclause</th>
<th>Requirement</th>
<th>Verification method</th>
</tr>
</thead>
</table>
| 4.8 Manuals       | The manuals shall contain information and, when applicable, illustrations on:  
|                   | — Ticket replenishment process;  
|                   | — Test procedures for standalone terminals;  
|                   | — Process for local inspection by enforcement agent if Category A with Pay & Go mode (local storage of transaction);  
|                   | — Instructions to configure all the software features provided in 4.5.1;  
|                   | — How the collection of cash/or token shall be undertaken as required by 4.4.4.1;  
|                   | — Instructions to access to maintenance areas of the terminal as required by 4.6.2;  
|                   | — Preventive maintenance schedule;  
|                   | — Instructions to perform preventive and corrective actions in case of terminal failure or vandalism;  
|                   | — Electrical safety instructions for mains machines  
|                   | — Installation instructions. | Check that the requested information are in the manuals. |
| 5 Technical requirements | | |
| 5.1 Safety | | |
| 5.1.1 Electrical safety | If the terminal is powered by mains electricity, it shall be protected by a residual current operated circuit breaker compliant with the EN 61009-1 type A as a minimum.  
The terminal shall provide a protection index IK09 according to EN 62262 (pendulum hammer) | If the terminal is powered by main electricity, perform a visual check of the presence of residual current circuit breaker compliant with the EN 61009-1.  
Verify IK09 according to EN 62262. |
| 5.1.2 Ingress protection (dust, water, and foreign objects) | All the equipment shall provide a protection index IP24D according to the EN 60529  
The mains supply part shall be in a compartment providing a protection index IP54. | According to EN 60529. |
<table>
<thead>
<tr>
<th>Clause / subclause</th>
<th>Requirement</th>
<th>Verification method</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.2</td>
<td>Operating capacity</td>
<td></td>
</tr>
<tr>
<td>5.2.1</td>
<td>Ticket stock</td>
<td>The minimum ticket capacity of the terminal shall be 3000 tickets as defined in 4.1.2.2 and 4.1.3.3. When the ticket stock is depleted, the terminal shall be out of service (see 4.2.3.2). This requirement does not apply for a Pay and Go terminal (as described in 4.1.3) and for Pay on departure without ticket (as described in 4.1.4).</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Install a new paper roll provided by the terminal supplier. Print one ticket with the minimum information according to 4.1.2.2 and 4.2.1.3. Measure its length, multiply by 3000 and check that the result is less than the paper roll length. Leave only paper for a single ticket. Perform a transaction. The terminal shall react according to 4.2.3.2. This requirement does not apply for a Pay and Go terminal (as described in 4.1.3) and for Pay on departure without ticket (as described in 4.1.4).</td>
</tr>
<tr>
<td>5.2.2</td>
<td>Capacity of the escrow for coins and tokens</td>
<td>The escrow unit shall have a minimum volume to hold at least 20 coins of 2 euros. When the escrow unit exceeds its maximum capacity, all coins and tokens inserted shall be returned or their insertion shall not be possible. An appropriate message shall be displayed to the end-user. This requirement does not apply for a cashless terminal</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Check that the insertion of 20 coins of 2 euros is possible. Insert more coins/tokens until reaching the maximum capacity of the escrow. Once the maximum capacity is reached, check that the terminal returns the subsequently inserted coins/tokens or disables their insertion. Check that a message is displayed to the end-user.</td>
