BRITISH STANDARD

BS EN
12414:1999

# Vehicle parking control equipment — Pay and display ticket machine — Technical and functional requirements

The European Standard EN 12414:1999 has the status of a British Standard

ICS 39.040.99; 93.080.30

# National foreword

This British Standard is the English language version of EN 12414:1999.
It supersedes BS 6571-3:1989 which is withdrawn.

The UK participation in its preparation was entrusted by Technical Committee B/509, Road equipment, to Subcommittee B/509/20, Vehicle parking control equipment, which has the responsibility to:

— aid enquirers to understand the text;

— present to the responsible European committee any enquiries on the interpretation, or proposals for change, and keep the UK interests informed;

— monitor related international and European developments and promulgate them in the UK.

A list of organizations represented on this subcommittee can be obtained on request to its secretary.

**Cross-references**

The British Standards which implement international or European publications referred to in this document may be found in the BSI Standards Catalogue under the section entitled "International Standards Correspondence Index", or by using the "Find" facility of the BSI Standards Electronic Catalogue.

A British Standard does not purport to include all the necessary provisions of a contract. Users of British Standards are responsible for their correct application.

**Compliance with a British Standard does not of itself confer immunity from legal obligations.**

**Summary of pages**

This document comprises a front cover, an inside front cover, the EN title page, pages 2 to 16, an inside back cover and a back cover.

The BSI copyright notice displayed in this document indicates when the document was last issued.

This British Standard, having been prepared under the direction of the Sector Committee for Building and Civil Engineering, was published under the authority of the Standards Committee and comes into effect on 15 November 1999



ISBN 0 580 35304 4

**Amendments issued since publication**

| Amd. No. | Date | Comments |
|---|---|---|
| | | |
| | | |
| | | |
| | | |

# EUROPEAN STANDARD NORME EUROPÉENNE EUROPÄISCHE NORM

# EN 12414

September 1999

ICS 39.040.99

English version

# Vehicle parking control equipment — Pay and display ticket machine — Technical and functional requirements

Equipement de contrôle du stationnement des véhicules - Horodateurs - Exigences techniques et fonctionnelles

Geräte zur Parküberwachung von Fahrzeugen - Parkscheinautomaten - Technische und funktionelle Anforderungen

This European Standard was approved by CEN on 8 August 1999.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the Central Secretariat has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

**Central Secretariat: rue de Stassart, 36 B-1050 Brussels**



Ref. No. EN 12414:1999 E

**Contents**

## Foreword

This European Standard has been prepared by Technical Committee CEN/TC 226, Road equipment, the Secretariat of which is held by AFNOR.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by March 2000, and conflicting national standards shall be withdrawn at the latest by March 2000.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

## Introduction

This standard has been defined with the aim of providing a product which offers all necessary and adequate guarantees:

- ease of use;

- security and safety;

- integration into the environment;

for those people called upon to use them: users, enforcement agents, operators and maintenance agents.

Pay and display ticket machines are either independent, associated to a local system or integrated into a centralized system.

Pay and display ticket machines are powered by an energy source:

- either by connection to an external source with or without buffer battery;

- or independently, with no connection to an external source.

## 1 Scope

This standard specifies the technical and functional requirements for pay and display ticket machines.

It applies to prepayment pay and display machines, operated by coins, tokens or electronic means, solely intended for simultaneous parking control of an unlimited number of road vehicles on or off-street and installed under public or private ownership.

## 2 Normative references

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

| | |
|---|---|
| EN 55022 | Limits and methods of measurement of radio disturbance characteristics of information technology equipment (CISPR 22:1993) |
| EN 60068-2-1 | Environmental testing - Part 2: Tests - Tests A: Cold (IEC 60068-2-1:1990) |
| EN 60068-2-2 | Basic environmental testing procedures - Part 2: Tests - Tests B: Dry heat ( IEC 60068-2-2:1974 + IEC 68-2-2A:1976) |
| EN 60529 | Degrees of protection provided by enclosures (IP code) (IEC 60529:1989) |