</tr>
<tr>
<td>5.2.3</td>
<td>Capacity of the cashbox</td>
<td>The cashbox shall have a minimum usable volume of 3,5 l. When the cashbox exceeds its maximum capacity, all coins and tokens inserted shall be returned or their insertion shall not be possible. An appropriate message shall be displayed to the end-user. This requirement does not apply for a cashless terminal</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Check that the usable volume calculated based on the drawings of the cashbox is at least 3,5 l. Perform transactions until reaching the maximum capacity specified by the supplier and check that following coins and tokens inserted are returned or their insertion is not possible. Check that an appropriate message is displayed to the end-user.</td>
</tr>
<tr>
<td>5.2.4</td>
<td>Storage relating to transactions by electronic means of payment</td>
<td>If an ePurse and/or private card is accepted, the card issuers requirements shall be adhered to. If a debit or credit card based payment is accepted, national / regional card issuers and financial and / or industry standards shall be adhered to.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Check the validity of the certificate of conformity delivered by the issuer of the electronic means of payment.</td>
</tr>
<tr>
<td>5.2.5</td>
<td>Energy autonomy</td>
<td>Any terminal shall be able to operate continuously more than a year without changing the internal battery. This operation shall be verified in accordance with Annex A, energy autonomy test</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Perform test according to Annex A. Verify minimum requirements applicable to the terminal configuration.</td>
</tr>
</tbody>
</table>
### Clause / subclause | Requirement | Verification method
--- | --- | ---
|  | Procedure by comparing the average energy consumption to the input energy. The following energy autonomy requirements are based on a calculation in laboratory conditions as defined in Annex A. The energy autonomy shall apply in three power modes:  
— when the terminal is powered by mains supply;  
— when the terminal is powered by solar energy;  
— when the terminal is powered by a combination of solar energy and a non-rechargeable battery. For a terminal powered by mains supply, the terminal shall be fully autonomous during 5 days at 75 transactions per day when no power is received according to A.3. It ensures the operation of the terminal in case of failure of the power supply. For a terminal powered by solar only, the terminal shall be fully autonomous during 45 days when no power is received according to A.3. It ensures the operation of the terminal during the winter. The terminal shall ensure a minimum number of 75 transactions per day, according to A.4. For a terminal powered by a combination of solar energy and a non-rechargeable battery, the terminal shall ensure a minimum of 2 years at 75 transactions per day. |  |
| 5.3 | **Resistance to environmental conditions** |  |
| 5.3.1.1 | **Terminal storage Temperature Resistance**  
The terminal shall be able to fully operate, according to 5.3.1.2 after each of the following conditions:  
— a 16 h storage in +70 °C according to EN 60068-2-2;  
— a 16 h storage in -20 °C according to EN 60068-2- | The resistance to environmental conditions requirements shall be tested with the test method n°1 of the EN 60068-2-61 (Environmental testing. Test methods. Test Z/ABDM. Climatic sequence), completed with two storage tests. Following sequence shall be realized successfully to confirm that the terminal is running properly:  
— wake-up the terminal; |
5.3.1.2 Terminal Operation Temperature Resistance

The terminal shall be able to fully operate during at least 24 h in each of the following conditions:

- +55 °C according to EN 60068-2-2;
- +55 °C and 95 % humidity according to EN 60068-2-30;
- -20 °C according to the phase 2 of EN 60068-2-1, with controlled recovery at 25°C 95% HR during 1h.

NOTE This humidity conditions while decreasing temperature gives freezing effects.

— according to the available payment means, realize 1 transaction with coins, 1 transaction with an offline card, and 1 transaction with an online card.
If the category of the terminal is B2 or B3, the above transactions shall all be realized with the communications to the server.

— Confirm that the printed ticket respect the legibility requirements described in 4.2.1.3.
If the category of the terminal is B1, B2 or B3, following actions shall also be realized successfully at the end of each of the 5 test phases to confirm that the terminal is running properly:

- transmit 2 error messages;
- transmit the transaction data realized during the test phase.

The phases and acceptation criteria listed in Table C.2 shall be applied.

<table>
<thead>
<tr>
<th>Phase</th>
<th>Test level</th>
<th>Acceptation criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heat storage test</td>
<td>The terminal is stored during 16 h at +70°C (without the power battery)</td>
<td>After the 16 h the terminal is stabilized at 25°C, the battery is connected. The terminal is turn on and shall run properly.</td>
</tr>
<tr>
<td></td>
<td>(EN 60068-2-2 - Environmental testing - Part 2-2: Tests - Test B: Dry heat)</td>
<td></td>
</tr>
<tr>
<td>Dry Heat functional tests</td>
<td>The terminal runs 24 h at +55°C</td>
<td>During all the period the terminal shall run properly (test realized every hour during the test period)</td>
</tr>
<tr>
<td>According to the Phase 1 of EN 60068-2-61</td>
<td>(EN 60068-2-2 - Environmental testing - Part 2-2: Tests - Test B: Dry heat)</td>
<td></td>
</tr>
<tr>
<td>Damp heat functional tests</td>
<td>The terminal runs 24 h at +55°C, with 95% of relative humidity</td>
<td></td>
</tr>
<tr>
<td>According to the Phase 2 of EN 60068-2-61</td>
<td>(variant 1 of the EN 60068-2-30)</td>
<td></td>
</tr>
<tr>
<td>Cold functional tests</td>
<td>The terminal runs 24 h at -20°C</td>
<td></td>
</tr>
<tr>
<td>According to the Phase 3 of EN 60068-2-61</td>
<td>(EN 60068-2-1 - Environmental testing - Part 2-1: Tests - Test A:</td>
<td></td>
</tr>
<tr>
<td>Clause / subclause</td>
<td>Requirement</td>
<td>Verification method</td>
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</tr>
<tr>
<td></td>
<td></td>
<td>Cold, with controlled recovery at 25°C 95% HR during 1h)</td>
</tr>
<tr>
<td>5.3.2</td>
<td>Terminal water flooding resistance</td>
<td>Cold storage test</td>
</tr>
<tr>
<td>5.4</td>
<td>Accessibility for end-user</td>
<td></td>
</tr>
<tr>
<td></td>
<td>A parking terminal shall comply with the requirements listed in EN 301549:2014, Table B.2:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>— applicable to a parking terminal as defined in the current document, and</td>
<td></td>
</tr>
<tr>
<td></td>
<td>— having primary relationship with accessibility needs expressed in EN 301549:2014, subclauses 4.2.2 to 4.2.11 (functional performance statement).</td>
<td></td>
</tr>
<tr>
<td></td>
<td>The following definitions given in the EN 301549:2014 shall be used:</td>
<td></td>
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<tr>
<td></td>
<td>— the minimal height of the capital letters and numbers = 6 mm reference EN 301549:2014, subclause 5.1.4 where the viewing distance is D= 500 mm;</td>
<td></td>
</tr>
<tr>
<td></td>
<td>— in EN 301549:2014, subclause 8.3.3, the ‘essential controls’ shall include the input commands (buttons, keyboards: mechanical or touchscreen), the payments means interface, the coin return cup and the ticket output;</td>
<td></td>
</tr>
<tr>
<td></td>
<td>— in EN 301549:2014, subclause 8.3.4, the button colour and button legend defined in 4.2.3.6, buttons colour and legend and the instructions and display necessary for the end-user to operate the parking terminal shall be included.</td>
<td></td>
</tr>
<tr>
<td>NOTE 1</td>
<td>“Usage without vision” (4.2.1) and “operation without keyboard interface” (5.1.6.1) are not mandatory requirements for parking terminals.</td>
<td></td>
</tr>
<tr>
<td>Clause / subclause</td>
<td>Requirement</td>
<td>Verification method</td>
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</tr>
<tr>
<td>5.5</td>
<td>Protection against theft or burglary</td>
<td>Check that you cannot access the anchoring without authorization.</td>
</tr>
<tr>
<td></td>
<td>The anchoring of the machine shall not be accessible by unauthorized persons;</td>
<td>If the terminal accepts coins:</td>
</tr>
<tr>
<td></td>