| | |
|---|---|
| EN 60742 | Isolating transformers and safety isolating transformers - Requirements (IEC 60742:1983 + A1:1992, modified) |
| EN 60898 | Circuit-breakers for overcurrent protection for household and similar installations (IEC 60898:1987 + corrigendum may 1988 + A2:1989 + A3:1990 + corrigendum august 1990) |
| EN 60950 | Safety of information technology equipment, including electrical business equipment (IEC 60950:1991, modified) |
| IEC 60068-2-30 | Environmental testing - Part 2: Tests - Test Db and guidance: Damp heat, cyclic (12 + 12 hour cycles) |
| EN 61000-4-2 | Electromagnetic compatibility (EMC) - Part 4: Testing and measurement techniques - Section 2: Electrostatic discharge immunity test - Basic EMC publication (IEC 61000-4-2:1995) |
| EN 61000-4-3 | Electromagnetic compatibility (EMC) - Part 4: Testing and measurement techniques - Section 3: Radiated, radio-frequency, electromagnetic field immunity test (IEC 61000-4-3:1995, modified) |
| EN 61000-4-4 | Electromagnetic compatibility (EMC) - Part 4: Testing and measurement techniques - Section 4: Electrical fast transient/burst immunity test - Basic EMV publication (IEC 61000-4-4:1995) |

## 3 Definitions

For the purposes of this standard, the following definitions apply:

**3.1 pay and display ticket machine:** machine for prepayment of vehicle parking which, according to the amount paid, issues a proof of transaction (ticket) to the user and determines the authorized parking period

**3.2 cancellation of a transaction**: operation used to interrupt the current transaction and leading to the return of the means of payment

**3.3 cash**: any currently valid coins issued by an official banking system with a set monetary value

**3.4 cash-box**: receptacle for permanent storage of coins and tokens, until collection

**3.5 confirmation of transaction**: operation resulting in the issuing of a ticket

**3.6 electronic means of payment**: any device containing an identifier guaranteeing its authenticity and capable of performing an electronic transaction

**3.7 escrow**: a unit to accumulate and hold the combined total of cash, before confirmation or cancellation of the transaction

**3.8 maximum parking period**: the longest period of time specified on an information medium which can be utilized as a parking period by the user category

**3.9 operational accuracy**: deviation of authorized parking duration compared to the duration displayed

**3.10 parking period**: period from the time a parking ticket is issued to expiry of the parking time as specified on the ticket

**3.11 return cup**: receptacle capable of holding the amount of returned physical means of payment following the cancellation of a transaction

**3.12 tariff**: price corresponding to a given parking duration for a given user category and at a given time period

**3.13 ticket**: a document issued for an authorized parking period in respect of the corresponding parking site

**3.14 ticket of revenue**: a document issued at the end of the operation of collection of physical payment

**3.15 token**: medium of transaction, with no official value recognized by the banking system, but able to serve as payment for a transaction

**3.16 user and/or operator machine interface**: instructions and controls adequate to ensure the correct operation of the machine

**3.17 validation of means of payment**: operation corresponding to the recognition of the means of payment (cash and/or tokens and/or electronic means of payment)

## 4 Functional requirements

### 4.1 Display of an out of order or not in use situation

When a machine is out of order or not in use this shall be shown to the user on the machine's interface(s) by means of an unambiguous visual sign indicating "out of order" or "not in use " in the form:

- either of a text with the comment "Out of order" or "Not in use";

- or by a red-coloured lamp or mask confirming the status.

In such a situation, the machine shall not accept any means of payment.

### 4.2 Display of an impending out of order situation

When an event is impending or an incident is liable to cause a machine failure after a given time period, this information, intended for the operator, shall be shown to authorized personnel.

### 4.3 Verification of electronic means of payment balance

The pay and display ticket machine shall be capable of verifying and displaying the data on an electronic means of payment without altering the value on this electronic means of payment.

### 4.4 Display of current time

A machine in normal working order while in use shall allow the user and the operator to consult the current time visually on the utilization face.

### 4.5 Display of permanent utilization information

The machine shall include on the utilization face for the attention both of the user and the operator the following permanent utilization information:

- tariff information;

- instructions for use of the operating mechanisms necessary for any transaction and its cancellation if required, and the symbolization of the corresponding means of payment (cash and/or token and/or electronic means of payment).

### 4.6 Choice of tariff

If the operator requires it, the machine shall include the capability to select tariffs activated by the user, which indicates, by display and before any transaction, the specific user category (e.g. resident tariff).

NOTE: This selection can be made manually or automatically or both.

### 4.7 Validation and acceptance of means of payment

The machine shall be able to recognize valid means of payment and it shall be capable of rejecting any means of payment whose characteristics have not been recognized as valid.
During the period between confirmation of the transaction and the ticket leaving the printer any cash or token inserted shall be returned directly to the user or insertion shall be impossible.

During the period between confirmation of the transaction and the ticket leaving the printer, any charge against an electronic means of payment shall be impossible.

### 4.8 Display of the transaction

#### 4.8.1 Amount

The machine shall display the value of incrementing payments until the transaction is completed.

#### 4.8.2 Parking time

The machine shall display the parking time either by direct selection or as payment meets each charge step.

The display shall show parking expiry time and parking expiry date.

### 4.9 Escrow

The machine shall have an escrow function.

### 4.10 Completion of transaction

#### 4.10.1 Confirmation

The machine shall include a mechanism activated by the user which enables him/her to confirm the transaction.

This operation shall occur simultaneously with the permanent storage of the means of payment (see **4.11**).

Before confirmation of a transaction when paying by electronic means, the design of the machine shall make any change against the electronic means of payment impossible.

#### 4.10.2 Cancellation

It shall be possible for the user to cancel the transaction. A time-delay cancellation feature shall also be incorporated.

The machine shall include a return cup.

### 4.11 Permanent storage of means of payment

This operation shall occur simultaneously with confirmation (see **4.10.1**).

#### 4.11.1 Permanent storage of physical means of payment (cash and/or tokens)

The machine shall include a mechanism to transfer the physical means of payment (cash and/or tokens) from the escrow to a cash-box.

#### 4.11.2 Processing of a transaction by electronic means of payment

The machine shall include a function to process provisionally stored data in order to transfer payment to the operator following confirmation of the transaction.

The machine shall include a function whereby the user may cancel a transaction without financial penalty.

### 4.12 Proof of transaction

The machine shall include a mechanism enabling a proof of transaction to be issued in printed form whatever method of payment is used.

### 4.13 Means of payment

Pay and display ticket machines shall be able to accept one or more or any combination of the following systems of transaction payment:

- cash;
- electronic means of payment;
- tokens.

NOTE: The machine can accept overpayment, but does not have to give change.

### 4.14 Storage of operating and management elements

The machine shall include a means whereby all data (cash, electronic means of payment, tokens and events) are stored within the machine.

The following management and operating data shall be stored:

- cumulative revenue;
- last collection;
- revenue held in the machine;
- machine identification;
- machine configuration or functional parameter.

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

The machine shall include a power source independent from the main source and solely intended for safeguarding of the management data. The batteries or dry cells provided to fulfil this role shall be capable of running under any circumstances for a minimum of 7 days, and this during a minimum period of 12 months starting from delivery of the machine, after which period they shall be replaced.

The supplier shall make recommendations as to the power source to be used for this purpose.

### 4.15 Verification of revenue held

The machine shall include a function whereby the operator can at any moment check the volume of physical payments held in the machine (cash and/or tokens), the electronic revenue held and the total of these holdings obtained since the previous collection with the possibility to issue a detailed control ticket.

Any record of transactions made by electronic means of payment shall be capable of being collected independently.

## 4.16 Revenue collection

### 4.16.1 Collection of physical payments (cash and/or tokens)

This operation shall always be accompanied by the issuing at the end of the operation of a detailed ticket of revenue per means of payment.

In every case, the collector shall never be able to have direct access to the collected means of payment, whatever the receptacle used, whether it is located inside or outside the machine.

The machine shall include a mechanism enabling revenue to be collected by one of the following methods:

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

b) collection of a removable cash-box. In this case the removable cash-box shall be collected by means of a specific mechanism.

Once the cash-box has been collected, a locked empty cash-box shall be put in its place. The machine shall not be capable of operating with any door open.

### 4.16.2 Collection of electronic means of payment

Collection of electronic means of payment shall correspond to an operation to verify the electronic payments being held in the machine, completed by the transfer of this stored data by any appropriate transmission system to the operator.

## 4.17 Symbols, pictograms, instructions and colours

The symbols, pictograms and instructions necessary for the user to operate the machine shall be visible from the user's operating position.

The means of payment shall be represented unambiguously: cash, tokens, electronic means of payment as appropriate.

The different steps in user operations shall be represented unambiguously: tariff selection, payment, validation, cancellation, take ticket.

The pictograms and instructions shall be placed in the logical order of operations.

NOTE: Recommended colours are:
- green for validation of a transaction;
- red for cancellation of a transaction.

### 4.18 Location of permanent instructions and display windows

All permanent instructions and display windows shall be placed so as to be readable from a position of the eyes at a height of 1,5 m above the surrounding ground level.

### 4.19 Legibility of information

#### 4.19.1 Non-permanent information necessary for the transaction

All non-permanent information necessary for the transaction (tariff selected, authorized parking time, etc.) shall be legible both day and night with normal or corrected vision at a distance of 1 m from the machine.