<td>If the terminal accepts coin as a payment method, the terminal shall fulfil at least the following security requirements:</td>
<td>— Check that with the authorization access for the service compartment(s) only you cannot access cash safe compartment(s).</td>
</tr>
<tr>
<td></td>
<td>— access to cash safe compartment(s) box and service compartment(s) door have to be separated, i.e. with different access authorizations;</td>
<td>— Check that with the authorization access for the cash safe compartment(s) only you cannot access the service compartment(s).</td>
</tr>
<tr>
<td></td>
<td>— the resistance of the terminal shall reach the P0 resistance class in accordance with the requirements and the test procedure defined in Annex C. Resistance time and tool sets shall be in accordance with Table B.1;</td>
<td>If the terminal accepts coins, check that the terminal reach at least P0 resistance class according to Annex B.</td>
</tr>
<tr>
<td></td>
<td>— the terminal shall not accept cash payment if the cashbox is not in place.</td>
<td>Perform necessary actions to remove cashbox and check that coins payment is not possible.</td>
</tr>
<tr>
<td></td>
<td>If the terminal accepts coin as a payment method, the terminal suppliers can verify the effectiveness of additional measures to increase the protection against theft or burglary above P0.</td>
<td>Optional classification P1 to P4 shall be tested according to Annex B.</td>
</tr>
<tr>
<td></td>
<td>The classification P0-P4 provides a measure of resistance to successful attack in accordance with Table B.1. The security test procedure is described in Annex B, security test procedure and shall be performed for terminal accepting coins by a test laboratory following ISO/IEC 17025 and certified by certification body according to ISO/IEC 17065</td>
<td></td>
</tr>
<tr>
<td>5.6</td>
<td>Data security requirements for a parking terminal</td>
<td>Check that the access to configuration and operational data are only possible following the authorized personnel procedure as described in the manual.</td>
</tr>
<tr>
<td></td>
<td>— Access to operating and management data as described in 4.6.4 shall be restricted to authorised personnel only.</td>
<td>Check the values of the operating and management data stored in the terminal. Remove power and after 30 days check that the values of the operating and management data stored in the terminal are still the same.</td>
</tr>
<tr>
<td></td>
<td>— The operating and management data as defined in 4.6.4 shall be stored for a minimum of 30 days in case of power failure.</td>
<td>Check the validity of the certificate of conformity delivered by the issuers of all accepted electronic means of payment.</td>
</tr>
<tr>
<td></td>
<td>— When electronic payment is accepted, the requirements from national/regional card issuers, banks and payment service providers shall be adhered to</td>
<td>Provide the self-declaration attesting compliance.</td>
</tr>
<tr>
<td></td>
<td>— When personal data is processed, the terminal shall meet the national/regional legislation and standards.</td>
<td></td>
</tr>
</tbody>
</table>
### Clause / subclause 5.7

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Verification method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Internal clock</td>
<td><strong>Measurement</strong></td>
</tr>
</tbody>
</table>

<p>| | |</p>
<table>
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<th></th>
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</thead>
</table>
| **The internal clock of the parking terminal shall be sufficiently accurate to not drift by more than one minute within a 28 day period.** | **a)** Synchronise the time at the terminal with a globally accepted source for correct time.  
**b)** Note the times as start time for each source  
**c)** Check the times 28 days later  
**d)** Note the times from each source  
**e)** Subtract the start time from the end time for each source and compare the results  
**f)** Verify that the difference between the results is not more than one minute |
| It shall be possible to correct the internal clock, at the terminal or by a remote action. | **a)** Perform the necessary actions to correct the internal clock, according to the supplier  
**b)** Verify that the internal clock has been corrected. |
Bibliography


[17] 2015/0278/COD, Proposal for a Directive of the Parliament and of the Council on the approximation of the laws, regulations and administrative provisions of the Member States as regards the accessibility requirements for products and services

[18] (2016/C 303/14), Opinion of the European Economic and Social Committee on the proposal for a Directive of the European Parliament and of the Council on the approximation of the laws, regulations and administrative provisions of the Member States as regards the accessibility requirements for products and services