#### 4.19.2 Additional information for the user

Additional information not necessary for the transaction but still of use to the user shall be legible both day and night in normal or corrected vision at a distance of 0,5 m.

NOTE: If the transaction is performed at night this supposes that the machine is installed in an adequately lit zone.

### 4.20 Height of insertion slots and return cup

Payment slots and return cup shall be positioned between 0,9 m and 1,5 m above the surrounding ground level, when the machine is installed.

This height can be raised to 1,7 m where a driver holding an authorized disabled persons permit is excluded from charging.

### 4.21 Operating mechanisms

#### 4.21.1 Location

Each of the operating mechanisms shall be located at a maximum height of 1,5 m above the surrounding ground level, when the machine is installed.

This height can be raised to 1,7 m where a driver holding an authorized disabled persons permit is excluded from charging.

#### 4.21.2 Physical requirements

The minimum area of any command push button shall be 90 $mm^2$.

When a command is activated by a rotary operation, the knob shall have a diameter of at least 20 mm.

Operations performed by pushing or pulling shall require a force not greater than 10 N.

In the case of operations performed by rotation, the torque required shall be not greater than 0,3 N·m.

## 4.22 Operating capacities

a) Ticket stock

The minimum ticket capacity of the machine shall be 3 000.

When the ticket stock is depleted, the machine shall indicate that it is not in use as described in **4.1**.

b) Capacity of the escrow for coins and tokens

The escrow unit shall have a minimum capacity of 20 of the largest sized valid coins or tokens acceptable to the machine.

If the capacity of the escrow is exceeded its contents shall be returned.

c) Permanent storage of means of payment

i) Cash-box

The cash-box shall have a minimum usable volume of 3,5 l.
When the cash-box reaches its maximum capacity, all coins and tokens subsequently inserted shall be returned or their insertion shall be impossible.

ii) Storage relating to transactions by electronic means of payment

The machine shall have a minimum storage capacity of 500 transactions.
Data to be stored shall include at least:

- identification of the electronic means of payment;
- amount of transaction;
- date and time of transaction.

When the storage capacity is reached, all subsequent payment by electronic means shall be impossible.

## 4.23 Ticket specifications

a) Proof of transaction intended for the user

As soon as any transaction is confirmed it shall lead to a ticket being issued in less than 4 s after confirmation and removal of the electronic means of payment when necessary.

The minimum area of the ticket shall be 3 500 $mm^2$. The smallest dimension shall be greater than 50 mm.

The material used shall meet the following specifications:

- minimum tensile strength: 25 N per centimetre of width;

- minimum thickness: 60 μm.

The ticket shall contain as a minimum the following legible and indelible information:

- amount paid;

- parking expiry time and date.

Parking expiry time and date shall be legible in daylight with normal or corrected vision at a distance of 1 m.

The ticket shall also include additional information which is required by local legislation, such as the method of displaying the ticket.

All information shall remain legible for at least 30 days if the ticket is exposed to daylight behind the windscreen.

b) Collection control ticket for physical means of payment

Collection of physical means of payment shall always lead to the automatic printing of a ticket of revenue containing at least:

- machine identification;

- collection number (with automatic incrementation by one at each collection);

- date and time of operation;

- respective amounts collected in cash and/or tokens.

## 4.24 Operating requirements

### 4.24.1 Ease of maintenance

The different consumable sub-assemblies (battery, lamps, tickets, etc.) shall be easy to reach and exchange on site without the use of specific tools and with no risk of error when fitting.

Management sub-assemblies (electronic boards, printers, etc.) shall be capable of being exchanged on site without the use of specific tools and with no risk of error when fitting. These operations shall be easy to perform.

### 4.24.2 Operating autonomy

The supplier shall make recommendations as to the type of any battery or dry cell to be used. In the case of emergency supply, the batteries shall provide autonomous working of at least 400 transactions in a minimum time period of 3 days. In the case of autonomous power supplies, the battery or dry cell shall provide working of at least 6 months or 15 000 transactions.

### 4.25 Operating security

#### 4.25.1 Cash and/or token handling security

The stored payments (cash and/or tokens) shall not be accessible by means of a single tool or a single manoeuvre, thereby implying the need to provide, for a given cash-box, two separate access mechanisms, each operated by a specific tool and one of the two tools being specific to the machine.

The supplier shall explain how security relating to cash and/or token collection shall be achieved.

The machine supplier shall undertake not to supply identical tools and mechanisms to different authorities.

#### 4.25.2 Security in dealing with accounting of electronic means of payment

The supplier shall explain how security relating to accounting of electronic means of payment shall be achieved.

## 5 Technical requirements

### 5.1 Electrical protection

The protection of people, and the ability of the machine to withstand electrical shocks and the risks resulting from these shocks, shall be in accordance with the regulations in force. The machine shall provide a protection index "IP 33 shock 9" in accordance with EN 60529.

The machine's internal circuits activated by the users, except transformers and heating devices, shall not run on voltages greater than specified in EN 60950.

Machines shall be classified according to their type of protection against electrical shocks as class I in accordance with EN 60950.

In the case of machines powered by the mains supply through a transformer, this transformer shall include circuit separation in accordance with EN 60742.

Metallic sheaths directly protecting electrical parts of internal sub-assemblies other than the power supply shall be electrically connected to each other.

Machines shall be protected against short-circuits:

- either by a fuse in accordance with EN 60950;

- or by a circuit breaker in accordance with EN 60898.

## 5.2 Resistance of machine to environmental conditions

### 5.2.1 Resistance to conditions of temperature and humidity

The machine shall be capable of running normally in outside temperatures ranging from –25 °C to +55 °C. In the case of a machine powered by battery and/or dry cells, the lower temperature limit is raised to –10 °C.

The machine components shall withstand maximum temperatures of +70 °C.

Verification of these requirements shall be performed with the machine switched off, followed by a functional test performed at ambient temperature, under conditions in accordance with international standards:

- EN 60068-2-1 - Test Ab - Cold –25 °C ± 3 °C - Duration: 2 hours;

- EN 60068-2-2 - Test Bb - Dry heat +55 °C; - Duration: 2 hours;

- IEC 60068-2-30 - Test Db and guide: cyclical wet heat test +50 °C and 97 % relative humidity.

### 5.2.2 Dust and waterproofing

The machine shall resist dust and rain characterized by a protection index IP 33 (see 5.1) and verified in accordance with EN 60529.

### 5.2.3 Radio electric disturbance and electromagnetic compatibility

The machine shall be capable of working under conditions in accordance with:

- EN 55022 - Level B;

- EN 61000-4-2 - Level 3 (6 kV) - Instructions relating to electrostatic discharge - Discharge on contact;

- EN 61000-4-3 - Level 2 (3 V/m) - Instructions relating to industrial radiation fields;

- EN 61000-4-4 - Level 4 (4 kV) - Instructions relating to rapid electrical transit in salvo.

## 5.3 Resistance against vandalism, accident and misuse

The manufacturer shall produce a statement of steps taken to minimize damage due to vandalism, accident and misuse, to include at least:

1) defacing of external surfaces by:

   - paint;

   - glue;

   - projection of liquids;

   - scratching;

- graffiti.

2) impacts;

3) insertion of foreign bodies, obstruction of openings, injection of liquid into openings;

4) robbery;

5) unauthorized dismantling.

*blank*

# BSI — British Standards Institution

BSI is the independent national body responsible for preparing British Standards. It presents the UK view on standards in Europe and at the international level. It is incorporated by Royal Charter.

**Revisions**

British Standards are updated by amendment or revision. Users of British Standards should make sure that they possess the latest amendments or editions.

It is the constant aim of BSI to improve the quality of our products and services. We would be grateful if anyone finding an inaccuracy or ambiguity while using this British Standard would inform the Secretary of the technical committee responsible, the identity of which can be found on the inside front cover. Tel: 020 8996 9000. Fax: 020 8996 7400.

BSI offers members an individual updating service called PLUS which ensures that subscribers automatically receive the latest editions of standards.

**Buying standards**

Orders for all BSI, international and foreign standards publications should be addressed to Customer Services. Tel: 020 8996 9001. Fax: 020 8996 7001.

In response to orders for international standards, it is BSI policy to supply the BSI implementation of those that have been published as British Standards, unless otherwise requested.

**Information on standards**

BSI provides a wide range of information on national, European and international standards through its Library and its Technical Help to Exporters Service. Various BSI electronic information services are also available which give details on all its products and services. Contact the Information Centre. Tel: 020 8996 7111. Fax: 020 8996 7048.

Subscribing members of BSI are kept up to date with standards developments and receive substantial discounts on the purchase price of standards. For details of these and other benefits contact Membership Administration. Tel: 020 8996 7002. Fax: 020 8996 7001.

**Copyright**



BSI
389 Chiswick High Road
London
W4 4AL